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## **Uma metodologia de transferências bidireccionais entre a Dança Contemporânea e as Tecnologias Multimedia**

(A Methodology for Bi-directional Transfer between Contemporary Dance  
and New Media Technologies)

Dissertação elaborada com vista à obtenção do Grau de Doutor no ramo  
de Motricidade Humana na Especialidade de Dança

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## Dedication

I dedicate this dissertation to my mentor in life, Daisaku Ikeda; to my father Wolfgang Jürgens and his wife Susanne Crome for their warmhearted and continuous lifelong support; and to my wife Paola for her interest, feedback and support over the years of this endeavor.

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# Abstract

Keywords:

Digital performance, contemporary dance, new media technologies, interactive systems, generative techniques, synergetic training, interdisciplinary choreography, multimodal improvisation, artistic laboratory, evolving glossary.

This thesis presents our *Methodology for Bi-directional Transfer between Contemporary Dance and New Media Technologies*. The term ‘Bi-directional transfer’ describes an essential dynamic in interdisciplinary collaboration. Its nature can be described as ‘mimesis of thought’, or analysis of ‘non-sensuous correspondences’ regarding important concepts, ideas, techniques and methods in contemporary dance and new media technologies.

Over the past five years we have compiled an *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance*, which can be seen as a crystallization of our collaborative interdisciplinary research and artistic work. Taking the form of a web-based hyperdictionary, this glossary of compositional, technical and philosophical concepts and principles was designed to provide a starting point for the development of specific artistic research topics and questions. Its function is to generate new ideas, structures, methods and solutions in collaborative interdisciplinary teamwork. The *Evolving Glossary* thus represents a core component of our *Methodology for Bi-directional Transfer*, and can be applied in the context of artistic research and creation in the field of *Digital (Live) Performance*; a term that we use as a synonym for the intersection of contemporary dance and new media technologies.

A second core component of our *Methodology for Bi-directional Transfer* is the *Artistic Laboratory*. Lab formats and methodologies are discussed to arrive at a categorization of constituent elements of artistic laboratories.

In the second part of this thesis we present three examples of the application of the *Evolving Glossary* in the context of *Artistic Laboratories*. We investigate the following three main areas of the application of our methodology:

1. generative techniques (covering the creation of artistic material, micro-and macro structures of live performance, and systems to document/archive and restore relevant information);
2. interactive situations in HCI (human-computer communication) contexts; and
3. synergetic training (creation of favorable conditions for synergetic effects to occur in the training with interactive systems). Case studies are presented in each of the three areas of investigation to link concrete artistic research and performance to the underlying creative strategies, and how these have been designed in each particular case.

In our conclusion we reflect upon the outcomes of this investigation and discuss further avenues for future research.



# Sumário

Palavras chaves:

performance digital, dança contemporânea, novas tecnologias multimedia, sistemas interactivos, técnicas generativas, treino sinérgico, coreografia interdisciplinar, improvisação multimodal, laboratório artístico, glossário emergente.

Esta tese apresenta a nossa *Metodologia de transferências bidireccionais entre a Dança Contemporânea e as Tecnologias Multimedia*. O termo ‘transferência bidireccional’ descreve uma dinâmica essencial em colaborações interdisciplinares.

A sua natureza pode ser descrita como ‘mimesis de pensamento’, ou análise de ‘correspondências não-sensoriais’ de importantes conceitos, ideias, técnicas e métodos na dança contemporânea e nas novas tecnologias multimedia.

Durante os últimos cinco anos compilamos o *Glossário Emergente para Colaborações Interdisciplinares em Performance Digital (ao vivo)*, que pode ser considerado a cristalização do nosso trabalho artístico e de investigação em colaborações interdisciplinares. Sob forma de um hiperdicionário em formato website, este glossário de conceitos e princípios composicionais, técnicos e filosóficos foi concebido para providenciar um ponto de partida para o desenvolvimento de tópicos e questões de investigação artística. A sua função é gerar novas ideias, estruturas, métodos e soluções em colaborações interdisciplinares. O *Glossário Emergente* representa uma componente principal da nossa *Metodologia de transferências bidireccionais*, que pode ser aplicada em contextos de investigação e criação artística na área de *Performance Digital (ao vivo)*, termo este que utilizamos como um sinónimo da intersecção entre a dança contemporânea e novas tecnologias multimedia.

Uma segunda componente principal da nossa *Metodologia de transferências bidireccionais* é o *Laboratório Artístico*. Uma reflexão sobre diferentes formatos e metodologias de laboratório conduz a uma categorização de elementos constituintes de laboratórios artísticos.

Na segunda parte da nossa tese apresentamos três exemplos de aplicação do *Glossário Emergente* no contexto do *Laboratório Artístico*. Investigamos as seguintes três áreas de aplicação da nossa metodologia:

1. técnicas de geração (tratamos a criação de materiais artísticos, estruturas micro- e macro de performance ao vivo, e de sistemas de documentação/arquivamento e recuperação de informação relevante);
2. situações interactivas em contextos HCI (human-computer communication); e
3. treino sinérgico (a criação de condições favoráveis para provocar efeitos sinérgicos durante o trabalho com sistemas interactivos). Apresentamos estudos de caso em cada área de investigação na intenção de revelar as relações concretas entre a investigação e performance artística e as estratégias criativas subjacentes, e como estas foram desenvolvidas em cada caso particular.

Na nossa conclusão reflectimos sobre os resultados da nossa investigação e traçamos futuras linhas de investigação.

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### **Further information**

1. Two DVD-ROMs accompany this dissertation. They contain a number of written documents (such as published articles and workshop reports), audio records of interviews, an offline version of the web-site containing our *Evolving Glossary*, and video footage supporting the case studies in chapters four and five.

The *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance* is presented as a web-site, which is made available on the first DVD-ROM, so that no Internet connection will be necessary for consultation.

2. This dissertation is formatted in the APA Style. At times we have introduced slight changes to improve the readability for the reader (such as the use of the Helvetica font, and a 1,5 line spacing).

3. We have selected the general “English” grammar- and spell-corrector in our word processing software (Pages 09), as opposed to more regional options, such as “American English” or “British English”.

4. The first DVD-ROM includes the dissertation in electronic format (pdf).

5. We have refrained from providing a list of important web-sites, blogs, or social network sites in the bibliography section. Many such references are introduced in the text (and footnotes) with an indication of the dates these sites were accessed.



# Introduction

## 1. Interest of this study

Ten years ago, in 2001, I submitted my Masters thesis at the University of Leeds, entitled *The central role of the body in the intersection of Contemporary Visual Arts and Dance: aspects of the use of technology in Wayne McGregor's choreography*. During the MA program I had met Sita Popat, who introduced us to the field of 'Dance&Technology', and provided practical sessions on the work with video in dance and the use of 3D character animation software, such as *Life Forms*. My thesis on the use of technology in the work of the British choreographer Wayne McGregor focussed on the perspective of the choreographer and dancer. From this practitioner point of view most of the 'cyber theory' available at the time was rather speculative and did not address the creative process concretely. On the other hand, dance studies and performance theory had not yet begun to address the work with recent new media technologies on a broader basis (except for a few pioneering artists and theorists, who published most of their findings on the Internet or in conference proceedings).

A year later Sita Popat invited me to participate in *Eurodans.net* (2002), an international research project, which joined approximately forty dance students from ten different institutions all over Europe. Each group was coordinated by a rehearsal director, who filmed and edited choreographic material that subsequently was made available to the other groups by means of a custom built website. The *Eurodans.net* project website provided innovative features, such as uploading rehearsal videos, or posting comments, which later became widely available through the introduction of the blog. However, most of the participating institutions struggled with the basic technical requirements (video filming, editing and compression for the Internet), and did not actively contribute throughout the first six months of the project. During the second phase of the project more groups participated, published their choreographic sequences and started to comment on each other's work. Sita Popat directed the choreographic process and prepared for the final phase, the public presentation of the choreographic material at the ELIA 2002 conference in Dublin. However, her research project took an unexpected turn:

When we arrived in Dublin, we all had a fairly good idea of how the structure and much of the movement content would work on stage. At this point, however, we ran into issues related to performance politics and the professional acceptance of 'practice as research'. Because of the pressure to put on a 'professional level' performance product, I was forced to step down from the choreographic role and Wayne McGregor was brought in to 'finish off'. This was against the ethos of the research, as Wayne had not followed the process online and did not know the movement material. As a result, the rich palette of movement material was formed in a way that did not take full advantage of the possibilities and planning. This was a disappointing end to the project, but one that raises many questions that I intend to explore later in an article.<sup>1</sup>

While the final presentation at the ELIA 2002 conference was very successful as a 'professional level performance product' due to the evident choreographic skills of Wayne McGregor, *Eurodans.net* as a research project did not conclude in a satisfactory way for those who expected the week at Dublin to be a chance to reflect and discuss the possibilities of online collaboration more in depth.<sup>2</sup> Issues related to the technical difficulties, which unprepared staff at many participating institutions experienced, were not discussed; and choreographic challenges met through the use of novel technological tools were simply not addressed.

Despite these inadequacies the *Eurodans.net* research project was successful and important on both, a personal and institutional level. Personally, I felt as much inspired by the questions that had not been answered as I felt grateful for the opportunity to participate in a large scale international research project. The Faculdade de Motricidade Humana/UTL in Lisbon had warmly welcomed the project and provided any possible support. As a result the Portuguese students were the most active group and contributed more than forty videos during the eight months rehearsal period.

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<sup>1</sup> Quoted from a message posted by Sita Popat on the Dance-Tech List Archive on the 19th of December 2002. Retrieved from <http://www.scottssutherland.com/dancetechnology/archive/2002/0403.html> accessed January 2011

<sup>2</sup> Sita (Popat, 2006) however has published a book about her online projects, which provides in-depth analysis of the Eurodans.net research project

From an institutional point of view the FMH student participation in the *Eurodans.net* project marked a pioneering step in Portuguese dance education, and introduced the work with new media technologies in contemporary dance, which gradually was integrated in the dance curriculum at the FMH.

A few years later (2005) Professor Daniel Tércio, who had accompanied the *Eurodans.net* project with keen interest, support and advice, invited me to the *TeDance* (Technologically Expanded Dance) Project, hosted and organized by FMH/ Technical University of Lisbon in collaboration with a variety of other academic institutions, artistic research centers and theaters in Portugal.<sup>3</sup> The *TeDance* Project coincided with the beginning of my doctoral research and represented a unique opportunity to start investigating methodically and systematically what I had explored practically in artistic and educational contexts. Two artistic residencies at CENTA (Center for Experimentation and New Tendencies in the Arts) in July 2006, and the Teatro Aveirense in April 2007, provided opportunities to join visual and media artists, musicians, dancers, performers, choreographers, engineers and programmers, allowing to investigate methods of collaborative interdisciplinary experimentation. By virtue of these research opportunities I was able to realize two case studies on generative techniques (see chapter three), and progress towards a model for artistic residencies (presented in chapter two). Also owing to the *TeDance* Project, our award-winning digital live performance piece *.txt* (2006-2009) was presented in a work-in-progress version at the international *TeDance* conference (2007) at the Culturgest theatre in Lisbon. Chapter four of this dissertation presents a classification of interactive systems in HCI (Human-Computer-Interaction) contexts, and scrutinizes several scenes from the perspective of our classification of strategies for interactive systems in HCI contexts.

During the past five years I have had several opportunities to present my research at international conferences and publish articles and book chapters on aspects of this investigation. Since most of my findings emerged from interdisciplinary collaboration, it is probably not surprising that much of the interest in this investigation was expressed by artists and academics from other fields of endeavor. Linguist Carla

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<sup>3</sup> For an introduction to the project see chapter three, 7.1

Fernandes (Universidade Nova de Lisboa) for example invited me to participate in her *Transmedia Knowledge Base for Contemporary Dance* (TKB) project (2010-13). The interdisciplinary TKB project is an international research project envisioning the creation and development of a knowledge base to document, annotate and support the creation of contemporary dance pieces, in Portugal and abroad. A custom built video annotator provides the technological tools for an innovative approach to documentation and archiving of the creative process and live performances of some selected choreographers. Simultaneously the video annotator is explored as a creation tool in the choreographic process. This latter area is where my doctoral research extends into a new research domain, and allows me to test the methodology presented in this dissertation.

Another example for the interest of this investigation for professionals from other areas was a recent invitation to participate in an Art&Science residential program organized by *DGArtes* / the Portuguese Ministry of Culture in collaboration with the *Ciência Viva* / National Agency for Scientific and Technological Culture, to assume the supervision of ten artists' residencies at scientific laboratories throughout Portugal. In the interview for the position I mentioned the 'Bi-directional methodology' and 'Evolving Glossary for Interdisciplinary Collaboration in Digital (Live)Performance' presented in this investigation,<sup>4</sup> and was selected based on the premise that the Art&Science residential program would both provide a fertile ground to elaborate and test this methodology, which on the other hand could serve the program as an innovative tutorial system.

## **2. Field of research**

The title of this investigation indicates the challenge to clearly situate this research in a distinct field of artistic practice: *A Methodology for Bi-directional Transfer between Contemporary Dance and New Media Technologies*. Both terms, 'contemporary dance' and 'new media technologies', delineate vast and heterogeneous fields of contemporary artistic practice. In chapter two we present widely consented notions and definitions of both terms (see sections 3.3 and 3.4 respectively). But what is

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<sup>4</sup> See chapter one, section 4

meant by ‘Bi-directional transfer’? This term attempts to describe an essential dynamic in interdisciplinary collaboration in general: when concepts, ideas, techniques and methods are transferred from one area of expertise to another, the resulting innovations are always bi-directional.<sup>5</sup>

In other words, innovation resulting from interdisciplinary collaboration produces important knowledge for all involved artists and/or researchers. In our short case study on the use of the 3D character animation software *Poser* in dance improvisation, we introduce the term

‘recursive mode of working’ to describe the bi-directional flow of inspiration and information between dancers and animators.<sup>6</sup>

Chapter three introduces a core concept set forth by art historian and media theorist Boris Groys termed ‘mimesis of thought’. A fine example of ‘mimesis of thought’, or ‘non-sensuous correspondences’, is the transfer of principles and compositional elements from Minimalism/Fine Arts to Choreography that Yvonne Rainer suggested in 1968.<sup>7</sup>

Based on the analysis of such non-sensuous (or structural) correspondences regarding important concepts, ideas, techniques and methods in contemporary dance and new media technologies, I have compiled an *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live)Performance*.<sup>8</sup> Taking the form of a web-based hyperdictionary, this glossary of compositional, technical and philosophical concepts and principles was designed to provide a starting point for the development of specific artistic research topics and questions. Its function is to generate new ideas, structures, methods and solutions in collaborative interdisciplinary teamwork. At the present, thirty-three entries were assembled and cross-linked. A color code indicates whether an entry derives from contemporary dance, new media art, design theory, or contains a more general philosophical concept.

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<sup>5</sup> See our discussion of Merce Cunningham’s well-documented collaboration with digital artists Paul Kaiser and Shelley Eshkar in chapter two, section 3.1

<sup>6</sup> See chapter three, section 7.2

<sup>7</sup> See chapter three, section 5

<sup>8</sup> See chapter one, section 4

The 'Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance' can be seen as the crystallization of the dynamic in interdisciplinary collaboration that we have described as 'Bi-directional transfer'. Why does its title carry the term 'Digital (Live)Performance'? Evidently, the intersection between contemporary dance and new media art covers recent artistic work, which cannot be labeled as 'live performance' - for example online dances, interactive CD-ROMs, *Second Life* projects, 3D character animation choreography, or video dance don't fall into this category. My choice of the term 'Digital Performance' owes to Dixon's influential publication and definitions (which includes all the examples mentioned above, and much more, such as Contemporary Theatre and Music, and Interactive Installations).<sup>9</sup> Since the term 'Digital Performance' has become widely used during the past five years, I suggest to use it as a synonym for the 'intersection between contemporary dance and new media art'.<sup>10</sup>

I have added the word (Live) between both terms for two distinct reasons: (1) the inclusion of the word 'Live' evidences the delineation of my field of investigation (which is much more narrow than the territory Dixon is mapping), and the focus on live performance for an audience; and (2) the use of the brackets suggests that the argument is valid for the entire field of Digital Performance as defined by Dixon.

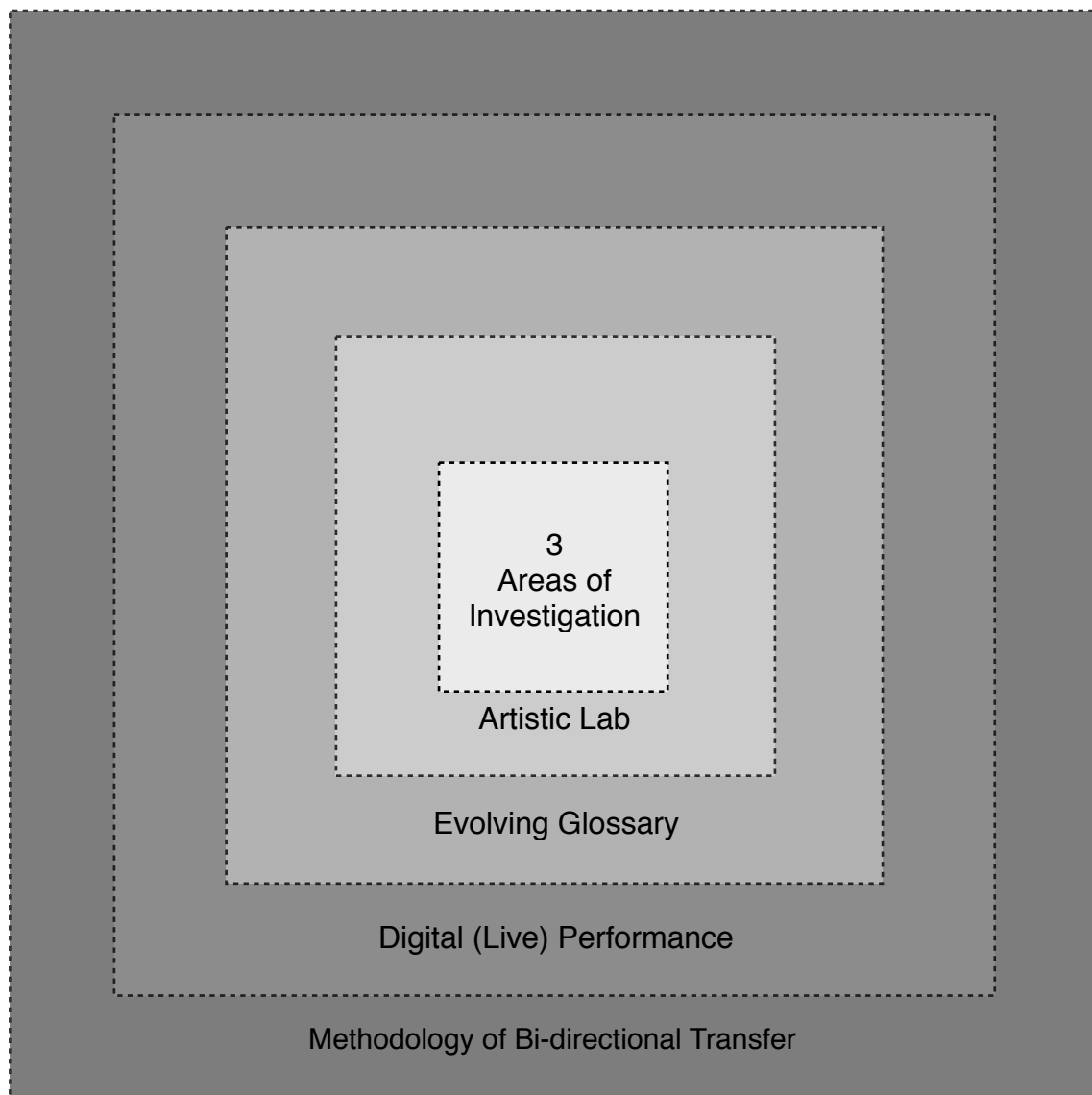
The graphic in figure 1 shows the delineation of my field of research discussed above. It can be either seen as a tunnel view focussing in from the general artistic area to the three specific areas of investigation (from the darker shades of grays towards the lighter tones of grey); or the graphic can be interpreted as the top view of a pyramid, which would indicate that the three specific areas of investigation are supported by the methodologies of the Artistic Lab and the *Evolving Glossary*<sup>11</sup> applied in the field of Digital (Live) Performance to exemplify our *Methodology for Bi-directional Transfer between Contemporary* .

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<sup>9</sup> See chapter two, section 3.6

<sup>10</sup> Of course I am well aware that Dixon's 'Digital Performance' includes much more, as I mentioned above.

<sup>11</sup> Short for the *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live)Performance* mentioned before



*Figure 1.* Graphic representation of the delineation of the field of research for this investigation

Both perspectives, the tunnel and the pyramidal view demonstrate that the *Evolving Glossary* is applied in specific artistic laboratories dedicated to three respective areas of investigation: (1) generative techniques, (2) interactive situations in HCI contexts, and (3) the synergetic training of performers. Each area of investigation is explored and discussed in chapters three, four and five.

This investigation focusses on the choreographic perspective within interdisciplinary collaboration due to the scope of the dissertation. Nevertheless I will point out a few examples of the Bi-directional flow of inspiration and information, which allows the digital artists in such collaborative projects to innovate their own concepts and practices.

### **3. Research question and objectives**

So far I have delineated the field of research and suggested the term ‘Digital (Live) Performance’ to accurately describe it. Subsequently, I have identified an important dynamic in collaborative interdisciplinary work in this field, which was termed ‘Bi-directional transfer’. Such bi-directional transfer(s) are our object of study, and their ultimate purpose is to support the process of designing creative strategies for the use of new media technologies in Digital (Live) Performance. The core research question of this investigation can be accordingly formulated as follows:

**How can we provide a flexible, evolving methodology for designing creative strategies for the use of new media technologies in Digital (Live) Performance?**

The formulation of our research question leads to the following objectives, central to this investigation:

- To develop a theoretical framework for designing creative strategies for the field of Digital (Live) Performance
- To research well documented long-term collaborations between media artists and choreographers or performance artists to analyze creative strategies, compositional structures and theoretical models used in their artistic processes
- To discuss existing methods of composition in contemporary choreography and new media art<sup>12</sup> with focus on their potential for trans-disciplinary transfer
- To systematize and methodologically structure the use of trans-disciplinary compositional tools and design of creative strategies
- To discuss the potential of this framework for analysis of existing artistic work in the field
- To present case studies of the practical application of the theoretical framework in the process of creation and teaching
- To publish this investigation online allowing further postdoctoral research to be included

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<sup>12</sup> At times I will also draw on design theory, which frequently overlaps with new media art.



## 4. State of Art

There is still few scientific investigation published in the fields of performance theory and media art history and theory, *which addresses the subject of compositional principles and design of creative strategies in the field of Digital (Live) Performance in a methodological way*, aiming at establishing a theoretical framework that can be used for analysis of existing work as well as serve for the practical artistic research and creative processes.

However, a number of important publications have appeared during the time of my investigation into this area, some contributing to more general theorization of the field and others addressing very specific topics related with this dissertation.

Copeland (2004), Evert (2003) and Siegmund (2004) have published important work that elucidates various aspects of the 'Bi-directional transfer' between contemporary dance and new media technologies.

Copeland's book on choreographer Merce Cunningham's decades spanning collaborations with artists from diverse fields, engineers, computer programmers and software developers, provides a detailed insight of Cunningham's (choreographic) methods of scientific inquiry. Copeland shows, how these methods have been developed by interdisciplinary application of ideas, principles and creative strategies shared between the network of artists that Cunningham integrated.

Evert's pioneering book on the use of new media technologies in contemporary dance is based on case studies of the work of choreographers Merce Cunningham, William Forsythe, Dawn Stoppiello with media artist Mark Coniglio (Troika Ranch) and Stelarc. Through detailed analysis of several stage works Evert establishes analogies between compositional techniques in the work with new media and choreographic principles and methods.

Siegmund's essay on Forsythe's piece ALIE/NA(C)TION shows how bi-directional transfer of ideas, compositional principles and working methods between the artistic fields (stage design, light design, choreography, sound design and music, visual design including projections, etc.) allow Forsythe to constantly innovate the creative process while achieving artistic coherence in his stage works.

Odenthal's interviews with William Forsythe and essays on his working methods allow for a better understanding of a shift of paradigms: improvisation and composition according to Forsythe *are technologies* employed by himself and collaborating dancers, who are seen as co-creators in the choreographic process.

Dixon's seminal book on *Digital Performance* (2006) developed out of a large scale research project, conducted by himself and Barry Smith between 1999 and 2001, which resulted in *The Digital Performance Archive* (DPA), an important online resource for interested researchers and artists. Dixon provides sound yet flexible definitions for the terms 'digital' and 'performance', presents a historical survey for the use of new media in theatre, dance performance art and installation; and presents thought provoking ideas and concepts (such as the 'digital double') as he discusses a tremendous amount of relevant artistic work in the field. His categories of interactivity in performative situations have also been of great interest for this investigation.

Birringer (who presented an important publication on the borders of media and performance in 1998) recently wrote a book on *Performance, Technology & Science* (2008). In this publication he tracks important innovations in the field during the past decade and discusses performative techniques within different interactive environments.

While Dixon's and Birringer's books provide a general review of artistic work in the field of Digital Performance, Chapple and Kattenbelt (2006), Broadhurst (2007), Broadhurst and Machon (2009), Tércio (2009), and Schroeder (2009) have published edited books including key articles, essays or research reports of great significance for the field.<sup>13</sup>

While the publications mentioned above represent essential references for the delineation of my field of research, and have been seminal for the theorization of the field, an increasing number of artist-researchers have presented their specific artistic methodologies and theoretical contributions in form of a PhD dissertation.<sup>14</sup> Lycouris

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<sup>13</sup> This selection of references reflects the delineation of my field of research, as much as it reflects my limitation to the three languages I speak and read on a scientific level: English, German and Portuguese.

<sup>14</sup> Some of these authors have published their dissertations, others have provided their unpublished work for consultation.

has investigated the process of dance improvisation in theory and practice (1996) and developed an important alternative methodology, which she termed 'interdisciplinary choreography' (2009).

Lampert's important study on dance improvisation (2007) investigates several approaches to improvisation and arrives at six categories of improvisational techniques and processes. Choreography can be viewed as 'slowed-down' improvisation, and highly structured improvisations can be termed 'real-time choreography'.

Butterworth has recently presented her *Didactic-Democratic spectrum model* (2009), derived from her PhD research, which describes the complex process of 'dance devising' and subsequently the role and responsibilities of choreographer and performer in the creative process.

Rubidge (2000) entitled her PhD research *Identity in Flux: A Theoretical and Choreographical Enquiry into the Identity of The Open dance Work*. Her significant artistic and academic contributions to the field address paradigmatic changes in the way choreographic process and form are conceived of in interactive choreographic environments.

Valverde (2004) has proposed an innovative theoretical framework for 'dance-tech interfaces', which she applies to analyze specific examples of digital performances. Beyond such general classification her four categories can be combined to produce creative strategies in a particular parts of a given work.

Nigten's 'Processpatching' methodology (2006) originated in close collaboration with digital and performance artists, for example Thecla Schiphorst.

Downie's impactful PhD thesis entitled *Choreographing the Extended Agents* (2005) deals with the programming of performance graphics for dance theatre, and is mentioned here because of his collaboration with choreographer Trisha Brown.

There are more artist-researchers who have presented or published their PhD research in the field of Digital (Live) Performance, which have not been mentioned here, because their work does not directly relate to the area of our investigation (for example Popat 2006, or Kozel 2007).

Beyond the publication of individual PhD projects several artist-researchers were involved in, or have been directing large scale research projects. Relevant examples for our investigation include Landsdale (*Decentering the Dancing Text* project, 2003),

Zuniga-Shaw (*Synchronous Objects*, 2009), Norman (*AMUC, Associated Motion capture User Categories* project, 2009), Schiphorst (*whisper, wearable, handheld, intimate, sensory, physiological, expressive, response system*, 2003), deLahunta (*Choreography and Cognition*, 2005) and Stegell (*Mind, The Gap - Synaesthesia and Contemporary Live Art Practice*, 2006). All of these research projects have not only produced new and highly significant knowledge in our area of investigation, but also have explored new methodologies for artistic research.<sup>15</sup>

Yet another area of knowledge production and subsequent theorization are reports on workshop series and artistic laboratories / residencies. Here I am not referring to the extensive, but often only temporarily available documentation on the Internet (such as project websites, forums, email list servers, or social networks for professionals in the area), but I am referring to printed publications.

The *Double Skin/Double Mind* (DS/DM) workshop documentation for example contains the fundamental choreographic principles of Emio Greco and Pieter Scholten (EG I PC) and aims at the preparation for creation and performance.<sup>16</sup> The *Double Skin/Double Mind* workshop was also presented internationally in various venues as an interactive DS/DM installation. Bermúdez initiated the *Notation Research Project* in 2004 based on the DS/DM workshop, which eventually led to the book publication *Capturing Intention: documentation, analysis and notation research based on the work of Emio Greco* (2007).

Dinkla and Leeker (2002) have documented and reflected upon the results of a workshop series entitled *Dance and New Media*. Their book probably comes closest to parts of the methodology our investigation: two categories (Dance with Technology, and Intermedial Performances) and three prototypes of further education are suggested to advance successful collaborations between media artists and choreographers. Particularly the first suggested prototype (teaching rules and strategies for the use of technology in performative and choreographic contexts)

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<sup>15</sup> This selection includes exemplary projects realized during the past decade, which have been internationally recognized, and had considerable impact.

<sup>16</sup> Available as an interactive DVD-ROM

seems to represent an essential step towards successful communication for artists involved in interdisciplinary research and creation.

In conclusion of this survey of publications relevant to both, the field of study and the methodology of my investigation, I would like to underline that the chapters three, four and five will draw on further appropriate scientific publications from diverse fields. However, it is beyond the scope of this dissertation to provide a state of the art within these 'neighboring' disciplines. I therefore limit myself to discussing the impact of such 'imported' theory on the subject under scrutiny in the respective chapters.

## **5. Methodology and Materials**

Virtually anyone attempting to write about performance is confronted with the intrinsic problems that this undertaking causes: the ephemeral nature and uniqueness of any performance, the challenges to describe one art form (performance) in the terms of another (written word), or the necessary contextualization of the author's viewpoint to communicate successfully with specific scientific, artistic and other communities.

In the field of Performance Studies in general, and Dance Studies in particular, certain methodologies have been developed and combined successfully, mainly by American and European scholars:

1. It is generally accepted that description and analysis of performance is based on available documentation and memory, not the life phenomena, the performance itself (Brandstetter, 2006). On this premise interesting concepts have emerged and resulted in new methodologies. 'Writing in motion' (King, 2003) in the form of scores, notation systems, Motion Capture data, video and computer animation can be used to trace the ephemeral moment of live performance. These traces on the other hand can be used as stimuli, or instructions for improvisation or real-time choreography, and serve as a base for 'thinking in movement' (Siegmund, 2004).
2. The concept of 'interdisciplinary scholarship' (Foster, 1986) does not only refer to the challenges presented by the intrinsically interdisciplinary field of study

(performance), but reflects the influences and contributions throughout the past decades made by cultural studies, semiotics and linguistics, feminist theory, anthropology and sociology, art history and philosophy, to name a few. Interdisciplinary scholarship provides important methodologies for analysis and discussion of cultural discourses of gender, race, ability, sexuality and age produced by the performer's body, as well as producing the performer's body (Albright, 1997). For my specific area of research Anne Nigten's (2006) 'Processpatching' approach provides an innovative and most adequate interdisciplinary methodology.

3. Concepts such as 'the body as a living archive', or 'the body as archive of history that can't be found in books' are symptomatic of a new status that bodily knowledge achieved amongst the canon of established academic disciplines. Contemporary dance today is seen as a field of knowledge production ranging from the analysis of both, historical and present social, political and cultural processes to scientific interdisciplinary research into new sensorial technologies applied in medicine, astronautics, cinematographic and entertainment industries (Odenthal, 2005).
4. Trans-disciplinary research, or comparative research across the disciplines, is another important methodology for the analysis of the creative processes. Artistic ideas, generative techniques, interactive strategies and compositional principles are frequently developed through transfer from one artistic language to another (see Copeland, 2004, on Merce Cunningham).

These four types of methodology are derived from the fields of performance theory and (media) art history and theory. They will be employed and combined in this investigation, to establish a solid theoretical framework for our *Methodology for Bi-directional Transfer between Contemporary Dance and New Media Technologies*.

As mentioned above in the section on the state of art, there are still few publications on this specific subject. However, during the past years of this investigation we also collected important documentation on long-term collaborations between media artists

and performance artists and choreographers, including published interviews, biographies, essays and scientific papers, conference proceedings and documentation of thematic festivals. Recently the number of publications on the Internet has also increased, providing important material often not available in print.

Another source of valid information was our personal work with leading artists in the field, for example during the I-Live-workshop 2006 in New York with Troika Ranch,<sup>17</sup> during which an extensive interview with Mark Coniglio and Dawn Stoppiello was conducted.<sup>18</sup> Further materials include the documentation of artistic residencies and laboratories that serve as case studies for this investigation; and the articles and book chapters I have published during the past years on aspects of this research.<sup>19</sup>

## 6. Structure of the Dissertation

This dissertation consists of an introduction to this investigation, two chapters on the theoretical framework for my 'Methodology of Bi-directional Transfer', three chapters on different applications of this methodology in specific artistic and academic areas, and a conclusion.

Chapter one presents the first part of the *Methodology for Bi-directional Transfer between Contemporary Dance and New Media Technologies*.<sup>20</sup> Part one of the methodology establishes the concept of 'Evolving Glossary' as an efficient way of creating a communicational and procedural base for collaborative artistic and research projects in the specific field of application of our methodology, which we have termed 'Digital (Live) Performance'.

In the first section of this chapter different forms of and tools for such collaborations are examined. To this end frequently used terms and their definitions are investigated regarding their contextual application in performance theory and in new media art theory. Approaches to and tools for collaborations in Digital (Live) Performance

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<sup>17</sup> A report of the Live-I workshop 2006 can be consulted in the annexed documents section of the accompanying DVD-ROM.

<sup>18</sup> The original audio files of the interview are also made available on the accompanying DVD-ROM.

<sup>19</sup> All materials can be consulted on the DVD-ROM.

<sup>20</sup> In the following we will use the term 'Methodology of Bi-directional Transfer' for the sake of better readability

comprise the 'Evolving Glossary', which represents a core component of our methodology. Related projects are referred in the second section of this chapter to present an overview of influential dictionaries, lexica, encyclopedias and glossaries in the Performing Arts.

The chapter concludes with the outline of the conceptual bases and structural characteristics of our 'Evolving Glossary for Interdisciplinary Collaboration in Digital (Live)Performance'.

Chapter two presents the second part of the 'Methodology of Bi-directional Transfer'. Here, the artistic laboratory is introduced as a practice based form of artistic research, which in this case is intended to provide a framework, in which the 'Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance' can be applied.

In the first section of this chapter we introduce existing workshop methods and techniques taught by well-known artist in the field, to arrive at the motivation for the formulation of our own methodology. The second section of the chapter clarifies the essential terms and elements of what we designate the artistic laboratory in the field of Digital (Live) Performance; and the third section introduces different formats and categories of constituent elements of the lab. A final section is dedicated to brief discussion of the integration of the glossary and the artistic lab within the three areas of this investigation, and its relation to the case studies presented in each of the respective chapters.

Chapter three opens with a succinct clarification of the term 'generative techniques', and subsequently discusses related terms and ideas, such as 'chance', 'serendipity' and 'emergence'. Towards the end of this part we suggest a working definition for this investigation. The following section on rule-based art systems discusses how specific techniques can be developed to generate significant material for works of art.

Correspondences between complexity science theory and performing arts theory are introduced to demonstrate that different investigations across very diverse disciplines have come to similar scientific models and conclusions. A subsequent section introduces the term 'mimesis of thought' to show how the design of rule-based art systems has become a major tendency in different contemporary art forms. We conclude our discussion by examining what exactly can be generated in the course of the artistic process, and suggest an array of techniques to generate ideas,



methods, material and structures. In the following and last part of the chapter we present two case studies realized as part of the participation in the *TeDance* (Technologically Expanded Dance) Project, hosted and organized 2006 and 2007 by the Technical University of Lisbon/FMH in collaboration with a variety of other academic institutions, artistic research centers and theaters in Portugal.

Chapter four is dedicated to the exploration of our methodology in the field of interactive situations in HCI contexts in Digital (Live) Performance. As an introduction to this probably most popular field in Digital (Live) Performance, we distinguish between different forms of interactive situations and systems. In the following we draw on existing substantial theorization to examine relevant notions of the terms 'interaction' and 'interactivity', as well as taxonomies and classifications of interactivity in Digital (Live) Performance. Subsequently we introduce our own classification of eight categories of interactive situations in HCI contexts, and discuss examples of well-known artist and practitioners.

The chapter concludes with a case study, which examines the design of creative strategies within the eight categories of interactive situations in great detail. To this end six scenes from the award-winning Digital (Live) Performance *.txt* (2006-2009) by Fernando Nabais, Fernando Galrito and Stephan Jürgens have been selected, which can be consulted on the DVD accompanying this dissertation.

Chapter five is dedicated to our third area of investigation, the specific training and preparation of a performer in the field of digital (live) performance. In the opening section of the chapter we recall the idea of 'synergetic training' as suggested by choreographer Kenneth King. Subsequently several notions of synergy from different academic fields are reviewed to arrive at the formulation of favorable conditions for synergetic effects to take place in training for digital (live) performance. The second part of the chapter presents a case study, which examines the design, objectives and outcomes of an artistic laboratory realized with the Dansul Dance Company and other participants in Mertola, Portugal. The chapter concludes with a detailed analysis of synergetic effects that occurred during the laboratory, and establishes possible avenues for further research.

The conclusion presents a reflection on this investigation, its contributions to the field, and its (planned) future applications in other areas of Digital (Live) Performance.

# Chapter One: Methodology 1 – The concept of ‘Evolving Glossary’

## 1. Chapter Introduction

This chapter presents the first part of our *Methodology for Bi-directional Transfer between Contemporary Dance and New Media Technologies*.<sup>21</sup> Part one of our methodology establishes the concept of ‘Evolving Glossary’ as an efficient way of creating a communicational and procedural base for collaborative artistic and research projects in the specific field of application of our methodology, which we have termed ‘Digital (Live) Performance’.

In the first section of this chapter different forms of (and tools for) such collaborations are examined. Frequently used terms and their definitions are investigated to this end regarding their contextual application in performance theory and in new media art theory. Specific tools and approaches for collaborations in Digital (Live) Performance comprise the ‘Evolving Glossary’, which represents the core of our methodology. Consequently related projects are referred in the second section of this chapter, presenting an overview of influential dictionaries, lexica, encyclopedias and glossaries in the Performing Arts.

The chapter concludes with the presentation of the conceptual bases and structural characteristics of our ‘Evolving Glossary for Interdisciplinary Collaboration in Digital (Live)Performance’.

## 2. Forms of and Tools for Collaborative Work in Digital (Live) Performance

### 2.1 Frequently Used Terms and Their Definitions

Certain terms are frequently employed to describe collaborative work in the field of Digital (Live) Performance, such as ‘interdisciplinary’ or ‘multidisciplinary’.

We will first look at their prefixes (for instance ‘inter-’, ‘multi-’, ‘trans-’, and ‘hyper-’), to clarify some essential terms and better understand existing definitions. The

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<sup>21</sup> In the following we will use the term *Methodology of Bi-directional Transfer* for the sake of better readability

following list of definitions for these prefixes is compiled of entries from the Oxford Dictionary (Ox) and the Merriam-Webster (MW) Dictionary.

‘inter-‘

- between, amongst, in the midst (MW)
- shared by, derived from two or more (MW)
- mutually, reciprocally (Ox)

‘multi-‘

- many, multiple, much (MW)

‘trans-‘

- across, beyond (MW, Ox)

‘hyper-‘

- over, beyond, above (Ox)
- bridging points within an entity (MW)

From this short list it becomes apparent, that some valid information can be derived from the meaning of these prefixes to clearer establish useful notions of a particular concept. Regarding the differences between ‘multidisciplinary’, ‘interdisciplinary’ or ‘transdisciplinary’, it follows that all terms are quite different in nature. The prefix ‘multi-‘ in the word ‘multidisciplinary’ describes an array of coexisting disciplines, or fields of study (Merriam-Webster), without specifying the relationship amongst them. On the contrary, the prefix ‘inter-‘ describes a place in between, amongst the disciplines, derived from two or more. Furthermore, the relation between the disciplines is expressed as mutual and reciprocal. Transdisciplinary can be defined as ‘across the disciplines’, indicating elements that are shared by all disciplines in question. Thus defined, ‘transdisciplinary’ and ‘interdisciplinary’ would exchangeable terms. In fact, the Merriam-Webster Dictionary does not attempt to define ‘transdisciplinary’, but refers to ‘interdisciplinary’ for explanation. However, the second meaning of the prefix, ‘beyond’ (the discipline) hints at a point of view somewhat outside of the disciplinary frame. In this perspective ‘transdisciplinary’

equals 'crossdisciplinary', and can be applied for instance, when research is thematically focused and requires analysis across the disciplines. Roger Copeland's remarkable work on Merce Cunningham serves as a good example of the crossdisciplinary approach (Copeland, 2004).

Back to forms of collaborations in Digital (Live) Performance and the clarification of frequently used terms in the field, we suggest examining the fashionable and apparently somewhat vague terms 'multidisciplinary' and 'interdisciplinary', before we go on to list and define those terms central to this investigation.

## **2.2 Collaborative Models**

Most of the work in the area of Digital (Live) Performance is collaborative effort and often requires rethinking and redesigning of methodologies, workflow and communication.

Distinctions between multidisciplinary and interdisciplinary collaborations are helpful to analyze as well as organize work processes in this field. In reality many artistic and research projects employ mixed models of collaborations to suit the particular needs of a team during the various phases of their endeavor.

Having said this, the following characteristics of multidisciplinary and interdisciplinary collaborations are presented in an attempt to clarify what working methods, forms of organization, and communication can be most effective for a particular production.

By and in large I base myself on Anne Nigten's important research on this subject. Nigten employs the Oxford dictionary definitions 'multi' as 'many' and 'inter' as 'between, among, mutually, reciprocally' (Nigten, 2006) .

According to this author, multidisciplinary projects are often based on artist-led work models. Typically the initial artistic concept is developed by an artist or director and realized by a team of specialists under his or her direction. Frequently the artist's role is to bring less technical and more artistically oriented knowledge and methodology to the project and serve as a catalyst for critical reflection or innovative use of existing technologies. Software for example may be repurposed, or combined with other software to achieve a specific goal. The artistic concept serves to connect the work of the specialists in their respective fields, and unite diverse ideas and contributions towards a vision of the whole.

Communication commonly requires clarification of methods, technical terms and jargon between the disciplines involved. The project manager or coordinator frequently carries out this task of mediating between the elements of a team. In summary, multidisciplinary projects are normally production oriented and result in the presentation of a (new) creation.

Interdisciplinary approaches are quite different in number of aspects. The artist or director for example commonly is taking on a dual role as supervisor and specialist team member who participates in the creative process. In the field of Digital (Live) Performance artists increasingly combine artistic training with scientific or engineering education, resulting in new profiles, such as artist-researchers, artist-scientists or artists-engineers. As these artists blend artistic and scientific methods, they are often able to speak different (technical) languages and are motivated to work with unfamiliar methods from other disciplines. Communication in interdisciplinary teams requires that each element speak more than one language and understands that elementary terms and concepts of another field.

Interdisciplinary projects tend to be more process-oriented and are less predictable in terms of the concrete outcomes as there is a mutual dependence on the research and development results throughout the production. Naturally there is an inclination towards adopting open forms for Digital (Live) Performances, and towards distributing compositional decisions to the (improvising) performers.

On a technological level 'open source' software is of great importance to much interdisciplinary collaboration, because software for the creation of a new work is often developed and tested during the project. To this end parts of (open source) software can be used, adjusted and embedded in a custom-built program.

As mentioned above, multidisciplinary and interdisciplinary approaches are frequently mixed throughout the various phases in accord with the particular characteristics of a project. Both approaches may coexist within a project, for example if the work with a group of performers is based on other methods than the simultaneous development of an interactive system for them implicates. If diverse approaches are adopted simultaneously, unexpected difficulties may arise, which can be effectively addressed by reflecting the conceptual and methodological base for the project in question.

From my personal experience yet another factor is crucial in collaborative processes, no matter what approaches are adopted. If every individual involved in collaboration shares a keen awareness and commitment to a certain goal, their diversity of education, cultural background, personal characteristics and capacities will benefit the project. It seems to me that this 'shared spirit' needs to be at the core of all collaboration; otherwise none of the approaches discussed above will fully work.

We find Nigten's perspective on multidisciplinary and interdisciplinary forms of collaboration very useful for implementation in the realm of Digital (Live) Performance, particularly as it resonates with other authors (Ascott, Shaw), who propose similar definitions and perspectives.

In her PhD thesis Nigten discusses interdisciplinary collaboration more in depth and suggests a number of unique and very specific concepts that constitute an invaluable contribution to the more general discussion in the field of interactive art.

Most useful for our purposes is her concept of *Processpatching* where the artist is seen as a connector, a bridge-builder between disciplines, who is 'patching together processes and methods from the arts, engineering and computer science environments'.<sup>22</sup> Nigten explains:

*Processpatching* has its roots in the arts without being formalized as a method. *Processpatching* is the new term I use for mixing and reinterpreting a plurality of methods into the artistic method. [...] The term *Processpatching* is chosen as an associative, connecting approach, which is similar to the process it describes.<sup>23</sup>

And:

Mulder and Post clearly outline the difference between a scientific search for a unifying theory (Ridley) and an artistic fascination for new connections and new meaning through re-contextualization. It is typical of many art and technology works that they are combinations of several techniques and methods borrowed from different disciplines. This connecting approach shows us how other (nontechnical) fields can be useful in working around those issues that are hard to solve with current technology or that are

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<sup>22</sup> p. i

<sup>23</sup> p.89

difficult to express in machine-understandable language. The verb 'to processpatch' is used to describe this attitude. *Processpatching* represents the less formal and more intuitive approach to research and development. It has a strong emphasis on the creation of new aesthetics, which are created via new combinations or repurposing of existing materials and methods.

For Nigten the *Processpatching* methodology links directly with Deleuze and Guattari's concept of the *rhizome*, which can be used to describe the artist's tendency to organize knowledge and materials in associative ways to a network topology, as opposed to the scientist's form of organization, which is predominantly based on treelike linear structures.

The space of this network topology, or work arena, in which *Processpatching* takes place, can be described as a 'Transvergence zone' between disciplines, or as a separate entity, a 'Third Space'. Nigten employs Marcos Novak's concept of transvergence, because Novak emphasizes the potential of the space between disciplines for innovation and speciation. Nigten states:

The artist in the role of the *processpatcher* thus refers to the mediation in this in-between space that provides room for the free style of putting together knowledge and concepts from the near disciplines. The *processpatcher's* main objective in these situations is to realize a novel artistic concept, an experience or an interactive process. The innovation arises from the way methods, themes and techniques are put together or combined in new compositions. The invention of new techniques or approaches could possibly come along during the process of art making, and in turn, this could lead to renewal or re-definition of the art practice.<sup>24</sup>

Nigten's *Processpatching* methodology and her concepts regarding the role of the artist in collaborative processes, the development of (artistic) innovative methods for research and creation, as well as the description of this emerging artistic field are instrumental for our investigation. We believe that the clarification of the role each element plays in a team collaborating on an artistic project involving new media technologies is essential for successful creative processes and outcomes of the projects. For this reason one of the principles we included in our *Evolving Glossary* is

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<sup>24</sup> Ibid. p.106

named 'Collaborative Models'.

The *Processpatching* methodology was developed for interdisciplinary environments, and resonates with the conceptual base of our collection of principles. Similarly, our glossary has a modular structure allowing multiple connections and re-combinations of the concepts for the development of creative strategies. A 'patch' in the programmers jargon describes how modules (sets of algorithms, or rules) are connected towards a specific interactive design. In our perspective *Processpatching* can be read as sketching out, planning, documenting and visualizing a dynamic, emerging and ever-changing creative process.

### **2.3 Central Terms for this investigation**

From the ideas outlined above it follows that the prefix 'inter-' best describes our approach to collaborative work involving two or more disciplines. As a next step we suggest looking into definitions and theories that connect this prefix to the media we work with in the field of Digital (Live) Performance, and with the performative texts resultant from the work with these media. Respectively the terms 'intermedia' and 'intertextuality' are of central interest for this investigation regarding the conceptual base for the glossary we have developed.<sup>25</sup>

In a subsequent step we will discuss the prefix 'hyper-' and its use with the identical three categories of disciplines, media and texts (for example in 'hyperchoreography', 'hypermedia' and 'hypertext').

While the category 'disciplines' is helpful to describe the field of the collaborative endeavor, 'media' refer to the technologies, methods and tools for artistic expression. The third category (performative) 'texts' is useful to look at the actual work, which could as well be a finished full-scale stage performance, as it might refer to a prototype for an interactive installation developed during an artistic laboratory.

This section on the conceptual base for the compilation of our glossary will conclude with the discussion of relations that can be established between the six terms we employ: interdisciplinary, intermedia, intertextuality, hyperchoreography (or meta-methodology), hypermedia and hypertextuality. Having looked at the term

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<sup>25</sup> The prefixes 'multi-' and 'trans-' will be mentioned occasionally for the sake of distinguishing concepts and terminologies, following the same etymological and epistemological approaches outlined above.



'interdisciplinary' in some detail above, we will now advance to clarify notions of 'intermedia' relevant to this investigation.

### 2.3.1 Intermedia and Intermediality

Again consulting the Merriam-Webster dictionary, the term 'medium' is defined as follows: 'a means of effecting or conveying something', and 'a mode of artistic expression or communication'. The Oxford dictionary combines these two explanations: 'a means by which something is expressed, communicated, or achieved'.

For our purposes media as the plural of medium can be described as 'means or modes by which artistic intention is expressed, communicated, or achieved'.

In combination with the prefix 'inter-' the focus shifts again to the spaces between the two or more media, to that which is shared and to what is derived from them.

Intermedia is a term introduced in 1965 by artist Dick Higgins.<sup>26</sup> Sixteen years later Higgins clarified in an extended version of his original article, that intermediality is a possibility inherent in the artistic process, and as such has existed since the ancient times. His intention had been to provide access to unfamiliar forms of contemporary art, such as concrete poems, happenings, sound poetry, environments, etc.

Having used the term in lectures and classes for years before publishing his article, Higgins elucidated the creative process of fusing concepts, methods, ideas, and materials into new artwork that was not yet entirely classifiable:

And often this creation of new media is done by the fusion of old ones; this was very common in the late 1950s and early 1960s, with the formal fusions I have already mentioned. No work was ever good because of its intermediality. The intermediality was merely a part of how a work was and is; recognizing it makes the work easier to classify, so that one can understand the work and its significances. (...)

This, then, is the caveat inherent in using the term intermedia: it allows for an ingress to a work which otherwise seems opaque and impenetrable, but once that ingress

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<sup>26</sup> The original article *Synesthesia and Intersenses: Intermedia* was published in Something Else Press, which Higgins himself entertained from 1964 to 1974 to promote primary sources and materials in the new arts, as well as reissuing works of the past which he felt seemed to merit new attention

has been made it is no longer useful to harp upon the intermediality of artwork.  
(Higgins, 1984, p. 6-7)

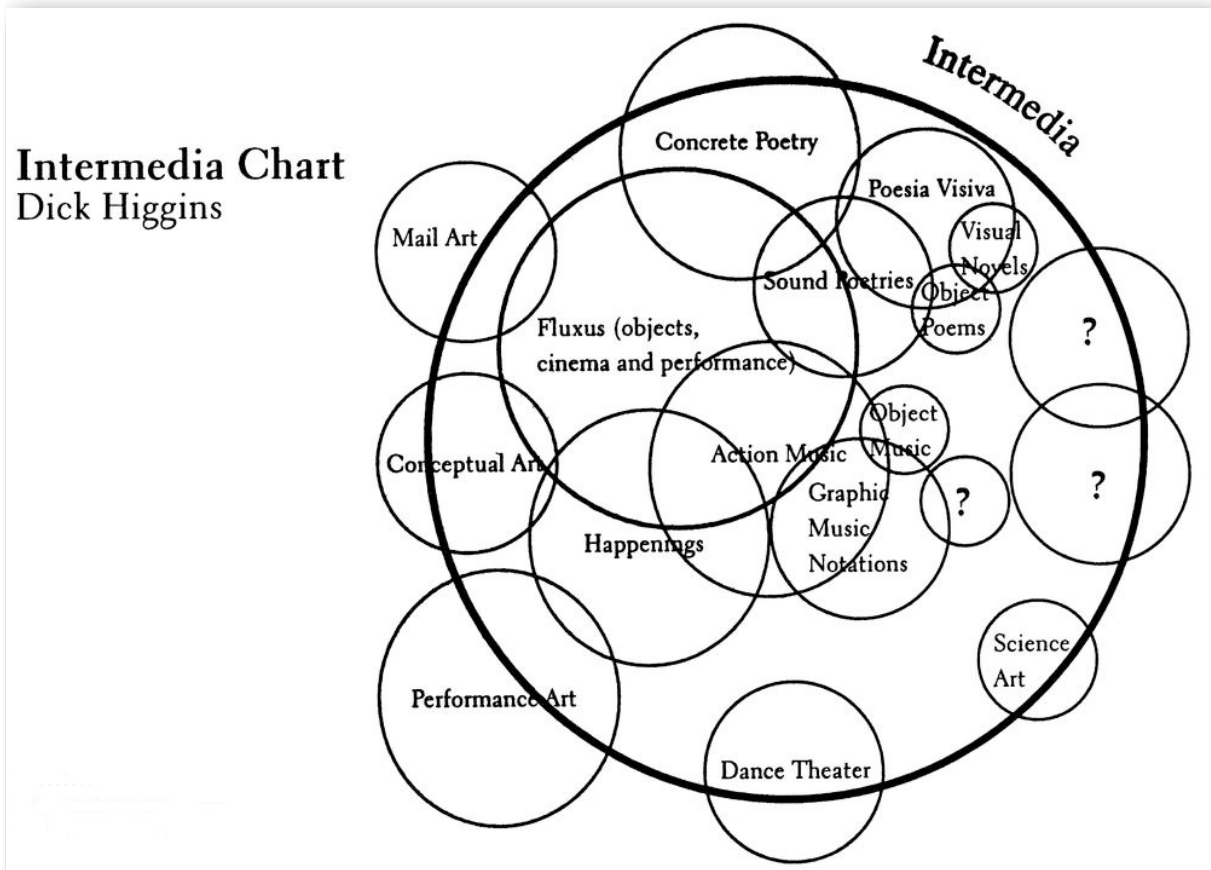


Figure 2. Intermedia Chart Dick Higgins

Once the work is accessible, the intermedial status of the work tends to vanish as new media become more familiar and new classifications are invented. The concept of intermediality in Higgins' view thus serves as a means to understand very recent art with particular characteristics. In Hannah Higgins words, his 'Intermedia Chart'

(...) resonates with temporally dynamic sociograms, where human interactions are highly differentiated and radically decentralized and based primarily on the specific needs of a given body, in this case the artists. According to a model like this, historic and contemporary experience is diverse, causally flexible and permissive of the as-yet-unknown.

The chart depicts intersections between fluxus and related work and makes no attempt at linear chronology. Fluid in form, the chart shows concentric and

overlapping circles that appear to expand and contract in relation to the 'Intermedia' framework that encompasses them. It is an open framework that invites play. Its bubbles hover in space as opposed to being historically framed in the linear and specialized art/anti-art framework of the typical chronologies of avant-garde and modern art.<sup>27</sup>

As Hannah Higgins elucidates in the paragraph cited above, the term 'Intermedia' as introduced and applied by Dick Higgins stands for a dynamic and evolving conceptual framework, which serves as a tool for better comprehension of fluid and complex creative processes of dialogic nature.

Similar to the distinction between 'multidisciplinary' and 'interdisciplinary', discussed in the beginning of this section, Higgins differentiates between 'mixed media' and 'intermedia'. For him the term 'mixed media' denominates situations in which several media are used in a work, but remain recognizably separate and unchanged, as for example in the traditional *mis-en-scene* of an opera. On the contrary, in intermedia two or more media are conceptually fused and result in a work that often is difficult to describe or categorize, as it falls between the currently recognized media and artistic forms.

Moving on to the field of Digital (Live) Performance, we will now look at the ways intermediality is seen in the context of the theatre and performance. In their important book on this subject editors and contributors Freda Chapple and Chiel Kattenbelt define intermedia in a clear and comprehensive way:

Intermediality is a powerful and potentially radical force, which operates in-between performer and audience; in-between theatre, performance and other media; and in-between realities – with theatre providing a staging space for the performance of intermediality. In addition, intermediality is positioned in-between several *conceptual frameworks* and *artistic/philosophical movements*. We see intermediality as part of a wider movement in which all postmodern arts and media are involved. Therefore, intermedial performance incorporates some, but not all of the features of postmodernism. Similarly, research into intermedial performances draws on some key areas of, but not the whole of contemporary theories about *performance*, *perception*

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<sup>27</sup> Ibid., p.9

*and media*. As the name of the research working group implies, intermedial researchers inhabit the space of the in-between. We put forward the proposition that intermediality in theatre and performance is about the process of how something that appears fixed becomes different, and our conceptual framework reflects the processes of change. (Chapple & Kattenbelt, 2006, p. 12)

Clearly, Chapple and Kattenbelt's perspective resonates with Higgins' understanding of the term, and provides a powerful tool to look at crossover and hybrid performances, which incorporate digital technologies into contemporary theatre practice and cause the blurring of generic boundaries. Often these kind of works are characterized by a self-conscious reflexivity, which extends into re-perception and re-construction of existing concepts and ideas, practices, techniques and methods in the realm of contemporary performance.

In their outline of the intermedial discourse throughout the past decades, Chapple and Kattenbelt do not reference so much the predominantly German debate within the field of (new) media art theory, but draw on more recent interdisciplinary publications, which they consider specifically relevant for intermediality in contemporary performance.<sup>28</sup>

Four theories in particular constitute the bases for a model that Chapple and Kattenbelt present to visualize the interrelationships between several of the key issues of intermediality in theatre and performance.

Firstly, Bolter and Grusin's influential concept of *remediation* and its main aspects (immediacy, hypermediacy and transparency) are discussed regarding the application to performance and theatre. Secondly, Auslander's important recent publication *Liveness* is referred to, which historically traces back the concept of 'live performance' and remediates the live/mediatized binary model into the useful term 'liveness'. Thirdly, key concepts from Manovich's *Language of New Media* are examined regarding their applicability in intermedial contemporary performance. In particular his three layers of digitization (numerical coding and modular organization; automation and variability; and the concept of transcoding) are brought into the perspective of staging and framing new media in theatrical productions. Finally, Deleuze and Guattari's rhizome as a model of knowledge organization is referred to

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<sup>28</sup> Ibid. p.13ff

as a “particularly useful way of thinking about contemporary intermediality in theatre and performance, where the theatre is a hypermedium for all the separate elements awaiting the activating and organizing mind and body of the perceiver”.<sup>29</sup>

These four theories substantiate a dynamic model advanced by Chapple and Kattenbelt. The pivot point at the center of the pyramid indicates the possibility to rotate the core of the model, which allows relating the key concepts of image (visual theatre), word (literary theatre) and sound (music theatre) to the (staging) dimensions of body, space and time. At this first level of interpretation, intermediality is not reliant on technology but is located in-between the different forms of theatre, in-between the performers and the different art forms, and in-between the performers and their audiences.

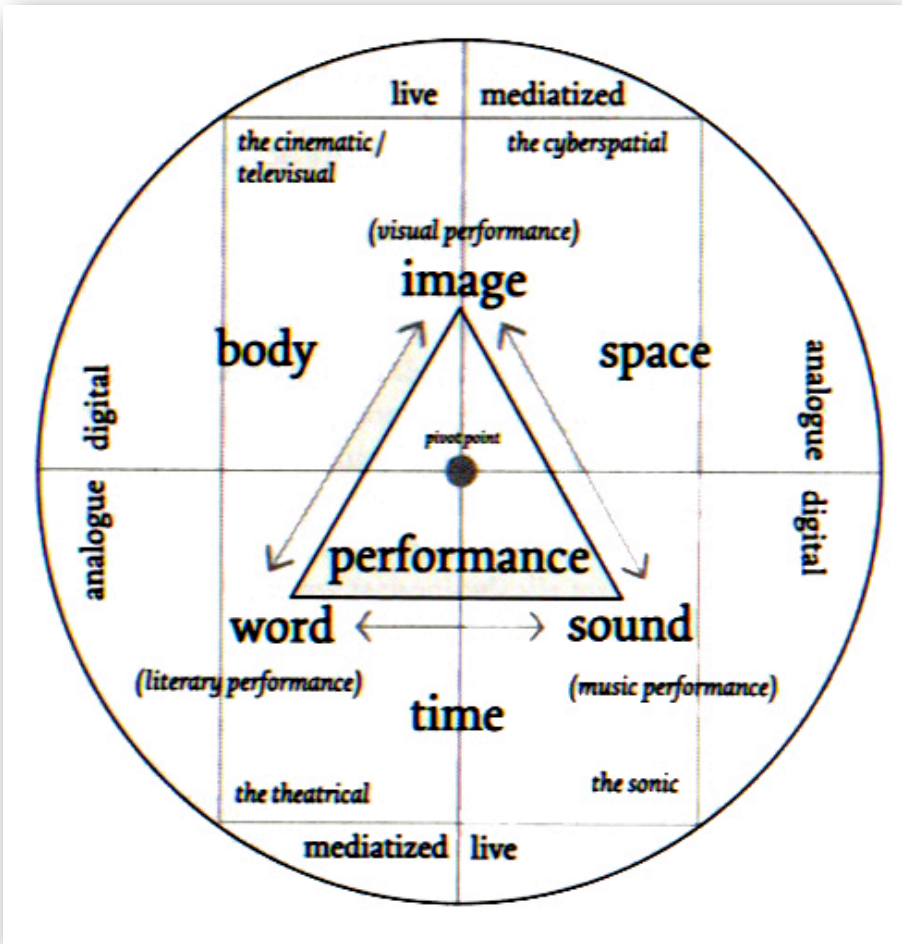


Figure 3. Intermediality in theatre and performance, Chapple and Kattenbelt

<sup>29</sup> Ibid. p. 19

Concepts directly linked to the new media technologies can be employed to analyze theatre and performance issues in the light of analogue/digital technologies and live/mediatized forms of communication; they are located at the outer limits of the model. This framework allows for complex analysis of the multiple layers of meaning present in the same (theatrical) space at the same (performance) time, and the ways signs and media are staged and framed by the performance.

Finally, Chapple and Kattenbelt extend this model beyond intermediality (with)in theatre and performance suggesting that theatre has become a hypermedium, or, in other words, a staging space for intermediality itself. Their model thus stages the new media debate itself, and envisions theatre and performance as a means to reflect upon intermediality as a contemporary way of life. Consequently key issues from the new media debate are inserted at the corners of a rectangle within the original circular model, namely the cinematic/televisual, the cyberspatial, the theatrical and the sonic dimensions.

Chapple and Kattenbelt's model serves as a theoretical framework for the field of intermediality in theatre and performance, as well as for the various essays published in their book. The second section on intermedial perceptions contains two articles by Peter M. Boenish, which are of particular interest for our investigation.

In the first writing *Aesthetic art to aisthetic act: theatre, media, intermedial performance* Boenish introduces the notion of 'aisthetic art' and a subsequent definition of intermediality (in the domain of theatre and performance):

(...) Based on a review of contemporary media studies and their suggestions of what constitutes a medium and mediality, I identify *intermediality* as an effect on the perception of the observers. Drawing on the original meaning of the Greek word *aisthestai*, 'to perceive', which initially referred to more than just the beautiful and sublime, I identify intermediality as an *aisthetic act* located at the very intersection of theatricality and mediality. This approach goes far beyond merely quoting, borrowing or the incorporating of strategies of another medium in performance, such as using the language of cinema on stage. (Boenisch, 2006, p. 104)

And in his second article *Mediation unfinished: choreographing intermediality in contemporary dance performance* Boenish writes:

Intermediality is triggered in performances as an effect in the perception of their observers. It is very literally located inter-media, inhibiting, blending and blurring traditional borders between genres, media, sign-systems, and messages. The intermedial effect breaks the standard law of observing the media timetable, and interferes with their normal function of creating unified messages, linear narratives and homogeneous worlds in the cognition of the observers. Instead of closing down the multiple semantic potential offered into one coherent meaning, intermedial performances derail the message by communicating gaps, splits and fissures, and broadcasting detours, inconsistencies and contradictions.<sup>30</sup>

For Boenisch the dancing body is a medium, which becomes particularly apparent in the codified movement languages of ballet and modern dance, for which an appropriate technique was developed to make use of its grammar and vocabulary. It is in the semantic plurality of differing physicalities, techniques and systems, that Boenisch locates intermediality in contemporary dance. Its effects can be recognized 'when choreography interferes with mediation and undermines the medium's function of signifying and transmitting a single authorial and authorized meaning; when choreographic strategies and dramaturgic decisions reconfigure standardized body-images; when the choreography translates, and transforms the corporeal representation; when they present to the audience a laboratory space rather than a narrative line of aesthetic beauty; when dancing bodies irritate, unsettle, even frustrate acts of spectating and observing'.<sup>31</sup>

In the second essay Boenisch goes on to identify three main domains of intermediality in contemporary dance: corporeal, spatial and sonic intermediality. These are discussed regarding the work of a number of choreographers who have extensively used and developed the choreographic approaches and tools outlined by Boenisch above: Xavier Le Roy, (along with European choreographers such as Jérôme Bel, Rui Horta, Emio Greco, or Vera Mantero); Merce Cunningham and William Forsythe; Canadian Lynda Geaudreau (and her fellow choreographers Jonathan Burrows, Meg Stuart and Akram Khan). Besides providing in-depth analysis

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<sup>30</sup> Ibid. p.114

<sup>31</sup> Ibid. p.152

of the intermedial effects in selected works of these choreographers, Boenisch's inspiring essay shows, how de-mediation, transcoding (between forms of artistic expression and their respective media) and de-creation (of unilateral artistic decision) results in meaningful alternatives, in performances that explore different potentialities and constantly emerging multiple perspectives.

In our perspective Boenisch's usage of the term intermediality resembles Dick Higgins approach in that access to potentially very difficult, often groundbreaking, innovative and provocative work is provided for audiences, which include dance professionals, such as choreographers, performers, teachers, academics, researchers and producers. In the light of this body of theories the is-this-still-dance-debate becomes utterly superfluous and gives way to more productive discussions addressing the specific contribution made to the field of contemporary dance and beyond, to contemporary cultural production.

### **2.3.2 Intertextuality**

If the outcome of an artist expressing him-or herself through the medium of dance can be called a dance text, or, if several media are involved in creating a performance and their use results in a performance text, the question is: what constitutes such a text? Which theories might support the analysis and interpretation of such texts? And how do the intermedial strategies and effects discussed above enter the performance text?

In her seminal book *Dancing Texts – Intertextuality in Interpretation* British scholar and editor Janet Adshead-Lansdale starts to answer some of these questions already in the title (Lansdale, 1999). Using the verb 'dancing' rather than the noun emphasizes the ephemeral and transient nature of art form. And 'just as the activity of dancing implies a constant change of position, so, too, does the act of interpretation', states Adshead-Lansdale in her preface. The concept of intertextuality employed in the domain of dance analysis permits the coexistence of differing, sometimes contradicting, but also overlapping and complementary interpretations. Parallel to literary theory, certain views have to be consequently



dismissed or reviewed, for example the quest for the true, authorized meaning of the work, which is inextricably linked to the author's intention.

Adshead-Landsdale had already advocated in an earlier work on dance analysis, that any element of a dance work, including image, sound, or movement, can be treated as text; and that all of these can be 'read' through the codes and sub-codes, on which they draw.<sup>32</sup>

In *Dancing Texts* she develops the concept of the performance texts based on de Marinis' work in theatre semiotics:

[de Marinis] argues, that the notion of a 'performance text' is a theoretical model of the observable performance within which two parts can be identified. The first is based on co-textual analysis, concerned with the 'internal' regularities of the performance text, with its material and formal properties and its levels of structure. The second, contextual analysis, covers 'external' aspects of the performance text, which can, in turn, be broken down into the cultural context (the relations that can be discerned between the text in question and other texts, whether performances or not, belonging to the same cultural synchrony) and the context of the performance, including all practical situations, in which the text occurs and the circumstances of its coming into being. (...) The performance text, it can be argued, is a mixture of the old and the new – 'an original combination within a textural structure of pre-existing codes... and distinctive codes that are created anew with each performance' (de Marinis 1993:4) – which, in turn, transforms and reinvents codes of the cultural text. (Lansdale, 1999, p. 84)

To consent to such a concept of the performance text implies accepting that there will be a multiplicity of 'readings', or interpretations, and that the reader has a most active role in the process of constructing meaning. As dance always has had the capacity to generate multiple meanings, its creative ambiguity – once criticized as its weakness – now can be seen as a strength: a rich network of meaning, both internal (the work) and external (its place within the field of contemporary cultural production), can be constructed through intertextual interpretative practice based on the different contributions of all 'readers' .

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<sup>32</sup> Ibid. p.84

To this end Adshead-Lansdale proposed five (initial) categories of semantics for intertextual analysis within the framework of the *Decentering the Dancing Text* research project (Lansdale, Deveril, Carr, Hall, & Miles-Board, 2003). In more detail, they consist of:

- A. **The Work** Semantics of the work itself.
  - Visuals (movement, dancers, setting or location, costume)
  - Sound (music, words, other sound)
  
- B. **The Work to Text** Description of a work.
  - Artists' descriptions (e.g. choreographers, performers, designers)
  - Movement description (technical notation, anatomical, metaphorical)
  
- C. **Personal Responses** Meaning maker's responses to work
  - Autobiographical, cultural, theoretical, other experientially-based responses
  
- D. **Cultural Connections** Intertextual connections between cultural works
  - Dance history, visual, literary, cinematic/screen, aural, scientific, historical events/figures, anthropological/sociological
  
- E. **Theoretical Connections** Intertextual connections between theoretical works
  - Etymology and linguistics, philosophical, philosophical, metatheoretical

As far as the analysis of intermediality in performance work is concerned, the combination of the information retrieved in the categories outlined above could also prove very useful for intertextual analysis of the aesthetic effects on the observer. Alternatively a separate category might be added to record intermedial strategies in particular, with cross-references to other observations and notes.

Furthermore, it seems essential to us to distinguish between intertextual interpretation of a work by one author, or a small team, and co-authored networks of meaning. While the former might result in a publication, such as the inspiring in-depth analysis of Lloyd Newson and DV8 Physical Theatre's *Strange Fish* by Lansdale

(Lansdale, 2007), the latter more adequately might take on the form of a moderated blog, or discussion forum within a news group. The co-authored networked intertextual interpretation might also reveal exactly where the artist's description of the work is not reflected in the meaning-maker's responses to the work; or where cultural and theoretical connections made by a dance critique do not relate at all to the artist's description of the work. We believe that these gaps between the several meaning maker's contributions are most interesting, and could also provide a rich source for the (intertextual) analysis of a particular work, regarding both, its internal workings, and its impact, or failure to impact, on the surrounding cultural context.

### **2.3.3 Hyperchoreography, hypermedia and hypertext**

We have been looking in some detail at definitions and theories connecting the prefix 'inter-' to three terms considered central to this investigation: the field of practice and study (discipline), the forms and means of artistic expression (media) and the resulting work (text). In the following section we discuss the prefix 'hyper-' and its use with the concepts of discipline, media and text. As the reader will remember, the Oxford dictionary defined the prefix as 'over, beyond, above'; and the Merriam-Webster adds 'bridging points within an entity' as another meaning.

While there is no such term as 'hyperdisciplinary', the first meaning indicates a meta-level from which the field of practice and/or study is viewed, and how it possibly might be related to other areas. The relatedness or connectedness is expressed in the second meaning of the prefix; however the bridging points have to be 'within an entity', or within boundaries that have to be established and defined.

The prefix 'hyper-' has been used in conjunction with the field of choreography, thus giving birth to the concept of 'hyperchoreography'. Advanced by Katrina McPherson and Simon Filds in 2001, who are well-known for their work in the field of video dance (McPherson, 2006), the concept of hyperchoreography is defined by them as follows:

Using digital hypermedia, Hyperchoreography is a non-linear dance performance 'space'. It only exists in an interactive and/or networked medium. It is based on the model of hypertext, as defined by Ted Nelson, and allows a choreographer/artist to create work that can be sequentially altered by a user at the point of interaction,

moving through hyper-linked moving images. The elements are put in place by the creators, but the shape of the work is decided by the user at the moment of interaction (McPherson & Filds, 2001)

Right from the start McPherson and Filds define the boundaries of the 'entity' (mentioned in the dictionary definition) as 'digital hypermedia' in an 'interactive and/or networked medium' (namely the Internet, including future developments). The field of choreography here is limited to the creation of dance for the screen. On the other hand possibilities provided for the work with video dance are extended by ICT and communication technologies. For example the video editing process can be partially shared with the user of an online application, who gets to decide, which sections of the available video clips (including their own uploaded footage) are combined into the final dance film.

Several works that can be associated with McPherson and Fild's idea of hyperchoreography are listed on their website, and provide an idea of the possibilities at this intersection of video dance and more recent Internet technologies.

However, in our perspective the term 'hyperchoreography' as introduced by McPherson and Filds does not accurately denominate the interesting work they have done. Choreography in our view is a much vaster field and includes many more dimensions than those that can be explored in the digital realm. If Todd Nelson's idea of 'Hypermedia' (which in fact is confined to the Internet, and an extension of his original concept of the hypertext) is employed to describe the means of artistic expression in hyperchoreography, we could more accurately speak of 'interactive hypermedia tools for online video dance'. Such a descriptor, or a similar, more specific concept would avoid narrowing down the vast field of contemporary choreography to a very specific area of artistic creation and investigation.

If on the other hand Chapple and Kattenbelt's idea of the theatre as a hypermedium is employed, 'hyperchoreography' would delineate a much more encompassing field of practice and study, which would be inclusive of the technologies and ideas mentioned by McPherson and Filds above, as we have seen in the model proposed by these authors. Instead a problem of a different kind arises: what is the

choreographer's role in working with intermedial strategies, with coexisting, often interdisciplinary forms of artistic expression, and with an array of new media technologies?

Sophia Lycouris (Lycouris, 2009a) suggests that the impact of interdisciplinary practice has contributed to the emergence of expanded definitions of choreography, which led herself to employing the term *interdisciplinary choreography*. In her artistic work as well as her research activities she has been exploring the idea of a 'compositional meta-system on the basis of which the choreographic edifice work'. Lycouris came to the conclusion that it is possible to develop appropriate "compositional meta-systems in order to support the creation of new choreographic work (and work incorporating new technologies in particular) in which the relationships between all heterogeneous components of the work can be defined in a coherent manner".<sup>33</sup>

Particularly interesting is the way Lycouris extends Preston-Dunlop's four-strand model of the dance medium, suggesting that 'interdisciplinary choreography includes the application of choreographic techniques on materials other than the dancing body, for example, images and sounds which can assume performative presence'. As a result interdisciplinary methodologies emerge along with the development of compositional meta-systems, which allow processing heterogeneous elements within a work.

As an example for such a compositional meta-system Lycouris discusses the concept of *choreographic environments*, which she concretely applies to Sarah Rubidge's responsive sound and video environment *Sensuous Geographies* (2002), her own dance installation *BODYSIGHT* (2001), and Troika Ranch's recent interactive dance performance *16 [R]EVOLUTIONS* (2006). These diverse experimental and innovative projects are interpreted as *choreographic environments* emerging through "considerations of choreographic rules, methods, techniques, or perhaps a kind of choreographic thinking".<sup>34</sup>

In another recently published article Lycouris writes in depth about the artistic concepts that led to developing interdisciplinary choreographic techniques for her

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<sup>33</sup> Ibid., p. 350

<sup>34</sup> Ibid., p. 359

latest project *E-Motions in Urban Networks*, a single screen animation film/installation project discreetly integrated in the urban space of Chelmsford, UK. Here choreography is seen as “a set of techniques used to design dynamic changes in a given environment, be that physical, virtual, hybrid or conceptual” (Lycouris, 2009b, p. 143).

The ‘given environment’ in the case of this inspiring project is the urban space of a small town, its post office and supermarket. Integrating spatial concepts from architecture and urban design research, Lycouris analyzes how the visual dynamics in urban space can be ‘choreographed’.<sup>35</sup>

On the other hand, choreographic methodologies are developed drawing on appropriate extra-disciplinary ‘vocabularies’, for example ideas of space in contemporary architectural discourse such as Hillier’s *Space Syntax*,<sup>36</sup> or Eisenman’s fluid environments (Lycouris, 2009a).

Lycouris’ ideas converge much with our own perspective, both in terms of artistic practice and analytical methodology. Our *Evolving Glossary* is an attempt to generate as well as to assemble such extra-disciplinary vocabularies, which allow extending choreographic techniques to serve artistic projects, which often fall in-between disciplines and media, or wouldn’t be considered dance-related at the first sight.

As we have seen, the term ‘hyperchoreography’ might be used to describe work referring to video dance techniques within networked digital media, but isn’t used by Lycouris (or anyone else) in its other sense of the word, ‘over, above, beyond’, indicating a (compositional) meta-level. Similarly, the term *hypermedia*, in the sense of appropriate forms of artistic expression (of such ‘hyperchoreographic’ ideas), is predominantly used within the realm of digital media. The Merriam-Webster dictionary’s definition reads: ‘a database format similar to hypertext in which text, sound, or video images related to that on a display can be accessed directly from the display’, and dates the term back to 1965.

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<sup>35</sup> Ibid. p.143

<sup>36</sup> Lycouris develops these ideas in both essays cited above, respectively p.148 (2009b), and p. 359 (2009a)

Chapple and Kattenbelt recently applied the term 'hypermedia' to theatre and performance situations, describing hypermedia as "a space where the art forms of theatre, opera and dance meet, interact and integrate with the media of cinema, television, video and the new technologies; creating profusions of texts, inter-texts, inter-media and spaces in-between" (Chapple & Kattenbelt, 2006, p. 24).

Also, Gieseckam in his study on the use of film and video in theatre discusses hypermediacy linking the concept of immediacy as put forward by Bolter and Grusin to the debate about the supposed purity or transparency of art (the theatre in this case). He writes:

They [Bolter and Grusin] suggest that, 'in the logic of hypermediacy the artist (or multimedia programmer or web designer) strives to make the viewer acknowledge the medium as a medium and indeed delight in that acknowledgement'. Much of the theatre considered in this study, beyond the use of electronic media, does in other ways frequently draw attention to, and indeed delight in playing with, theatre as a medium. Companies such as Forced Entertainment and Forkbeard Fantasy continually play with overt disguise and transformation, work with cheap wigs, exaggerated costuming and obvious gender swapping. The performers often adopt very diverse performance styles and performance personae, thereby drawing attention to the act of performance. As with Bolter and Grusin's photomonteurs, the hypermediacy of such productions is then the extension of a more general subversion of notions of immediacy (Gieseckam, 2007, p. 18) .

Though the term hypermedia dates back to 1965 and is frequently used in new media art theory, it seems that in Digital (Live) Performance the term was only introduced very recently. In this sense the publications cited above are seminal theoretical works on the analysis of the interrelations between new media technologies and their use in theatre and performance.

#### **2.3.4 Transmedia**

Instead a term has been adopted, which does not appear in the Merriam-Webster, the Oxford or other dictionaries we consulted, nor is there any definition to be found in online resources. Nevertheless the concept of transmedia is employed by

scholars, artists, festivals and in arts education. The College of Visual and Performance Arts at the Syracuse University bases their transmedia program on 'cross-disciplinary approaches to art-making',<sup>37</sup> and the Hogeschool Sint-Lukas at Brussels, Belgium, offers a 'Transmedia Postgraduate Program in Arts + Media + Design', which has produced significant output, such as international workshops, conferences and publications on the subject.<sup>38</sup>

Probably the most well known festival is the *transmediale*, a 'festival for art and digital culture' in Berlin, Germany. Their performance program was established in 2006 and reflects the festival's philosophy of 'opening up the festival to not just pure media art but also to projects where art, technology and the digital age meet the everyday'.<sup>39</sup> Another renowned German institution carries the term in its name: the Trans-Media-Akademie Hellerau (TMA) has recently opened their Trans-Media-Laboratory, aiming at the 'promotion of trans-departmental and trans-disciplinary discourses between culture, technology, economy, education, research, politics and human development'.<sup>40</sup>

From these examples it becomes quite evident that the prefix 'trans-' in all cases is employed to focus on a perspective 'across' and 'beyond' the media and disciplinary boundaries.

Several aspects of the concept become more comprehensible, if we look at a term proposed by the founder and director of MIT's comparative media studies program, Henry Jenkins: 'transmedia storytelling'. In his book *Convergence Culture* Jenkins defines transmedia storytelling as follows: "A transmedia story unfolds across multiple media platforms with each new text making a distinctive and valuable contribution to the whole" (Jenkins, 2006).

While the first part of the definition (a story unfolds across multiple media platforms) is identical with Glorianna Davenport's<sup>41</sup> notion of 'multimedia storytelling', the second half of Jenkin's definition is quite specific: each part of the transmedia

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<sup>37</sup> <http://vpa.syr.edu/> accessed January 2011

<sup>38</sup> [http://transmedians.be/projects\\_new/](http://transmedians.be/projects_new/) accessed January 2011

<sup>39</sup> See <http://www.transmediale.de/en/history> accessed January 2011

<sup>40</sup> <http://cynetart08.de/ziele> accessed January 2011

<sup>41</sup> Glorianna Davenport is another renowned MIT researcher



narrative that is told on a different media platform is considered a new and distinct text, and simultaneously represents an essential part of the whole.

The chapter on Transmedia Storytelling in *Convergence Culture* exemplifies this concept with reference to the Wachowski brothers' *Matrix* film trilogy, the anime film *The Animatrix*, the video game *Enter The Matrix*, and *Matrix* related comic books and MMOGs.

In his MA thesis on transmedia storytelling Long elaborates on the difference between the classical movie franchising strategies, which involve multiple media platforms as well, and transmedia storytelling. He states that the Wachowski brothers for example had transmediation in mind from the very beginning of the project, and therefore conceived of the entire narrative in the sense of Jenkin's definition, where each element is a distinct part of the whole. Long further distinguishes adaptations of existing works from one medium to another, such as Jackson's *Lord of the Rings* trilogy as 'retelling a story in a different media type', and so rightfully comes to the conclusion that transmedia storytelling is a recent phenomenon (Long, 2007).

However, there are interesting historic precedents of artistic work that evidence 'transmedia' characteristics. Man Ray for example, explored his artistic ideas methodically across various media. His early studies of motion in still images manifest for instance in the oil painting *The Rope Dancer Accompanies Herself with Shadows* (1916) and two years later in another version of the theme, the *Rope Dancer* (1918), which uses a combination of spray gun technique and pen drawing. Ray invented or refined a number of mechanical and photographic techniques to create still and moving images. In his avantgarde films *Le Retour à la Raison* (1923) and *Emak-Bakia* (1926) he uses novel photographic techniques such as photograms and solarization, and employs an array of lenses, concave and convex surfaces, and motorized devices to explore the kinetic and visual effects of (dadaist) objects, which he had created before as a sculpture, or a model to be painted or photographed. At times Man Ray collaborated so closely with his friend and fellow artist Marcel Duchamp (for instance on an early example of kinetic art, *Rotary Glass Plates* (1920)), that 'transmedia' characteristics can be found across the work of these two artists.

In the absence of a clear definition and sufficient studies of the concept of transmedia we suggest using the term along the lines described above: *as the distinct use of multiple media platforms towards a number of elements (or works) that together form a cohesive whole.*

This understanding of transmedia adapted to theatre and performance can be easily distinguished from the aforementioned concept of theatre as a hypermedium. In the proposed perspective a single performance or work cannot be considered 'transmedia' by itself. A single work nevertheless might be categorized transmedia, if the underlying ideas, concepts, methods and contents are 'transmediated', or further developed, in another artistic work, or in related activities such as publications, conferences, and workshops.

Although both, the *transmediale* festival and the Trans-Media-Akademie Hellerau, do not explicitly explain their understanding of the term transmedia, it seems to us that the thematic approach to curating work and conceptual coherence across the disciplines, media and diverse projects have inspired the choice of names.

Hypermedia and transmedia are both terms that have been extensively employed in the realm of digital media, and subsequently have been theorized in new media art theory. The application of these concepts to theatre and performance is more recent, as we have seen, and opens up interesting and new perspectives on the use of (new) media technology in the field of performance. Above we have suggested looking at the three categories of discipline, media and text in relation to the prefixes 'inter-' and 'hyper-'. To conclude our overview, we will now turn to the concept of hypertext in relation to our field of study.

## **2.4 Hypertext and performance text**

The Merriam-Webster dictionary defines 'hypertext' as 'a database format in which information related to that on a display can be accessed directly from the display'. While the term itself (as well as the term 'hypermedia') was coined by Ted Nelson in 1965, the idea of annotating or linking relevant information to a text is evidently much older.

Probably the most famous example for a hypertext is the World Wide Web, which predominantly is built on HTML technology. HTML is an acronym of Hyper Text

Markup Language, which is used to describe the structure and characteristics of text-based information (font, color, size, style, link paragraph, heading, list, etc.), and to embed other media files (graphics, fotos, videos, sound, etc.). Through HTML simple interactive control features are provided to navigate the content of a web site.

Interestingly, the term 'markup' has been long before used in the traditional publishing practice, where a manuscript was 'marked up' by use of a conventional symbolic language with publishing instructions in the margins and the text.

It follows that the technology (the markup language), which allows displaying a text document as well as linking it to other text documents and media files stored in the database, can be seen, in Bolter and Grusin's terms, as *remediated* traditional publishing techniques.

The Merriam-Webster dictionary's definition of hypertext as 'a database format in which information related to that on a display can be accessed directly from the display' seems in fact vague and does not distinguish between text documents, other (linked) media, nor the technology, which brings it into existence. But the same dictionary in its 2003 edition defines 'hypermedia' in a complementary way: 'a database format similar to hypertext in which text, sound, or video images related to that on a display can be accessed directly from the display'.

So why does hardly anybody use the term 'hypermedia', when we refer to web pages, pdf documents, or even word processing documents?

Our perception of what constitutes a 'text' has radically changed throughout the past decades, as we became used to the possibilities that our word processing software offered, namely to include images, graphics, hyperlinks, and, more recently even embedded video clips into a 'word' document. Parallel we witnessed the advent of the Internet, and got used to writing 'electronic mail'. Our 'remediated' letters also gradually consisted of more media types, became instantly customizable, and *searchable*. Database management techniques are incorporated into these documents and allow us to store, retrieve information about, or search these 'texts' in great numbers.

Most recently we witness the tendency to integrate an increasing number of software applications in our workflow. Not only can a hyperlinked file attached to an email automatically open the respective software needed to visualize and edit the

document, but we are offered the possibility to extend our workflow to planning software, using agendas or task lists.

It seems only natural to us that this everyday experience is reflected in artistic work and led to the reformulation of what constitutes a performance text. Lansdale for example suggests analyzing a dance work as a performance text, which may include images, sound, movement and other elements.

The blurring of the boundaries between multiple media incorporated in a hypertext document thus has correspondences in the performance text, which we already discussed in detail. Lansdale therefore suggested intertextual dance analysis as an appropriate method for such complex performance texts, and developed a hypertextual model in collaboration with researchers from the University of Southampton. Central to the *Decentering the Dancing Text* project we referred to above, was the development of a hypertextual system that could represent the various semantic levels for the intertextual analysis of digitized dance videos. The joint Associative Writing Framework (AWF) project at Southampton (Leslie Carr, Wendy Hall and Timothy Miles-Board) explored the production of hypertexts that integrate diverse existing Web resources. Both projects were combined to investigate and evaluate the AWF system in the dance context (Lansdale et al., 2003).

In the *Decentering the Dancing Text* project hypertextuality and intertextuality are aligned as follows:

In *hypertextuality*, connections, or (hyper)links, can be considered to be the major factor in the defining of something as a hypertext. A reader can navigate their way around a series of connections made by the author of the hypertext. In the case of *intertextuality*, these connections can be born at the 'production stage' of a text or when it is read by another person. The concept of intertextuality, to state it in simple terms, suggests that many works of art, or 'texts' as they are known (regardless of form), gain much of their meaning and relevance to people by virtue of these connections. (Lansdale et al., 2003, p. 108)

As far as the technological progress is concerned, design specifications and requirements are needed to innovate and develop hardware and software. To support an emergent intertextual analysis of a dance piece, the Surrey researchers specified

their requirements: the hypertextual system should both act as a recording device and navigation tool, with filtering, indexing and search facilities included.

The AWF tool components include a hypertext editor, a web browser, an annotator, a (hypermedia) relate tool, and a server. A common problem - the integration of a powerful hypertextual system with a graphical overview – was resolved satisfactory compared to other Web browser-based and map-based approaches. In summary, the AWF provided, at least, an ‘important testing ground for the intertextual analysis of dance in digital video form’.<sup>42</sup>

Essential for the model is the notion of open-endedness in terms of meaning and interpretation. Contextual and background information provided by the creators and promoters of the work is not considered a definite reading of the piece, but just ‘another layer of material which could be incorporated into an individual interpretation’.<sup>43</sup> This approach makes a significant shift regarding the interpreter (meaning-maker in Landsdale’s terms): it recognizes the existing diversity of opinions and perspectives through conceptualizing the analytic model and tools in a way that (technologically) enables the meaning maker to inscribe their personal intertextual reading of the work, while s/he is simultaneously part of the larger network of meaning-makers.

There have been many attempts at describing the audiences’ much more active role in performances, particularly since the 1950s, by using alternative terms such as ‘witness’, ‘observer’, or ‘meaning-maker’, which express specific aspects of their participation. Nevertheless it still seems a long way to provide access for nonprofessional meaning-makers to contribute in active and creative ways to both the processes of artistic creation and theoretical analysis and research. A web based hypertextual system for intertextual readings of artistic work accessible for such contributions might be an important step towards the inclusion of the majority of people involved in live performance. Employing the five categories of semantics in dance analysis mentioned above, contributions could be made in a specific area, according to the participant’s expertise and interests, background and motivation for the input.

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<sup>42</sup> Ibid., p.118

<sup>43</sup> Ibid., p.118

## 2.5 From dance analysis to the realm of creation

Looking for further correspondences between hypertext and performance text, we might ask then: what constitutes the 'markup language', or 'source code' of live performance? How are different media 'linked' and 'embedded' in live performance? In other words, what are the techniques and methods of 'interdisciplinary choreography'?

Here the focus evidently shifts from dance analysis to the realm of creation.

To begin with, we need to remember that the performance text is latent until it comes into being at the moment of its live performance, and returns into a latent state afterwards.

Similar to this process, hypertext, or source code in general has a performative dimension, too. Inke Arns develops this idea in her insightful article on software art, which she describes as follows:

The term 'software art' was first defined in 2001 by transmediale, the Berlin media art festival, and introduced as one of the festival's competition categories. Software art, referred to by other authors as 'experimental' and 'speculative software' as well as 'non-pragmatic' and 'non-rational' software, comprises projects that use program code as their main artistic material or that deal with the cultural understanding of software, according to the definition developed by the transmediale jury. Here, software code is not considered a pragmatic functional tool that serves the 'real' art work, but rather as a generative material consisting of machinic and social processes. Software art can be the result of an autonomous and formal creative process, but can also refer critically to existing software and the technological, cultural, or social significance of software (Arns, 2004).

Later in her article, Arns proposes that program code ought to be seen as *performative text*, because the source code (or *genotext*) generates all sorts of audiovisual surfaces and output (or *phenotext*). Linking this observation to Austin's speech act theory, Arns concludes that program code implies a performative act, because 'saying and doing come together in it'. Software art therefore looks critically

into the possibilities as well as the constraints implicit in program code, and aims at turning the underlying value systems visible to the audience.

There have been many examples of critical self-reflection in contemporary performance, some of which we have discussed in the section on intermedia. In an attempt to establish correspondences between art practices in the fields of new media art and contemporary performance, we suggest employing the concept of hypertext as an equivalent to source code or program code, and ask: what then constitutes the 'source code', or *genotext* of a live performance? In which ways are choreographic methods and media art practices mutually reflected and/or transferred in interdisciplinary collaborative projects?

It could be argued that notation systems and the respective scores of all kinds can be seen as *genotexts* of live performance. There are three reasons why we will not follow this approach:

1. The interrelation between notation system, or *genotext* and the performance text (the actual live public presentation of the work), or *phenotext*, constitutes a field of study on its own, and is beyond the scope of this doctoral thesis.
2. Notation systems such as Laban or Benesh are not adequate tools for an intertextual approach to complex (intermedia) performance texts, as described above. Most of contemporary dance and Digital (Live) Performance therefore predominantly use other tools to prepare, develop and document material during the creative process.
3. Scores however will be examined regarding their generative potential in the third chapter of this dissertation, and discussed as a valuable tool in the creation process.

Consequently we have chosen another route. The next section of this chapter will explore differing approaches to composition in interdisciplinary choreography and Digital (Live) Performance. Towards the end of our brief overview of major tendencies in the past decades, we will focus on several artistic research projects, which employ recent lexicological and terminological methodologies to arrive at custom-built

evolving glossaries for the particular project. We suggest that such glossaries can both, constitute and document the specific *genotext* of a given artistic process and work, in a similar, but much broader way than a score can provide such information.

### **3. Related Projects: Dictionaries, Lexica, Encyclopedias and Glossaries in the Performing Arts**

#### **3.1 There is no one theory of choreography, There is no one set of principles?**

Only two decades ago Janet Adshead-Landsdale identified two related problems regarding the study, teaching and analysis of choreography. The first problem consisted of tendencies to mystify the artist and the work, and the second, related problem, was the poor growth of analytical method in parallel with emerging dance styles.

In the Proceedings of the 4<sup>th</sup> Study of Dance Conference held at the University of Surrey in April 1985 Landsdale urges to substitute a rather romantic notion of the choreographic process with concrete choreographic methods or practices. The predominant group of theories (Ellfeldt, Hayes, H'Doubler, Humphrey and Smith-Autard) at the time are compared to arrive at common criteria for this analytical framework. Through the analysis of Cunningham's *Untitled Solo* from 1953 Landsdale shows how irrelevant traditional methods can become (Landsdale, 1986, p. 19). In her conclusion she affirms that there is no one theory of choreography, there is no one set of principles, and there is no one set of practices.<sup>44</sup> Instead Landsdale suggests a closer interrelation between watching, analysis and making of (particular groups of) dances, supported by a variety of means to get closer to the detailed structure of a particular choreographer's work.

#### **3.2 A dictionary conceived of from a choreological perspective**

Ten years later Valerie Preston-Dunlop published her influential book *Dance Words*. Her ambitious project set out to "compile a dictionary with definitions of terms used in dance practice" (Preston-Dunlop, 1995, p. xv). Soon she realized that first-hand information collected from the artists talking about their individual creative process in

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<sup>44</sup> Ibid., p.25



their own idiosyncratic terms provided a wealth of complementary insights that needed to be included. Though probably less objective in a lexicological perspective, the inclusion of personal terms allowed the *Dance Words* project to reflect very diverse contemporary practices, bridging multicultural perspectives, cross-art forms and strong media influences.

Amongst several criteria that Preston-Dunlop applied for the compilation of the dictionary's entries the last two of the list are most interesting, as they reflect how radically the field of dance studies had evolved in only one decade since Lansdale's article.

The criteria applied were:

(...)

d) that the language of established dance practitioners, of dance academics, of younger dancers, and of the amateur would all be included, to reflect the range of people who dance and who talk about it;

e) that where already-published detailed dictionaries of technical terms in specialist areas such as Indian dance, classical ballet, or notation exists, this book would avoid duplication, by including entries in which the usage of terms be given rather than the description of the terms themselves (Preston-Dunlop, 1995, p. xvi).

Departing from a combined use of traditional technical terms and personal idiosyncratic expressions used in particular creative contexts, Preston-Dunlop advises to consult adjacent terms to the one that has just been studied to become aware of coexisting contrasting and similar views.

*Dance Words* is conceived of from a choreological perspective, which focuses on the process of the dance creation. Consequently contributors to the seven parts of the work come predominantly from the dance domain, except for Part Five, where entries by musicians, designers for dance, and video collaborators are included.

### 3.3 A dictionary in the light of the innovations of the 1990s, of the crosscultural, multimedia and interdisciplinary aspects of theatre today

Three years later French scholar Patrice Pavis presented his (revised) *Dictionary of the theatre: terms, concepts, and analysis* (Pavis, 1998). In a foreword to the dictionary, Marvin Carlson lays emphasis on the fact that Pavis ‘has created the first dictionary of theatrical terms that reflects this blending of the specialized vocabulary that has been borrowed by theatre studies from many other intellectual disciplines’.<sup>45</sup> While Pavis, like Preston-Dunlop, maintains historical (and literary) terms, he chooses a different approach towards revising and correcting his 1980 and 1987 editions of the dictionary in the light of “the innovations of the 1990s, of the crosscultural, multimedia and interdisciplinary aspects of theatre today”.<sup>46</sup> The novelty of the third edition is the introduction of specialized vocabulary from theoretical writing across the disciplines about theatre today. This multifaceted perspective on present-day theatre practice corresponds to Landsdale’s call for applying a variety of means to come closer to the structure of a specific work. Particularly those creations that engage in a reciprocally influential relation with critical theory require an interdisciplinary and integrative approach to lexicology, such as the one developed by Pavis.

As in *Dance Words*, single terms listed in the *Dictionary of the theatre* refer to different, even contradictory, historical applications. However, in Pavis’ view the dictionary is a “methodological and epistemological undertaking, rather than a terminological or technical one”.<sup>47</sup> Consequently his focus lies on clarifying notions that have become confused over the time, by closely examining and reviewing the critical apparatus that is used to describe theatre.

Pavis’ dictionary is “a presentation of major issues in dramaturgy”, and insofar comparable to the choreological perspective of *Dance Words*, but engages beyond the theatre domain with major issues in “aesthetics, hermeneutics, semiology and anthropology”.<sup>48</sup> The dictionary also reflects, includes and clarifies the constantly

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<sup>45</sup> Ibid. p. viii

<sup>46</sup> Ibid. p. ix

<sup>47</sup> Ibid. p. x

<sup>48</sup> Ibid. p. x

evolving vocabulary in the field of theatre criticism. Pavis shares Preston-Dunlop's concern to integrate less objective, but nevertheless fundamental contributions; thus entries on current key aesthetic issues, methods of analysis and forms of representation found their way into the dictionary.

The entry on 'Choreography' is worth taking a closer look:

(...) Contemporary performance techniques tend to erase the boundaries between spoken theatre, song, mime, *dance theatre\**, dance, etc. It is important, for instance, to pay attention to the melody of the *diction\** or the choreography of a *staging\**. There is a choreographic dimension in all acting, all movement on stage, in any organization of sign. Choreography has much to do with the actors' movements and gestures, the pace or *rhythm\** of the performance and the synchronization of word and gesture, as with the arrangement of the actors on stage.

The staging does not reproduce movements and behavior from everyday life as it is. They are stylized, rendered harmonious or 'readable', co-ordinated for the spectator's gaze, worked and repeated until the staging is, so to speak, 'choreographed'.<sup>49</sup>

(Pavis, 1998, p.53)

While this entry on *choreography* unmistakably reflects a conception within the domain of theatre, it is simultaneously truly interdisciplinary in its attempt to elucidate aspects of a theatrical term (such as *staging*) in the light of a classical dance word (such as *choreography*).

And yet, read by people from the dance field, this entry on choreography may be discussed quite controversial, and even rejected as an appropriation or misinterpretation of the term, by those who have developed other sets of values.

### **3.4 Interdisciplinary collaborative research on a contested concept in choreography**

Scott deLahunta and Philip Barnard have conducted very insightful collaborative research on this matter. Investigating the question "What's in a Phrase?" deLahunta and Barnard started precisely by examining diverse and sometimes antagonistic approaches to the concept of the dance phrase, which is attributed to Doris

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<sup>49</sup> The terms in italics refer to other entries in the dictionary.

Humphrey's and her seminal *The Art of Making Dances* from 1959. Their stance is that although some choreographers may reject Humphrey's ideas and values, movement still is "composed of temporal subdivisions, whether they are referred to as phrases, units, segments or parts", and "phrasing in dance making may be unavoidable" (DeLahunta & Barnard, 2005).

Janet Landsdale's claim, that there is no one set of principles, practices and choreographic theory, is a yet another starting point for deLahunta's and Barnard's specific research into the concept of the dance phrase. In response to Landsdale's call for close interrelation between watching, analysis and making of dances, dance researcher deLahunta and cognitive psychologist Barnard carefully designed a cross-disciplinary methodology in collaboration with British choreographer Wayne McGregor and ten dancers of the Random Dance Company. Entitled "The Viewing and Parsing Exercise" this study consisted of the conception of eight choreographed sequences varying in duration from 25 to 120 seconds, and subsequently of the two-stage procedure of viewing and parsing this material.

McGregor and the dancers were given time to familiarize themselves with the sequences first, and then were asked divide or 'parse' each sequence into smaller units. It was entirely left up to the participants to resolve what a 'unit' was and what criteria and processes they might use to accomplish the task of specifying the time at which a unit would begin and end.

In their analysis of the quantitative and qualitative results of this study deLahunta and Barnard place emphasis on the extent of variation in the unitisation made by the participants, as well as the possible sources of this variation.

A core feature of why phrasing is problematic pervades their (the participants) discourse. Parsing and structure is accomplished in relation to some attribute or coherent sets of attributes as they evolve over time. Since its not possible to parse concurrently in relation to all attributes, its necessary to invoke decision processes and schemes not just for the division of time but also to accommodate multiple perspectives such as the role of the task, learning/teaching, and exactly what to attend to in dynamic bodily configurations. (...) While the dancers unitized the full sequence, McGregor, the choreographer, tended to select only a few units of choreographic interest, leaving other segments of movement, labeled 'choreographic waffle', unparsed. (DeLahunta & Barnard, 2005, p. 8)

The insight that all parsing occurred in relation to the individual's differing sets of attributes, which in turn correlates to the particular professional role of each participant, probably might have been expected by the researchers. What follows from these results is far more exciting: the viewing and parsing exercise might evolve into a methodological tool allowing the change of perspectives, facilitation of the different roles and understanding what the choreographer seeks in the making of a work. If a multimodal perspective of the concept of the phrase is adopted, not only diverging approaches of different choreographers to the idea of phrasing could be accommodated. The same movement material could be subdivided and phrased in ways that best suit the needs of a dancer teaching a colleague, a teacher working with a student, a choreographer selecting interesting parts, or a dancer performing the sequences on stage.

### **3.5 A generative dictionary for research on research**

A different group of researchers share deLahunta and Barnard's concern for the relational dimensions of any concept, idea or term used in contemporary performance.

In their article *Re-received Ideas, A generative dictionary for research on research Part 1* Gwen Allen, Iain Kerr and Chris Thompson present the theoretical framework for a "generative dictionary of key themes and terms in contemporary performance research" (Allen, Kerr, & Thompson, 2006a, p. 55). Based on Gustave Flaubert's utterly satirical *Dictionary of Re-Received Ideas* (1911-13) and Fluxus artist Robert Filiou's self-reflective inquiry into research methodology, *Research at the Stedelijk* (1971), Allen et al.'s twelve-page short generative dictionary (Allen, Kerr, & Thompson, 2006b) materializes their critical reflection and artistic concerns regarding a dictionary project for contemporary performance.

Often lists of key terms – for a discourse, a field, a process or series of them – do not reach out to engage with the relationalities between the terms, whose interactions produce the space of meaning. Stein and Hemingway used essentially the same words; their relations make the work so different.

(...) The dictionary has long been considered useless when it comes to dealing with the intricacies of artspeak. (Allen et al., 2006b, p. 56-56)

Following a witty discussion of the terms ‘concept’, ‘conceptual art’ and ‘concept art’ based on dictionary entries and other sources, Allen et al. arrive a remarkable suggestion:

Maybe it would be interesting to see what would happen if, instead of thinking of conceptual or concept art, we spoke of conceptacle art. As we found in our dictionary travels, a conceptacle is an organ or cavity enclosing reproductive bodies. If thinking is the kind of endlessly reproductive affair that we like to imagine it to be, perhaps we should speak not in terms of concepts – the forming of them and the wielding of them – but of conceptacles, a term that enfolds into the concept the action of both housing and effectuating reproduction.<sup>50</sup>

Consequently the *generative dictionary for research on research* adopts a guerrilla type of approach towards lexicology, appropriating methodologies to produce an apparently nonsensical and satirical mini-dictionary, which causes the reader to think hard on a number of levels about the entries. Eventually – after a series of attempts to trace different relationalities and enter the various ‘spaces of meaning’ – the reader senses the fresh creative energy in this Fluxus-spirited work on contemporary performance research.

In fact all entries reveal strategies commonly employed by many artists during the diverse stages of their respective creative processes. A second, more thorough reading examining this aspect helped us to identify over a dozen approaches to generate performance material, structure, presentational strategies etc:

1. Phonetic associations allow to link words and terms, which are written differently and are unrelated in meaning
2. Entries remain blank, there is simply no text
3. The contributor’s idiosyncratic use of the term allows surprising, humorous and sometimes ironical interpretations of the term; this idiosyncratic use represents the only entry in the dictionary
4. Satire, sarcasm, irony and exaggeration are used to critically reflect on a term or its use

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<sup>50</sup> Ibid. p.57

5. An entry consists of a set of instructions in the tradition of Happenings and Fluxus
6. A collection of (working) questions comprise the entry
7. Terms are introduced and/or discussed based on personal, empirical experience
8. Personal strings of associations are referred
9. Entries consist of images with or without notes or commentaries
10. Some entries reference performances, or ideas for performances, which may have taken place during the year indicated; or they may be fictional
11. Collections of statements or perspectives on a certain term by public figures are presented
12. A fictitious interview of one artists/contributor with himself in a different role is included
13. Handwritten or typed notes and comments on a particular entry are superimposed in the published version, indicating a continuous state of discussion and reviewing between the collaborators
14. 'Serious' academic articles on certain terms also find their way into the dictionary

The list of strategies presented above is neither conclusive, nor complete, but certainly exemplifies an array of widely used creative techniques in contemporary performance. Interesting here are the terms 'generative' and 'research on research' in the project's title. 'Generative' indicates the process-oriented nature of the artistic research, which focuses on creation. Terms are used as a starting point, to discover their possible meaning(s), or to generate meaning through a variety of artistic methods. 'Research on research' references Robert Filiou's project at the Stedelijk museum in 1971, where he investigated artistic research and its methodologies. While academic reflection and writing can be integrative part of artistic research, the greater part of artistic methods and techniques in the past was developed towards creation and therefore is essentially different in nature.

The *Re-Received Ideas* dictionary contains a wealth of examples for creative strategies, which are manifest in the terms it presents, rather than describing them.

Interestingly the project is published in volume 11, no. 1 of *Performance Research* entitled 'Indexes', a term designating an (alphabetically) ordered list of items that make up a certain set.

### **3.6 The Lexicon of Contemporary Performance**

Some of the entries in the *Re-Received Ideas* dictionary are also listed in a parallel, though larger project published in the subsequent issue of the same journal, called *The Lexicon of Contemporary Performance*. This project places a similar emphasis on a relational approach:

So this lexicon is yet another attempt to 'take up the fragmented world and find its living connections' – but here through a fully relational rather than formal approach to the question of which terms or concepts are informing and impacting upon current performance in the broadest sense. One of a number of ways in which this relationality is further playfully encouraged in the polymorphous and polyvocal material that follows is through a typographic signaling of the displacements or migrations of key terms between individual entries. Categories leak, meanings circulate and proliferate as these words find new contexts, connectivities and differences elsewhere in entries for other terms (Allsopp & Williams, 2006, p.v).

Put in more technical terms, keywords in a given lexicon article are highlighted through bold letters, and thus call attention to the fact, that the same word or expression will resurface in a different context, probably in several other entries. Reading chronologically through the lexicon, rather than navigating fragments of the work, one senses a peculiar continuity and beautiful intertextual weaving, not unlike the experience of being absorbed into a well-written novel. In fact there are striking similarities with the multiple interwoven strands of narratives, multifaceted perspectives on events and characters, and delightfully intelligent play with the sound, multiple contextual meanings and typological appearance of the word in literary works such as James Joyce's' *Ulysses*.

Owing in part to the *Fragments of The Intersubjective Encyclopedia of Contemporary Theatre*, conceived of and published by the journal *Theaterschrift* in 1994, *The*



*Lexicon of Contemporary Performance* adopts the idea of publishing a partial and fragmentary 'assemblage of ideas', a 'play of concepts – aesthetic, performative, political, analytical, propositional, playful etc'. ("Lexicon of Contemporary Performance ", 2006, p. 5)

The function of the contemporary lexicon has shifted from a mode of translation and description, via a conventional and purportedly objective means of definition (for example the many and predominantly 19<sup>th</sup> and 20<sup>th</sup> century dictionaries of theatre or performance terms) to an assemblage of ideas: a 'glossary of overdetermined usage' as Bojana Cevejic and Ana Vujanovic call it in their issue of *Maska* on 'Open Work' (2006). (Allsopp & Williams, 2006, p.v).

Although the lexicon refers to other recent lexicons of its kind, notably Patrice Pavis' *Dictionary of Theatre*, with whom it shares the concern of clarifying those terms and concepts that inform and impact on contemporary performance, there are no attempts made at categorizing, or creating theoretical frameworks for the chosen entries. As mentioned above, 'the assemblage of ideas' has a quasi-literary quality to it, involving rather than merely informing the reader.

What distinguishes this editorial endeavor is the 'recurrent focus on the wide array of contemporary practice that uses alphabets, archives, lists and indexes as a generative source'.<sup>51</sup>

**BLOOD** gore blut thirsty poisoned spottled soaked enough to freeze your he was spitting blood bloody good bodied blooded life blood blood is thicker than water bad blood new blood young blood blood feud blood brothers blood ties blood lines blood rush blood wedding no bloody good you blood sucker blood clots coagulates blood and thunder blood and guts blood and gore smear stain drip drop spill pump sweat drink leak pump blood let bloodless full sanguine sang froid precious blood river of blood simple blood pressure blood red blue blood blood orange (...) ("Lexicon of Contemporary Performance ", 2006, p. 16)

The entry on blood (citation above is about a third of the original text) in the *Lexicon of Contemporary Performance* is truly remarkable. Part of the *Marathon Lexicon*, a

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<sup>51</sup> Ibid. p.iv

twelve-hour performance lecture curated by Tim Etchells and Adrian Heathfield and performed by Forced Entertainment in 2003, this entry can be seen as a lexicon inside a lexicon, a truly intertextual approach to selected concepts and terms. At the same time this article serves as a documentation of both, the event and the performative text. And thirdly, analogous to the entries composing the *Re-Received Ideas* dictionary, this item is expression of and reveals the underlying creative strategies used for writing and performing.

While the *Marathon Lexicon* certainly represents a form of artistic contemporary practice, which uses alphabets, archives, lists and indexes as a generative source, it is not only a means to an end, but also results in a performance that reveals and reflects the creative process of its authors.

### **3.7 Performed research: a living encyclopedia of movement**

Canadian choreographer Lynda Gaudreau's six-year project *Encyclopædia* (1999-2005) in four installments was also conceived and performed for a theatre audience but differs from *Marathon Lexicon* in many aspects. In an interview with Yannick Dufour, Gaudreau explains:

Even if my dance seems very 'written', in my case it would not be appropriate to speak of phrase of movement. I focus on each unit of movement and I only choreograph one movement at a time. I make series of 100 movements. Each unit is completely different from any other. In relationship to language, there is something similar, an alphabet. However in dance it is renewed each time. My letter A doesn't exist, I have lots of letter A's. (Dufour, 2001)

In 2001 Gaudreau combines the first two installments *Document 1* and *Document 2* to present *Compilation*. Movement series such as "50 feet in line, the 100 moving feet, the 50 hands on the floor, the 270 hands, and others" comprise the collection of movement series. Gaudreau's project thus is a 'living encyclopedia of movement', which comes into being for the time of the performance.<sup>52</sup>

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<sup>52</sup> See Introduction of The Encyclopædia Project at [www.lyndagaudreau.com/info/e/crea/ency.html](http://www.lyndagaudreau.com/info/e/crea/ency.html), accessed January 2011

*Encyclopædia* originated from Gaudreau's passion for the world of documentation, and a major research interest in the project's beginnings was a question shared by many choreographers: how to preserve the choreographic gesture?

I don't write the choreography of my shows on paper. Choreographic work does not always require me to take a pen to translate movement, it would be fastidious. One could do with Laban's system, for example. With video today one can go about it differently, even if it is just a visual substitute. In doing so, one realizes that the body alone holds memory.<sup>53</sup>

Consequently Gaudreau's *Encyclopædia* can only exist in performance, and thus elegantly demonstrates the impossibility of creating a reference book of live performance accessible to the audience other than through witnessing the actual stage work. Otherwise, this encyclopedia is inaccessible for the spectator; all one can consult is information about the project: video clips, photos, writings, references, in short: documentation.

Interestingly Gaudreau chooses the term 'document' for her performances, which Merriam-Webster defines as 'evidence, proof; a writing conveying information'. What exactly is evidenced, what kind of information conveyed in *Encyclopædia*?

In *Document 1* Gaudreau works not solely from the movement series described above, but incorporates choreography by Meg Stuart (*No Longer Readymade*, 1993) and Benoît Lachambre (*Solo à la hanche*, 1999), the video dance *Hands* (1995) by Jonathan Burrows, choreographic images by Daniel Larrieu (*Feutre*, 1999) and ultimately interviews about dance and creativity with Barbara De Cronick and Jérôme Bel.

Dance critic Johannes Odenhal, who accompanied and contributed to *Document 1*, regards this form of collaboration towards such a polyvocal work as Gaudreau's "perspective of cultural production", which is difficult to describe in terms of choreography (Odenhal, 1999). Gaudreau herself emphasizes her desire to "retain and preserve some of the work produced by today's artists", who "for the duration of the event (...) will interact, converging with my own work".<sup>54</sup> Elsewhere she states "I

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<sup>53</sup> Interview with Dufour

<sup>54</sup> Introduction of The Encyclopædia Project

want to approach *Encyclopædia* from a personal perspective, as a scrap book. As a personal book of meetings that I've had – my sources, what stimulates me, what I'm doing" and "While [I was] away, I met all these creative artists, and that's the motor of my creativity. And I want to show the public my path, share it with others" (Szporer, 2002).<sup>55</sup>

*Encyclopædia* evidences the extremely hard-to-grasp rich network of interrelated contemporary artists and their mutual impact on each other, their collective concerns and diverging positions. It is an obvious truth that dancers train, work and perform with several choreographers and many other performers during their careers, inevitably influencing and shaping each others' personalities, methods and individual vocabulary. Nevertheless it is rarely acknowledged by artists that their particular individuality emerges from intense dialogue with other human beings and particular circumstances and conditions in the surrounding environment. In this sense all of Gaudreau's 'Documents' evidence and expose layers of contemporary choreography hardly ever visible to the audience, through a dense, polyvocal performative text.

And yet the collaborative model adopted by Gaudreau also reflects the way in which all great encyclopedias of the past have emerged, as co-authored compilations of hundreds or thousands of articles on specialist subjects.

One of the most famous encyclopedia projects, the *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers*, edited between 1751 and 1772 by Jean le Rond d'Alembert and Denis Diderot, inspired the work on *Document 1* in a particular way. Gaudreau took images and plates from the *Encyclopédie* depicting sculpting tools from the era and used their graphic structure for movement research and creation. This translation process from one artistic language to another occurs in all four installments of the *Encyclopædia* project. In Szporer's words, the project is Gaudreau's "research lab where she filters information from movement, thought, and life in general. Here, other forms of expression, including literature, video, photography, film and installation, are intimately linked with gestural invention".<sup>56</sup>

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<sup>55</sup> Retrieved from: [http://www.lyndagaudreau.com/info/indexf\\_e.html](http://www.lyndagaudreau.com/info/indexf_e.html), accessed January 2011

<sup>56</sup> Ibid.

Peter Boenisch uses the term 'transcoding' to describe this process of intermedial translation. He describes *Document 3* (2002), in which Gaudreau explores a sound installation designed by Alexandre St Onge and Christof Migone, as follows:

Each of the four dancers in the piece wears a highly sensitive microphone attached to their shirts. Consequently, each rustle of the cloth, every single breath, and each resonance of their dancing bodies is immediately transcoded into sound and projected into oversized dimensions, with the sounds loudly amplified on the public address system, while being additionally transformed through using reverberations, echoes, feedback noise and other sound effects. (...) *Document 3* creates a striking *acoustic dance*, allowing the observers to be an actual audience of a dance piece by listening to the performers as they utter body language via the microphones (Boenisch, 2006, p. 163)

In his essay Boenisch also suggests that *Document 3* exemplifies 'sonic intermediality', the third of three proposed categories of intermediality. The transcoding activity of the body creates an 'acoustic dance', a choreography that can be 'listened to'. Boenisch's approach is particularly useful here, as he employs the concept of intermediality in dance without an emphasis on the use of new media technology, but investigating the processes of de-mediation and transcoding. The difficulties of describing Gaudreau's work in terms of choreography mentioned by Odenthal above reflect the necessity of the intermedial approach, which can be applied to analyze all four installments of *Encyclopædia*.

Boenisch writes:

It is in this semantic plurality of physicality where we may locate intermediality in contemporary dance and look to identify its effects. These will be found when the choreography interferes with mediation and undermines the medium's function of signifying and transmitting a single *authorial* and authorized meaning; when choreographic strategies and dramaturgic decisions reconfigure standardized body-images; when the choreography *translates*, and *transforms* corporal representation; when they present to an audience a *laboratory space* rather than a narrative line of

aesthetic beauty; when dancing bodies irritate, unsettle, even frustrate acts of spectating and observing.<sup>57</sup>

Gaudreau has been extensively engaged in research lab activities, which are branching off her choreographic processes and explore alternative formats for artistic creation, exchange and presentation, but also feedback into her work for the stage. On her web site these laboratories are as carefully documented and presented as her choreographic oeuvre, for example *Lucky Bastard* (2003):

(...) *Lucky Bastard* is a multidisciplinary laboratory bringing together artists from widely different fields. The notion of encounter is at the core of this event: the encounter between the participants, between the artists and the public, and between an artist and an idea. Moving about 'in the now', each artist receives a last-minute trajectory with time and space guidelines, as well as certain actions and gestures to execute. Each individual is unaware of the others' trajectories. Each one acts on his/her own and sometimes, without knowing it, in a duet or in a group. 'More and more, there is a kind of formatting in performances. This is why I was searching for a different way of creating, away from the usual production schemas', explains the choreographer. Is it a performance, a representation, or a creation process? 'I wanted to develop a project bringing artists and the public together, but not necessarily based on what they have in common', specifies Lynda Gaudreau. 'I am interested in things that don't go together, bastard associations. With *Lucky Bastard*, there will be no rehearsals, only meetings, successful or not, between creators of all disciplines'.<sup>58</sup>

Subsequently *Document 4*, the closing installment of the *Encyclopædia* series, was not only developed through a series of artistic residencies and laboratories, but presented to the audience what Boenisch calls a 'laboratory space' on stage. Gaudreau's encyclopedia, which started out as a research into (intermedia) methods for the creation of movement series, closes with a collection of further (research) questions addressing perception, motivation, decision-making processes and movement organization: "What do we see when we are not looking for meanings or ideal abstract forms? When does something strike our attention in the vast array of seemingly random behaviour? How can the spectator be brought to perceive a

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<sup>57</sup> Ibid., p.152

<sup>58</sup> [www.lyndagaudreau.com/info/indexf\\_e.html](http://www.lyndagaudreau.com/info/indexf_e.html) accessed January 2011

sensation, to be captivated by an emerging order, which in the next moment will be submerged by another flow of information? What methods of composition can we use when we don't compose by form, structure, narrative or expressive content?"<sup>59</sup>

In summary, projects like Gaudreau's *Encyclopædia* and Forced Entertainment's *Marathon Lexicon* can be considered 'performed research' in a 'laboratory space', which may be performed on a traditional stage, or manifest in other alternative formats and spaces. The terms 'lexicon', 'dictionary', or 'encyclopedia' serve as a metaphor for artistic research, as structuring device, and as theme for the live performance, rather than as a descriptor for fixed compilations of concepts, principles, documents and relevant data. A 'performed lexicon' may serve as a link between the process of artistic creation on one hand and performance theory and documentation on the other hand, incorporating and fusing elements of both worlds.

### **3.8 Developing and using generative indexes to produce an evolving lexicon for the creative process**

Yet other creators use lists, glossaries, indexes or lexica in their creative process without making their methods transparent for an audience as an integral part of the work's public performance.

Norah Zuniga Shaw (Shaw and Lewis, 2006) for example shares her insights on developing and using generative indexes to produce an evolving lexicon for the creative process independently from the live performance, by writing an article with her collaborator on the *Inflecting Particles* project, Matthew Lewis.

'Inflecting Particles' integrates generative art, dance, collaborative experimentation and the many performativities contained within each. The project is as much about the rigorous and playful construction of a unique interdisciplinary process as it is about final theatrical productions. We seek to create ways of working that bring our disciplines together in an integrative space where neither the code nor the body is in a position of primacy. The material (movement, text, imagery, structures) we are generating through this system of exchange, which is in an early phase, will

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<sup>59</sup> Ibid.

eventually be used to create an intermedia performance that synthesizes the generative drawings with dance improvisation for an audience (Shaw & Lewis, 2006, p. 76).

Shaw and Lewis' meticulous and articulate reflection on their shared collaborative process and the emergence of an appropriate methodology to engage in a truly interdisciplinary dialogue certainly accounts for innovative artist work. However, their work is probably even more important for the dance and technology community, as it provides a rare and precious insight into the ways that a computer scientist and digital artist might communicate with a choreographer and dance researcher. Shaw and Lewis reference dance critic Marcia Siegel who claimed that each performance has its own unique lexicon that emerges while one is viewing the work.<sup>60</sup> Siegel's idea of the emerging lexicon resonates with their creative process, where, contrary to the conventional use of the term, the practice of indexing 'happens throughout the creation of the work, enacting change in our process'.<sup>61</sup> In a first step intersecting approaches were looked at through careful examination of existing lexicons of programming, contemporary dance, drawing, technology-based art and other writings and research. This preparatory research revealed analogue processes in dance improvisation and computer science, which could be utilized to create indexes with generative potential for further artistic ideas and working methods. Dance improvisation for instance relies on sets of rules designed to generate movement material and performative structures. Analogue to this process algorithms (or computational rules) constitute the very base for programming. During this first phase of studying possible intersecting approaches it became apparent that there were also unintelligible regions within the respective disciplines. Consequently these areas had to be carefully 'translated' and thus made accessible to the other. Combination and translation of indexes for generative drawing and choreography eventually resulted in an open, expandable and evolving lexicon, which often would contain multiple conceptions.

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<sup>60</sup> Siegel quoted in Zuniga-Shaw et al.2006), *Inflecting Particles*, p. 84

<sup>61</sup> *Ibid.*, p.84



Such a co-authored or multi-authored emerging lexicon requires adequate writing tools, and subsequently Shaw and Lewis suggest that Wikis, SubEthaEdit, Writeboard, or similar software and online applications can advance interdisciplinary indexing. As to the form their 'evolving lexicon' might take they also envision alternative formats, for example a 'online shared URL bookmarking database that allows users to find and organize their bookmarks, discover related sources, and track other users' links'.<sup>62</sup>

### **3.9 Design specifications of interactive systems and glossaries for the artistic process**

Frédéric Bevilacqua, leader of the Real Time Musical Interactions team at IRCAM - Institute for Music/Acoustic Research and Coordination in Paris, has been developing a *gesture-follower* with his collaborators, which compares a motion-captured performed gesture in real-time with a set of prerecorded examples stored in a database. To this end machine learning techniques are adapted from the field of artificial intelligence research, and combined with 2D or 3D motion capture technologies.

Bevilacqua's research into high-level parameters of movement, which he compares to the concept of movement qualities used by choreographers, led him to criticize the available poor tools of interpreting captured motion data (Bevilacqua, 2007, p. 27). Prevailing methods follow the 'mapping' (of sensorial input to multimedia output) approach, indicating a spatial organization of the capturing process (tracked objects size, position, velocity or relation is measured). On the contrary, the gesture follower uses a time-based approach. The crucial step in gesture-following consists of the careful selection and recording of movement phrases that are considered representative for a particular gesture vocabulary. Performed gestures are then captured in real-time and compared to these time units, or phrases, stored in the database.

In order for the gesture-follower to work efficiently, this database has to be conceived of according to physical, psychological and semantic criteria, and will naturally represent solely a particular artists' universe. However, Bevilacqua has engaged in several collaborations with renown contemporary choreographers, such as Hervé

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<sup>62</sup> Ibid., p. 84

Robbe, Myriam Gourfink and Emio Greco I PC. As the gesture-follower was developed through these diverse collaborations, Bevilacqua came to realize that the gesture-follower as methodology “is independent, to some extent, of the motion capture technology itself”.<sup>63</sup> Evidently the technology continues to be chosen according to the type of movement to be captured, but essentially the gesture follower tries to solve a general problem with motion capture: the gap between gesture representation and the actual captured data.

It is right in this gap that an artistically coherent system needs to be created, including both, the movement phrases recorded for the database, and the terminology representing the gestures, which allows the meta-dating of recorded material. Once the database and metadata exist, the gesture follower can come to qualitative conclusions about the motion captured in real time. Qualitative interpretation of motion capture data represents an important advance towards the embodiment as well as the analysis of artistic intention.

Interestingly, the publication resulting from the *Notation Research Project*, in which Bevilacqua participated, is entitled ‘Capturing Intention’ (*Capturing intention : documentation, analysis and notation research based on the work of Emio Greco*, 2007). In the context of the manifold artistic research activities carried out by Emio Greco and Pieter C. Scholten and their dance company EG I PC, ex-dancer and researcher Berta Bermúdez initiated the *Notation Research Project* in 2004. The focus of this (ongoing) project is: “what notation system can capture inner intention as well as outer shape of gestures and phrases?”<sup>64</sup> A parallel project, the planning and making of a documentary of the workshop Double Skin/Double Mind (DS/DM), which contains the fundamental choreographic principles of EG I PC and aims at the preparation for creation and performance, served as the concrete research matter for the *Notation Research Project*. The documentary of the DS/DM workshop, an interactive DS/DM installation, and the publication *Capturing Intention*, accompanied by an interactive DVD-ROM, were concluded by the end of 2007.

During this rich interdisciplinary research process, Greco and Scholten came to realize that their capacity to be clear in their description of the principle components of the DS/DM workshop was essential for annotation and capture processes and

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<sup>63</sup> Ibid. p.29

<sup>64</sup> Ibid. p. 5

techniques. In Bermúdez words, “the body has to be clear and the words have to be right”<sup>65</sup> in order to capture and communicate intention, no matter what medium is chosen. A choreographer or dancer passes a dance onto other dancers through instructions and words; in the interactive DS/DM installation audiovisual instructions and feedback are given through the prerecorded examples of Emio Greco; and the interactive DVD-ROM works the same way, except the user’s movement can’t be tracked as in the installation situation and is simulated by the movement of the computer’s mouse.

### **3.10 Collaborative research with a linguist**

The task of conceiving a (movement) database and its guiding structural principles, which is representative of a given choreographer’s vocabulary, can be further aided by linguistic methods, such as defining concepts, indexing, and organizing entries in form of a glossary, lexicon, dictionary, or encyclopedia.

Recently (2008) Portuguese linguist Carla Fernandes has been invited as an international consultant for the *Inside Movement Knowledge* project, which is the continuation of *Notation Research Project*, and consists of Emio Greco I PC’s investigation into systems for recording and transmitting the essential elements of their creative work.<sup>66</sup>

Fernandes has been working for years on a system of linguistic annotation of contemporary dance works. Adapting methodologies for the annotation of text corpora, Fernandes continues to develop multi-modal forms of linguistic annotation based on videos captured during the creation, rehearsal and performance stages of Portuguese choreographer Rui Horta’s Trilogy *Pixel*, *SetUp* and *Scope*. Beyond the analysis of movement material, categories for annotation also include verbal and multimedia resources, light design, stage design, costume, sound and eventual audience participation. To this end she has first been using Michael Kipp’s video annotation software ANVIL, which was originally developed to generate conversational gestures for an animated embodied agent based on annotated text

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<sup>65</sup> Ibid. p.6

<sup>66</sup> See <http://www.ickamsterdam.com/> accessed January 2011

input.<sup>67</sup> However, more recently Fernandes uses the video annotation software ELAN, developed by the Max Planck Institute, Nijmegen, Netherlands.<sup>68</sup>

At the present Fernandes is applying her methodology within the framework of the continued *Notation Research Project* to aid Bermúdez in developing a glossary accommodating the main creative principles of EGIPC's work.

Since February 2010 Fernandes has joined forces with Nuno Correia, coordinator of the Interactive Multimedia Group at the Universidade Nova de Lisboa, Portugal, to develop a custom-built video annotator. Under Correia's supervision a video annotation tool called V Annotator was built in at the UNL within the framework of the European research project *Vizard*. The V Annotator was conceived of as a tool to augment documents, rather than merely describing material for later retrieval. Annotations, or the addition of meta-data, are seen as a way of accommodating multiple perspectives of video content (Correia, Costa, & Guimarães, 2002). Applying a timeline model, which supports the representation of time-related multimedia content, events are organized into multiple tracks. Events can have a number of tagged values acting as qualifiers, which are labeled with a string of text. Video-lenses that define interpretations of the events and their qualifying tagged values provide the semantics of this qualification. In other words, video-lenses are designed to provide interpretations of the multimedia content according to the specifications required by the user.

Since 2002 Correia and his collaborators have been working on important improvements of the video annotator: the development of detection tools allowing automation in data interpretation, user input features, the import from external sources and the capacity to adapt the interface according to the user's requests. The collaboration with Carla Fernandes on her *Transmedia Knowledge Base for Contemporary Dance* (TKB) project (2010-13) will help Correia and his team to further develop and test their video annotation tool within the framework outlined above.

The interdisciplinary TKB project is an international research project envisioning the creation and development of a knowledge base to document, annotate and support

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<sup>67</sup> See <http://www.dfki.de/~kipp/dissertation.html> accessed January 2011

<sup>68</sup> See <http://www.lat-mpi.eu/> accessed January 2011

the creation of contemporary dance pieces, in Portugal and abroad. It consists of three main components:

1. Linguistic annotation and indexation of videos from Rui Horta's trilogy *Pixel, SetUp and Pixel* (as a first case study towards an online archive for contemporary dance in general)
2. Software development for annotation and motion analysis: custom-made annotator and knowledge management system / research on automatic recognition of motion
3. Creation tool: iterative design of the user's interface (to be applied to other interested choreographers as well)

Within the first task of linguistic annotation and indexation a specialized glossary will be created to define the terms used by the particular choreographer and his collaborators. The other novelty in the TKB project (for example in comparison with the *Decentering the Dancing Text* project) is not so much the creation of an archive, or its innovative methodology, but rather the simultaneous use of the glossary and databases as a tool for the creative process and choreographer's personal archive. The development of a prototype of a creation-oriented tool will be based on the outcomes of the earlier stages of the TKB project; particularly on the results of the annotated video corpora and the possibilities provided by the software development. A choreographer's creation process is evidently highly individual and specific, which is why this task will be approached from a combination of the practitioner and researcher's perspective. Being a choreographer and researcher myself, I was invited to test the TKB interface regarding my own creative process and methods.

The TKB creation tool is being designed by Urândia Carvalho, will be developed at FCT/UNL under supervision of Nuno Correia, and tested by Rui Horta and Stephan Jürgens. Chris Ziegler, who has already developed several well-known visualization tools for contemporary dance,<sup>69</sup> was invited as a design consultant.

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<sup>69</sup> See for example *Improvisation Technologies* (with William Forsythe), and the *DS/DM* installation and DVD-ROM (with Emio Greco I PC)

### 3.11 Beyond specialized techniques and disciplines

Amongst all the examples of related work above a fundamental reference has been kept for the end of this section: the *Dictionary of Theatre Anthropology* by Eugenio Barba and Nicola Savarese (2005). The reason being that this essential work is based on a totally different approach, which resonates and inspires our own methodology. In his preface to the dictionary Barba repeatedly stresses that the term 'theatre anthropology' is in fact a new field of study, and not based on the methodology and paradigms of cultural anthropology.

A transcultural analysis of performance reveals that the performer's work is the result of the fusion of three aspects which reflect three different levels of organization. 1) The performer's personalities, their sensibilities, their artistic intelligence, their social personae: those characteristics that make them unique and one of a kind. 2) The particularities of the traditions and socio-historical contexts through which the unique personality of a performer is manifest. 3) The use of physiology according to extra-daily body techniques. The recurrent and transcultural principles on which these extra-daily techniques are based are defined by theatre anthropology as the field of pre-expressivity. (Barba & Savarese, 2005, p. 5)

These 'recurrent and transcultural principles' were identified by Barba and his collaborators at the International School of Theatre Anthropology (ISTA, founded in 1979) during more than 25 years and applied to the actor's and dancer's creative work. ISTA's research focuses on the field of pre-expressivity and the principles that govern the scenic *bios* (the performer's 'presence'), because this methodology enables the practitioner "to learn to learn rather than to learn a technique".<sup>70</sup> As a result the performer is enabled to go beyond specialized techniques and disciplines.

The *Dictionary of Theatre Anthropology* consists of 26 entries, or chapters and approaches the principles both through theoretical discussion and practical sessions. Over the years it has become a popular sourcebook, which helps expanding knowledge regarding the scenic body as well as the spectator's response. Barba defines its purpose in the introduction in form of a mission statement: "ISTA directs its

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<sup>70</sup> Ibid. p.5

attention to this ‘empirical territory’ with the objective of going beyond the specializations of particular disciplines, techniques or aesthetics. This is a question of understanding not technique, but the secrets of technique which one must possess before one can go beyond technique”.<sup>71</sup>

It is this sourcebook approach that has been inspiring the conception of our *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance*. Similar to Barba’s dictionary, though on a much smaller scale, our entries derive from more than a decade of artistic and research projects in the field of Digital (Live) Performance, an ‘empirical territory’ as well, that has been theorized for arguably less than two decades.

#### **4. The Evolving Glossary**

The *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance* is a methodological core component of this dissertation. It is termed *Evolving Glossary*, because we certainly do not intend to propose a definite and limited number of entries, but rather adopt a work-in-progress approach to both, artistic research and creation. Feedback and constructive criticism is welcome and essential to this undertaking, as the overall objective is to investigate and contribute to the development of new compositional tools in the domain of Digital (Live) Performance. In much of the related work in the field with generative lists of specialized terms is referred to as a lexicon, dictionary or encyclopedia. Although our glossary is alphabetically organized, uses definitions, illustrations and references to clarify entries, we consider this set of influential concepts, principles, laws, ideas and methods to be of predominantly practical value for the creative process. There was never any attempt at compiling an exhaustive and entirely representative collection of specialist terminology.

Our methodology, which centers on the design of creative strategies for the use of new media technology in Digital (Live) Performance, accommodates the glossary. As of today, thirty-three concepts and principles constitute the glossary. Concepts are represented by terms; for example ‘accessibility’ (to an interactive work) is looked at

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<sup>71</sup> Ibid. p.5

in terms of 'perceptibility' and 'operability' from the audience and the performers' perspectives.

Given the nature of the object of study, several modalities of knowledge representation are employed: the essence of presented terms is conveyed through definitions, detailed descriptions, examples and illustrations.

Five key criteria were instrumental in the process of selecting the core concepts and principles for our glossary:

1. The sourcebook approach. Low numbers and recent publication dates of research resources attest to the fact that Digital (Live) Performance and Intermedia Performance are very new fields of study. Both areas are empirical and overlapping fields of study, which tend to investigate beyond disciplinary boundaries. Concepts are gained both from the analysis of major art works in the field (corpora), and from empirical research in artistic Labs, including our own research projects, choreography and teaching experience. Theoretical discussion of the presented concepts and principles is accompanied by practical information and suggestions in a learn-how-to-learn perspective.
2. The form this glossary takes can be described as a 'hyperdictionary', to borrow a recent term from lexicology, which refers to a crosslinked multimedia lexical (online) database. Connections made between the terms and entries reflect our proximity to Lansdale's intertextual approach to dance analysis, although we intend to head the opposite direction, the process of artistic creation. Multi-modal knowledge representation, such as verbal definitions combined with several forms of visualization (graphics, charts, images and video) and examples of influential artistic work naturally work best in an online database environment, which is why we chose this form of representation for our glossary.
3. Duplication of similar dictionaries, lexica, or encyclopedia is avoided. Given the vastness of our field of study we felt the urge to specifically focus on what contribution might be useful from the practitioner's perspective, who certainly will frequently opt to combine tools and ideas from varying resources. We have extensively referred to related work in a different section.



4. There are no categories to organize the glossaries entries. We felt that well defined research questions will help to make a much more individual and intuitive use of this glossary, and consequently focused throughout the second to fourth chapter of the dissertation on how to develop these.
5. In the future the glossary will be open to input. Feedback and suggestions for example can be obtained through a forum/newsgroup connected to the online glossary, or alternatively through a blog.

While chapter one focused on the motivation for the conception of our *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance*, chapter two will discuss the practical application of its concepts, principles and methods.

# Chapter Two: Methodology 2 – The Artistic Lab

## 1. Chapter Introduction

This chapter presents the second part of our *Methodology of Bi-directional Transfer*. Here, the artistic laboratory is introduced as a practice based form of artistic research, which in our case is intended to provide a framework, in which the *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance* established in the first chapter can be applied.

In the first section of this chapter we introduce a selection of existing workshop methods and techniques taught by well-known artist in the field, to arrive at the motivation for the formulation of our methodology. The second and third sections of the chapter respectively clarify the essential terms and elements of what we designate the ‘artistic laboratory in the field of Digital (Live) Performance’, and then proceed to introduce different formats and categories of constituent elements of the lab. A final section is dedicated to brief discussion of the integration of the glossary and the artistic lab within the three areas of our investigation, and its relation to the case studies presented in each of the respective chapters.

## 2. Expanding Resources

### 2.1 Johannes Birringer’s critique

In his recent book *Performance, Technology & Science* (2008) Johannes Birringer stresses the need for the development of adequate performance techniques for the work with interactive technologies in live performance. He distinguishes between two generations of interactive systems: the first interactivity is based on a stimulus-response model and maps sensorial input to audiovisual output, whereas the second-generation interactivity evolves in non-causal interrelation between performer and a system with some degree of autonomy, usually developed based on ideas and methods derived from the field of artificial intelligence research.

While Birringer attributes the successful dialogical nature of the performer’s interaction with a second-generation system to the parallel and interconnected use of

operational rules in choreography and programming, he diagnoses a lack of performance techniques regarding other systems:

Moving toward indirect interfaces (optical, magnetic, and ultrasonic sensors or machine vision), however, creators of such performance systems often prioritize the development of software techniques over physical techniques. In innumerable performance experiments of this kind one sees mediocre or underdeveloped dancing/acting. In such cases, perfunctory physical techniques are used to patch the interface rather than expanding the transformational capabilities of the system or developing new re-organizations of the body and its expressive metabolism. The situation tends to be worse, I think, in interactive installations inviting the unprepared public to move and become 'co-authors'.

In an indirect interface, the performers (or participants) are challenged to re-organize their motional, affective, perceptive, and proprioceptive behavior in the environment. The desired aesthetic aim would be to anticipate direct *dance transformations* or *acting transformations* in real-time. In other words, the more complex the technologies behind the interface become, the more attention, creativity, and originality need to be applied to transformative techniques and synaesthetic processes. (Birringer, 2008, p. 154)

We have cited Birringer in some length here, because his critique raises a couple of interconnected questions, which in our perspective need to be addressed in some detail to discuss what might be needed to improve performance techniques in (these kinds of) interactive (performance) systems.

First of all, we will not discuss interactive (dance) installations for the general public, because they should not be confused with performances realized by professionals for audiences in the framework of the theatre or a site-specific public presentation.

Interactive (dance) installations for the general public most often prioritize sets of aesthetic (or perceptive concerns) over an aesthetic perspective, and therefore employ terms such as 'dancer', 'choreography', or 'co-author' from a different perspective, which evidently differs from the use of the same terms in the context of professional productions for the theatre or other public spaces with their conventions and audiences' expectations. Furthermore, Birringer does not clearly explain how his

'indirect interfaces' are related to what he calls 'the first and second generations' of interactive systems.

Digital artist Mark Downie on the contrary clearly describes in his doctoral thesis the differences between prevalent 'mapping' - approaches and artificial intelligence based 'agent' approaches to establishing relations between sensorial input and multimedia output of interactive (performance systems). Downie dismisses most mapping approaches based on their conceptual and technical limitations and proposes a detailed model of what he calls an 'extended agent', which essentially is software acting upon other software that interprets incoming data from motion capture technology (Downie, 2005). This 'meta-level' software allows the dynamic and 'intelligent' interaction between performer and interactive system, which Birringer sees as characteristic for the second-generation interactivity.

In technical terms though *both* first and second-generation interactivity use the hardware Birringer describes as 'indirect interfaces' (optical, magnetic, and ultrasonic sensors or machine vision). The main difference lies in programming sensorial input and multimedia output. We therefore will discuss a variety of interactive systems in more detail in chapter four.

Other sensorial technologies employed in performances measure physical conditions of the external environment (light, temperature, pressure, vibration, electrical fields, etc.) or the internal environment (heart beat, sweat, angle of the extremities, etc.). These technologies often impose particular restrictions upon the performers and challenge the choreographer in quite specific ways.

Kerstin Evert has analyzed Troika Ranch's *In Plane* from 1994, and the 1999 version of this solo for choreographer and dancer Dawn Stoppiello, regarding the dialogue between the human body and interactive technology (Evert, 2003). She describes the technological setup and its components in detail to explore its impact on the choreography. At this time Troika Ranch was using a system they called the MIDI-Dancer, which consisted of a full body suit with sensors measuring the degree of flexion in the various joints, the receivers, and the software allowing the use of data to manipulate audio and visuals. Evert comes to the conclusion that Stoppiello is limited in her movement choice through this system, but on the other hand gains considerable real-time control over the stage technology. In her description of this

early work by Troika Ranch she stresses several times how conceptually coherent the dialogue between body and interactive technology is crafted, particularly because the interface becomes content and is reflected critically.

The critical point in this example is the use of the particular limitations that choreographers and performers experience when working with a certain interactive technology. In the case of Troika Ranch co-directors Dawn Stoppiello and Mark Coniglio have been working jointly for almost two decades on a daily bases. While Coniglio has presented the increasingly powerful software *Isadora* to a wider interested community, Stoppiello has specialized on choreography with interactive technology. Both have shared their knowledge on numerous occasions, namely as their well-known Live-I workshops, which recently have extended from the field of live performance to installation work. Live-I workshops address technical questions as much as performance issues and aesthetic concerns.

## **2.2 Troika Ranch's Live-I workshops**

I had the privilege to participate in the 2006 Live-I workshop, which took place at the 3LD Art & Technology Center (Manhattan, New York) from July 24th - August 4th. The first week focused on the subject of 'Software / Sensors / Technology', while the second week was dedicated to 'Aesthetics and Creative Expression'.

The Live-Interactive (Live-I) Workshop is an intensive seminar for artists and advanced students who wanted to explore the use of interactive computer technology in the creation and performance of dance, theater, installation, and related live artworks.

For the 2006 edition ten workshop participants were selected from Australia, Canada, Italy, Portugal, Scotland, the U.S., and the U.K., working in such diverse fields as musical anthropology, (interactive) installation art, animation within live performance, contemporary theatre, DJ and VJ, special needs education, fine arts with emphasis on digital arts and video art, contemporary dance and choreography, music and sound engineering, and technical assistance to theatre productions.

In Live-I workshops, students learn *Isadora* as the primary software tool for authoring, though they are welcome to bring other software, too. Almost everybody in the 2006 group had already intensively worked with *Isadora* before, and was familiar with video capturing and editing. In contrast to previous years, this group was not so

much interested in exploring the live performance situation, but in deepening their understanding of the possibilities that *Isadora* and video tracking techniques offer. Probably the particular focus of this years' workshop was strongly influenced by Troika Ranch artists' generous sharing of their artistic process and technical expertise revealing in detail how their recent production *16 [R]Evolution*s.

Throughout the workshop Coniglio and Stoppiello introduced several elements of their personal artistic methodology. For example, regarding the use of video projections in live performance, they distinguish between:

1. Video as an environment with performers on stage
2. Video as a 'character' with a dramaturgically conceived 'behavior'
3. Video as a light source illuminating for instance the performers' body
4. Video as 'cinema' without a performer on stage

Workshop participants would then experiment with all categories and show examples to each other.

As Coniglio and Stoppiello denominate their area of artistic intervention 'digital dance theatre' it is not surprising that transdisciplinary use of metaphors and concepts is frequently employed in order to intuitively work with more abstract concepts, such as mathematical functions within the software *Isadora*. A document window in *Isadora* is called a 'stage', onto which 'actors' from 'video-', 'audio-', 'midi-', 'generator-', 'mouse&keyboard-', 'calculation-', 'control-', and 'user-' groups can be placed and connected. Successive 'scenes' can be 'entered' and 'exited' just as in a real theatre piece. A document in *Isadora*, or patch, is a graphic arrangement of modules or functions, which defines a particular way of working with selected digital media. A particularly interesting example of the use of metaphor was the creation a so-called 'sensitive instrument'. Following a simple exercise (making any kind of instrument with an ordinary rubber band) workshop participants had to create a patch that functioned as a responsive instrument, in other words, some kind of sensory input would manipulate or transform selected media files in a particular way. For example, the volume of the human voice detected by a microphone would determine the font size and position of a text line within a video projection.

During the second week of the Live-I Workshop Coniglio and Stoppiello introduced their model 'sphere of interactivity' to situate live interactive work with digital media within a familiar set of parameters of artistic creation:

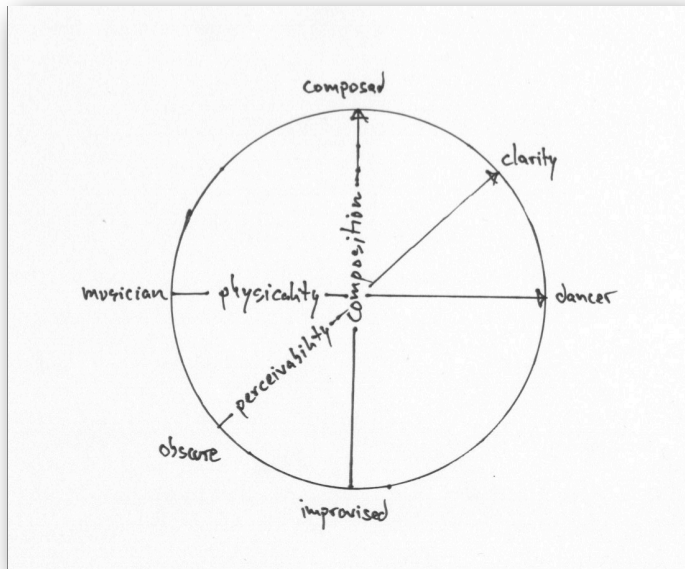


Figure 4. Sphere of Interactivity model

The y-axis of the model represents possible compositional choices. Sections of a piece can be totally composed or improvised, or they may include both elements to a varying degree (a more or a less structured improvisation). These compositional choices are made regarding the media (represented by the musician on the x-axis), or the performer (represented by the dancer on the other end), or both simultaneously. Interaction between media and performer(s) is more or less perceivable, as represented along the z-axis of the model (clarity/obscure). For Troika Ranches' creators and performers the clarity for the performer is essential, whereas it doesn't always have to be obvious to the audience, what kind of (interactive) relationship has been established between performer(s) and digital media.

Workshop participants concentrated during the second week on content-based selection and/or production of media within a specific interactive set up.

Brainstorming and creative writing were amongst the tools suggested to work from an idea towards the 'translation – process', as workshop leaders called it: why do I want to communicate in the media I chose as opposed to another one?

To sketch out some sort of 'dramaturgy of interaction' for each weeklong individual project, Coniglio and Stoppiello suggested distinguishing between three kinds of events:

1. The micro-event (e.g. a bodily gesture triggers a video-clip processed in real-time)
2. The mega-event (e.g. a bodily gesture triggers several media at the same time)
3. The meta-event (e.g. a bodily gesture crosses over into another media)

Since the preparation and experimentation with interactive setups is sometimes quite time-consuming, students would first concentrate on the development of so-called 'self-generating systems', in other words, of patches, which could function through use of the mouse or keyboard simulating input from sensory devices.

Once such a system worked, calibration could take place, if necessary, and then sensory input would be provided by the actual performer, whose position in space, movement velocity or shape changes were interpreted by the software in the same numerical ways that the position of the mouse was calculated before.

Videotaped rehearsal sessions also proved to be a valid alternative of working within the process of going forth and back between the actual interactive choreography in the physical space and the programming of the patches, especially when it comes to more sophisticated set ups, for example the infrared video-tracking.

In conclusion, the Live-I workshop 2006 provided participants with a wealth of practical and theoretical information, which allowed each participant to develop research methodologies for their own artistic processes, and to develop prototypes for interactive systems, or elements of it, that could be refined in the future.

Artistic methods, such as the 'four ways of using video projections', the 'sensitive instrument', the 'self-generating system' and models such as the 'sphere of interactivity' and the 'dramaturgy of interaction' are extremely helpful, both for conceptualizing and realizing a project, and for critical self-reflection of the artistic process.



We believe that this kind of set up for workshop and artistic laboratories provide adequate conditions and techniques that allow the performer “to re-organize their motional, affective, perceptive, and proprioceptive behavior in the environment”, as Birringer recommends in the quotation above.

### **2.3 Correspondences with Robert Wechsler / Palindrome’s methodology**

Robert Wechsler, artistic director of the Palindrome performance group, has worked with motion tracking technology since 1985. In a long-term collaboration with software artist and engineer Frieder Weiss the *EyeCon* motion tracking system was developed, which he still uses in combination with other hardware and software tools for his artistic work.

Much of the teaching Wechsler did with Frieder Weiss led to building a complex artistic methodology, which is adapted to the needs of the student/groups, and includes practical skills as well as theory. In an interview with Marion Barrios Solano, the producer of dance-tech.net, Wechsler comments on the motivation of many artists for the use of digital technologies in live performances:

‘Most of the uses I see it put to, are gratuitous; in other words, I don’t think there is a strong artistic justification actually. And rather, it’s interesting – I think that word applies – and it makes some flashy, you know, some catchy things. But [in] most of the work I have seen, and most of the work I have done with technology, I think, the technology has not raised the artistic level of the work. I don’t say all, I say most, I definitely think there are exceptions, but most of it is, well, gratuitous... or boys with toys, or a step in the direction of MTV and [that] kind of flashy projection effects’.<sup>72</sup>

Further into the interview, Wechsler explains that breeching from the ten-year-collaboration with Frieder Weiss in 2005 allowed him to return to the basics. Deliberately choosing a do-it-yourself approach to the use of interactive technology, he developed a ‘low-tech-high-art approach’ over the course of the past years. Mentioning his current teaching work with four graduate students, he makes clear that teaching the (technical) basics of the EyeCon system takes him a few hours,

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<sup>72</sup> My transcription from the interview on: <http://www.dance-tech.net/profiles/blogs/1462368:BlogPost:11977> accessed January 2011

while digging into the artistic motivation and conception takes the rest of an intensive month of work.

Wechsler's observations clearly resonate with Birringer's critique quoted above, and his methodology offers a valuable way of addressing the need for education and training in this field. Taking a closer look at the contents and methodology of his workshops, correspondences between his work and Troika Ranch's methods and techniques become clear.

In Troika Ranch's 'sphere of interactivity' model for example, the y-axis of the model represents possible compositional choices. As we have seen, sections of a piece can be entirely composed or improvised, or they may include both elements to a varying degree (more or less structured improvisation). Wechsler writes on interactivity in similar terms:

In all cases, interactivity depends on a certain degree of looseness, or openness in the artistic material, which allows for a convincing exchange to take place.

This quality of looseness/openness is similar to, though not the same as, improvisation.

Palindrome's work is probably 80% choreographed, that is, the movements are largely fixed. And yet, even within structured material a certain feeling of play (in the sense of clearance) is necessary in order to generate an interactive effect. If a piece is completely fixed, like television, it cannot be interactive. It would be as if attempting a conversation with someone who already knows exactly what they want to say (the exasperation of which is surely known to all). (Wechsler, 2006, p.5)

Regarding the z-axis of the Troika Ranch model, which represents the perceivability of interaction, Wechsler employs the term 'intelligibility', and states:

(...) the artist really has two separate tasks: one is to employ or design a system that works, or *reads* in the perception of the audience -- i.e. is *intelligible* -- and the other is to find how it can be interesting to an audience and useful to the needs of a performance piece -- i.e. is *artistic*.<sup>73</sup>

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<sup>73</sup> Ibid. p.15

Later he suggests categories for both criteria. In Wechsler's experience interactive art becomes (artistically) interesting when 'Amplification of Gesture', 'Communication with an Unseen Player', and 'Visual or Acoustic Accompaniment' happens. It becomes convincing (or intelligible), through "Education, Timing, Repetition, Intuitive Logic, and Parallel Support".<sup>74</sup>

These categories and parameters translate into concrete suggestions, or, in Birringer's words, performance techniques. For example:

1. Map to multiple outputs. For example, you may wish to link a movement to a particular sound *as well as* to a visual element such as a stage lighting change or video projection element. Although this may seem obscure the correlation, because the mappings are parallel, it will have the effect of reinforcing the connection.
2. Think about camera angles. Choose one, which helps the movements to be accurate and repeatable.
3. Link media events to particular gestures. That way a movement becomes marked in the mind of the audience. I.e. use memorable, movements, those with character, even though technically there may be no advantage to doing it that way.
4. Trigger or control the same events from the same stage positions or from the same body posture even though, again, this may be irrelevant to the system you are using.
5. Look for intuitive mappings (higher body level-to-higher pitch, faster-to-louder, busier movement-to-busier sound, heavier movement-to-heavier sound, etc.). Artists tend to have great reluctance to do this for reasons, which are not entirely clear to us.
6. Near the beginning of the piece, or at least *during* the piece, use the system in a clear and transparent way. In this way, it can explain itself to the viewer. Having done this, the audience becomes sensitized to the interactive experience. They will then be attuned to and accepting of later, subtler mappings.
7. Either before, or after the piece, explain to the audience what the technology is and how it works. There are as many good reasons to do this, as there are not to, but it is an option. Some pieces don't need it, some don't want it, and others simply love it. Either way, whether you do it or not, I will guarantee you one thing: someone will come to you after the show and thank you from the bottom their heart for doing it, just as the next person in line will castigate you for the same thing. (Wechsler, Dowling, & Weiss, 2004, p. 6)

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<sup>74</sup> Ibid. p.18

While all the selected suggestions carefully consider the issue of intelligibility from the audiences' viewpoint, Wechsler elsewhere stresses the importance of the performer been as clear as possible regarding his/her interaction with the system, as the audience also perceives this clarity.

Some artists in fact contest suggestions five to seven, while others subscribe to this point of view in the interest of a larger non-specialist audience.

In Troika Ranch's model the x-axis represents the interaction of dancer/performer with the system (media here are represented by the musician), of which the 'sensitive instrument' exercise is a good example.

Wechsler naturally also contemplates the mapping techniques between sensorial input (triggered by the performer's action) and the media output (see suggestions one to five for example). In a sample of his yet unpublished book *Motion Tracking -- a practical guide for performing artists* Wechsler lists input and output parameters in great detail<sup>75</sup> and subsequently introduces the term 'compliance', which describes the causal relationship between the two:

The third component of mapping, I call compliance. This refers to the nature of the causal relationship; its disposition, direction, finesse, etc. In other words, what the input *does* to the output. For example, if you choose movement dynamic as your input, and music loudness as your output, you still need to decide on how the two are related. Is there a threshold, below which, or above which nothing happens? Does increased movement dynamic cause increased loudness, does it make it quieter?<sup>76</sup>

Many more correspondences could be established between the work of these pioneers in the field of Dance Technology and Interactive Art, but the three examples given in this section certainly allow for a thorough insight into the solid artistic methodologies developed by Troika Ranch and Palindrome.

Instead, we will turn our focus now to several formats of collaborations between choreographers, performers, digital artists, programmers and engineers who use interactive technologies in live performance situations. To this end we will look at the seminal publication *Dance and Technology – Moving towards Media Productions*

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<sup>75</sup> Available from <http://www.palindrome.de/> see p.19-22, accessed January 2011

<sup>76</sup> Ibid. p.23

(2002), which contains a documentation of a workshop series entitled *Dance and New Media* that took place at the Choreographisches Zentrum NRW Zollverein in 2001.

## **2.4 Two categories and three types of workshops**

Martina Leeker writes in her final evaluation and reflection upon the workshop series about two fundamentally different categories to be considered as further education prototypes:

The first category consists of dance with technology workshops, in which electronic digital technologies and media are instrumentalised for use with dance (e.g. McGregor). This kind of workshop teaches dancers and choreographers technical as well as choreographic knowledge and skills that they can immediately implement in their work. These workshops are addressed more to dancers and choreographers. Media artists become a part of the dance and of a targeted aesthetic.

Second is the category of intermedial performances workshop, in which a co-operative and transdisciplinary exchange between dance and media art is attempted. The focus in these workshops lies in the de-/constructive investigation of mediality. This kind of workshop has more of an experimental character and should take place over a longer period of time than those in the first category. Learning success first becomes evident in the mid- to long term. (Dinkla & Leeker, 2002, p. 376)

Regarding distinctions between the aesthetic concerns of the lecturers, their attitude towards the use of technology, the structure, content and methodology of each workshop, Leeker proposes to differentiate three general types of workshops:

1. Teaching rules and strategies for the use of technology in performative and choreographic contexts (Wayne McGregor)
2. Cooperative investigation of how choreographers and dancers make use of electronic digital media and technology (Paul Sermon)
3. Teaching an aesthetic of media art as an example of the use of electronic digital media and technologies in dance (Gretchen Schiller/Robb Lovell)

In our perspective Leeker's suggestions derive from the close observation and analysis of three distinct workshops, and are probably hard to apply to other work in the field in this general form. The Live-I workshop 2006 for example falls between the two categories, which certainly was inevitable given the selection of ten workshop participants with such different backgrounds. On the other hand, descriptions from both categories are helpful to describe the nature of this particular workshop. We therefore don't suggest to dismiss such categorization, but rather would use it to describe partial aspects and perspectives of participants in dance technology workshops.

The same critique applies regarding the three general types of workshops Leeker proposes above. Taking a close look at the extensive documentation, it seems that even within the *Dance and New Media* workshop series at the Choreographisches Zentrum NRW Zollverein different techniques and methods from more than one workshop type were applied in each of the classes. Paul Sermon for example introduces his concept of the 'third space' and teaches very specific rules along with it. As the third space is conceived of as a common telepresent space, allowing participants to cooperate in specific circumstances, the set up of both remote locations must be of the same scale, conditions and situation. This central aspect of Sermon's methodology is very close to workshop types one and three, while there is no collaborative investigation in this introductory part of the class.<sup>77</sup>

In Wayne McGregor's workshop on the other hand, participants also worked within a telematic setting, which was developed in collaboration with the workshop leader. In contrast to Sermon's interface, McGregor's 'Remote Location Studio Set Up' allowed for cameras to be moved and 'choreographed' as well. A 'Group Storyboard' was collaboratively developed to coordinate dancers and their choreographic material in relation to the camera work in both remote locations. As this example shows, in parts of McGregor's workshop 'cooperative investigation' is used as a method, while different techniques were employed in other sections. McGregor states:

It is unlikely that I would ever have a group of five dancers contributing to the storyboard in actual choreographic practice. I would prefer to conceive the storyboard

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<sup>77</sup> Ibid. p.372

on my own. (...) The creation of a storyboard is a way of working that of course didn't originate with choreography for telematic rooms; it comes from the field of film. So we were applying a working method that implies formal and content-related qualities to the setting we were working with at the moment.<sup>78</sup>

In other words, McGregor used various methods of working to open up multiple ways that his students could explore in the future. In part these methods correspond to the second and third type of workshop in Leeker's model, and correspond rather to the second category of intermedial and transdisciplinary exploration. McGregor's wide range of skills in several fields allow teaching across the disciplines, and probably make it much harder to clearly detect the application of intermedial approaches as in similar workshops co-taught by two or more specialists.

In conclusion, we suggest that *combinations* of the categories and types of workshops proposed by Leeker can foster both conception and analysis of dance and technology research, education and artistic activities. Due to the complexity of the work in this field, we have refrained from trying to contribute with this sort of more generalized categorization and models in favor of a modular and combinable organization of our methodology. Some of the useful concepts already mentioned above have been incorporated in our glossary (such as Paul Sermon's 'Third Space'). Examples of both, central concepts/methods and their application in concrete work in the studio will be discussed in detail by means of thematically selected case studies in each of the following chapters.

Back to Dinkla and Leeker's book *Dance and Technology – Moving towards Media Productions*, we feel that the third workshop taught by Gretchen Schiller and Rob Lovell provided concepts and tools beyond the (questionable) dichotomy of body and technology that seem to result from a more integrated approach. Particularly interesting for our investigation is:

1. Metakinesis
2. Training the body as tool
3. Use of the 'pooling'-technique for intertextual work

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<sup>78</sup> Ibid. p.352

#### 4. Eight building blocks for interactive environments

Gretchen Schiller (2002) uses the term *Metakinesis* with reference to John Martin, and defines it as ‘the *identification or empathy of movement* from moving subject to an observer’. Workshop participants were introduced to Maya Deren’s stair scene from *Ritual in Transfigured Time*. Schiller states:

The stairs were framed and edited so that they pull and surprise the subject walking up the stairs. The subject (Maya Deren) moves in response to the movement of the stairs and the architecture as a whole. This was shown to illustrate how the camera, space and movement collectively create new physical spaces and *Metakinesis*. (Schiller, 2002, p. 177-178)

The concept of ‘Metakinesis’ allows Schiller and Lovell to establish common ground for the diverse activities of filming/editing, movement creation and choreography, and the conception/design of the actual interactive environment/installation.

In this perspective all participants’ bodies need to be trained as tool, regardless of previous training and specialization. In Schiller’s words,

Sensitivity to movement and to the body’s relationship to space is necessary to produce this [movement] empathy in images and installations. We tend to compromise body training due to the timely demands of computer operating systems, software, interfaces, and computer integration. For this reason, we spent five days practicing *Gyrokinesis* with Camilla Nold’s guidance. *Gyrokinesis* trains the individual to connect and cultivate physical and imaginary spaces.<sup>79</sup>

Not surprisingly the media artists among the students of this workshop commented on a new kinesthetic empathy with the digital media; and dancers on the other hand rarely get exposed to training with focus on the interrelations between imaginary spaces and the surrounding physical environment.

Training the body as tool as preparation for interactive installation work can be compared to drawing classes for architects: even though today most of the work is done on the computer with sophisticated 3D drawing and animation software,

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<sup>79</sup> Ibid. p.177



students continue to use the pencil. Drawing, sketching out and scribbling is considered a form of thinking and an indispensable tool for contemporary architects, designers and fine artists alike.

Much in the same way the famous art school Bauhaus integrated physical training in their 'Vorkurs' (preparatory studies) module of the undergraduate course in the 1920ies and 1930ies, as they believed that bodily knowledge and sensibility is essential for successful artistic training and work.

Schiller and Lovell's integration of Gyrokinesis classes in their workshop program is particularly thought provoking, because amongst all the possible choices available today for training nonprofessionals along with professional performers they consciously choose the system most suitable for the collaborative installation work that would follow. While this may seem an evident method to employ, it is not at all a standard process, even in carefully designed dance and technology workshops. It is much easier to find custom designed workshops and courses for the use of digital media in live performance and installations, which address the needs of the students adequately.

The intent of the *Interactivity as Choreographic Phenomenon* workshop was expressively different: the focus here was on perceptual changes and the introduction of concepts and methods that allow for an integrative approach towards the designing of and performing in interactive installation environments.

To this end a particular choreographic design tool, called 'Pooling', was introduced, which Schiller took from San Francisco based choreographer Joe Goode. Goode had introduced the term when choreographing intertextual works that included sound, text, movement and images. In Schiller's workshop six pools described diverse elements of the interactive environment, such as the set up and its properties; the role and responsibility of the 'bodysubject' (=visitor) within the environment; the intent of the qualitative and kinesthetic transfer; the influence of sound; the choice of video as part of a tracking system, or as video dance; the design of the interactive system. Pools mutually influenced each other and overlapped at times while consistently remaining the respective properties. Multiple influences and correlations can be represented graphically in form of a chart to visualize connections and the flow of information.

Lovell (2002) presents a short case study in the same book, which resonates with the Pooling approach and its carefully charting of the interrelations between the different elements of an interactive environment. He describes the media structures in an interactive performance space as fluid:

While one can define the components of an interactive performance space, it is not clear how to define the capabilities and limitations of any given media, and more precisely, how to define the building blocks that can produce a specific interactive environment or effect. Each type of media is capable of a range of interactive modes depending on the equipment used to generate and render the media. Each media interacts and depends upon other media in various ways as well. Each type of sensor will have different affinities with various types of media. (Lovell, 2002, p.92)

Subsequently Lovell describes in great detail each element of his model of media structure(s) in an interactive environment. He proposes a chain consisting of Action – Sensing – Processing – Translation – Control – Generation – Manipulation – Rendering. These eight building blocks describe interaction in a mediated environment in much more detail than frequently suggested categories, such as Sensing, Processing and Response, based on which most prevalent mapping approaches relate sensorial input to media output. Evidently the chain structure of this model does not imply a fixed linear progression from ‘action’ to ‘rendering’, but refer to stages of the interactive process, which can be partially repeated before advancing to the next phase; or different stages may occur simultaneously in subparts of the interactive system.

When media are hard to distinguish, bleed into each other, fuse, or artistic work falls entirely between known media, artists and teachers are challenged to work across or outside the disciplines. Working methods such as Lovell’s ‘eight building blocks for interactive performance spaces’ are particularly successful in these kind of scenarios, because they offer participants clear practical guidelines regarding the phases of the creative process, the skills requested for a certain task, and the necessary steps towards the realization of the goal.

The identical working method can be applied within diverse models of collaboration between participants: specialists may work on very specific tasks (for example Lovell

did the programming of the interactive systems for the workshop mainly by himself), while others work across the disciplines on a particular task (for example, the various groups of the Schiller workshop created movement, filmed, edited and conceived of the kind of interaction with the media).

Lovell's model can also be applied beyond the particular workshop he taught with Schiller: e.g. by an experienced team such as Troika Ranch, by autodidacts such as Robert Wechsler (since 2005), or by directors such as Wayne McGregor, who brings a wide range of integrated skills to the process.

We have discussed Schiller and Lovell's methodology in some detail to exemplify the kind of concepts, compositional and technological methods that are relevant for our investigation precisely because of their adaptability to a variety of creative processes and forms of artistic collaboration. Concepts and methods meeting these criteria have been selected for our glossary with the objective to choose and combine the most adequate tools for the respective process.

In this section we have discussed Birringer's account that there is need for the development of adequate performance techniques for the work with interactive technologies in live performance, and consequently presented a variety of workshop formats and methodologies that might serve as models for researching and teaching such performative techniques. At this point it seems appropriate to express our dissatisfaction with the generic term 'workshop' applied to the highly specialized research and teaching work described above. The Oxford dictionary defines 'workshop' as follows:

noun

**1** a room or building in which goods are manufactured or repaired.

**2** a meeting at which a group of people engage in intensive discussion and activity on a particular subject or project.

verb [ trans. ]

present a performance of (a dramatic work), using intensive group discussion and improvisation in order to explore aspects of the production before formal staging : *the play was workshopped briefly at the Shaw Festival.*

Interestingly the verb 'to workshop' has been included here as a result of the extensive use of the term in the performing arts to denote predominantly teaching activities; but in our perspective the term still does not reflect the work described

above appropriately. We therefore suggest to employ the concept of the *artistic laboratory* to stress the dimension of (artistic) research, which in our opinion is not expressed in the term 'workshop', but constitutes a main component of all work referenced above. The next section of this chapter will present a number of influential writings on this subject towards establishing possible definitions and listing the main elements that might constitute such an artistic laboratory.

### **3. The Artistic Lab - Towards a definition**

#### **3.1 The Dance Lab of Kerstin Evert**

Kerstin Evert presented her award-winning *DanceLab - Zeitgenössischer Tanz und Neue Technologien* in 2003 as the first book published on this subject in German. Her insightful study has been an important contribution to theorizing the recently emerging field of Digital (Live) Performance, but also it raises questions regarding her methodology and line of argument. For these reasons we felt the need to discuss some important aspects of this work in some detail.

In the introduction to her study Evert contextualizes the German term 'Tanztechnik' (dance technique) within the broader field of anthropology. Referring to Marcel Mauss and his seminal work *The Techniques of the Body* she defines the term 'Tanztechnik' as a 'Körpertechnik' (technique of the body). Mauss had suggested that the concept of the 'technique of the body' defines the ways in which human beings in different cultures utilize their bodies. In his theory the human body is regarded a technical object, which learns culturally coded movement patterns by means of mimesis. These movement patterns in and by themselves contain specific knowledge and methods as to how the body is utilized regarding a particular objective. For Evert a dance technique shapes, forms and prepares the body for theatrical dance performance over years of intense daily training. Thus the performer's body on stage differs from the everyday body in both appearance and skill (Evert, 2003, p. 9).

Essential for Evert's approach is anthropology theories stance that the techniques of the body can be seen as a first and basic category of techniques that ought to be distinguished from, and later brought into relation to other techniques, which make

use of tools, instruments and machines. Through learning how to use the latter, the human body is recurrently transformed and made an instrument itself, or, in Mauss' terms, 'technesized'. Evert subsequently applies French sociologist Bourdieu's notion of the 'habitus' to describe how the dancer's body executes movement sequences based on the bodily memory, where dance technique and choreographic material have been stored. Each execution also actualizes and augments these movement sequences, so that the dancer takes an active part in the performance process (Evert, 2003, p.10).

Theater is seen by Evert as a technique of producing 'images in motion', which are presented in the frame of the proscenium theatre. She elaborates on the dancer's body as a 'multiple constructed body' in the sense that the body previously formed through dance technique now is staged according to theatrical parameters and choreographic choices. Images of the (dancer's) body on stage always reflect discourse and (artistic) use of the body, and in this respect dance is of particular interest among the performing arts regarding its recent contact and confrontation with new media technologies.

A number of case studies (Merce Cunningham, William Forsythe, Troika Ranch, Birgitta Trommler, Philip Landsdale and Stelarc) are presented by Evert to investigate two main research questions in her Dance Lab:

1. Evert supposes that structures and models of new media technologies are adapted for the choreographic process and style. These adaptations in turn influence the staging of the body and the body images presented to the audience.
2. The following questions arise based on this assumption: how does the trained dancer's body deal with the technology in question? In which ways do technology and body meet? In which ways are bodies presented on stage within their confrontation with the technology? What kind of body images and body discourse are designed and shown on stage?

### **Three examples for discussion**

In her case study on the influence of several media technologies (film, video, digital technologies) on Merce Cunningham's choreography Evert affirms that Cunningham adapts cutting technique and montage principles in film for his choreographic work. In

her view these film-specific techniques are reflected in Cunningham's "choreographic segmentation and isolation of body parts and movement sequences, in his dance technique transmitted in daily training, in dramaturgy and staging parameters, as well as a multi-centered treatment of space" (Evert, 2003, p.85).

Evert claims that Cunningham's movement sequences, which he developed and assembled by chance operations, were already based on the principle of film cut. According to her this principle is used in Cunningham's work with the animation software *Life Forms*. Here keyframes (single images) are edited, assembled, and learnt by the dancers, and result in a staccato quality of the choreography under scrutiny, *CRWDSPCR*.<sup>80</sup>

In her discussion of Cunningham's work with motion capture technology and the software *Motion Flow Editor* Evert attributes the fluid movement quality of the choreography *Biped* to the interpolation between different motion captured movement sequences by the computer.<sup>81</sup>

We have selected these three examples from Evert's case study on Cunningham, because they show clearly how problematic and limiting this approach can become. In part the problems lies in Evert's main assumption that choreographers *adapt* structures and models of new media technologies for the choreographic process and style; and that these adaptations in turn influence the staging of the body and the body images presented to the audience. We will show that adaptation is only one possible choreographic option amongst many others, and certainly not the option Cunningham chose.

Another part of the problem derives from the understanding of what 'technique' and 'technology' means regarding contemporary dance and new media technologies. We will discuss this issue in another section (see this chapter 3.3), after addressing the three selected examples of Evert's case study on Cunningham.

As mentioned above, Evert affirms that Cunningham adapts cutting technique and montage principles in film for his choreographic work, and that these film-specific techniques are reflected in Cunningham's "choreographic segmentation and isolation

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<sup>80</sup> Ibid. p.73

<sup>81</sup> Ibid. p.76

of body parts and movement sequences, in his dance technique transmitted in daily training, in dramaturgy and staging parameters, as well as a multi-centered treatment of space” (Evert, 2003, p.85).

This affirmation is astonishing, because it is chronologically wrong, but also essentially and technically not correct. Cunningham himself lists ‘Four Events That Have Led to Large Discoveries’ chronologically over the course of his career (Cunningham, 1994, 1998). The first discovery consisted of the separation between dance and music in the late nineteen forties, which led to the usage of a rhythmic structure based on time lengths and allowed for an independent creation process in dance. On the other hand, music and dance are interdependent in the performances of his works, based on agreed temporal structures.

The second event is the introduction of chance operations during the nineteen fifties in movement research, composition, and the use of certain selected parameters of the performance.

Working with and for film and video in the nineteen seventies is mentioned as the third main discovery, which led Cunningham to develop specific concepts of space, time and choreographic composition for film and video that would in turn expand possibilities for stage works.

The fourth event is more recent: since the nineteen nineties, Cunningham worked with a ‘dance computer’, specifically the (character animation) software *Life Forms*, which has been explored by him as a memory device, a movement composition tool, and a visualization device. He downplays the possibility to invent humanly impossible movement as yet another form of exploring new possibilities to work, and stresses the continuity of his process throughout his entire career.

According to Cunningham himself, he had firmly established his essential choreographic methodology many years before he got involved in working with film and video.

Still from a historical perspective, the segmentation of the dancer’s body in training and choreography at least goes back to the origins of classical ballet, and can be observed in other cultures as well, for example classical Indian dance. Classical ballet dancers learn codified movements for legs and arms, the inclination and twisting of the body and head positions. Often movement is learnt isolating body

parts, before they are coordinated and set to music. Modern dance techniques classes use the same pedagogy in class and rehearsal. Martha Graham for example isolated the spine in her contraction and release warm-up exercises, before more complex arm and leg movements were added and coordinated subsequently in her classes. Cunningham designed his classes from the very beginning in a similar way, which does not surprise, as he danced with Graham before he started his career as a choreographer. He also introduced much more articulate foot work in his own technique, which was inspired by his ballet training.

The fragmentation of the body in classical ballet and Modern Dance was also helpful in preservation, documentation and re-staging of important choreographies. Classical ballet relied on its detailed and articulate codification, where every step can be described in detail. In the beginning of the twentieth century Laban designed and presented his well-known system for general movement analysis and notation, which isolates the body parts and notates them individually. As a result almost any movement system of the time could be described in previously unmatched detail. Laban's system is in many ways similar to musical notation systems, and allows documentation as much as reconstruction of a dance. For this very reason several choreographers in the nineteen fifties and sixties experimented with dance scores as a potent tool for movement generation<sup>82</sup> and developed their own systems and scores.

Cunningham was familiar with most of the compositional innovations in contemporary music through his collaboration with composer John Cage, who edited and published an influential work on graphical scores.

Cage, a former student of twelve-tone-music pioneer Arnold Schönberg, certainly inspired Cunningham by introducing him to radically novel and innovative compositional methods, both, his own and fellow contemporary composers' work. Cunningham himself it seems, was not keen to adapt any of these musical compositional methods. As we have seen above, he lists the separation of music and dance as the first important event in his career as a choreographer. The keen, almost scientific interest in dance and human movement possibilities rather *resonates* with Cage's constant experimentation with fundamental principles and parameters of music and his ingenious investigations into the very nature of sound.

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<sup>82</sup> I will address this issue in more detail in the following third chapter



Reading Roger Copeland's acclaimed book on Merce Cunningham *The Modernizing of Modern Dance*, it becomes evident that several artists of the 'Cunningham circle' shared artistic sensibilities and mutually inspired each other, as much as they differed in their artistic methodology and objectives. Rather than affirming for example that Cunningham might have adapted the cutting technique of Cage's magnetic tape recordings in the nineteen fifties, Copeland refrains from such instrumental interpretation of the use of compositional methods and technologies. Instead he suggests a variety of shared sensibilities between Cunningham and his collaborators, and identifies these common concerns and interests thematically.

The theme of cutting and assembling for instance is discussed in a much larger framework. Copeland writes:

In the 20th-century art, collage was arguably the chief alternative to - indeed the very antithesis of - the Gesamtkunstwerk. And even though collage is a practice we tend to associate primarily with the visual arts (where it originated), its modus operandi is readily observable in the performing arts as well. Collage is a principle organizing strategy in the work of Elizabeth LeCompte and The Wooster Group, the plays of Heiner Mueller, the theatre pieces of Robert Wilson, the choreography of Pina Bausch, the music of John Zorn, and the films of Godard, Kubrick and Makavejev. But the earliest - and arguably, still most influential - practitioner of collage in performance is Merce Cunningham. Collage has been central to the work of Cunningham and his collaborators - to both their process and their product - from the very beginning. (...) The chance operations that Merce Cunningham utilizes for linking together disparate fragments of movements, produce - almost by definition - a performative version of collage. But almost every aspect of Cunningham's work is informed in some way by the collage aesthetic: the autonomy of sound, movement, and décor in his dances, the decentralized way bodies are distributed throughout the performance space; and even the spectator's choices about where and when to focus his or her visual and auditory attention (Copeland, 2004, p. 60).

A little further into this chapter of his book, Copeland describes the way in which Cunningham interweaves his movement material as 'splicing' and compares this approach to the film or video editors work. He continues: 'A little later in this chapter, we'll examine the way's in which Cunningham's investigation of the collage carries

over into his work with film and video - media in which 'splicing' becomes a literal rather than metaphorical activity'. (Copeland, 2004, p.171)

From these quotations it becomes very clear that Cunningham shares affinities and sensibilities with his collaborating artists, which Copeland discusses in thematic organization and great detail throughout his book under the umbrella theme of the collage. Although Copeland, like Evert, compares Cunningham's choreographic methodology to film and video editing techniques, he points out that Cunningham had explored these principles in a pioneering way *before he started to work with film and video*. More importantly, Copeland makes the comparison on the level of Cunningham's artistic vision and investigation, whereas on a technical level he underlines substantial differences. A film editor for example would not let chance operations determine the order of the sequences. Nor is the process of filmic montage the same as collage:

Cinematic montage, unlike the inherently less manipulative aesthetic of the collage, fuses its separate components into a single entity; and the resulting juxtaposition of the two is imposed upon the viewer, often quite didactically (Copeland, 2004, p.174)

Copeland refers here to Lev Kuleshov's famous editing experiment involving an actor, whose impassive expressions were first juxtaposed with a bowl of soup, and then with a dead woman in a coffin. As a result the spectators would interpret the identical actor's face as 'hungry' in the first montage and as 'mournful' in the second montage.

This distinction between collage and montage is not just an important observation regarding the technical differences between Cunningham's splicing technique and (most of) film editing, but it reiterates our focus to artistic intention, vision and aesthetic rather than looking at technique and technology in a limited, instrumental perspective.

Film editing builds on the cinematic language, which uses perspectives, shot sizes, camera movement, framing and other techniques to develop a narrative, of course except for more experimental forms of cinema and video. In most video dance none of these techniques are adapted, but, on the contrary, choreographic methods have been developed to explore these media, by Cunningham and many others.

Simultaneously these collaborations have led to considerable experimentation and innovation in film and video,<sup>83</sup> so that it is much more appropriate to employ concepts such as the *Transvergence zone* (see chapter one, 2.2) to describe these mutual influences and collaborative discoveries.

Returning to Evert's affirmation that the filmic cutting becomes even more evident in Cunningham's work with the character animation software *Life Forms*, we suggest to take a closer look at this interpretation. According to Evert keyframes are single images, which are edited and assembled in *Life Forms* before they are shown to and learnt by the dancers. The staccato quality of the movement sequences in Cunningham's choreography *CRWDSPCR* is attributed to assembling single images in the animation software.

To start with, an animation in a typical software program is composed of twelve to thirty frames per second. Keyframes are those frames in an animation, which store changes in position for each body part in a figure, as well as changes in other parameters, such as changes in scale, color, lighting, or camera position. Keyframe animation is the process of assigning different poses to different keyframes during an animation. Keyframes are therefore not assembled successively one after the other as single images into a timeline - this would result in an indiscernible frenzy of body parts and their movement, or of other parameter changes stored in the keyframes. *Life Forms*, as any other character animation software, uses interpolation between one keyframe and another to calculate the 'in between' position of body parts, cameras, objects, color and so forth.

In other words, interpolation is the very opposite of traditional cutting and editing, because new frames between keyframes are 'invented', calculated. As far as the movement quality is concerned, the interpolated movement between two keyframes can be very slow (if I tell the program to calculate three seconds to raise the figure's arm), or extremely fast (if I attribute ten frames, or a third of a second, to the same movement). Whether movement appears to be staccato in its quality, or legato, depends on the time (or number of frames) that the animated figure disposes to execute the movement. Additionally, there are several forms of interpolation available, which also influence the movement quality.

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<sup>83</sup> See Mitoma's important edited book (Mitoma, Zimmer, Stieber, Heinonen, & Shaw, 2002)

For Cunningham the rhythm of gestural changes of a figure in *Life Forms* represented consequently a *choreographic choice*, much in the same way he would choreograph the rhythm of gestural changes of his real dancers in the studio.

Dixon (2006) in his discussion of *Life Forms* concludes:

(...) that the computer is the perfect tool for Cunningham's choreography because the software constantly supplies new (and sometimes humanly impossible) sequences to be tested; and computed/animated movement needs no reference to music during the compositional phase, thereby fulfilling another of Cunningham's most fundamental rules of engagement. His interest in digital methodologies were therefore rooted in their support of his own existing systems and approaches (Dixon, 2006, p. 185)

Regarding the third and final statement from Evert's case study, we assume that by now it has become very clear, why movement qualities observed in Cunningham's choreographies using new media technologies can't be simply imputed to the adaption of film and video specific methods. As mentioned above, Evert attributes the fluid movement quality of the choreography *Biped* to the interpolation between different motion captured movement sequences in the software *Motion Flow Editor*. One should think that from the start motion captured movement sequences executed by human dancers are much more fluid than any character animation figure will ever move. Why else are actors and dancers motion captured in virtually every bigger production of 3D animation films, if it were not for more realistic, fluid and natural movement qualities?

However, the *Motion Flow Editor* was developed by Michael Girard and Susan Armkraut, who had been working for years on a sophisticated animation software called *Biped*, which soon after became embedded in the commercial animation software *Character Studio*, which in turn was integrated into the well-known *3D Studio Max* (today *Autodesk 3ds Max*).

Cunningham was invited by *Riverbed* (today *Openendedgroup*) digital artists Paul Kaiser and Shelley Eshkar to work with the software *Biped*, *3D Studio Max* and motion capture techniques on a collaborative project entitled *Hand-drawn Spaces*. Paul Kaiser writes about the use of the *Motion Flow Editor*.

It was a choreographer's perspective that Susan and Michael wanted to approximate as they figured out a new method of working with multiple movement sequences. The 'Motion Flow Editor' they programmed during the Hand-drawn Spaces project let Merce connect his many motion-captured sequences in any order. Most astonishingly, the program interpolated the proper gait-shift transitions from one motion to another, so that the shifts from a run to a jump to a walk, for example, would occur smoothly over a specified range of frames rather than in an abrupt cut. It also allowed Merce to determine whether a transition between two phrases would match up the positions of the right or left feet, for example, or if it was to occur in mid-step. Now the software had the breadth and the precision required by Merce to choreograph a complex dance.<sup>84</sup>

As becomes clear from Paul Kaiser's report, the programming of the Motion Flow Editor was very much indebted to Cunningham's choreographic methodology, and in fact to choreographic principles in general.

Creating transitions between movement phrases is one of the basic exercises in dance composition and choreography classes, and there are many artistic solutions beyond the forms of interpolation that the Motion Flow Editor can perform:

There are no set ways of making transitions from one part of a dance to another. The composer usually works on these in an intuitive way. Finding an answer to a movement problem can only be achieved by moving through all the possible avenues until it feels and looks right.

Transitions can be very short or quite long in time. Indeed a transition from one part to another maybe affected by merely *holding still* in a body position before moving into the new part. This has the effect of holding on to something for a second or two whilst an impression is formed by the audience before changing the subject. Or, the transition may be made as a *hesitation* between movements or phrases or as *anticipation* of movement to follow - for example, a lean of the body into a direction before actually traveling on that pathway. Transitions hold parts together by bridging and, therefore, help to create the overall rhythmical framework. The longer transition, lasting perhaps as as long as a *phrase*, usually acts as a link between sections.  
(Smith-Autard, 1994, p. 70-71)

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<sup>84</sup> <http://www.openendedgroup.com/index.php/publications/older-essays/steps/> accessed January 2011

Jaqueline M. Smith-Autard's book on dance composition covers traditional guidelines predominantly used in dance education, and certainly doesn't represent all choreographic methodology developed and employed by today's professional contemporary choreographers. Nevertheless the paragraph on the principle of transitions elucidates how artistic intention determines what kind of transition might be appropriate for a particular situation, and that this kind of intention can't be possibly programmed, but is a result of experimentation and intuitive evaluation.

In other words, Cunningham, who certainly dominated his artistic craft, didn't need the *Motion Flow Editor* to create fluid transitions. On the contrary, the programming of the software *benefitted very much from his methods and needs*, as we have seen in Kaiser's report on the *Hand-drawn Spaces* above. One of the truly amazing achievements of the *Hand-drawn Spaces* project was the sophisticated programming, which allowed Cunningham to do in a virtual environment, what he already did so well in the dance studio.

It is beyond the scope of this investigation to look in more detail into the interesting subject of Cunningham's collaborations with digital artists and programmers regarding the mutual influences and innovations, both technical and methodological. For our purposes it is suffice to conclude by referring to the famous live performance *Biped*, which was developed by Cunningham and the same collaborators in 1999. This time Cunningham would mix motion captured sequences danced by male performer Jarred Philips and his female colleague Jeannie Steele. The *Motion Flow Editor* also allows to mix any number of frames of a particular body part with any number of frames of another body part, and thus create hybrid sequences on the same figure. This is the exact same technique Cunningham had used in his untitled solo from 1951; and it also is a technique that has been used by many other choreographers for decades.

We have discussed Evert's case study on the influence of technology in Cunningham's choreography in some detail to call attention to the consequences of employing definitions of technique and technology that are reduced to their *instrumental dimension*. This approach is very hard to resist, as it is so far spread and widely accepted, but can be very misleading as we have seen. To reduce any

technique or technology to its instrumental dimension also means to deviate from its origins. For example, in the field of dance techniques, it has to be asked what constitutes a technique, what distinguishes one technique from another, how did this particular technique come into being, what is its purpose, who developed it and who practices it, which artistic vision does it support, and so forth.

In our view Copeland's approach of tracing shared sensibilities on the level of artistic vision and investigation between individual and groups of artists allows for detailed analysis of mutual interests and influences while his methodology simultaneously permits discussing substantial differences on a technical level. His discussion of the collage principle across several art forms is a splendid example of how to look into the *nature* of similar techniques and methods used by diverse artists.

### **3.2 The Question Concerning Technology**

Discussing Evert's case study opened up a number of important questions, which we suggest to examine before attempting to outline a methodology for the artistic laboratory:

What is the *nature* of technique and technology?

What is the nature of dance technique and dance technology?

What are 'new' media technologies?

What dance technology in relation to what 'new' media technology do we want to discuss, and when?

What kind of interfaces between dance and technology can be defined?

What artistic stances can be taken towards what technology?

In the beginning of her study Evert hints at an approach, which we consider very helpful in this matter. She refers in a footnote that 'technique' goes etymologically back to the Greek 'techné', while 'technology' derives from 'tecnologia' and is composed of 'techné' and 'logos'. 'Techné' can be translated as craftsmanship or craft, and denotes the knowledge of principles and methods involved in producing an object or accomplishing an objective. 'Tecnologia' analyzes the conditions and reflects the impact of 'techné' in society, and thus refers to knowledge *about* 'techné'.

Evert states that at the present both terms are frequently used as synonyms. This certainly is true; nevertheless we suggest to develop this etymological approach further.

This is the Oxford dictionary entry for 'technique':

*1. Different techniques for solving the problem method, approach, procedure, system, modus operandi, MO, way; means, strategy, tack, tactic, line; routine, practice.*

*2. I was impressed with his technique skill, ability, proficiency, expertise, mastery, talent, genius, artistry, craftsmanship; aptitude, adroitness, deftness, dexterity, facility, competence; performance, delivery; informal know-how.*

The entry for 'technology' reads:

*The application of scientific knowledge for practical purposes, especially in industry: advances in computer technology / recycling technologies.*

- machinery and equipment developed from such scientific knowledge.*
- the branch of knowledge dealing with engineering or applied sciences.*

From our perspective these entries confirm that still today there are valuable distinctions between the two terms, and they can be linked to their Greek origin, as we will see.

If technique is defined as a means to solve a problem and involves competence and craftsmanship (Oxford), it makes sense that technology as the study of technique may involve scientific methods and eventually lead to the application of scientific knowledge for practical purposes (Oxford). Either way technology involves a discursive dimension, which is also implicit in the Greek term 'logos' (Aristotle applied the term to rational discourse), which, with 'techné', constitutes the term 'tecnologia'.

German philosopher Martin Heidegger has written an important essay entitled *Die Frage nach der Technik* (*The Question Concerning Technology*), which pursues an etymological approach and helps to clarify some essential aspects of the terms technique and technology. It is curious though that the English translation of the



German title (*The Question Concerning Technology*) uses the word 'technology' for 'Technik', while the German language also contains the term 'Technologie'. There are several good reasons to translate 'Technik' as 'technology'.

'Technik' has a variety of meanings, for example engineering, technique, technics and technology (Langenscheidt dictionary). At the time Heidegger's essay was written, and until today, 'Technik' refers primarily to engineering, science and technology. Its translation as 'technique' is better justified when combined with another word, as in 'Körpertechnik' (body technique), 'Tanztechnik' (dance technique), and referring to performing an action. 'Beleuchtungstechnik' (lighting technology) for example is better translated as a technology, as the word is closer to engineering.

Another good reason for translating 'Technik' as 'technology' in the title of Heidegger's essay is his discussion of the use of term itself. In short, Heidegger warns against a limited understanding and consequently dangerous use of technology. For this reason he chooses an etymological approach and traces 'Technik' all the way back to Greek philosophy to recuperate a deeper understanding of the phenomenon. Due to the lack of understanding the essential nature of 'Technik' humanity can fail to develop a free and emancipated orientation towards technology.

Heidegger therefore states that "the essence of technology is by no means anything technological" and shifts the discussion from the field of technological specialists into the philosophical arena. His affirmation also allows him to expand the discussion historically to the point that later into the essay he will argue that essence of technology precedes the emergence of those technologies (from the eighteenth and nineteenth centuries on) that we associate today with the term 'Technik'. The historical expansion of his discussion also allows him to trace back Latin and Greek concepts, which had different influences on the way we perceive technology.

Heidegger's critique revolves around the everyday understanding of technology as a means for achieving something, as an instrument for human activity. This instrumental perspective leads him to examine the term 'instrument' in the light of the traditional philosophical model of the four causes. The Latin *causa* is defined as 'that which brings something about' and emphasizes *effecting*. In contrast, the

corresponding Greek term *aition* means literally 'that to which something else is indebted' and foregrounds the idea of responsibility.

Employing the example of a silver chalice used in the Christian ceremony of communion, Heidegger compares Latin and Greek terms for the four causes to arrive at his new interpretation of the idea of causality. The traditional model consists of *causa materialis* (the material silver), *causa formalis* (the form of the chalice), *causa finalis* (the ceremony of communion as the purpose of the chalice's existence) and the *causa efficiens* (the silversmith as the agent that creates or 'effects' the production of the chalice). In contrast, argues Heidegger, the Greek model, from which the Latin terms are derived, does not suggest such category as the *causa efficiens*. Aristotle's model differs considerably in that the silversmith is considered responsible for, or the starting point of, the chalice's 'coming into being'. Rather than manufacturing the chalice, the silversmith is 'revealing' (logos) the potentialities of the chalice: *hyle* (material), *eidos* (the abstract idea of the chalice, or 'chaliceness', and *telos* (the defining boundaries for the chalice's use).

Heidegger's examination of 'cause' and subsequent reformulation of the model leads him to a discussion of *poiesis* as a 'revealing of something that was concealed'. While the term *poiesis* later evolved into today's 'poetry' and describes the work of a poet, Heidegger sees technology as well as a kind of *poiesis*, a way of bringing forth, of revealing, of bringing into being.

This argument is quite comprehensible from the etymological perspective. As we saw above, 'technology' roots in the Greek word *techne*. John Zuern states:

Heidegger makes two points about *techne*:

(1) In the sense of 'technique', *techne* refers to both manufacturing (the techniques of shoemakers and printers, for example) and to the arts (the techniques of poets and graphic designers, for example). *Techne* is part of *poiesis*.

(2) In Greek thought from Plato on, the word is used in connection with the word *episteme*, from which we get the word 'epistemology' - the branch of philosophy that examines how we know things. *Techne*, Heidegger concludes, is a kind of knowing. We might think of it as 'expertise', which we generally understand as more than a set of practical skills. It is 'know-how'; in Heidegger's words, 'what is decisive in *techne*

does not lie at all in making and manipulating nor in the using of means, but rather in the revealing mentioned before’.

If we understand technology as deriving from this concept of *techne*, Heidegger continues, then we will see that its essence lies not in the instrumental production of goods or manipulation of materials, but in ‘revealing’. Remember that Heidegger has said something similar about the silversmith, who, through his *techne*, brings together the form and matter of the chalice within the idea of ‘chaliceness’ to reveal the chalice that has been ‘on its way’ to existence.<sup>85</sup>

In other words, the dimension of *poiesis* leads to the question of humanity’s orientation towards the world in general. Heidegger claims that this orientation, or ‘enframing’ at the present is instrumental, exploitative and blind. The world is viewed as a ‘standing-reserve’, a source of raw materials, including ‘human resources’. It is the ‘enframing’ (Gestell) concludes Heidegger, that is the essence of technology. Consequently the essence of technology lies in the orientation of humanity towards the world and its forms of ‘revealing’ (or processes). Therefore the ‘enframing’ also contains a ‘saving power’, or opportunity. In the words of Zuern, “if we reflect upon the enframing as the essence of technology, we will find not only that we are a part of the world, but that the world ‘needs’ us to care for it, that humanity ‘is needed and used for the safekeeping of the essence of truth’”.<sup>86</sup>

In the conclusion of his guide for Heidegger’s essay Zuern writes about Heidegger’s view of art’s relationship with the world and with technology, and about the role that art can play in the struggle for a more responsible orientation. According to Zuern, Heidegger “imagines a classical Greece in which art was not a separate function within society, but unifying force that brought together religious life, political life, and social life”.<sup>87</sup> In Heidegger’s view the art of ancient Greek culture manifested a profound sense of connectedness with all Being, and art was the result of the acknowledged responsibility to take care of all existence. In sharp contrast to the exploiting attitude described by the term ‘standing-reserve’, the artist stands for an

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<sup>85</sup> <http://www2.hawaii.edu/~zuern/demo/heidegger/> accessed January 2011

<sup>86</sup> Ibid.

<sup>87</sup> Ibid.

alternative dimension of the 'enframing'. For Heidegger the artist takes the world as it is and reveals it, in accord with the Greek word *aletheia*, which literally means 'revealing', or 'unveiling'. Zuern concludes that "art's relationship with the world is, in Heidegger's view, different from technology's in that art is less concerned with measuring, classifying, and exploiting the resources of the world than it is with 'taking part' in the process of coming-into-being and revealing that characterize the existence".<sup>88</sup>

On the surface this relation between art and technology may seem far-fetched, or mystical, but Heidegger's view is increasingly shared today, fifty years later, by many important philosophers, artists, scientists and educators.

His stance that humanity needs to be aware of its 'taking part in the process of coming-into-being and revealing that characterize the existence' may seem very abstract to most of us, but becomes instantly clear if we look at the concrete example of one of the most fundamental technologies today: the (industrial) production of food. Carlo Petrini, the founder of the University of Gastronomic Sciences in Pollenzo and Colorno, Italy, states:

According to the UN Millennium Ecosystem Assessment published in 2005, food production and transportation is now the main cause of the pollution and gradual destruction of our planet. This should make us reflect. If it is true, as Wendell Berry says, that eating is also an 'agricultural act', then good quality foods that are produced in ways that respect the natural environment and local traditions can encourage biodiversity, equity and sustainability. (...) Food is not only food but also pleasure, culture and conviviality - the mediator of values and attitudes, a vehicle for realization and a catalyst of our emotions. With this awareness we become co-producers, rather than merely consumers. The 'consumer' has to feel part of the production process, with an awareness of the influence of their preferences, either supporting degradation or rejecting injustice and sustainability. (Petrini, 2009, p.2)

Petrini outlines here how awareness of the food production process can lead us to develop a responsible and proactive attitude toward technology. In other words, our behavior as consumers directly influences which kind of production processes are pursued and what kind of technologies are employed or developed.

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<sup>88</sup> Ibid.

Dr. Vandana Shiva, a renowned Indian physicist, who later trained as an environmentalist and today directs the Navdanya (Nine Seeds) program of the Research Foundation for Science, Technology and Ecology, has been an impressive example of such responsible and proactive attitude. In 2004 the new 'Seed Licensing Law' in India threatened to entirely take away the farmers' right to preserve their own seeds. Instead every farmer would have to get permission from a registering authority that licenses and registers seeds. Consequently the farmers' varieties were intended to be made illegal. In other words, they would not be approved on the official list, and consequently would disappear, to give way for a few licensed sorts of seed exclusively sold by large corporations to the farmers. Perversely these licensed seeds are in reality hybrid nonrenewable seeds, which have to be bought every year and treated with large amounts of expensive chemicals. As a result most farmers have to go into debt because they sell everything they were able to grow to pay back their loans. Dr. Shiva and the Navdanya movement organized a nonviolent march across the country and succeeded in preventing the act from being implemented. Moreover, the Navdanya movement has created 46 seed banks in different parts of India, which have two important contributions: First, the seed banks make local seeds available and work fine for organic farming. Second, these seeds can help with climate change:

So, in the state of Orisa, we have seeds that can help us deal with saltwater and cyclones. In Bihar, where the Ganges river flows, we have rice varieties that can grow six meters tall to survive the flooding; in the desert areas we have seeds that survive droughts. But the corporations are greedy and try to patent all this rich diversity. The best seeds are bred when scientists cooperate with farmers, and the best biodiversity conservation happens when local communities partner with taxonomists; the best organic farming happens when soil scientists work with producers. (Shiva, 2009, p.8)

It is difficult to find a clearer and self-explanatory example (than the Seed Licensing Law) of the severe consequences deriving from a short-term and strictly profit oriented approach to technology. On the other hand, the Navdanya movement and numerous other similar initiatives around the globe prove Heidegger's point that the

essence of technology “lies in the orientation of humanity towards the world and its forms of ‘revealing’ (or processes)”.

As we have seen in the example of particular seeds bred in particular localities, the amazing potential inherent in nature can be ‘revealed’ through creative interdisciplinary collaboration between farmers, scientists and producers, if a different set of values is adopted. The key-points in this successful example are creativity and strong humanitarian values.

While the humanitarian values directly translate into a less profit oriented, biologically and economically sustainable, and collaborative approach that draws as much on inherited traditional knowledge as it seeks the integration of modern sciences, the importance of ‘creativity’ (and thus the role of art and the social function of the artist) is probably less obvious.

Acclaimed Buddhist philosopher, poet and educator Daisaku Ikeda addressed this issue in his speech entitled *The Fight To Live a Creative Life* on the occasion of the Entrance Ceremony of Soka University in 1974. He starts with a surprising affirmation:

A university is not the result of a system or a building program but a product of the determination and passion of young people seeking new knowledge and wisdom. First of all, determined young people must aspire to make truth their own. To help fulfill such aspirations, teachers and instructors will be found; and, through the cooperative effort of students and instructors, universities will evolve. Fundamentally, the university begins with a thirst for knowledge and a love of truth on the part of the students. The atmosphere of such thirst and love must prevail. A university without eager students is a university without life, a university in which the main purpose has been forgotten. The time has come to return to the origins of university education. (Ikeda, 2001, p.167)

Later into his speech, Ikeda refers to social scientist George Friedmann’s book *The Power and the Wisdom*:

The word *power* in the title refers to human power to control the environment by scientific or technological means. *Wisdom* means to him the intelligence to harness this power and use it creatively for the welfare of humanity. (...)

It is important to acquire power, but the acquisition of power must always be accompanied by the development of wisdom. Wisdom is rooted in the souls of human beings. The way to acquire it is to follow the simple advice of Socrates: 'Know thyself'. This is the starting point for establishing a sense of human dignity, preventing the degradation of human beings into anonymous, interchangeable machine cogs. The essence of true knowledge is self-knowledge. This is the ideal of Soka University. Countless splendid universities and research institutions in the world can give power. But what have they done for humanity? The cruel emptiness and frustration of contemporary civilization are the outcomes of their kind of education.<sup>89</sup>

Ikeda's urge to control the acquisition of power through wisdom and to use it creatively for the welfare of humanity certainly deeply resonates with Heidegger's call for a responsible use of technology, Petrini's view of the consumer as a co-producer, Dr. Shiva's fight for biodiversity and organic farming in the framework of Community Culture, and innumerable similar projects and initiatives.

In essence, this perspective leads back to the courageous battle for the realization of human rights that has been fought for centuries by famous examples of great human beings, a battle that needs every single citizen to collaborate for these humanistic values to be fully put into practice.

Living a creative life therefore is not the specialist task or a privilege of the artist, but rather a way of living that unlocks the potential inherent in every human being, which, in Heidegger's words, needs to be 'revealed'. Ikeda closes his speech by encouraging students, faculty and guests as follows:

You must never slacken in your efforts to build new lives for yourselves. Creativeness means pushing open the heavy door to life. This is not an easy struggle. Indeed, it may be the hardest task in the world. For opening the door to your own life is more difficult than opening the doors to the mysteries of the universe.

But the act of opening the door vindicates your existence as a human being and makes life worth living. None are lonelier or unhappier than those who do not know

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<sup>89</sup> Ibid., p.172

the pure joy of creating a life for themselves. To be human is not merely to stand erect and manifest reason and intellect: to be human in the full sense of the word is to lead a creative life.

The fight to create a new life is a truly wonderful thing, revealing radiant wisdom, the light of intuition that leads to an understanding of the universe, the strong will of justice and a determination to challenge all attacking evils, the compassion that enables you to take upon yourself the sorrows of others, and a sense of union with the energy of compassion gushing forth from the cosmic source of life and creating an ecstatic rhythm in the lives of all human beings. As you challenge adversity and polish the jewel that is life, you will learn to walk the supreme pathway of true humanity. Whoever leads a creative life from the present into the future will stand in the vanguard of history. I think of this flowering of the creative life as the human revolution that is your mission now and throughout your lives.<sup>90</sup>

Human revolution means in other words, to lead a creative life by constantly challenging oneself to manifest the inherent individual potential and talent towards a valuable contribution to society.

As we have seen in the example of the Navdanya seed banks, the values and principles implied in the concept of 'human revolution' inform the development of technologies in a way that the outcome is diametrically opposite to the technologies conceived of and employed by the large corporations. Ikeda's keen observations on the nature of the problems of contemporary societies has led to invitations by many of the world's leading universities to lecture and elaborate on the idea of human revolution and the Buddhist perspective on life.

In essence, human revolution addresses the 'life state' of a human being and its environment. The term 'life state' refers to the physical, mental, spiritual and emotional disposition of human beings. However well working methodologies and techniques are refined, often the life state plays a much more fundamental role in the practical work and daily communication between collaborators. Consequently that which informs technology (a set of values, the resulting discourse and methodology) derives from the life state of the individual and the social collective. Human revolution thus aims at improving the individuals life state or life condition, leading to successive improvements in the community and the environment.

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<sup>90</sup> Ibid., p. 174



It is beyond the scope of this investigation to go into much depth on this subject; we therefore suggest to take a closer look on three key Buddhist concepts, which are suffice to understand how life in general, and human revolution in particular operates. These concepts are also very helpful in expanding Heidegger's terms and perspective and will provide a solid base for models of (artistic) collaboration in the domain of this investigation.

The first concept is known as the *Ten Factors of Life*. In the second chapter of the Lotus Sutra<sup>91</sup> ten factors are listed to describe *the pattern of existence common to all phenomena*. (1) *Appearance*: the first factor describes attributes of beings and inanimate objects that are discernible from the outside, such as color, form, or shape. (2) *Nature*: this factor explains inherent quality or characteristics, which can't be discerned from the outside; for example the particular personality of a human being. (3) *Entity* refers to the essence of life that permeates and integrates both *appearance* and *nature*, which means that they are inseparable. The factor *Power* (4) describes life's potential energy, or vitality. *Influence* (5) explains the action resulting from activating this potential and its consequent impact on the environment. (6) *Internal cause* describes the cause latent in life, which produces an effect of the same characteristic as itself. (7) *Relation* elucidates various related internal and external conditions that help the internal cause produce an effect. (8) *Latent effect* is the effect produced in life at the moment the internal cause is activated through its relationship with several conditions. (9) *Manifest effect* describes the concrete result that emerges in time as a manifestation of the latent effect. Finally, *Consistency from beginning to end* (10) is the unifying factor, indicating consistency and interrelatedness between the other nine factors. The first three factors express the reality of life itself, while the next six factors elucidate the functions and workings of life. (Soka Gakkai Dictionary of Buddhist terms, 2002, p.667)

The second Buddhist concept is called the *Ten Worlds* and complements the *Ten Factors of Life*. It is employed to describe *differences between phenomena*. Ten distinct realms or life states are explained as followed: (1) *Hell* is a condition of misery and suffering; it is the perceived lack of all freedom leads to further self-

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<sup>91</sup> The Lotus Sutra contains the essential Mahayana Buddhist teachings and is revered in various Buddhist traditions. See also Burton Watson's translation into English, *The Lotus Sutra* (1994).

destruction. (2) *Hunger* describes a state governed by constant desire of all kinds, without ever getting satisfied. (3) *Animality* depicts a condition driven by instinct and subjected to 'the law of the jungle'; despising the weak and fearing the strong. (4) *Anger* is a condition dominated by the ego, driven by the need to be superior. *Humanity* (5) describes a state where one tries to act based on reason and attempts to harmonize with others; it is a state characterized by calmness. (6) *Heaven* depicts a condition of joy resulting from the absence of suffering, or the temporary fulfillment of desires. (7) *Learning* is a state of actively creating a better life through self-reformation and self-development by learning from others. (8) *Realization* is characterized by insights in lasting truths, which are perceived through one's own observations and efforts. (9) *Altruism* describes action based on a state of compassion. Finally, *Buddhahood* (10) is the state of perfect and absolute freedom based on the capacity to realize the true nature of life. The Buddha state permits access to the boundless wisdom, compassion and courage inherent in human life, and allows interacting with others based on these supreme human qualities. Each of the ten worlds contains the other nine worlds, so that at any given moment any of the other states of life can be accessed. In fact we change from one world to another many times during a day. The challenge from the viewpoint of the Buddhist practice is to establish the higher life states as a base for daily life to overcome any type of suffering and manifest the full potential inherent in every human being.<sup>92</sup> The third concept Buddhist is called the *Three Realms of Existence*. It offers three perspectives of the existence of individual lives in their environment: the first component, *The realm of the individual life* (1) suggests that any living entity is composed of five components (form, perception, conception, volition and consciousness), which elucidate how the individual responds to the environment and disintegrate at the moment of death. *The realm of living beings* (2) refers to the individual as an integrated whole (who manifests and experiences the ten worlds), and its interaction with the collective body of all individuals. *The realm of the environment* (3) describes the place or land where the living beings carry out their activities. The state of the environment is a reflection of the state of life of those living in it. In other words, life and its environment are apparently two distinct phenomena, but in essence are inseparable.

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<sup>92</sup> Ibid., p. 686

In combination these three concepts are known as the *three thousand realms of existence in a single moment of life*. Each of the ten worlds contains each other (ten times ten is hundred); each of the ten worlds possesses the ten factors (hundred times ten is thousand), and each of the ten worlds manifests in the three realms of existence (thousand times three is three thousand).<sup>93</sup>

As mentioned above, these concepts are particularly useful, when applied to concrete collaborative situations. In the following we will take a look at a concrete situation to better understand the application of the principles introduced above. For example, if a choreographer chooses a dancer in an audition just based on a few short tests of his technical ability, capacity to quickly learn movement material and perform well, he might fail to see more important factors for the creative process, performances and touring of the work. Especially in smaller companies and project-based collaborations stable human relations are crucial for success. Let's suppose the choreographer in our example found a seemingly excellent dancer in a typical audition (world of heaven). During the rehearsal process it becomes apparent that the dancer has severe financial problems and needs to take on further work with other choreographers, or an extra job outside rehearsals (world of hunger). The choreographer can't pay enough to demand exclusive work on the choreographic project (factor relation). The dancer comes to rehearsals with less and less vital energy (factor power), and as a result contributes only minimally (factor influence). Exhausted, the dancer gets injured after a few performances and needs to be substituted (factors internal cause, relation, latent and manifest effect). Frustration sets in (world of hell), because in the end both dancer and choreographer wanted to present an interesting new work of high quality.

This short example demonstrates, how the ten factors, ten worlds and three realms of existence are inextricably interconnected and operate in each moment of our lives. Being able to put the idea of the creative life into practice requires a higher life state, so human revolution can set in. Employing the principles presented above, a different model for auditions could be set up (world of realization), for example a three-day-workshop with varying activities, which allow to get to know each other and the

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<sup>93</sup> Ibid., p. 722

present life circumstances (world of learning) in a way that allows careful analysis in forming a team for a new project or work (world of altruism and Buddhahood). Returning to our discussion of the term technology and Heidegger’s model of the four causes, based on which he develops his position that the essence of technology is not technological, but can be found in our orientation towards it (and life in general). The following table shows correspondences between Heidegger’s terms derived from their Latin and Greek origins, and the Buddhist terms introduced above:

Table 1

*Correspondences between Heidegger’s terms<sup>94</sup> and Buddhist terms*

Latin terms	Greek terms	Buddhist terms
<p><b>Causa</b> is the source of the English word ‘cause’, ‘that which brings something about’.</p>	<p>The word <b>aition</b> means ‘cause’, ‘reason’, and literally ‘that to which something else is indebted’. In reformulating traditional philosophy’s model of causality, Heidegger contrasts this Greek concept of causality, which emphasizes responsibility, with the Latin <b>causa</b>, which emphasizes effecting.</p>	<p>The second chapter of the Lotus Sutra lists <b>ten factors</b> (also: ten suchness) to describe the pattern of existence <b>common to all phenomena</b>.</p>
<p>The ‘material cause’ in the traditional model of causality, the <b>causa materialis</b> is the silver in the example of the chalice.</p>	<p><b>Hyle</b>, meaning ‘matter’, is one of the four ‘ways of being responsible’ in Heidegger’s model of causality based on Greek concepts; the silver that makes up the material being of the chalice is an example of <b>hyle</b>.</p>	<p><b>Appearance</b>: attributes discernible from the outside, such as color, form, shape (of the chalice in this example).</p>
<p>The <b>causa formalis</b> is the ‘formal cause’ in the traditional model of causality-- the form of the chalice in the example of the chalice. Connected with this idea: <b>Quidditas</b> translates as ‘whatness’. Whatever pertains to all manifestations of a thing, the genus to which all things belong, for example, the ‘treeness’ of banyan trees, mango trees, lychee trees, etc.</p>	<p>Meaning ‘idea’ or ‘aspect’, <b>eidōs</b> is one of the four ‘ways of being responsible’ in Heidegger’s model of causality based on Greek concepts; the ‘chaliceness’ of the chalice is an example of <b>eidōs</b>.</p>	<p><b>Nature</b>: inherent quality or characteristics, which can’t be discerned from the outside.</p>

<sup>94</sup> According to Zuern

Latin terms	Greek terms	Buddhist terms
<p>The <b>causa finalis</b> is the ‘final cause’ or ‘purpose’ in the traditional model of causality; the rite of communion in the example of the chalice.</p>	<p><b>Telos</b> means ‘end’ in the sense of ‘aim’ or ‘purpose’, ‘fulfillment’ or ‘accomplishment’. <b>Telos</b> is the context in which the chalice will be used (in Heidegger's example, the Christian rite of communion) and which bounds the chalice in terms of its identity as a chalice, is its <b>telos</b>.</p>	<p><b>Internal cause:</b> the cause latent in life, which produces an effect of the same characteristic as itself. (The internal cause is difficult to perceive; it is that which is responsible for the silver to become a chalice and not a ring, a spoon, or something else.)</p>
<p><b>Causa efficiens</b> refers to the ‘efficient cause’ in the traditional model of causality-- the silversmith in the example of the chalice.</p>	<p>In the sense Heidegger is drawing upon, the term <b>logos</b> has the meaning of ‘deliberation’, ‘consideration’, and ‘thought’. <b>Logos</b> constitutes one of the four ‘ways of being responsible’ in Heidegger's model of causality based on Greek concepts; the silversmith's capacity to bring the chalice to appearance is an example of <b>logos</b>.</p> <p>See also the connected term <b>Apophainesthai</b> below.</p>	<ol style="list-style-type: none"> <li>1. <b>Relation:</b> various related internal and external conditions that help the internal cause produce an effect</li> <li>2. <b>Latent effect:</b> the effect produced in life at the moment the internal cause is activated through its relationship with several conditions</li> <li>3. <b>Manifest effect:</b> the concrete result that emerges in time as a manifestation of the latent effect</li> </ol> <p>(These factors include the silversmith and his work, but also describe his relation to others and the environment.)</p>
	<p><b>Apophainesthai</b> translates as ‘appearing’, ‘bringing to light’. Heidegger builds upon this word's etymological relationship to <b>legein</b> and <b>logos</b> for his description of causality as a form of responsibility for the ‘presencing’ and ‘revealing’ of things.</p>	<p><b>Manifest effect:</b> the concrete result that emerges in time as a manifestation of the latent effect. (The factors Internal cause, Relation, Latent effect and Manifest effect together can be considered a thorough explanation for the functioning of Heidegger’s ‘revealing’.)</p>

As we can see from the table, there are many correspondences between the terms, which also help to better understand the respective ideas. However, there are four additional Buddhist concepts missing in the Latin and Greek models, which are

fundamental for our perspective on the term technology: the factors Entity, Power, Influence and Consistency from the beginning to the end.

The factor Entity describes the fact that the essence of life permeates and integrates both Appearance and Nature, in other words, that they are inseparable. In our concrete case this means that there is no technology (Appearance) without its creators' value systems, objectives and life states (Nature). This is a really crucial point. For example, if we look at the technology involved in the construction of nuclear weapons, we understand immediately the importance of the factor Entity: there are concrete groups of human beings working on the construction of weapons of mass destruction, whose objective is at least to fiercely threaten, if not to annihilate hundreds of thousands of other human lives. As we have seen above, the factor Power describes life's potential energy, which in the case of the atomic bomb specifies the potential for a tremendous explosion; and the factor Influence indicates the resultant devastating destruction.

The last of the ten factors, Consistency (from beginning to end) is the unifying factor, indicating consistency and interrelatedness between the other nine factors. It is remarkable that in this system of the ten factors two factors stress the interrelatedness between and inseparability of the other factors.

German writer and dramaturgist Heinar Kipphardt published a documentary theatre piece in 1964 entitled *In der Sache J. Robert Oppenheimer* (approximately: *The case J. Robert Oppenheimer*), in which he analyzes the role and responsibility of the famous scientist in the development of the atomic bomb, and his subsequent refusal to participate in the development of the hydrogen bomb in 1951. The complex argument skillfully presents conflicting political, scientific, ethical and personal issues within the individual and the various lobbies. Kipphardt's work is a fine example of the factor Consistency from the beginning to the end, in that it shows the impossibility of a scientist being 'neutral' in such a military project, or for that matter, in any research project.

In the beginning of our (etymological) discussion of the term technology we referred the Oxford definition, including the suggestion: *The application of scientific knowledge for practical purposes, especially in industry: advances in computer technology / recycling technologies*. This reading of 'logos' in the Greek 'technologia'

as 'science informing technology' certainly is a valid definition, but, as we have seen from the philosophical critique of technology, not sufficient.

In Heidegger's interpretation of the respective Greek terms 'logos' constitutes one of the four ways of being responsible, and indicates 'consideration' and 'thought' as a way of developing a responsible attitude. In the table above we have suggested the corresponding concepts of Relation, Latent effect, and Manifest effect. Relation is defined as 'various related internal and external conditions that help the internal cause produce an effect', and the Internal cause 'produces an effect of the same characteristic as itself'. Suppose that political and military leaders in a country share a profound distrust and desire for revenge towards a neighboring nation based on traumatizing experiences of lasting armed conflicts in the past and present. The internal cause might be described as the search for military solutions that promise power and control of the situation. It also 'produces an effect of the same characteristic as itself', in other words, it inevitable will produce more armed conflict. The factor relation describes the related internal and external conditions (world of anger) 'that helps the internal cause to produce an effect (armed conflict). The Latent effect describes the mechanism that inevitably the search for military solutions (internal cause) produces corresponding military technology.

In conclusion, the life condition and intention expressed in the internal cause will unavoidably manifest, which is why Daisaku Ikeda warns: 'Countless splendid universities and research institutions in the world can give power. But what have they done for humanity? The cruel emptiness and frustration of contemporary civilization are the outcomes of their kind of education' (Ikeda, 2001, p. 172).

Consequently, it is the internal cause that needs to be transformed in the first place. In our example above, if military and political leaders are urged by an increasing number of peace seeking citizens to change their policy towards finding strategies for peace talks and contracts, the internal cause will correspondingly produce other 'technologies', such as dialogue, supervision of the United Nations, and eventually peace contracts and the beginning of joint economic projects.

So if science informs technology, and technology supports and shapes science, which value systems and discourses inform science and technology? Which stance

can the contemporary artist take who works with emerging technologies, or collaborates in interdisciplinary research projects?

After discussing the terms ‘science’, ‘technology’ and ‘art’, Stephan Wilson (2002) suggests in his seminal book *Information Arts: Intersections of Art, Science, and Technology* the following fundamental differences between art and science:

Table 2  
*Differences between Art and Science*

<b>Differences between Art and Science</b>	
Art	Science
Seeks aesthetic response Emotion and intuition Idiosyncratic Visual or sonic communication Evocative Values break with tradition	Seeks knowledge and understanding Reason Normative Narrative text communication Explanatory Values systematic building on tradition and adherence to standards

However, Wilson also lists correspondences to better analyze the chances for collaborations between the fields:

Table 3  
*Similarities between Art and Science*

<b>Similarities between Art and Science</b>
Both value careful observation of their environments to gather information through the sense. Both value creativity. Both propose to induce change, innovation, or improvement over what exists. Both use abstract models to understand the world. Both aspire to create works that have universal relevance.

Wilson goes on to analyze the value systems and discourses informing contemporary art, and science and technology on the other hand. He states that art practice and theory have been radically reshaped by the influence of Critical Theory, whereas the techno-scientific world in general has not deeply engaged with the concepts from



cultural studies. According to Wilson, science is grounded on an impressive record of ideas tested by methods of verification that approach objectivity; and builds on a tradition of developing new knowledge, understanding, investigative tools, and new technologies that have transformed life in almost every corner of the world. Scientists believe they can refine theory and make universally valid discoveries, and technologists believe they can create technologies that better human life and transform culture in positive ways.

Critical Theory on the other hand is linking arts, literature, media studies, politics, sociology, anthropology, philosophy and technology in an interdisciplinary search for relevant concepts and frameworks to understand the current world. Important themes in Critical Theory are:

1. The rejection of the modernist idea of one dominant cultural stream
2. The impact of mediated images and representation on ideology and behavior
3. The emphasis on deconstructing the language systems and meta-narratives that shape culture
4. Critiques of the narrative of progress
5. Challenges to science's claim to universal truth and art's claim to an elevated, avant-garde vision

Regarding the discordance between the world views of cultural theoretician's and those who work with new technologies, Wilson sees the artists who works with emerging technologies with feet in both worlds:

On one side they are invited to help create the new technologies and elaborate on new cultural possibilities; on the other, they are asked to stand back and use their knowledge of the technology to critically comment on its underrepresented implications. This bifurcation causes critical discord in regard to the work of these artists because of the different stances they can assume. In particular, established critiques might ignore or consider work that entertains the progressive world views of the technologists to be naive. (Wilson, 2002, p. 23)

Wilson sees this dilemma as a chance for artists to stake out their own theoretical stances and to choose which assessments and theoretical propositions to accept or reject. He outlines three different stances for artists working with emerging technologies, which may be combined at times:

1. Artists may choose to continue a 'modernist practice of art' with modifications for the contemporary era
2. Art practice may consist of deconstruction as the main agenda
3. Artists can engage in research activities and participate in the invention and elaboration of new technologies and their cultural possibilities

Commenting on each of these artist' stances towards the work with emerging technologies, Wilson points out the limitations of the first approach and clearly advocates the latter two perspectives.

In continuing their art practice within the mainstream world of museums, galleries, collectors and critics, these artists come across a number of limitations. Wilson states that artists within the world of art can't be really independent, and have to consider strong reluctance regarding the acceptance of new technologies, as becomes evident from the century long struggle of photography, and, more recently, cinema and video, to be accepted into the canon. Furthermore, the extensive use of some of the new technologies, such as digital imaging, interactive media, and Web art, raises high-art-low-art issues according to Wilson.

Deconstruction as art practice supported by theory-based analysis therefore is a potent tool to examine and expose the mediated sign systems and contexts that shape the contemporary world. Destabilizing the representations of what is considered normal thus can be seen as a prime opportunity for artistic action in the world of digital technology, claims Wilson.

Participating in research and the invention and elaboration of new technologies can be combined with the second approach, especially to help generate genuinely new knowledge, cultural meanings, and possibilities rather than just disseminate old signs.

Artists who integrate such collaborative projects, need to prepare and educate themselves, says Wilson:

They must broaden their definitions of art materials and contexts. They must become curious about scientific and technological research and acquire the skills and knowledge that will allow them to significantly participate in these worlds. They must expand conventional notions of what constitutes an artistic education, develop the ability to penetrate beneath the surface of techno-scientific presentation to think about unexplored research directions and unanticipated implications, and learn about the information sources used by scientists and engineers to engage emerging fields, including academic and professional journals, trade shows, academic meetings, Internet resources, and equipment supply sources.<sup>95</sup>

While the citation above describes the ideal attitude of artists seeking to engage with scientific and technological research, artists today in reality adopt very diverse attitudes towards the use of technology:

1. Exploration of new possibilities: The artist's work itself functions as research into the new capabilities opened up by a line of inquiry
2. Exploration of the cultural implications of a line of research: The artist explores the narratives and conceptual frameworks that underlie the research
3. Use of new unique capabilities to explore themes not directly related to the research
4. Incidental use of the technology: The artist finds the new images intriguing, but is not especially interested in the underlying inquiries

Wilson's choice of words indicates the approaches he favors, as much as the role of the 'artist as researcher' represents for him a contemporary model of participating in a conscious and responsible way in today's society. His perspective and methodology clearly resonates with this investigation and has been instrumental in the development of our vision of the artistic laboratory.

Nevertheless it needs to be stressed that, fundamentally, the call for a responsible attitude towards emerging and existing technologies goes far beyond our area of expertise and does not exclude the world of leisure and consumption. On the

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<sup>95</sup> Ibid. p. 39

contrary, the concept of human revolution needs promotion and acceptance amongst those that show little interest in our artistic and academic perspectives, and therefore require engagement with areas of contemporary society that traditionally have been alien to the arts and academia, such as popular culture, mass media, or the world of merchandising culture. In the citations above Wilson stresses that the artist who wants to engage with the world of research, needs to expand his or her vision of the role of artistic education and practice, and engage in a dialogue with different fields and their respective methodologies. Such a change of attitude most certainly will be met with fierce criticism from fellow artists, critics and even friends, as Wilson shows by reminding us of the century long battle of photography to become accepted into the canon of the arts.

### **3.3 The use of the terms ‘technique’ and ‘technology’ in dance**

Back to the field of dance, the term ‘technique’ is frequently used to describe a codified movement language, as in the several schools of classical ballet, and the Graham technique, Limon technique, Horton technique, or Cunningham technique. Some techniques in modern dance are named after their inventors, because they are intrinsically connected with the respective choreographer’s dance style. In these cases the dancer perfects the dance technique during daily training with the objective to prepare for the choreographic process and performance of a work in the particular style.

While dancers continue to train their bodies until today, postmodern and contemporary dance include many more methods to specifically train and prepare the performer’s body for the respective choreographic work. According to Lampert (2007) dichotomies between classical and modern, free and controlled, improvised and fixed collapse increasingly in postmodern and contemporary dance. As a consequence dancers train in several dance techniques. Even seemingly contradictory techniques, such as classical ballet and new dance are combined, for example in William Forsythe’s work. Contemporary choreographers look for versatile dancers who respond to the particular project’s needs.

Beyond Lampert’s classification of dance styles and their respective techniques in Western Theatre Dance (ballet, modern dance, postmodern dance and contemporary dance), we would like to call attention to two important observations:

First, performers today also train in systems, which cannot be labelled dance techniques, such as T'ai Chi, Yoga, acrobatics, martial arts, extreme sports, to name a few. In chapter one (3.11) we referred to Eugenio Barba, who propagates a 'learning-how-to-learn' education to address the needs of the contemporary performer. As a result many teachers refrain from teaching a single dance technique in all its purity, but provide the student with a more general technique, which nonetheless contains much of the traditional vocabulary, mixed with various other movement styles. Dancers are thus enabled to quickly respond to diverse choreographic methods and projects. Often individual talents and capacities of a performer beyond their particular dance training are valued and used by the choreographer; and frequently a dancer teaches these skills to fellow company members. It becomes clear from these examples that the role of the dancer in general has evolved from being a mere instrument used by the choreographer to taking a collaborative part in the choreographic process. This collaboration at times includes multiple roles, such as teaching fellow company members, or contributing choreographic material.

Second, improvisation has become an increasingly important part of the choreographic process since the 1950s. Improvisation is used as a tool in almost any dance form existing today, from (neoclassic) ballet to hybrid forms of modern and postmodern dance, contact improvisation, dance theatre and physical theatre to concept dance. Dance improvisation can be used in the training of the dancer, in the creative process of making a new piece, or even as integral part of a live performance. Therefore the objectives of improvisation in dance are manifold: to explore new ways of moving, to create movement material, or to explore variations of existing parts of a dance work. We must distinguish between objectives related to the production and performance of a new dance work, and to other, less product oriented goals. The latter includes identifying idiosyncratic patterns and habits, breaking them and moving in different, surprising ways. In correspondence to these different possibilities we find a wide range of improvisational techniques and systems, which address the needs of dancers, choreographers and teachers.

Obviously, the role of the dancer in choreographic projects, which use improvisation in one or several phases of the creative process, is totally different from the dancer

who integrates a traditional corps de ballet. Dancers who are asked to improvise become collaborators, or even co-creators to varying degrees. We will elaborate on this subject in the third chapter of this thesis.

Both observations mentioned above affect Evert's view of the kind of training dancers receive and bring to the choreographic process, particularly to the work with new media technologies.

Our first observation (regarding the present multiplicity and hybridity of dance techniques and other forms of physical and mental preparation of the performer) indicates that it becomes virtually impossible to detect the influence of the work with technology on the dancers' bodies, unless there is sufficient and detailed information available about the choreographer's methods and process. It seems to us that this approach is particularly weak when the artists themselves have not commented on their individual process.

For example, in video dance works, there are many examples of highly influential works,<sup>96</sup> which have not been choreographically influenced in the least by the fact that digital technology was used; instead choreographies are rather often adapted to the space of the camera in the same way they have to be adapted to the physical space of different size theaters on a tour.

Choreographers such as Bill T. Jones and Trisha Brown on the other hand have been working with the very same digital artists of the *Openendedgroup* as Merce Cunningham did, and yet there is no obvious influence of the interactive technology on their choreography. On the contrary, both choreographers' methods and artistic vision had a strong impact on the digital artists Paul Kaiser, Shelley Eshkar and Mark Downie, and eventually contributed to technological improvements and innovations. In terms of the concepts we introduced in the first chapter, most of these well-known and documented collaborations between digital artists, programmers and choreographers show that the creative process happens in an interdisciplinary setting. Innovation is bi-directional and therefore it is extremely difficult to decide whether the technology has influenced and changed the movement vocabulary, or

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<sup>96</sup> See for example the stage work of DV8, Wim Vanderkeybus, or Rosas/Anne Teresa de Keersmaeker, which has been later adapted for film and video.

the choreographic methods have caused software and hardware development to adapt to movement ideas that existed beforehand.

Lycouris' notion of *interdisciplinary choreography* (chapter one, 2.3.3) here seems particularly useful, as choreographic methods in the realm of Digital (Live) Performance are extended to virtual spaces, bodies and objects with their intrinsic way of functioning. As we have seen in the beginning of this chapter, practitioners in this field are developing new forms of research, training and performance, which largely transcend traditional dance techniques, and require *interdisciplinary training*, or even, in Kenneth King's word, 'synergetic training'. Chapter five is entirely dedicated to this topic.

So if in dance the term 'dance technique' is used frequently, despite its multiple and sometimes contradictory meanings, what would be the meaning of 'dance technology'? In our research we did not come across this particular term in the field of dance, except when it signifies the straight relation of dance with new media technologies. The term 'improvisation technologies' however became very popular with the publication of a CD-ROM published in 1999 by the title *William Forsythe: Improvisation Technologies, A Tool for the Analytical Dance Eye*. As is well known, this interactive CD-ROM introduces the larger public to a general description of the movement principles underlying Forsythe's choreographic work, and present a set of tools to generate new compositional material and structures, as well as tools for the re-organization of existing material and structures.

It is significant that Forsythe chose the term 'improvisation technologies' instead of 'improvisation techniques'. As a choreographer who is not only familiar with Greek philosophy, but employs its concepts and terms, for example in the choreography *Eidos:Telos* (1995), Forsythe certainly wanted to emphasize the discursive dimension of 'logos' implicit in 'technologia'. In other words, what is it that gives birth to a technique? Which principles are taught and used in a particular technique?

Interestingly the subtitle of his CD-ROM (*A Tool for the Analytical Dance Eye*) indicates that teaching his movement principles used in the choreographies *Loss of Small Detail* (1991) and *Self Meant to Govern* (1994) to his dancers was not only intended to generate the choreographic sequences in real-time during performance, but also as an archival tool for the re-staging and analysis of these choreographies.

We will elaborate on this thought in depth in the third chapter. For now it suffices to refer to the deliberately unusual choice of terms, which point to the importance of choreographic thought and method in the creative process. Gerald Siegmund (2004) has even entitled his insightful edited book on Forsythe's work *Denken in Bewegung* ('Thought in Movement') to stress the importance of 'logos' in this choreographers' work.

If indeed the conception, teaching and analysis of improvisational techniques can be termed 'improvisation technologies' with good reason, the same certainly holds true for choreographic techniques. As Lampert (2007) has suggested, choreography can be seen as 'slowed-down improvisation'; and in this perspective movement principles and creative strategies in improvisation and choreography are identical.

Among British dance scholars such reflection on the nature of improvisation and choreography constitutes the discipline of 'choreology'. In Valerie Preston-Dunlop's book *Dance Words* (1995) the term 'choreology' is employed to describe the study and practice of a 'technology of dance':

In choreological study, how the dancer creates the dance is the concern, how s/he turns what there is to be said by the dance into a performance is central, be it an avant garde performance art piece, a Morris dance, or a Latin American program. What means are at the disposal of the choreographer and reconstructor is central. The conventions of dance, the media of dance, its structuring processes, and the collaborations with fellow art makers are all of crucial interest. The structural elements of movement, the things that can be notated, are included, and so too are the interpretative elements of the performers and the spectators, which leads to an interest in issues of style, meaning and communication. (Preston-Dunlop, 1995, p.xvii)

This perspective was first developed at the *Choreological Laboratory* in Moscow in 1923-1928, where 'choreology' is defined as

(...) the theoretical and practical study of the 'art of movement', by using experiments in rhythm and plasticity and searching for a means of recording movement, using cinema, photography, graphics, paintings and sculpture.<sup>97</sup>

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<sup>97</sup> Ibid. p. 580



And in the section on choreology in *Dance Words* we even find an entry entitled 'Technology of dance' by Roderyk Lange:

The precursory contribution of Rudolf Laban to choreological study methods through his notation system, and his choreutics and eukinetics, by which tangible data on the movement texture of the dance can be collected.<sup>98</sup>

As becomes clear from these quotations, the term 'dance technology' can be useful to describe the *outcomes* of practical choreographic work informed by research and theory (and vice versa) *in the form of a (meta-)system*, such as the ones developed by Laban or Forsythe, or, for that matter, by any dance professional developing such a meta system. This perspective comes very close to the Oxford definition for the term 'technology' we mentioned above, in which the development of technologies is linked to the application of scientific knowledge; and vice versa, the new technologies advance scientific inquiry. The science in question here would be the field of choreology, or in more general terms, dance studies.

We suggest the following working definition:

*'Dance technology' can be understood as a meta system of the field of dance that allows for the development of particular dance and improvisation techniques, the documentation and analysis of creative work, or the teaching of its principles to students and professionals.*

### **3.4 What are 'new media technologies'?**

So far, we have discussed the terms 'technique' and 'technology' in some depth, and looked into the use of these terms related to the field of dance. In chapter one (2.3.3) we have seen that identical terms and their definitions can differ considerably when employed in the field of media studies and performance studies (see for example the concept of 'hypermediacy' as put forward by Bolter and Grusin in their discussion of

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<sup>98</sup> Ibid. p. 581

the 'newness' of actual media versus the use of the same term by Chapple and Kattenbelt in their study on intermediality in contemporary theatre).

In the following section we therefore present key concepts used in (New) Media Studies during the last decade with the objective to clarify their use in the context of our investigation, as well as their recurrent usage in the domain of Digital (Live) Performance. Throughout the past years numerous publications on New Media have addressed a tremendous amount of diverse issues related to this emerging domain. We intend to strictly limit our discussion to arrive at an understanding of the terms 'new media', the technologies associated with them, and a short reference to the recent discussion of the concept of 'newness' in 'New Media' for the sake of clarification of the complex relation between 'old' and 'new media'.

Lister et al. (2003, 2009) suggest six defining characteristics of new media in their comprehensive reader:

1. digital
2. interactive
3. hypertextual
4. networked
5. virtual
6. simulated

Their approach in identifying new media's characteristics avoids endorsing essentialist positions in favor of a careful analysis of the physical constitution and operation of the technologies at hand.

### Digital

The 'digital' characteristic is not claimed to be an essential quality of new media, but rather a useful description of its nature, which "seriously constrains the range of purposes to which it can be put and powerfully encourages others" (Lister, 2009, p. 14). Beyond technical distinctions of digital and analogue technologies Lister et al. present an illuminating example of what the condition of digitality means in practical terms: the essential creative process of editing for example (which is utilized across various media such as film, video, sound, text etc.) allows for the creation of media

texts which “exist in a permanent state of flux in that, freed from authorial and physical limitation, any user can interact with them, turning them into new texts, altering their circulation and distribution, editing them and sending them, and so on”.<sup>99</sup> Although these media texts are ‘dematerialized’ in the sense that physical data of a photo, book, or film are converted to binary, numerical information, Lister et al. resist the claim of much digital rhetoric that this represents a complete transcendence of the physical world. On the contrary, we could argue, the ever-increasing amount of toner and paper, photographic paper, printers of all sizes and kinds, scanners and multifunctional office machines are vivid testimonies to a much more complex and competitive relation between analogue and digital, old and new media technologies.

### Interactive

The term ‘interactivity’ is a much debated and contested key characteristic of new media. Due to its central importance for our investigation, we have dedicated chapters four with a respective case study to this subject. For now it is suffice to mention a basic distinction in the use of interactive new media technologies: those falling into the category of HCI (Human-Computer-Interaction) and those termed CMC by Lister et al. (Computer-Mediated Communications). Chapter four deals with designing creative strategies for HCI interactive situations.

### Hypertextual

In chapter one we have discussed the concepts of hypertextuality and hypermediality in some depth. Lister et al. employ Bolter and Grusin’s idea of hypermediacy and suggest that this term has been very influential in the theory of new media since the end of the 1990s. In accordance with these authors, Chapple and Kattenbelt apply this idea to the realm of contemporary theatre, where the performing arts intersect with new media.

### Networked

This characteristic is a particularly complex one, as it describes large-scale cultural, social, political and economical changes, which are reflected in the way we

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<sup>99</sup> Ibid. p. 19

communicate and consequently in the kind of technologies that have been developed throughout the past twenty-five years:

(...) new media are networked in comparison to mass media - networked at the level of consumption where we have seen a multiplication, segmentation and resultant individuation of media use; dispersed at the level of production where we have witnessed the multiplication of the sites for production of media texts and a greater diffusion within the economy as a whole than was previously the case. Finally, new media can be seen as networked rather than mass for the way in which consumers can now more easily extend their participation in media from active interpretation to actual production.<sup>100</sup>

A user's "power to archive, annotate, appropriate, and recirculate media products" (Jenkins quoted in Lister et al.), in other words, the power to produce, certainly presents new opportunities for artists and their audiences alike. The chapter of this investigation on interactive situations therefore will also present some critical reflection on the influence of these developments on the creation and reception of contemporary choreography; and the claim that dance now is taken to new platforms of presentation, such as virtual environments, blog networks and social network sites, online forums of all kind, or community TV networks.

### Virtual

According to Lister et al. the difficult and complex term 'virtual' is readily and frequently used with respect to our experience of new media, which allow access to virtual worlds, spaces, objects, environments, realities and allow us to create and communicate with virtual selves and identities. Particularly with regard to the 'virtual reality' technologies (interactive 3D graphics) the closely related issues of 'immersion', 'illusion' and 'embodiment' are constantly discussed and reviewed in theories of cyberculture.

However, the term 'virtual' has a long history in philosophy, theology and history, which lead some authors to contextualize the recent technological possibilities in a broader discussion of artistic strategies and aesthetics throughout the centuries (see

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<sup>100</sup> Ibid. p. 35

for example Oliver Grau's (2003) seminal work *Virtual Art - From Illusion to Immersion*). Brought in relation to the (live) Performing Arts, it reminds us that the theatre always has been a 'virtual' space in its very nature (in the broader sense of the word), and that recent new media technologies today are frequently integrated, adapted, and reflected or commented upon.<sup>101</sup>

## Simulation

Without doubt, 'simulation' is a term closely linked to, or even exchangeably used for 'virtual', but Lister et al. offer an intriguing reason for treating simulation as a characteristic of new media in its own right:

A simulation is certainly artificial, synthetic and fabricated, but it is not 'false' or 'illusory'. Processes of fabrication, synthesis and artifice are real and all produce new real objects. A videogame world does not necessarily imitate an original space or existing creatures, but it exists. Since not all simulations are imitations, it becomes much easier to see simulations as things, rather than representations of things.

(Lister, 2009, p.38)

In their account, simulation here is not understood as an overarching postmodern theory of culture, but, much more modest, as a term derived from Game studies, which describes valuable possibilities not available in other media. Lister et al. present a useful definition by Marc Prensky, who describes computer simulation as "a mathematical or algorithmic model, combined with a set of initial conditions, that allows prediction and visualization as time unfolds".<sup>102</sup> This perspective builds on a clear notion of simulation as a practical tool for engineers, social scientists, military planners, economists, as well as artists. In fact this perspective is very familiar to us, if we think, for instance, of asking at a bank for a simulation of a loan to buy a new flat. In such a case the simulation will include several 'scenarios' to preview the impact of different interest rates, and may include the calculation of insurance policies at different stages of our lives. Such a simulation has a powerful practical

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<sup>101</sup> See also Dixon's (2006) chapter on 'Space', where he addresses this issue from various angles

<sup>102</sup> Ibid. p.41

impact on our daily lives, as the differences between simulations of various banks may sum up to thousands of euros over time.

Back to the subject of computer games, Lister et al. suggest a third perspective on the issue, simulation as 'alternate semiotical structure':

What distinguishes the computer simulation is precisely what video games remind us of: it is a dynamic real-time experience of intervening with sets of algorithms that model any environment or process (not just imitating the existing ones) - playing with parameters and variables.

The key point across the different and overlapping concepts of simulation is that 'simulations are real, they exist, and are experienced within the real world which they augment'.<sup>103</sup>

Further characteristics and concepts

It goes without saying, that Lister et al.'s list of new media's main characteristics are intended to be 'the beginnings of a critical map'. These six qualities can be found to different degrees in different new media, and serve to describe what makes new media different. Next we need to ask: different from what? Different from predating 'older' media?

Bolter and Grusin (1999) have proposed the influential idea of 'remediation' to this discussion. A short definition for the term 'remediation' could read as follows: 'remediation is the representation of one medium in another medium'. Indeed, this important idea might well be considered a further defining characteristic of new (digital) media. The authors present two logics of remediation, which they see as the two sides of the same coin: the logic of immediacy and the logic of hypermediacy. Closely connected to these two logics of contemporary artistic practices are what Bolter and Grusin call 'the twin preoccupations of contemporary media: the transparent presentation of the real and the enjoyment of the opacity of media themselves'. In order to stand in an immediate relationship with the contents of a medium, the user or audience needs to immerse, or become unaware of confronting

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<sup>103</sup> Ibid. p.38

a medium. In other words, the interface between medium and user/audience has to be erased, or become transparent.

At least since the Renaissance, it has been a defining feature of Western visual (and for that matter verbal) representation. To understand immediacy in computer graphics, it is important to keep in mind the ways in which painting, photography, film, and television have sought to satisfy the same desire. These earlier media sought immediacy through the interplay of the aesthetic value of transparency with techniques of linear perspective, erasure, and automaticity, all of which are strategies also at work in digital technology. (Bolter & Grusin, 1999, p. 24)

Although Bolter and Grusin do not refer to the Performing Arts, it is fairly obvious that techniques of transparency (such as the separation of the audience in a dark space and the actors on an illuminated stage) have been employed to achieve an immediate relationship with the presented work.

The logic of hypermediacy on the other hand has served as a strategy to make the user/audience aware of the medium or media. Though simple to understand, the logic of hypermediacy is far more complex in its function as a counterbalancing force. In the authors' example of a paintbox software the 'intuitive' quality of the software (meaning the easy accessible use of the software) is only achieved through the conscious reference to a culturally familiar object, the paintbox. In this, and in many similar cases, immediacy is achieved through the logic of hypermediacy. Quoting media theorist Erkki Huhtamo, the authors suggest that hypermediacy can also provide 'authentic' experiences:

Technology is gradually becoming a second nature, a territory both external and internalized, and an object of desire. There is no need to make it transparent any longer, simply because it is not felt to be in contradiction to the 'authenticity' of the experience.<sup>104</sup>

These seemingly contradictory, but factually counterbalancing logics of remediation are taking on four different forms:

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<sup>104</sup> Ibid. p. 42

1. Transparency is desirable to maintain the same relationship to old media as before (for example, digital photographs of paintings presented online by an art gallery to promote a forthcoming exhibition should erase their status of a digital medium)
2. 'Translucent' relationships to old media stress the improvements over the precursor (an electronic encyclopedia for instance, is still the reliable resource the user knows, but offers increased services, such as hyperlinks and search functions)
3. Aggressive remediation, which tries to refashion the older medium or media altogether, while still marking the presence of the older media, which results in a sense of multiplicity or hypermediacy, characterized by obvious discontinuities (for example old television or movie clips taken out of context and mixed into VJ-DJ event)
4. Absorption of the older medium into the new medium; however, the new medium remains dependent on the older one and discontinuities are minimized (for instance, the genre of computer games sometimes labelled 'interactive films', where players can become characters in a cinematic narrative)

As becomes evident from this list, all forms of remediation still 'function in a constant dialectic with earlier media, precisely as each earlier medium functioned when it was introduced'.<sup>105</sup>

Looking at Anne Teresa de Keersmaker's choreography *D'un soir un jour* (2006) the concept of remediation lends itself to analysis of the masterfully crafted piece, which "combines six short choreographic episodes in an exceptionally rich musical journey that starts and ends with the music of Claude Debussy".<sup>106</sup> De Keersmaeker 'remediates' dance material from two parts of *Erase-e(x)* by Johanne Saunier [Joji Inc.], material by the Wooster Group, and a fragment from original choreography to *Prélude à l'après-midi d'un faune* choreographed by Vaslav Nijinsky. Besides remediating earlier dance materials and choreographies, she uses the final scene of Antonioni's film *Blow-up* (1966), which is simultaneously projected and worked into

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<sup>105</sup> Ibid. p. 50

<sup>106</sup> <http://www.rosas.be/SubPages/subAtdk/prodDunsoirunjour/dunsoirunjour/tabid/101/language/en-US/Default.aspx>  
 Accessed January 2011



her choreography. While the logic of hypermediacy is clearly visible in this dance, none of the forms of remediation mentioned above quite describe de Keersmaecker's choreographic strategies exactly, which suggests, that the useful concepts of immediacy, transparency, hypermediacy and remediation need to be re-thought in the context of Digital (Live) Performance (alias Chapple and Kattenbelt's collection of essays provide interesting examples of such transdisciplinary thinking).

So if more recent media 'function in a constant dialectic with earlier media', it is crucial to ask what exactly the 'newness' in new media is.

Lister et al. suggest three perspectives regarding the change of media throughout history:

1. Measuring 'newness'
2. Old media in new times
3. Remediation

#### Measuring 'newness'

The authors suggest to base thinking about the 'newness' of new media on the historical dimension of the phenomenon, and ask critically about the concept of newness itself (and for that matter about the term 'revolution' associated with digital media). Three approaches are presented to help measuring newness: to inspect closely whether something only appears new on the surface, or really is a new category or kind of thing; to maintain vigilance when something new has become familiar and we cease to critically question its consequences; and finally, to revise through inspection, what is new. In the latter case, we may discover some kind or degree of novelty that was not initially obvious to us and becomes apparent through revising our perspective.

#### Old media in new times

Drawing on media theorists Mackay and O'Sullivan the authors distinguish an 'old medium in new times' from a 'new medium' altogether. As an example serves 'digital television', which is not a new medium, but represents a change in the form that contents are delivered. Again, Lister et al. stress the importance of asking what exactly is new about the medium and the technologies used to deliver it.

## Remediation

The authors assert that there is ‘an unassailable truth’ in the idea of remediation, because “new media are not born in a vacuum and, as media, would have no resources to draw upon if they were not in touch and negotiating with the long tradition of process, purpose and signification that older media possess”. (Lister, 2009, p.48)

Closely connected with these critical perspectives of the very idea of ‘newness’ are historical models and approaches employed to describe the changes and continuity in media. Lister et al. hold that certain “historical perspectives are often strongly marked by paradoxically old-fashioned ideas about history as a progressive process”,<sup>107</sup> and suggest to look closely at the kind of ‘histories’ connected to media theory. Three basic accounts are distinguished:

1. Teleological accounts of new media
2. A history of a set of chronological connections between ‘pivotal concepts’
3. Foucauldian genealogies of new media

### Teleological accounts of new media

According to Lister et al. “attempts to find a (teleo)logic in history were strong in the nineteenth century (...) a dominant sense of optimism and faith in the progress of industry and science encouraged the view that history (as the growth, evolution and maturing of human societies) was drawing to a close” (Lister et al., 2003, 2009, p.55). As an example for such teleological accounts the authors present Howard Rheingold’s 30000 years spanning history of ‘virtual reality’, in which he claims that essential today’s new media technologies are the culmination of all human media over time, and in this sense the Upper Paleolithic cave paintings of Lasceaux were already holding the seeds of today’s virtual reality. Another example for teleological accounts would be the 8-stage historical model of the progressive development of technologies of image production and transmission offered by media art theorist and director of the prestigious ZKM (Center for Art and Media Technologies in Karlsruhe,

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<sup>107</sup> Ibid. p.52

Germany) Peter Weibel. This model spans 160 years starting with photography as the first stage, in which Weibel sees ‘the birth of new visual worlds and telematic culture’. Lister et al. sharply criticize such teleological accounts on the grounds that these “can be highly misleading in their grand sweep and the way in which they place new media, far too simply, as the end point of a long process of historical development”.<sup>108</sup>

A history of a set of chronological connections between ‘pivotal concepts’  
Media theorist Paul Mayer’s important contribution to the history of new media focuses on the development of computer media and communication against and through different sets of ‘pivotal concepts’ deriving from other related and not directly related fields:

Hence, as we follow Mayer’s historical account of key figures and ideas in the history of computing, we also see how the conceptual development of the modern computer as medium took place for quite some other reasons. At the very least these include the projects of eighteenth-century philosophers, nineteenth-century industrialization, trade and colonization, and an early twentieth-century need to manage statistics to for the governance and control of complex societies. (...)

Computer-mediated communication, Mayer’s specific interest, is only one key element within a broader landscape that includes convergences, hybridisations, transformations, and displacements within and between all forms of older media. These media, such as print, telecommunications, photography, film, television and radio, have, of course, their own, and in some cases long, histories. In the last decades of the twentieth century these histories of older media became precisely the kinds of factors that began to play a crucial role in the development of computer media, just as the demands of navigators or astronomers for efficient means of calculation did in the nineteenth.<sup>109</sup>

Mayer’s historical survey of computing certainly resonates with the critical approach towards new media theories that Lister et al. suggest, and can be considered a most valuable method to understanding the historical dimension of emerging technologies

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<sup>108</sup> Ibid. p. 53

<sup>109</sup> Ibid. p. 56-57

in that it focuses on the complex network of conditions as its object of research, rather than the seemingly isolated appearance of a new medium or technology. From the viewpoint of our own investigation we suggest combining Mayer's method of analyzing sets of chronological connections between 'pivotal concepts' with a third approach to history developed by philosopher and historian Michel Foucault.

Foucauldian genealogies of new media

Mark Poster, quoted in Lister et al., points out the conceptual problem that the Foucauldian perspective on history helps to resolve:

The question of the new requires a historical problematic, a temporal and spatial framework in which there are risks of setting up the new as a culmination, telos or fulfillment of the old, as the onset of utopia or **dystopia**. The conceptual problem is to enable a historical differentiation of old and new without initializing a totalising narrative. Foucault's proposal of a genealogy, taken over from Nietzsche, offers the most satisfactory resolution.<sup>110</sup>

Bolter and Grusin for example have explicitly referenced their indebtedness to Foucault's notion of genealogy, and Lister et al. mention the (media) historians John Tagg, Jonathan Cray and Geoffrey Batchen as examples of could be called a 'Foucauldian' perspective.

Lister et al. suggest:

We should note that Poster is particularly keen to avoid thinking of history as a process with a 'culmination' and end point. Bolter and Grusin, like Foucault, are not interested in the origins of things. They are not interested in where things began or where they finished. They are interested in 'affiliations' (the attachments and connections between things) and 'resonances' (the sympathetic vibrations between things). They want to know about the 'through' and 'against' of things. Instead of images of linear sequences and chains of events we need to think in terms of webs, clusters, boundaries, territories, and overlapping spheres as our images of historical process.<sup>111</sup>

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<sup>110</sup> Ibid. p. 58

<sup>111</sup> Ibid. p. 58

What Lister et al. propose based on the theories of the media theorists quoted above, also clearly ‘resonates’ with the influential notion of the *rhizome*, which Deleuze and Guattari presented in the 1970s as an alternative model of organization of knowledge. Contrary to the classical scientific form of dichotomous knowledge organization, for example in taxonomies and classifications, the *rhizome* model precisely encourages the investigation and visualization of ‘affiliations’, the often multiple, cross-category and cross-hierarchical connections between its elements.

Such affiliations are explored by Gitelman and Pingree (2003) in an interesting way: new media are discussed in their relation to ‘failed media’ and ‘dead media’:

Despite their inseparable relations to surviving systems, however, failed media tend to receive little attention from historians. ‘Lacking the validation that comes with imitation’, Altman notes, ‘unsuccessful innovations simply disappear from historiographical record’. His suggested corrective for this excessive focus on, for example, ‘cinema-as-it-is’, is an attention to ‘cinema-as-it-could-have-been’ or ‘cinema-as-i-once-was-for-a-short-time-but-ceased-to-be’ *New Media* aims to apply some of this ‘could-have-been’ and ‘was-for-a-short-time’ kind of thinking to past media. Because our understanding of what media are and why they matter derives largely from our understanding and use of the media that survived - those devices, social practices, and forms of representation with which we interact every day - the importance of this kind of analysis is easy to overlook (Gitelman & Pingree, 2003, p. xiii)

In the introduction to their edited book *New Media 1740-1915* Gitelman and Pingree suggest that emerging media pass through an identity crisis, in which their status in relation to established media is uncertain. Importantly, this crisis is only resolved when the perceptions of such an emerging medium and its practical uses can be adapted to existing categories of public understanding of what this new medium offers for whom and why. This notion of identity crisis, drawn from Rick Altman’s idea of ‘crisis historiography’, implies that no medium ever exists as a static form, and technological change inevitably challenges old, existing communities. Consequently, each case of emerging media ‘invites consideration of numerous and dynamic

political, cultural and social issues', state Gitelman and Pingree, and "inasmuch as 'media' are media of communication, the emergence of a new medium is always the occasion for the shaping of a new community or set of communities, a new equilibrium".<sup>112</sup>

Whether the emergence of new media is experienced as a threat and challenge, or as an exciting opportunity, depends largely on the perspectives and notions of new media and its technologies that are adopted. Gitelman and Pingree therefore refer to Paul Durguid, who warned against two reductive 'futurological tropes' influencing the experience of today's media, respectively the ideas of 'supercession' and of 'increasing transparency'. From the idea of 'supercession', or the assumption that each new medium will subsume its predecessors, follow expectations such as the extinction of the printed book because of the arrival of digital or electronic books. The second trope, or idea that each new medium mediates less and therefore represents reality more accurately, leads to the conviction that any new media is necessarily superior to its predecessors.

Both misconceptions root in the influential cultural narrative of (modernist) progress, and resonate with teleological historical accounts, as we have seen above.

Gitelman and Pingree's important contribution to the discussion of the 'newness' of new media substantiate a necessary shift towards the reflection upon the framing of discussions of new media itself.

Henry Jenkins (2006) has recently proposed three key concepts, which help to frame the discussion of new media in an entirely different way: (1) convergence, (2) participation and participatory culture; and (3) collective intelligence. Convergence is explained in the glossary as follows:

**Convergence:** A word that describes technological, industrial, cultural and social changes in the ways media circulate within our culture. Some common ideas referenced by the term include the flow of content across multiple media platforms, the cooperation between multiple media industries, the search for new structures of media financing that fall in the interstices between old and new media, and the migratory behavior of media audiences who would go almost anywhere in the search

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<sup>112</sup> Ibid. p. xv

of the kind of entertainment experiences they want. Perhaps most broadly, media convergences refers to a situation in which multiple media systems coexist and where media content flows fluidly across them. Convergence is understood here as an ongoing process or series of intersections between different media systems, not a fixed relationship. (Jenkins, 2006, p. 322)

The fact that contents are flowing across multiple media platforms, for example the coexistence of books in digital format and printed version, attests to the reality of 'convergence' and at the same time allows Jenkins to declare the failure of the digital revolution paradigm, which he identifies as the 'myth that new media technologies will displace older media systems'.<sup>113</sup> Instead, the coexistence of older and newer media lead to an interesting perspective of the relation between media and technologies:

To define media, let's turn to historian Lisa Gitelman, who offers a model of media that works on two levels: on the first, a medium is a technology that enables communication; on the second, a medium is a set of associated 'protocols' or social and cultural practices that have grown up around that technology. Delivery systems are simply and only technologies; media come and go all the time, but media persist as layers within an ever more complicated information and entertainment stratum.<sup>114</sup>

In other words, delivery technologies, such as vinyl, CDs, MP3 files, or 8-track cassettes serve as tools to access media content (the recorded sound). They become obsolete and get replaced frequently, while the medium evolves. Furthermore, Jenkins calls attention to the fact that at the same time that content is converging over different media platforms, the hardware (or delivery technologies) are diverging. This phenomenon, which Jenkins calls the 'Black Box Fallacy', manifests in an accumulation of more and more 'black boxes' in our homes and lives (VCRs, digital cable box, DVD player, camcorder, sound system, game console, flatscreen TV, laptops, cell phones, ipods etc.), which all too often can't communicate effectively one with another, because of their (intentionally) differing industry standards. The idea that devices can and will converge in central devices (a

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<sup>113</sup> Ibid. p. 323

<sup>114</sup> Ibid. p. 13-14

single multifunctional black box at home, or a mobile version of the black box) presently competes with the development of specialized media appliances for all kind of situations (e.g. the computer, which has evolved into multiple version ranging from the desktop with a dual 30 inch monitor to a tiny notebook, PDA or smartphone). Jenkins' notion of media convergence, as we have seen, goes beyond the simple technological developments and addresses the "logic by which media industries operate and by which media consumers process news and entertainment". (Jenkins, 2006, p.16)

This focus on the social and cultural protocols associated with a medium leads us to the second main concept Jenkins suggests, the 'participation', or forms of audience engagement with the media. 'Participatory culture' has emerged as a form of actively participating in the creation and circulation of new content (for example on *Youtube*, or in social networks).

The third key concept, 'collective intelligence' is closely related to such active participation:

Consumption has become a collective process - and that's what this book means by collective intelligence, a term coined by French cybertheorist Pierre Lévy. None of us can know everything; each of us knows something; and we can put the pieces together if we pool our resources and combine our skills. Collective intelligence can be seen as an alternative source of media power. We are learning how to use that power through our day-to-day interactions with convergence culture. Right now, we are mostly using this collective power through our recreational life, but soon we will be deploying those skills for more 'serious' purposes.<sup>115</sup>

Jenkins' understanding of the term collective intelligence and vision of the use of new media in professional, or, in our case, scientific, artistic and educational contexts, clearly resonates with the practices presented in the beginning of this chapter, namely Schiller and Lovell's of 'pooling' information and knowledge. In our perspective Jenkins' three key concepts and Bolter and Grusin's idea of

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<sup>115</sup> Ibid. p. 4



'remediation' not only represent fundamental contributions to new media theory, but could rightly be included in Lister et al.'s list of new media's essential characteristics.

It is evidently beyond the scope of this investigation, nor could it be the intention of this short section on basic terms and concepts employed by new media theorists, to deepen any discussion of the contributions referred above. Instead, this selection presents those theories that we think to be most relevant for our investigation. Our objective here is to revisit and apply these ideas in the context of concrete case studies presented in through the chapters three to five.

### **3.5 'Dance and Technology', or 'dance-tech': a misnomer?**

Isabel Valverde (2005) writes in her PhD dissertation about the genesis of the term 'dance and technology':

Dance and Technology was introduced as a conference series in the early 1990s, first gathering mainly American, Canadian, and British artists and researchers whose work linked these two and other related areas. These conferences were held respectively in Wisconsin in 1992, Vancouver in 1993, and Toronto in 1995. In 1999 *dance-tech* expanded to cover larger international scope becoming the International Dance and Technology Conference (IDAT99) now Dance Tech Inc. 'Dance-technology' is also the designation of an e-mail list server since 1995, which is part of 'Dance & Technology Zone', a web site launched and managed by Scott deLahunta, Marc Coniglio, and Scott Sutherland, and lately by the latter. This site has been played a key role in contributing to the spread of this work and establishing a community of artists, scholars, researchers, computer artists, interface designers, among others. (Valverde, 2005, p.38)

Meanwhile this pioneering website is archived and other e-mail list-servers, blogs and social networks have emerged run by key figures of the 'dance-tech' community. The brief mission statement of the Dance & Technology Zone reads:

Though the number of creators using technology to enhance or extend their live performances is growing, those actively pursuing these avenues of investigation are sometimes separated by great distances. Our hope is to use the internet to bridge these gaps by creating a resource site with three main objectives. First, to promote

research and present thoughtful inquiry into the ways in which these new tools will effect both process and content. Second, to create an umbrella data service which will provide links to artists and events on (and off) the net. Third, to create a shared resource of practical information and know-how for artists, practitioners and educators who by necessity or choice, are fashioning these new technologies themselves.<sup>116</sup>

While the web site has served as an invaluable resource and tool for many members of what was to become the 'dance-tech community', the mission statement clearly shows the difficulties of defining, or just finding an appropriate name for this complex artistic field. Thus the statement is deliberately vague: there is no mention of which creators use exactly what kind of 'new technologies'. Instead the web site is intended as an 'umbrella data service', and maybe this openness was the key to its success for the six years of its activities.

One of its cofounders, Scott deLahunta, contributed several early articles, whose titles indicate an ongoing search for accurate terms: 'New Media and Information Technologies and Dance Education' (1996), 'Sampling... Convergences between Dance and Technology' (1998), and 'Speculative Paper: Theater/Dance and New Media and Information Technologies' (1998). From these titles and papers it becomes clearer, that the word 'technology' in the term 'Dance and Technology' represents several 'New Media and Information Technologies'.

More recently, since 2007, Marlon Barrios Solano has produced a social network named 'dance-tech.net', which subtitle elucidates its philosophy: 'Interdisciplinary Explorations on the Performance of Motion'. On the welcome page we read:

**What is it?**

My name is Marlon Barrios Solano, I am based in NYC and I am the creator and producer of dance-tech.net (this social networking site), [dance-techTV](#) and of the [dance-tech.net interviews](#).

***Techne, or techné***, is etymologically derived from the Greek word τέχνη (Ancient Greek: [tékʰnɛ:], Modern Greek Eil-Techni.ogg which is often translated as **craftsmanship, craft, or art**.

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<sup>116</sup> <http://art.net/~dtz/dtz.html> accessed January 2011

**dance-tech.net** is a social networking website connecting people concerned about the **techne** or the CRAFT of dance in our contemporary world, its embedded condition in technologically designed and mediated environments and of course its trainings, its stories and histories.

Using the most advanced social software platforms and internet rich multimedia applications, dance-tech.net provides movement and new media artists, theorist, thinkers and technologists the possibility of sharing work, ideas and research, generating opportunities for interdisciplinary and collaborative projects. It explores innovation, creative processes, collaborations and the impact of new media technology and interdisciplinary approaches on the performance of movement and life.

**dance-tech.net** is also an experiment on developing a sustainable and alternative infrastructure for knowledge distribution and trans-local collaborative creativity facilitated by the new internet.<sup>117</sup>

Again, from this introduction it becomes clear that the abbreviation 'tech' in 'dance-tech' represents 'new media technologies' - with focus on interdisciplinary collaboration and processes. Barrios Solano, who had participated very actively in the lively discussion of the (still existing) 'dance-tech' email user list moderated by Johannes Birringer, suggested in a thread dating from November 2007 'to widen the focus to 'new media and performance':

(...) I think that we need to create our own site as a social network. That will allow us to feel a more face to face interconnected distributed dialog. That technology will allow us to create 'groups', post performances, embed videos, and our users will be able to visit their areas or groups and review different levels of discussion.

I also propose to widen the focus to 'new media and performance' or embodied performance and computation, I am willing to set it up.

What do you think?

More thoughts later.

Marlon <sup>118</sup>

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<sup>117</sup> [http://www.dance-tech.net/profile/network\\_producer](http://www.dance-tech.net/profile/network_producer) accessed 10/2009

<sup>118</sup> <http://www.freelists.org/post/dance-tech/london-dance-film-festival-critical-debate-postchoreography.2>  
accessed January 2011

Coincidence, or not, Birringer entitled his book on the intersection of performance and (new media) technology as early as 1998 'Media & Performance - Along the Border'. After all, it seems that 'Dance and Technology', 'dance-technology', or 'dance-tech' *is essentially about the intersection of dance/performance and new media*. Why then the confusion of two different semantic fields in a term? In other words, why this connection of the term 'dance' (which is an artistic form of expression, a medium) and 'technology' (which is a generic term, and in our case, represents 'new media', but also, and confusingly, new media's *delivery technologies*)?

Steve Dixon (2006), who suggested the term 'Digital Performance' instead, sheds light on this curious question:

The concern of this book is to take a generally reverse stance to much of the writing around cyberculture, digital arts, and performance, which has tended to discuss technological aspects first and foremost and content/aesthetics second (if indeed at all). Rather, our focus and concern is to assess and analyze the particularities of performance and performances in relation to how they have adopted and utilized technological developments in varied ways in order to create different types of content, drama, meanings, aesthetic impacts, physiological and psychological effects, audience-performer relationships, and so on.

The tension behind the 'technology versus content' issue was tellingly underlined in an exchange on the 'Dance-tech' user group mail list in August 2001. Company in Space, a pioneering digital dance group from Australia, sent an announcement advertising their new telematic work *CO3* (2001) which they described as 'a landmark performance... the next startling stage in cybernetic performance art'. The email described in some detail the coming Internet-linked performance between two dancers, one in Florida and one in Melbourne, who wear state-of-the-art motion-capture suits to animate two avatars that perform in real time within a shared virtual environment. A curt reply was posted by digital artist Nick Rothwell: 'I'd rather hear about the artistic content and motivation for using the technology, not just the technology itself. What is the content, exactly?'

(...) British media designer Roy Stringer stressed how 'authorship has nothing to do with technology'. He observed that although artists, authors, and directors love to work in new forums and experiment with new digital techniques, 'the killer application in new technologies is *content*'. (Dixon, 2006, p.5-6)

Dixon's account certainly resonates with Heidegger's claim that 'the essence of technology is by no means anything technological'. Collapsing new artistic forms of expression and their distributing technologies into the generic term 'technology' (in 'dance and technology') means deflating and reducing new media to their appearance. Not just 'content and motivation for using the technology' are left out, but, as importantly, media-specific artistic methodology and research. In the next section of this chapter we will discuss examples of such methodologies developed in the context of new media.

As if this discussion would not provide enough reason to refrain from using this terminology in the context of our investigation, there is another important aspect that deserves attention.

The separation of 'dance' from 'technology' (in the term dance-technology) implies an anti-technological perspective of the field of dance. Dance has had its own technologies for centuries. Right from the start graphic notation systems have been developed for the sake of documentation and instruction. Concert theater dance as much as disco dancing rely on their supporting technologies. In every traditional dance class fairly recent technology is used (sound systems, video recorders, or DVD players). In this perspective the use of new media technologies is a continuation of earlier remediation processes within the field of dance (and the performing arts in general). For example, traditional dance classes were accompanied for the longest time by live musicians, such as the pianist in a ballet class, or the percussionist in a modern dance class. During the past decades we have witnessed a shift towards the substitution of the live musician and the remediation of music in the form of diverse sound systems and media formats.

Less obvious, even to professionals in the field, is the perspective of 'technology of dance' we have mentioned above (3.3). While virtually everybody is familiar with the term 'dance technique', to think of a 'dance technology' as meta systems in dance and performance, is a perspective adopted by a few. We argue that one term does not make sense without the other: if there are dance techniques, there must be dance technologies, there must be a respective discursive dimension allowing to develop, analyze and reflect upon the techniques.

Consequently, if 'technology' in the term 'dance and technology' refers to and even signifies new media technologies, the 'technology of dance' is not considered and reduced to 'bodily techniques', and therefore reduced to the dimension of liveness, to the work in the studio and public performance for audiences. From this point of view, the term 'dance and technology' represents a reduction to more conventional and limited definitions of dance.

In Preston-Dunlop's *Dance Words* we find the following entry for dance:

'Dance might ... be defined as any movement designed to be looked at'; said with reference to the Judson Church experiments.

*Roger Copeland and Marshall Cohen, 1983.*

In other words, in the 1960s the domain of dance had been expanded to include film and projections, graphic scores of all kinds, the written and spoken word, sound and music of all types, and so on. And the way of looking at all of these materials is summed up in the quote above: there is (designed) movement in film (for example the camera moves), there is physical activity in the projection of a film, there is recorded movement in a graphic score, as well as there is movement to be derived from a score, and so on. However, there was no need felt by dance professionals to call this engagement with other media and their distributing technologies something else but dance, movement, choreography, or composition.

Still, Valverde explains why she chose the term *dance-tech* as fundamental for her dissertation, in which she presents four kinds of 'dance-tech interfaces':

Comparable to the impact of Simone Forti's 'Huddle', one of the first dances presented as a moving sculpture in a gallery, or Trisha Brown's site-specific performances on building walls or rooftops, *dance-tech* is extending performance to the screen and World Wide Web virtual reality as a mediatized, mixed-reality event rather than 'live' art. In the same fashion, similar to Judson Dance Theater's task-oriented dances for audience participation that emphasized the accessibility, ephemerality, randomness, and connectedness to life of artistic experience rather than a final product, *dance-tech* explores similar approaches through the concept of

digital interactivity, generating game-type contexts as installations, VR environments, and Web sites.

Taking this tradition into account, the most radical shift is probably the definitive collapse of a definition of dance based solely on the 'live' performer and audience in a physical site. *Dance-tech* is increasingly including work with all sorts of artificially created characters (such as avatars and techno buffs) moving in cyberspace, or even being conceived as the interface itself for the audience to interact with.

Despite or because all the controversy associated with 'dance-technology', I chose to keep this term as my research topic; first, for lack of a convincing alternative, and second, because considering *what* to call it is not as important as *why* to call it at all. After all, I perceive dance and performance as a privileged site for issues surrounding the body within culture and, consequently, because of its interface with technology, *dance-tech* is at this time the appropriate designation. Although it is somewhat redundant to add technology to dance in this emerging new place that dance is passing through, I find the *dance-tech* definition necessary as a transition from being taken for granted as two separate disciplines leading to their hybridization. (Valverde, 2005, p.41-42)

From our perspective this approach obviously is problematic for a number of reasons.

First of all, Valverde doesn't offer a clear '*dance-tech* definition', instead she refers a historical moment when the term is officially introduced in the name of the IDAT conferences.<sup>119</sup> More precisely, what exists is an active and creative community using the term as an umbrella for all kinds of artistic activities.

Secondly, we find the affirmation that dance and technology are two separate disciplines, incorrect. As mentioned above, we suggest that the terms 'dance' and 'technology' don't belong to the same semantic fields. Dance certainly can be called a discipline within the performing arts, but technology is a very generic term *associated with* the most diverse disciplines. At the Massachusetts Institute of

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<sup>119</sup> She writes in the introduction to her dissertation: "Dance and Technology was introduced as a conference series in the early 1990s, first gathering mainly American, Canadian, and British artists and researchers whose work linked these two and other related areas. These conferences were held respectively in Wisconsin in 1992, Vancouver in 1993, and Toronto in 1995. In 1999 *dance-tech* expanded to cover larger international scope becoming the International Dance and Technology Conference (IDAT99) now Dance Tech Inc. "Dance-technology" is also the designation of an e-mail list-server since 1995, which is part of "Dance & Technology Zone", a web site launched and managed by Scott deLahunta, Marc Coniglio, and Scott Sutherland, and lately by the latter."

Technology (MIT) there is no single course in 'technology', and only one in thirty-five courses carries the term in its name (Science, Technology and Society).

Thirdly, dance as an artistic field has already evolved beyond the claims of innovation Valverde makes for the field of 'dance-tech'. For example, performance had already been taken to the screen as early as 1924, when Erwin Piscator used slide and film projections in his production *Red Revue* (Gieseckam 2007).

Maybe we are being too harsh on Valverde here, whose dissertation we consider an important contribution, which has stimulated much thought, and, as Evert's study, has helped to ask new questions. We empathize with Valverde and her choice to "keep this term as my research topic (...) for lack of a convincing alternative", because it is objectively very difficult to develop solid terminologies when we find ourselves in the midst of a rapidly evolving field of study. Furthermore, we have likewise used the term 'dance and technology' and 'dance-tech' for many years to teach, write and produce artistic work. On the other hand, we keenly sense the necessity to abandon this terminology for the reasons discussed above.

### **3.6 Digital (Live) Performance**

When Valverde completed her dissertation, Dixon had not yet published his influential book *Digital Performance - A History of New Media in Theatre, Dance, Performance Art, and Installation* (2006). Nevertheless, the term was employed by him and his collaborator Barry Smith to name their large scale research project 'The Digital Performance Archive (DPA)' (1999-2001). Dixon explains:

Digital Performance, in the terms that we define it, concerns the conjunction of computer technologies with the live performance arts, as well as gallery installations and computer-based net.art, CD-ROMs, and digital games where performance constitutes a central aspect of either its content (for example, through a focus on a moving, speaking or otherwise 'performing' human figure) or form (for example, interactive installations that prompt visitors to 'perform' actions rather than simply watch a screen and 'point and click'). Apart from occasional references, our study excludes the use of digital technologies in 'non-live' and 'non-interactive' performance forms such as film, television and video art. (Dixon, 2006, p.x)



While the term ‘Digital Performance’ in the sense defined above comes closest to how we could delineate the field of study of our own investigation, it is likewise important to us that the term has become more widely accepted and used during the past decade:

Since 2000, the use of the term ‘digital performance’ (in the sense that we intend it) has become more frequent within performance studies as well as in university education where, for example, a master’s degree in Digital Performance was launched in 2004, UK, led by Robert Wechsler (artistic director of the German dance and technology company Palindrome) and David Collins (editor of the *International Journal of Performance Arts and Digital Media*).<sup>120</sup>

To us the term ‘Digital Performance’ is the most convincing for our investigation, because of its semantical coherence. We understand the word ‘digital’ in the sense Lister et al. have described it, as one of new media’s key characteristics, and as such representing the entire list we have mentioned above, including our additions of other theorists (remediation, convergence, participation and collective intelligence). As mentioned in the introduction to this dissertation, we have added the word (Live) between both terms for two distinct reasons: (1) the inclusion of the word ‘Live’ evidences the delineation of our field of investigation (which is much more narrow than the territory Dixon is mapping), and the focus on live performance for an audience; and (2) the use of the brackets suggests that the argument is valid for the entire field of Digital Performance as defined by Dixon.

#### **4. Lab Methodologies**

The concept of the artistic laboratory has been frequently employed over the past decades to denominate a form of research, which in fact can be linked to long traditions in the arts. Gloriana Davenport (2004) states that a core methodology of the Massachusetts Institute of Technology’s (MIT) Media Lab is the ‘atelier’. This French term is used to describe ways in which fine artists have been working for

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<sup>120</sup> Ibid. p. XI

centuries. The idea of the atelier is often connected to a master and his or her disciples collaborating on a larger project. The daily work at the atelier included teaching skills, experimenting and refining new materials, and discussion. Similarly experienced scientists, artists and professors collaborate with their students on research projects at the MIT Media Lab. Davenport mentions that academic activities, such as teaching classes, frequently trigger interesting research questions. Artistic research naturally involves developing new technologies and devices at the Media Lab, and eventually results in the presentation of prototypes, which are presented to sponsors and the industry.

#### **4.1 Lab formats**

In 2007 we had the opportunity to visit the *Biennial Rencontre-i* at Grenoble in France. Part of the program was a guided tour to the Minatec Ideas Laboratory (CEA), directed by Michel Ida, which allowed for an insight to the collaborative research conducted by an interdisciplinary team of artists and scientists.

Choreographer and dancer Anabelle Bonnery for example has been participating in the development of sensorial technology.

At CEA watch-like sensors fixed to hand and feet have been developed, which measure position in space and acceleration of movement. Data obtained by these sensors are imported to the software Max/MSP to generate musical structures in real time. Bonnery's bodily training and knowledge has been essential to this project, which aims at discovering what kind of gestures can produce what kind of sound.

Dance Labs in general work on the same premises as many media labs. Artistic ideas and research questions are formulated and tested in a methodological way to produce knowledge in the form of prototypes.

French choreographer Kitsou Dubois, who I also met at *Rencontre-i*, showed *Zero Gravity Dance* work, which she developed on the base of several sessions at NASA, where she experimented with zero-gravitation. She had been invited to prepare astronauts physically, and in turn got the rare opportunity to work with dancers at the Space Lab.

Bonnery's and Dubois' work are examples for temporary *project based dance-labs*, which is probably the most common format.

A different approach are *short-term research laboratories* based on specific topics, such as the international Think Tank on *New Performance Tools: Technologies / Interactive Systems* organized by Scott deLahunta and Johannes Birringer at the Ohio State University in 2002. This research laboratory brought a variety of specialists together to share and reflect about this particular topic. In this case a different kind of knowledge was produced, which can contribute to develop a cross-disciplinary ‘meta-methodology’ of the field in question.

Today most dance-labs are organized within artistic residencies as part of the production of dance works, within larger scale research projects organized by universities, or in collaboration with other disciplines and institutions.

Concluding this brief survey of dance lab formats, I would like to mention the Dance Lab founded in 2004 at the FU Berlin in Germany. Under supervision of Gabriele Brandstetter the Dance Lab is part of the Institute for ‘Theaterwissenschaften’ (the term literally translated reads ‘theatre sciences’, and focuses on the production of ‘Körperwissen’, i.e. bodily knowledge as an alternative to educational knowledge). The Dance Lab focuses on three areas of investigation: knowledge produced through and by the body, reflection about human perception and movement as a multifaceted phenomenon, which permeates all aspects of life. This research agenda provides a solid conceptual framework for the lab, which allows for designing curricular activities, artistic projects and collaborative cross-disciplinary investigation. The Dance Lab at the FU Berlin could be called a *permanent laboratory*.

**All examples mentioned above represent common formats of artistic laboratories, which can be listed as follows:**

- short-term research laboratories (workshops, think tanks etc.)
- series of laboratories (thematically organized, or curated)
- project-based laboratories and residencies
- permanent and/or institutionalized laboratories

We will refer back to these formats in the chapters that present case studies, and discuss the implications of choosing a particular format over another.

## 4.2 Categories of constituent elements of artistic laboratories

Some characteristics are recurrent in all formats, and can be considered constituent elements of an artistic laboratory. We suggest seven general categories:

### 1. Time

As we have seen, artistic laboratories in general and dance labs in particular can be short-term, one-off initiatives; they can be organized periodically and in series; they may consist of a longer specific research project; and they may be conceived as an ongoing activity on a regular bases.

### 2. Place

According to the nature of the lab in question, the artistic research may take place in the facilities of host organizations, or several of these, and they may find a permanent, sometimes custom-built home. Peter Stamer (2005) makes an interesting claim, when he states “knowledge is choreographed topographically”. This certainly corresponds to many artists’ experiences of working at specific locations with its particular conditions.

### 3. People

In the same way every participant in a dance lab plays a unique role and makes a clear difference through their individual contribution, labs may involve a permanent staff or team of collaborators, or they can be designed for very diverse groups of participants.

Collaborative models and their mixes of multidisciplinary, interdisciplinary and transdisciplinary approaches fall into this category.

### 4. Ideas

The major objective of organizing a dance lab is to test artistic ideas and to develop and refine artistic research questions.

### 5. Methodology

Stamer (2005) asserts that the classical model of the laboratory (hypothesis and verification/falsification) is essentially different from the model of the artistic

laboratory. According to him the latter is based on ‘divergent thinking’, which integrates the formulation of the research questions as part of the experimentation (a question leads to the reformulation of the same question, or to new questions).

## 6. Equipment and technology

We have discussed the term ‘technology’ in quite some detail and put forward our definition in relation to the field of Digital (Live) Performance. In our perspective it is vital to distinguish between distributing technologies (hardware and software), which fall under the category of equipment, and the creative use of such equipment, which involve methodology, experimentation, analysis and reflection. Technology is therefore inseparable from the media it was developed for, the histories, conventions, uses, methodologies and work created within it. Whether the artists and collaborators address these issues or not, there is no way to avoid dealing with these realities. As has become clear from our argument, we sympathize with and encourage a humanly responsible and conscious stance towards the use of media technologies and equipment.

## 7. Outcomes

A Dance Lab frequently leads to the development of prototypes, or ‘beta-versions’ of a new performance format, a specific interface, or appropriate creative strategies. The idea of producing prototypes includes conceptual advances and methodological improvements that can be made available for the interested public.

These categories of constituent elements of artistic labs are very useful for the field of Digital (Live) Performance for two simple reasons:

Firstly, they are sufficiently broad to accommodate concepts and practices from diverse fields, such as the visual arts, performing arts, or new media art. Secondly, they support the organization of key components in the ‘process-patching’ approach that we borrow from Anne Nigten (see chapter one, 2.2). In the following section we will present a selection of examples for each of the seven categories, which show how valuable principles, concepts, or methods from diverse areas can be accommodated in these categories, and thus offer a wide range yet coherent set of instruments for the artist-researcher and their collaborators.

### 4.3 Design theory, Visual Arts labs and Contemporary Arts practices

#### Time

Related to the first category (Time), our first example, the concept of 'Development Cycle', was inspired by design theory. Lidwell et al. (2003) have presented their *Universal Principles of Design* as a source book for practitioners who seek to "enhance usability, influence perception, increase appeal, make better design decisions, and teach through design". In their introduction they explain:

The concepts in this book, broadly referred to as 'principles', consist of laws, guidelines, human biases, and general design considerations. The principles were selected from a variety of design disciplines based on several factors, including utility, degree of misuse or misunderstanding, and strength of supporting evidence. The selection of 100 concepts should not be interpreted to mean that there are only 100 relevant principles of design - there are obviously many more. (Lidwell, Holden, & Butler, 2003, p. 10)

We highly empathize with this methodology, which has been one of the major influences and inspirations for the creation of the *Evolving Glossary* that we propose as a core element of our methodology. The following thoughts on the principle of 'Development Cycle' were developed based on the section on the principle by the same name in Lidwell et al.'s book.

#### Product Design Development Cycle

In product design the four basic stages involve requirements, design, development and testing. These concepts can be effectively transferred to interactive system design in Digital (Live) Performance.

Design requirements are obtained through market research, for example controlled interaction between designers and members of the target audience.

At the second stage design concepts and specifications are developed to meet the requirements. Methods applied in this phase are brainstorming, prototyping and several iterations of experimentation, testing and refining the concepts.

The third stage of the cycle consists of the development of the actual product. In a typical design development cycle iteration at this stage usually is too expensive and

therefore not desirable. The final stage is where the product is tested to ensure that design requirements and specifications are met and the target audience will accept the new product.

In general (commercial) hardware and software design progress through these basic stages, and correspond to the stages of the creative cycle outlined above. At the same time both processes are highly specific and need to be carefully planned according to the available resources. Digital (Live) Performance projects that entail well-articulated parallel development cycles tend to result from long-term collaborations with some kind of (artistic, academic, industrial) research component.

### Development Cycle in Digital (Live) Performance<sup>121</sup>

Digital (Live) Performances evolve sequentially through fundamental stages of creation. While most of the methods and technique employed at each stage derive from similar productions in the performing arts, the creation process often involves the development of custom-built hardware and/or software. Consequently parallel creation processes have to be articulated and carefully planned. We will outline the basic stages of the performative process first and then go on to discuss how the phases of a typical product design development cycle can be related and integrated in this model.

Four main stages can be distinguished in the creation of a new Digital (Live) Performance, which we will denominate the 'creation cycle'. Two phases comprise the 'iteration cycle', which follows after the creation of a new work.

### Creation Cycle

#### 1\_Artistic concept: research and training

During this first stage the overall artistic concept is developed. Research usually is carried out in all fields concerning the new work, and may be continued throughout the next phases of the cycle, or may even constitute an integral part of the entire project. Training comes into play whenever specific preparation is needed before starting rehearsals. For example the work with a new technology, such as an

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<sup>121</sup> The 'Development Cycle' adapted for Digital (Live) Performance is an entry in our *Evolving Glossary*.

interactive system for the stage, may require instruction. Sometimes artists develop concepts long before the project can be actually produced and realized.

## 2\_ Creating material

At this stage material for the performance is created, often through extensive movement exploration, specific improvisational tasks, scenic elements, or experimentation with technology.

## 3\_ Designing strategies for interaction

Stage two and three may be reversed according to the methods and needs of the choreographer and his team. Strategies for interaction here concern the use of the technological devices. If the device is been developed parallel to the rehearsal period, strategies for interaction may require interdisciplinary dialogue and mutual understanding of the working processes.

## 4\_ Performance dramaturgy: developing micro- and macro-structures for the performance of the work

Today choreographers work with a very diverse array of compositional tools and methods. At times the same term, for example 'movement phrase' has different meanings and connotations for the individual choreographer. For this reason I prefer to describe smaller units of a work, such as 'movement phrase' or 'movement sequence' as 'micro-structures', which can be individually named and indexed by the choreographer and his/her dancers. 'Macro-structures' refer to larger sections of a work.

The term 'performance dramaturgy' relates to the final structure(s) of the work, including open forms and process-oriented improvisational performances.

Stage four concludes with the actual presentation of the work for an audience.

## Iteration Cycle

### 5\_ Documentation of the work

There are two main reasons for documentation: preservation of the work and re-staging a work in the future. For the preservation of performances recordings on video and film are very common; notation systems (e.g. Laban or Benesh) are used



less frequently. Re-staging requires the preservation of additional information at different levels: the 'performative text' in Digital (Live) Performance may include audiovisual compositions, code programmed for a particular interactive system, or scores preserving the instructions for interactive strategies (e.g. the exact use of certain sensorial equipment).

## 6\_Re-staging or re-creating a work

The process of re-staging or recreating a work will be as individual as the creation process was before, and evidently corresponding methods and techniques will be used. Re-creation is a frequent choice In Digital (Live) Performance, because technology advances very quickly and allows improving certain aspects of the original work. In some cases project management previews the (public) presentation of several versions of a performance to allow developing and integrating more complex technology and artistic ideas.

In general re-staging refers to the (exact) preservation of a work, which is presented unaltered on a different occasion, while re-creation describes the process of reviewing and altering certain parts of the original work. In re-creation stages of the first cycle are re-visited.

### **Place**

We have presented the concept of Development Cycle in some depth, because it serves as a good example how such a concept can be applied, both, in its original version (the design concept is useful for the design of interactive systems), and as inspiration for a similar concept in the field of performance (see the extended version above).

In our next example, regarding the second category of constituent elements of artistic labs (Place), we draw on the work of curator, art gallery director, professor and journalist Linda Weintraub, who presented her influential study *Making Contemporary Art - How Today's Artists Think And Work* in 2003. Based on forty interviews and case studies, Weintraub suggests six main aspects of contemporary art practice:

1. Scoping an audience
2. Sourcing inspiration

3. Crafting an artistic 'self'
4. Expressing an artistic attitude
5. Choosing a mission
6. Measuring success

Each chapter dedicated to these themes is subdivided into further issues to discuss the wide range of individual artistic practices, and infinite creative possibilities deriving from these examples.

'Scoping an audience' for example, is subdivided into 'Choosing a constituency', 'Communicating with the audience' and 'Relating to the audience'. Obviously the constituency of the audience is a fundamental issue related to our second category of 'Place', as many artists carefully examine the specific location and conditions for the work, or even create for a particular occasion and place. 'Choosing a constituency' is exemplified by Weintraub as follows:

1. One-for-All (artist: Thomas Kinkade)
2. One-for-Some (Isaac Julien)
3. One-for-One (Skip Schuckmann)

Weintraub writes about Kinkade:

Thomas Kinkade is an artist who, instead of working in isolation, is associated with a corporate empire that facilitates the accomplishment of his goal - to spread his vision of peace and harmony throughout the culture. Kinkade is devoted to creating art that appeals to the majority. But even more attention is directed to creating distribution outlets to realize this ambition. His work not only satisfies popular tastes and expectations, it employs marketing channels beyond the confines of the art world, occupying popular sites that promote mass-produced housewares, collectibles, and books. Accountants, marketers, manufacturers, publicists, distributors, and lawyers contribute to realizing Kinkade's mission. (Weintraub, 2003, p. 18)

Beyond the format of the audience constituency (one-for-all) this example is fascinating, as it raises a series of questions regarding art and mainstream culture, the marketing and distribution of art, the kind of target audiences valued by artists

and so on. This discussion clearly resonates with similar debates around new media, for example with regard to (video) game art. Kinkade's example in the context of our category of 'Place' constitutes the opposite of Stamer's notion of topographically choreographed (and thus specific) knowledge. It represents the desire to communicate 'universals' (shared sensibilities, desires, needs, dreams) with 'the world'. Transferred to our field of study, this idea could be translated as 'working for larger audiences' in live performance situations, but it also may indicate a necessity for networked, mediated forms of communication to reach geographically remote places.

Weintraub's second audience constituency (one-for-some) is exemplified by Isaac Julien's work:

Isaac Julien's films, film installations, and photographs present evidence of his physical characteristics, his lifestyle decisions, and his sexual preferences. Many of his behaviors are only practiced by a minority of minorities. The majority of majorities classify them as taboos. Such deviations from social and sexual norms are typically confined to underground networks and classified as pornography. But Julien presents them in refined art galleries and museums where they are welcomed because of his high standards of craftsmanship and erudite conceptualizations. His choice of venue not only dignifies material that is often categorized as deviant, it channels his presentations to sophisticated and liberal-minded audiences that are not likely to take offense. In this way Julian mitigates the controversy that often erupts around art that violates social mores. His goal is to encourage tolerance, not provoke antagonism.<sup>122</sup>

Probably this constituency (one-for-some) is very familiar for most performance artists. While it makes sense to bring radically extreme subjects and themes to the art world and encourage tolerance, or critical reflection, for many artists working in less reformist ways, this constituency may at times be undesirable in the sense that they may hope for a different audience but the few 'sophisticated and liberal-minded' members of the community. Particularly in Digital (Live) Performance and the hybrid and interdisciplinary character of most works in this field, it seems a natural objective to scope new audiences, and redefine who the people are we want to communicate with.

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<sup>122</sup> Ibid. p. 24

An interesting constituency is the one-on-one relation with the audience:

Skip Schuckmann establishes a third/audience outpost. Unlike Kinkade, his tactics of dissemination are remote from those typically used for non-art commodities. Unlike Julien, his manner of interacting with his audience diverges from the cultural mainstream. Schuckmann exempts himself from all mass-media tactics by initiating and formulating his work around the desires of each client, one at a time, accommodating his or her particular location and life circumstance. In creating his artwork, Schuckmann honors each client's desires. At the same time, he seeks opportunities to integrate his own abiding commitment to the health of the planet, the vitality of its life forms, and the spiritual rewards of pursuing these principles. Instead of buying art, Schuckmann's clients buy into a personal relationship with the artist.<sup>123</sup>

In this description of Schuckmann's approach Weintraub comes very close to what Stamer (2006) has termed 'Places of Knowledge' in his article on artistic laboratories of the same title. Discussing an interdisciplinary art project by the name of LABORATORIUM, curated by Hans Ullrich Obrist and Barbara Vanderlinden 1999 in Antwerp, Belgium, Stamer develops his idea of the production of (artistic) knowledge and its cultural, artistic and social aspects as rooted in and inseparable from the place of its origins. In this perspective an audience is seen as participating in the creation and acquisition of such knowledge. Consequently this kind of knowledge is not regarded as a secure (scientific) discovery, but as relational and emerging within particular conditions.

## **People**

Our next example concerns the third category (People) of constituent elements of artistic labs. So far, we have addressed this subject from the perspective of collaborative models (chapter one, 2.2), the importance of developing project-specific glossaries (chapter one, 3.8) and the 'human factor', or individual life state and attitude of each participant (chapter two, 3.2).

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<sup>123</sup> Ibid. p. 34

We have also come across the technique of 'pooling' in the case of Schiller and Lovell's workshops (chapter two, 2.4), which conceptually is similar to our example of a well-known methodology employed in Design theory and practice.

Design consultant and creativity trainer Mario Pricken, who has been working with creativity techniques, thought strategies and effective idea management, presented an influential resource book entitled *Kribbeln im Kopf (Creative Advertising)* in 2001. In the first part of this remarkable study, based on the analysis of more than ten thousand publicity campaigns, Pricken presents fifteen rules to create a framework and favorable conditions for creative top performances in advertising agencies, design firms, television stations and international marketing departments. In our perspective his rules can be easily adapted as instructive recommendations for successful 'pooling' in Digital (Live) Performance teams (Pricken, 2001).

They are:

1. DreamTeam - this single term stands for: a meeting culture, the attitude towards collaborators, and toolbox for creative sessions.
2. Briefing. A motivational tool for the team, which provides two types of information: limitations and augmentations of the target field.
3. Switch on all five senses to stimulate ideas.
4. Formulate objectives as clearly as possible.
5. Always separate ideas phase and evaluation phase.
6. Avoid idea-killers (negative attitudes towards ideas).
7. Visualize ideas using doodles.
8. Develop (someone else's) ideas.
9. Look for the positive aspects in other people's ideas.
10. Make mistakes and have fun doing it.
11. Stick with it, the best ideas are yet to come.
12. Develop your sense of humor.
13. Wait before evaluating ideas.
14. Select ideas creatively.
15. Turning ideas into action.

Pricken discusses each of these rules or recommendations in some depth, and provides several concrete examples. For our investigation, his perspective is a refreshing and stimulating, not only because many of these rules apply to almost any team working on creative projects, but also, because in the domain of performance studies we did not come across much literature or other documentation of these tools and processes. Thorough experimentation with these principles prove (naturally) valid for the field of Digital (Live) Performance, particularly, because some of the concrete artistic work overlaps with the fields addressed by Pricken, such as the design of interactive systems for live performance.

## **Ideas**

While we used an example of Pricken's methodology regarding the creation of favorable conditions for creative work and processes, the next case in point draws again on Weintraub's study. The fourth category of constituent elements of artistic labs (Ideas) deals with the conception of research questions and artistic ideas that are to be developed in the context of the artistic laboratory. Here we suggest to look into the *source of inspiration* for artistic work, while the methodologies, that help to develop such research is discussed in the next section.

Weintraub reflects on 'sourcing inspiration':

Artistic sources vary greatly. Some artists intercept cultural frequencies. Their creative juices are stimulated by situations that are external to them, such as politics, nature, history, culture, religion, psychology, and science. Although cultural factors have inspired countless generations of artists, the quantity of inspirational sources made available to contemporary artists is mind-boggling. In fact, it includes the entirety of recorded human experience. (...)

A second group of artists finds their inspirational impulses within themselves. Their muses lie dormant within them until inspiration awakes them. In order to jumpstart their creative engines, these internally motivated artists meditate, or pray, or swallow hallucinogens, or listen to trance-inducing music. They may release their inner voices through introspection, psychoanalysis, isolation, fatigue, discomfort, or deprivation. Others may excavate their memory banks, submit to spontaneous impulses, record their dreams, or induce visions. They carry their artistic destiny within themselves. (...)

Finally, some artists choose the option of simultaneously engaging in multiple inspirational sources, assigning each its own inspirational variables. (Weintraub, 2003, p.122/123)

Again, Weintraub presents most interesting case studies for different forms of sourcing inspiration; but, more importantly, provides an array of questions intended to make the reader-artist reflect about the kind of sourcing they prefer:

Are you more likely to be inspired by:  
the presence or absence of contentment?  
personal situations or social conditions?  
interactions with human beings or non-humans?  
rest or fatigue?  
relaxation or pressure?  
sobriety or being high?  
joy or sorrow?  
culture or nature?  
familiarity or mystery?  
production or consumption?  
the past or the present?  
facts or feelings?  
anger or pity?  
yourself or others?<sup>124</sup>

Questioning as a conscious technique is probably as old as human curiosity and research, but nevertheless a most powerful tool. Not only can interesting questions lead to great ideas, but asking questioned can be considered an important methodological tool as well.

### **Methodology**

In our perspective the art of designing valuable (research) questions is a determining factor for the outcomes and success of any artistic lab, of any artistic endeavor.

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<sup>124</sup> Ibid. p. 123

Mario Pricken therefore has carefully designed an extensive catalogue of more than 200 questions to trigger creative ideas. Derived from over ten thousand first class and award winning advertising campaigns in print, TV, the internet and direct marketing, Pricken presents an ontology of successful communication patterns, which are surprisingly useful for nonprofit oriented purposes as well: in visual arts education, in new media theory and practice, or in Digital (Live) Performance creation processes, to name a few.

His *Clicking-Fragenkatalog*<sup>125</sup> (clicking question catalogue, *KickStart catalogue* in the English version of the book) carries the objective in its very title: to provide a 'click', to trigger an inspirational moment at any stage of the design development cycle.

Twenty-eight thematically organized categories of questions are introduced to the reader-artist, many of which (naturally) complement, or concretize Lidwell et al.'s *Universal Principles of Design*. For example, the design principle of 'Expectation Effect' is defined by Lidwell et al. as "A phenomenon in which perception and behavior changes as a result of personal expectations or the expectations of others" (Lidwell et al., 2003, p.68). In every final paragraph of their articles on their selected design principles Lidwell et al. pose questions to stimulate creativity, or leave recommendations for the reader. In the case of our example they write:

The expectation effect demonstrates that expectations can greatly influence perceptions and behavior. For example, tell a large group of people that a new product will change their lives, and a significant number will find that their lives changed. (...)

Keep the expectation effect in mind when introducing or promoting a new design. When trying to persuade, leverage the effect by setting expectations in a credible fashion to guide the target audience to the desired conclusion, rather than letting them form their own. (Lidwell et al., 2003, p.68)

In Pricken's *KickStart Catalogue* we find an entry on 'provocation and shock'. A lingerie advertisement by She-Bear illustrates the shock of the inversion (and thus enhancement) of the 'Expectation Effect'. The photograph entitled «Wear it for

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<sup>125</sup> The English version of the book uses the term Kick-Start Catalogue, which we will adapt in the following



yourself» shows three Arabian women tightly dressed in their burkas with She-Bear shopping bags on their way home from a shopping trip. (Pricken, 2001, p.74)



Figure 5. Lingerie advertising by She Bear

In the first place one might expect from an average lingerie to see young girls wearing lingerie in suggestive poses. This expectation is obviously defrauded in a humorous way, but, simultaneously, expectations are even further stimulated by leaving every element to the spectators phantasy: what kind of lingerie did these women buy or wear? As a result the eroticism of veiling and unveiling is enhanced in a surprising, unexpected, and intelligent way.

Each question in Pricken's *KickStart Catalogue*, as much as each question or recommendation Lidwell et al. suggest, exemplifies the powerful technique of designing questions that trigger creative solutions. Many of them don't just fall into one single category (for example, the lingerie advertising would also serve as an accurate example of the '180°'- category, where several forms of inversion are put

forward), and all of them can be combined with other ideas and principles to explore the potential of this particular combination.

### Equipment and Technology

Mario Pricken's second book *Visuelle Kreativität* (*Visual Creativity*, 2003) shows (on the hardcover version in German) a hand pulling an eye-shaped aperture in a yellow rubber surface to reveal the inner part of an eye, looking straight at the reader. On the opposite side a handle just about the size of four fingers of an adult's hand is cut out of the book. The handle obviously serves to carry the book, but, more importantly, if you place the book vertically on a table and grab the handle, it visually creates the exact symmetrical physical complement of the printed hand, which seems to pull the eye-shaped aperture on the revers side.



Figure 6. Book Cover *Visuelle Kreativität* by Mario Pricken

Ingenious and simple, this cover communicates the essence of Pricken's book, this time dedicated to creative technique for the discovery and invention of new image worlds in advertising, 3D animation and computer games. A possible interpretation of the cover: the printed hand has 'opened the eye', in other words, the contents of the

book help the reader-artist to develop their visual creativity; and the reader's hand put in the handle represents 'handicraft', or techné, or the active acquisition and use of the suggested techniques and principles. From our perspective, Pricken offers 'technology' in the sense of the word we discussed at length in this chapter, as something that is 'not technological in its essence', but provides means to creatively deal with scientific and artistic problems through developing adequate methodologies and techniques. At no point in his books Pricken refers to the use of the main software programs that might help to realize the visual worlds he teaches the reader-artist to envision in detail. It is rather assumed that the capacity to imagine and envision leads the user naturally to choose the right tools (distributing technologies), or to improve skills regarding respective software and hardware, or even to develop them if necessary.

Interestingly, Pricken ventures into time-based arts with his second manual, which stresses (and explores) the interdisciplinary potential that his methodology had right from the start. This shift in focus makes his approach extremely valuable and useful for the field of Digital (Live) Performance, because Pricken already formulates his methods in a transdisciplinary (and time-based) perspective. Two chapters are particularly resourceful, respectively entitled 'The Six Ways of Seeing' and 'The Visual Lab'.

Pricken's introduces to 'the art of seeing' in a chapter on 'Visual Evolution', in which the limitations of our imagination and the insights of top creative artists are discussed. Drawing on cognitive psychology and brain research in general, Pricken suggest six ways to train our visual perception to bypass and extend these limitations. The second chapter, 'The Six Ways of Seeing', is comprised of twenty-nine exercises, at times subdivided into several tasks, which address specific aspects, are thematically organized and illustrated with brilliant examples. From a performer's perspective, this visual training resembles the physical and perceptual training preparing for creation, rehearsal and performance.

'Visual Laboratory', the following chapter, builds on the skills acquired or improved through the previous training in 'the art of seeing', and serves as a "creative partner, that will help you to train your visual thinking and to nurture your creative talents", and on the other hand constitutes a visual laboratory to experiment with and develop

new and innovative image ideas (Pricken, 2004, p.62). Most of the eight departments of the visual laboratory employ a similar strategy as the *KickStart Catalogue* in the previous book: selected examples by renowned artists are combined with question that stimulate further research. Section seven is particularly interesting for our investigation. Here Pricken presents two ‘mind-matrixes’, which consist of a compositional tool box of fourteen principles and affiliated tasks and questions (mind-matrix 1); and a glossary of fifty-six constituent terms describing the features and capabilities of mythic figures, comic strip heroes, and fiction characters in films, as well as figures from video games (mind-matrix 2). Combining both matrixes, very specific artistic challenges (research questions) are designed, eventually leading to surprising visual discoveries. This particular method resonates strongly with some of our own choreographic methods in the field of Digital (Live) Performance, and will be discussed in more detail in chapter three of this dissertation.

Other parts of the visual laboratory explore the intersection of photography, graphic design, and typography; or focus on particular film and editing techniques, such as morphing. In conclusion, both, ‘The Six Ways of Seeing’ and the ‘The Visual Laboratory’ chapters of this work represent excellent solutions to developing transdisciplinary meta-methodologies of the kind Lycouris had suggested for interdisciplinary choreography (see chapter one, 2.3.3).

From our point of view, approaches such as proposed by Pricken, allow accessing the *non-technological core* of the work with existing technology, and the invention and conception of new technologies itself.

As a particularly pertinent example in the field of the visual arts we may refer to the open source programming language *Processing*, which evolved from ideas explored in the Aesthetics and Computation Group at the MIT Media Lab within an open project initiated by Ben Fry and Casey Raes. *Processing* allows the programming of (visual) digital media, and is most often used in generative and interactive art. As the name of this programming language indicates, media are *processed*, which evidences the existence of a meta-level. On this meta-level of programming media substantial craft (*techné*) regarding the medium in question is required, as well as the capacity to think ‘outside the box’, and conceive of the artistic vision/objective and corresponding algorithmic logic. In our example we are not considering the programmer who simply uses existing libraries (this way of working would fall into the

category of craft), but the development and innovation of source code, which in this case represents a new technology or technological tool.

## **Outcomes**

Unexpectedly or not, the outcomes of an artistic lab or project may be different from the targeted achievements. Different here does not mean more or less success on a pre-established scale, but divergent in quality. Weintraub offers interesting perspectives on 'Measuring Success' in the final chapter of her book on how contemporary artists work:

The word 'success' indicates fortunate outcomes, but it does not indicate the nature of these outcomes. Artists are free to choose among countless goals, systems of measurements, and criteria of accomplishment. For some, success is measured according to rulers that have developed a patina from long and frequent use. It is common for recent generations of artists, for instance, to adopt rulers that are keyed to the increments of wealth, power, and eminence. Many contestants vie for these three limited sources. Such popular definitions of success involve entering a field of operations crowded with competitors, but they also offer benefits that exceed wealth and fame. One benefit is having predecessors whose accomplishments provide precedents that are available for emulating. Furthermore, readymade markers of commendation await artists who subscribe to them. In our culture, these might include auction sales, media attention, honorary degrees, foundation support, or solo exhibitions. But this triumvirate of criteria is not mandatory. Rulers can be self-styled by artists who strive to fulfill independent goals. (Weintraub, 2003, p.355)

Such self-styled rulers of success are presented throughout the essay on the subject, and, as in the previous chapters, Weintraub presents captivating case-studies to outline several subtle criteria of measuring success in the work of acclaimed artists, who might as well be called 'successful' by the popular standards of success discussed in the quotation above.

Activist artist Betsy Damon, for instance, initiated a huge water-reclamation project in Chengdu, China, where she gained trust of the local institutions to the extent that she was asked to design a living water park on a six-acre site along the waterfront. Her ecological success roots in the primary theme of her work, collaboration. Cited in



Weintraub, Damon states: “I believe that a group of committed people can address any challenge concerning water, and solve the difficulties in ways that respect the dynamic universe and every individual. The key to our success is relationships! My work is action, action that motivates, connects, and possibly at times, changes lives, which I hope invites or offers the possibility of connection”. (Damon cited in Weintraub, 2003, p. 360)

Likewise an established artist, Michelle Lopez’s suspicion towards media attention has helped her to preserve her work and career from too much influence in either way, frustration over too much effort for too little reward, and too much reward for too little effort, eventually resulting in careless complacency. Deflecting media attention purposefully, Lopez invests in sensorial success. Weintraub writes about her:

Until 2002, leather was Lopez’s preferred medium. It offered a unique combination of qualities. Leather invites tactile, visceral engagement. It is sensual, receptive, and malleable. She welcomes the marks, scuffs, soil, and sweat that it accumulates as a chronicle of its history. Although her initial drawings are composed on a computer, Lopez designs the other components of her studio practice according to their consonance with her vision of regaining the intimate connections and sensual contact she finds lacking in contemporary lifestyles.<sup>126</sup>

Both examples from Weintraub’s chapter on measuring success have been selected because of their striking similarity with artistic lab practices, as far as these artists’ orientations towards human sensorial perception, surrounding environments and social processes go. Beyond economic issues, recognition and status concerns, their consistent focus is on particular artistic research questions, conscious choice of methodology and careful exploration of their materials.

At the same time both artists (like the other examples referred by Weintraub) embody alternative perspectives on what constitutes ‘success’, which is an important aspect to consider when analyzing the outcomes of an artistic lab. Whether the objectives were met, or not, are there alternative ways to look at the results? Are there additional criteria, which can be employed to evaluate processes and experiences in a constructive way?

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<sup>126</sup> Ibid. p. 387

Weintraub may have had something similar in mind, when she decided to include a glossary of related thoughts and terms to this (and other chapters), which is hardly recognizable as such, because its pale colored letters, vertical orientation and peripheral position on the page seem to be designed to enter our mind rather unconsciously. Nevertheless, these elements of the chapter glossary can be used much like Pricken's mind-matrixes, both to look at (the success of) planned or achieved outcomes:

- Inches of media coverage
- Size of your bank account
- Hits on a website
- Acceptance into prestigious collections
- Creating a new art movement
- Attracting followers and creating a living legacy
- Inspiring future artists
- Expanding the definition of art
- Reaching new audiences
- Offers to trade art
- Financial self-sufficiency
- Gaining the respect of people you respect
- Induction into the academy of arts and sciences
- Dinner at the White House
- An obituary in a national publication
- Invitations to celebrity parties
- Offers to model in advertisements
- Requests to give advice
- Requests to be interviewed
- Requests for your autograph
- Praise and flattery
- Unsolicited favors
- Applause
- Attention

Reading through this list, probably there is a good reason for the discreet design Weintraub chose: all of these elements of the glossary are certainly legitimate, but

definitely not considered central to artistic or scientific research. And yet they may outweigh more central criteria, which is the reason we have introduced the Buddhist concepts of the Ten Worlds and the Ten factors. According to the theory of the Ten factors, for example, the element 'Expanding the definition of art' of the aforementioned glossary as a motivational focus (factor internal cause) attracts the related external effect (reaction in the environment, factor relation). If the artist-researcher is in the state of anger and chooses provocation and shock as communication tools, s/he will attract people with a similar life state, fervently supporting or passionately contesting him/her. While the nature of the goal implies antagonism as a very likely reaction, it will depend on the strength of artist-researchers resolve (factor power), what scale of impact might be achieved (factor influence). In the end the outcomes will depend on the essential quality of the artist-researcher's anger (factor nature). Suppose the nature of the anger consists of a keen sense of justice, which is hurt in the face of discrimination or power abuse. Such anger might fuel taking action for justice, and in the case of an artist lead to choose the diffusion of concentrations of power as a mission. Daniel Joseph Martinez, presented by Weintraub as an example of political success, prefers to call himself a 'Tactical Media Strategist'.

(...) Martinez has launched an artistic crusade. He bypasses the official legal and judicial mechanisms that institute societal change, because they perpetuate inequality and prejudice. He is a freelance artist-activist whose success is determined by his ability to shame the offenders and empower the victims. His uncompromising interpretation of the democratic principles of equal opportunity applies to everyone, but particularly to Chicanos, like himself, who endure alien status in the country of their birth. (Weintraub, 2003, p.375)

We do not have a way of knowing whether the life state of anger fuels Martinez's motivation, nor whether the essential quality of this anger inspired him to choose his mission, because the factor nature is by definition not perceivable by others. Nevertheless this might be a viable explication of his and other activist artists' driving force, and as such an example of creating value from this life state. On the contrary, if an artist should insist on wanting to 'Expand the definition of art', but the essential quality of his/her state of anger, for instance, is resentment, a lack of confidence and



general distrust, most probably the outcomes reflect such life state in the form of general difficulties with all kind of people, collaborators or critics. Often such a life state leads to isolation and the individual is prone to be entirely ignored no matter how much effort goes into the work.

In conclusion, the terms related to the subject of measuring success were very wisely placed at the margins of the pages by Weintraub - should they become central in the artist-researchers work, they either become a mission and material, or they start to interfere severely with the central objectives of the work. In this last category of constituent elements of the artistic lab (outcomes) the concepts of the Ten Factors and Ten Worlds are particularly useful to describe often intangible, difficult-to-express aspects of the artistic work. From our perspective they can serve as an extremely effective tool to detect, describe and discuss such human factors in the production of artistic work. Hunt and Melrose (2005) have attributed great importance to the realm of the human, and included it in their threefold model of the 'production organism':

While the specifics of the system manipulated by the mastercraftsperson<sup>127</sup> will vary considerably depending on the professional role (that of a stage manager will be quite different from that of a lighting technician), we can identify a system that all mastercraftspersons are both part of and manipulate. We shall term this system the production organism, choosing 'organism' over 'machine' or one of its synonyms to serve as a reminder that the system here is greater than the technological infrastructure of the theatre. We shall subdivide the production organism for our purposes into three parts or realms: 1. the *technological-real*, 2. the *fictional-affective*, and 3. the *human-real*.

(...) The third realm, the human-real, entails the full set of professional roles associated with the performance, people with whom the mastercraftsperson interacts: the director, designers, other mastercraftspersons, the audience, and so on. (Hunt & Melrose, 2005, p. 77)

In their insightful article Hunt and Melrose investigate the reasons why "the signature of those craftspersons is systematically erased from the public representation of the

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<sup>127</sup> Hunt and Melrose use this term to describe a theater technician more appropriately

stage work, overwritten instead by an authorial or directorial signature”;<sup>128</sup> and what kind of knowledge-politics lead to such treatment of the theatre technicians’ contributions to the artistic work. Describing an incident during a lighting rehearsal in detail, Hunt and Melrose point to the crucial importance of the human-real realm: the theatre technician, or mastercraftsperson, in this example brings up a lighting channel pretending to make a mistake, so that the lighting designer is reminded of a valuable alternative for the light design of a particular scene, which so far was not resolved, to the director’s growing dissatisfaction. Through his combined human maturity and professional skill the technician is able to solve the difficult and tense situation.

Chapter four of our investigation will return to Hunt and Melrose’s work to discuss some often overlooked and more intangible aspects of collaborative processes in complex artistic productions.

## **5. The Glossary and The Artistic Lab**

### **5.1 ProcessPatching**

We have, in Anne Nigten’s words, ‘process-patched’ several methods and techniques derived from design theory, visual art labs and contemporary art practices through integrating these with our ‘categories of the constituent elements of artistic labs’, to show how our artistic methodology combines, mixes and reinterprets a plurality of methods and processes into a pragmatic coherent whole, without necessarily being formalized as a methodology. Such procedure does not only build on excellent preexisting examples (such as Nigten’s curatorial, artistic and academic work), but also resonates with and reflects the artistic creative process in great detail. In this section we shall provide a brief overview of how the Lab methodologies we presented ought to integrate with the *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance* that we presented in chapter one of this dissertation. Again, the idea of ProcessPatching is pointing to the most effective use of our methodology, which is tested in three main areas within the field of Digital (Live) Performance, and exemplified in the respective case studies.

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<sup>128</sup> Ibid. p.73

## 5.2 Three areas of investigation

Considering that the term Digital (Live) Performance is the most appropriate to describe the artistic field in which we apply our *Methodology of Bi-directional Transfer*, we need to keep in mind, that in employing this term we always refer to it in the sense of Digital *Live* Performance. We investigate three main areas of the application of our methodology:

1. generative techniques (covering the creation of artistic material, micro-and macro structures of live performance, and systems to document/archive and restore relevant information);
2. interactive situations in HCI (human-computer communication) contexts; and
3. synergetic training (creation of favorable conditions for synergetic effects to occur).

These three areas are frequently interconnected yet progress from the general to the highly specific: while the chapter on generative techniques might be useful for someone intending to venture into other areas of Digital (Live) Performance than those we have investigated within the frame of this dissertation, the chapter on interactive situations describes very clearly defined set ups, and discusses creative strategies for these particular circumstances. Finally the last chapter on synergetic training seeks to consider these specific conditions and to offer some insight to recent approaches in training and rehearsing in these environments.

## 5.3 Case studies

Each chapter dedicated to one of the outlined areas of investigation is accompanied by a case study. The third and fifth chapter build on the work realized in three different artistic residencies, during which we worked with groups of young professionals, university students and high school students. Open interviews, field diaries and audiovisual documentation support conclusions drawn from the work with these groups. Given the nature of our investigation, we frequently focus on the *process of designing creative strategies*, for example which motivations and ideas underly certain decisions, rather than trying to prove eventual success or failure of these methods. Information gathered through the methods described above is consequently looked at from the perspective of the process of designing artistic research questions itself, not of verification/falsification of a particular thesis.

Chapter four on HCI interactive situations is supported by case studies of artistic work, both, the analysis of well-known and well-documented performances, and our own artistic work. Again, we do not use the information regarding our own artistic process to verify/falsify anything, but rather to provide and analyze process-oriented insights, that otherwise would be extremely hard to get hold of, as many artists preserve a certain privacy concerning the details of their creative processes; in part, because they want to avoid being copied or imitated, but more importantly, because the observation of the creative process may have undesired impact and influence on the process itself.

All case studies serve to link concrete artistic research and performance to the underlying creative strategies, and how these have been designed in each particular case. Our *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance* thus builds on these case studies as much as the glossary evolved with and through the various residencies, research projects and performances. It is our main objective that this methodology shall constantly evolve to better serve its users, which is why we have intentionally refrained from choosing a more traditional academic approach and format for our dissertation. Several of the principles, concepts and ideas of the *Evolving Glossary* have been mentioned and build into the two chapters on methodology presented so far. The following chapters shall combine the seven categories of the artistic lab and further elements of the glossary to discuss the respective case studies.

# Chapter Three: Generative Techniques

## 1. Chapter Introduction

This chapter opens with a succinct clarification of the term ‘generative techniques’, and subsequently discusses related terms and ideas, such as ‘chance’, ‘serendipity’ and ‘emergence’. Towards the end of this section we suggest a working definition for our investigation. The following section on rule-based art systems discusses how specific techniques can be developed to generate significant material for works of art. Correspondences between complexity science theory and performing arts theory are introduced to demonstrate that investigation across very diverse disciplines has come to similar scientific models and conclusions. A subsequent section introduces the term ‘mimesis of thought’ to show how the design of rule-based art systems has become a major tendency in different contemporary art forms. We conclude our discussion by examining what exactly can be generated during the artistic process, and suggest an array of techniques to generate ideas, methods, material and structures. In the following last part of the chapter we present two case studies realized as part of our participation in the *TeDance* (Technologically Expanded Dance) Project, hosted and organized 2006 and 2007 by the Technical University of Lisbon/FMH in collaboration with a variety of other academic institutions, artistic research centers and theaters in Portugal.

## 2. What are generative techniques?

Consulting the Merriam-Webster dictionary for clarification of the term ‘generative’, we find the following entry:

generative:

having the power or function of generating, originating, producing, or reproducing

Generic and simultaneously quite clear, the term can be employed to describe a driving force in (artistic) creation, or more precisely, the power and inherent logic of the creative process once it is on its way. In this perspective the term ‘generative’

also designates the inner workings of certain processes, and thus the (deliberate) loss of control over all compositional aspects of a work by an artist, who instead wishes to create autonomy of a particular creative process. In order to do so, s/he develops and employs specific techniques. Interestingly, the entry for 'technique' in the Oxford dictionary makes reference to artistic (and scientific) processes:

technique:

a way of carrying out a particular task, especially the execution or performance of an artistic work or a scientific procedure.

- skill or ability in a particular field: *he has excellent technique* | [in sing.] *an established athlete with a very good technique*.
- a skillful or efficient way of doing or achieving something: *tape recording is a good technique for evaluating our own communications*. (...)

Considering these definitions, we can conceptualize a 'generative technique' as a 'skillful way of producing (varying degrees of) autonomy within a particular artistic process'.

This working definition will be kept in mind while we discuss important related issues, such as chance, mimesis, rule-based art systems and the design of (artistic) research questions. Issues, that have been closely associated with the generative in art, and frequently controversially discussed.

### **3. Related Ideas**

#### **3.1 Chance**

Probably it is easier to establish firmly what the use of chance in artistic creation is *not* intended for, then describing accurately why an artist would want to engage the unpredictable.

Chance, or randomness, can be characterized as follows:

- it produces unpredictable results
- frequently the number of possibilities far surpass human capacity to explore all of them
- most of the results are 'insignificant' in that they don't produce meaning for us.

Marie-Pascale Corcuff (2008) provides a simple calculation to illustrate these observations:

(...) a painting, or any picture, may be considered as a bitmap of a given size, where the pixels have got given colors. Let's consider a very small one (10 by 10 pixels, i.e. 100 pixels), and only white and black as colors; even with so few parameters, the number of different pictures is colossal: there are  $2^{100}$ , or  $(2^{10})^{10}$ , so about  $2(10^3)^{10} = 10^{30}$  (1 followed by 30 zeros) different pictures...

(...) Amongst all of the configurations of 10 by 10 pixels, there are some that we recognize as 'forms', that correspond to some pattern: for example, if the picture is all white or all black, or the bottom half white and the top half black, etc., or if the pixels are organized in a way that makes sense to us: if we see a letter, a digit, a 'sign', something that looks like a portrait, etc. (Corcuff, 2008, p. 191)

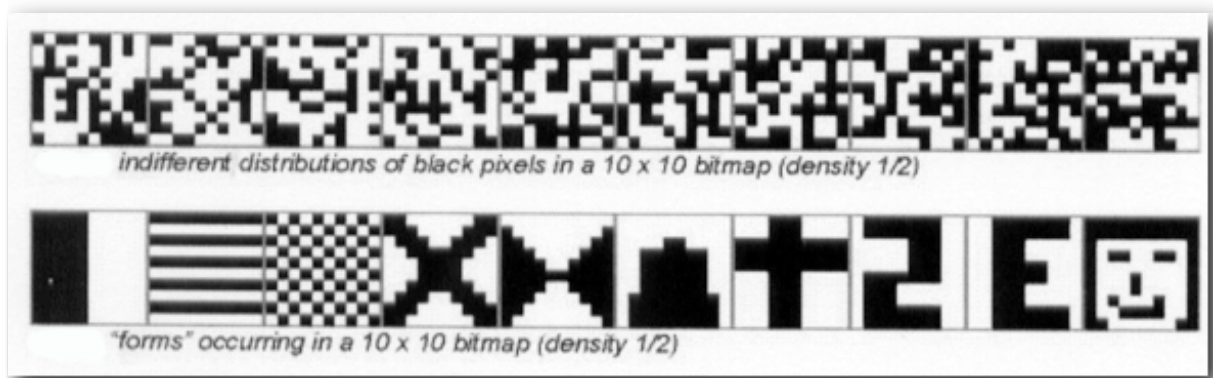


Figure 7. Indifferent distributions and forms occurring in randomly generated 10x10 bitmaps

In other words, the generation of a 'significant' picture by pure chance is an extremely rare occurrence, even in such a simple system as the 'painting by random numbers' presented above.

Insignificance of the result in fact is the proof of the randomness of the data.

Artistically, pure chance procedures without the application of any rules are certainly not satisfactory for most artists. Consequently Corcuff goes on to discuss a case, in which randomness can become a useful tool. Using the example of a simple L-system<sup>129</sup> to describe the growth of a plant, Corcuff demonstrates how the

<sup>129</sup> Aristid Lindenmayer, a Hungarian biologist, developed 1968 a formal language today known as L-systems, or Lindenmayer-system, which served to model the behavior of cells in plants. His formal language can also be used to generate self-similar fractals.

introduction of randomness in such a process can provide diversity. Though the result of the forth generation, or the fourth stage of the presented L-system is complex enough to resemble a natural plant, no randomness was introduced up to this point.

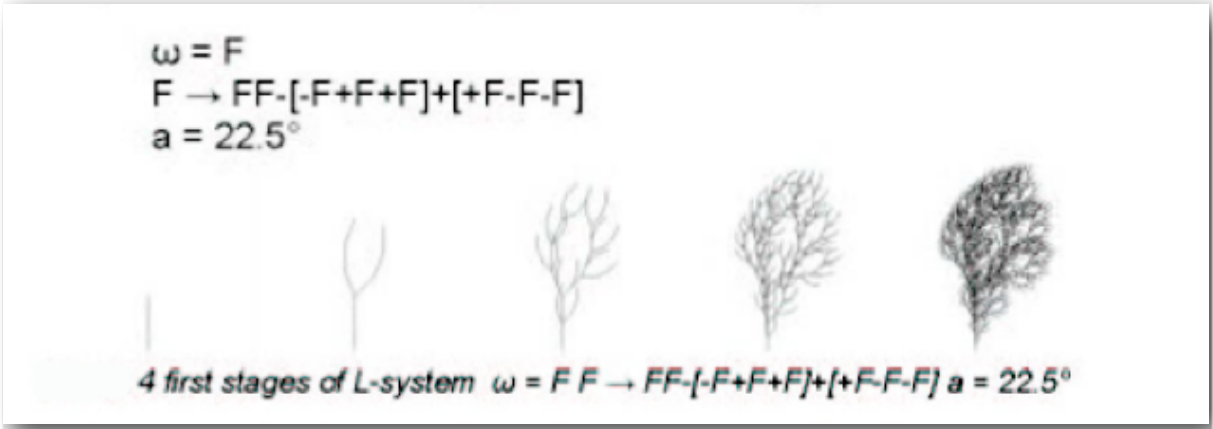


Figure 8. Four first stages of the displayed L-system

To achieve diversity, Corcuff suggests to introduce *hybridization* (the rewriting of certain production rules in the system), which leads to variation in the direction of the branches in this example; and *inaccuracy* (the variation in the range of the parameters, in this example the length and angle of the branches). By introducing hybridization and inaccuracy with (random numerical input) diversity is achieved, while the *identity* of the plant is preserved.



Figure 9. Ten results of the 4th stage of the displayed L-system

Randomness within a clearly defined process and production rules thus can mimic the multitude of events in life, concludes Corcuff. Her insightful article then presents examples of the potential of generative design applied to 3D architectural models.

For our investigation the terms identity, diversity, hybridization and inaccuracy are very useful concepts that we will revisit when discussing the design of creative strategies in rehearsal and performance (in chapter four). For now it is suffice to



conclude that the simple, 'pure' introduction of chance or random by its very nature produces *insignificant results* (otherwise it would not be chance by definition), and very rarely an (artistically) useful result. However, within the framework of a carefully designed process, chance can be a very powerful tool to deliberately provoke unforeseeable, but specific solutions. Most often we will find that artists employ chance procedures in this perspective,<sup>130</sup> motivated by the desire to overcome personal limitations of all kinds in the creative process. Later into this chapter, we will discuss this point in more depth and hope to contribute some valid examples by means of our case studies.

### 3.2 Serendipity

Another kind of chance that occurs frequently in the artistic process is serendipity.<sup>131</sup> Promoted and defined as “the discovery through chance by a theoretically prepared mind of valid findings which were not sought for” by sociologist Robert K. Merton in the 1950s, the concept of serendipity describes two important aspects in the work with chance. First, serendipitous discoveries are not sought for and thus cannot be programmed or generated. Rather do they depend on a condition of the mind that can be described as ‘sagacious’. Sagacity implies discernment and good judgement, as well as the capacity to associate apparently unrelated facts and observations. Serendipity as a particular form of chance thus can be seen as the combination of accident and sagacity. Especially in the history of scientific research and discoveries, we find interesting examples of serendipitous effects.

The discovery of the mirror neuron (a neuron said to fire both when an animal or human acts and when the animal or human observes the same action performed by another) can be considered a fascinating example. When a group of neurophysiologists in 1996 at the University of Parma, Italy, was researching the precise location of neurons responding to a monkey’s action (reaching for pieces of food), they accidentally found that some of the neurons they recorded from would respond similarly when the monkey saw a researcher pick up a nut, and when the monkey carried out the same action itself. While the discovery of mirror neurons

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<sup>130</sup> For example Cunningham in dance, Boulez in music

<sup>131</sup> Horace Walpole coined the term ‘serendipity’ in a letter from 1754 to his friend Horace Mann.

represents one of the most important recent findings in neuroscience, it is not yet clear how mirror neurons might support cognitive functions such as language acquisition or imitation. For discussion of the implications of these findings for the (synergetic) training of performers see chapter five.

Returning to the subject of serendipity, it is commonly accepted that accidental discoveries recognized by the artist's prepared mind play an important role in the creative process, to the extent that a work may change its structure, shape, or content due to serendipitous findings.

In the context of our discussion of generative techniques however, we consider serendipity a form of chance, which occurrence is certainly welcome, but can't be programmed or generated. Instead, this phenomenon shows the importance of the 'prepared mind', which we could describe as open to other points of view, willing to create connections between unrelated matters and ideas, and constructive dialogue with others. This 'prepared mind' recognizes a chance event as a fortunate significant possibility for a different search; it is as if a different filter has been simultaneously being active to save the result for another occasion.

### **3.3 Emergence**

Our survey of ideas related to generative techniques certainly needs to include the notion of 'emergence'. The term appears in many different contexts with significantly differing meanings. For this investigation its use in systems theory, science, or art is of importance, namely as a frequently used concept in (interactive) system design, for example in game theory. Here emergence describes how a variety of relatively simple interactions can cause more complex patterns and systems to arise in unpredictable ways. In other words, *when a number of simple elements operate in an environment, a more complex emergent property or emergent behavior can manifest through the behavior as a collective.*

Emergence undoubtedly can be considered a chance event in that it often represents an unpredictable and/or unprecedented result (the first of three characteristics we listed above). In the case of human interaction though emergence is closely connected to the 'prepared mind'. In Contact Improvisation for instance, movement sequences emerge from the collective sharing of weight, which could never be danced individually. On the other hand, the thorough training of the performers helps

to prepare for this kind of emergence to occur. Consequently emergent behavior and emergent properties (of the dance) can become predictable to a certain extent, if the right conditions are known and provided.

Mitchell Whitelaw (2004) has dedicated a chapter of his book *Metacreation - Art and Artificial Life* to the topic of emergence. He discusses Nagel and Carini's critique of the concept, who both claim that emergence is more of an epistemological phenomenon, as it always occurs relative to a model (Whitelaw, 2006, p. 211 and p. 217).<sup>132</sup> Carini even defines emergence as 'the deviation of a physical system from an observer's model of it', and sets out a typology of emergence-capable devices (Carini cited in Whitelaw, 2006, p. 218). Key features of such a device are the ability to measure or effect changes in the outside world, and the capacity for adaptive self-alteration.

Digital artist Mark Downie (whose concept of the intelligent agent in life performance we discuss in chapter four, 3.7) even goes further and sharply criticizes emergence as a 'digital fantasy':

If an emergent phenomena stands or falls on the excitement of getting more out than one puts in, it conversely offers little advice on how one should go about getting anything in particular out of such a system. Artificial Life's emergence then stands more as an anti-methodology than a constructive practice and we should be as suspicious of 'emergence' as we are of 'mapping' as a point of origin for an art-making. (Downie, 2004, p. 50)

While Downie dismisses emergence altogether, Whitelaw builds on the concept of emergence as an epistemological phenomenon, and argues that the concept can be useful, if for example Carini's taxonomy is understood as a challenge to work towards truly emergence-capable devices. Not surprisingly, Carini's key features of emergent-capable devices also characterize Downie's intelligent agents (see Downie's discussion of the perception, action and motor systems of his software agents p. 40 and 41 of his thesis).

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<sup>132</sup> Year and page numbers refer to the paperback edition of the publication in 2006

Relating emergence to the concept of creativity, Whitelaw refers the work of artist and researcher Harold Cohen, who has linked both terms to computation. Cohen argues that creativity can be seen as the capacity for continuous self-modification, and as such builds on cycles of adoption and adaptation of (creative) strategies, while their efficiency is continually observed and evaluated. Whitelaw states:

In a new subfield named creative cognition, an attempt is made to plot the 'basic cognitive processes and structures' that give rise to creativity in all its forms. 'Conceptual combination' is one widely identified process that acts as a wellspring of creativity; bringing to or more concepts together often results in a new conceptual whole with new, emergent properties. (Whitelaw, 2006, p.230)

We believe Whitelaw offers a valuable perspective for the practical artistic use of the contested concept of emergence here; consequently we have adopted this view for our investigation, along with Carini's notion of emergence as an epistemological phenomenon, which occurs relative to a model of the physical system.

For our purposes 'generative techniques' can be seen as a set of rule-based or algorithmic (artistic) procedures, which are set into motion with some degree of autonomy, contributing to both, the creative process and the presentation of the work of art /Digital (Live) Performance.

The main objective in using generative processes can be described as the 'potential to bring about change' in the creative process, or as integral part of the completed work.

In the field of dance improvisation, Friederike Lampert (2007) distinguishes between (re-) generative processes, or renewal of the known, which is predictable; and emergent processes, in which unpredictable innovations occur based on the recombination of known elements. Her definitions clearly resonate with Whitelaw, Cohen and Carini's views.

Exchange, comparison and transfer of working methodologies, principles and (compositional) elements can generate new specific vocabularies and procedural inventions, as we experienced in our own artistic and pedagogic work, which we present in our case studies.

In our field of study the transdisciplinary research perspective and interdisciplinary working approach were adopted based on positive experience of emerging behavior and qualities in these kind of team efforts. Synergetic effects in the interdisciplinary collaboration of team members with complementary skills for example can account for such emergent behavior or quality. As aforementioned, we will discuss this issue in depth in chapter five.

## **4. Rule-based art systems**

### **4.1 Automatic generation avoiding randomness**

Tjark Ihmels (2006) presents different research projects in his essay *You Get as Much as You Generate*, which all share the same concern: “to find out about the basic conditions of automatic generation *avoiding randomness*” (my emphasis). In the light of the concepts put forward above it would make sense to rephrase this goal as follows, ‘To find out about the basic conditions of automatic generation avoiding *insignificance*’, which is the main trait of randomness that artists as well as scientist want to avoid.

Ihmels shares detailed information about the creation and functioning of a self-generating film on the internet entitled *Posing at three thirty*. A database provides 12.000 small film sequences consisting of one take each. Several generators are applied to generate story-like events, which ‘emerge merely from the random combinatoric options of the software’. Ihmels explains:

The basic story line is created by the main generator which decides whether or not two characters meet in a set place. If the characters meet, the generator also decides, whether or not the characters will engage in a conversation. Where this is the case, the dialogue generator takes over. The dialogue generator decides how long the conversation will last and what is being said. Picture and sound tracks run simultaneously yet independently of each other, so that the generator can also decide on the appropriate camera take. In addition, it decides whether or not additional film sequences are to be included in the film setting (like a third person enters the room). The dialogue generator informs the sound generator when spoken text is used, so that the background music can be regulated accordingly when applicable. Once the conversation is over, the main generator takes over again; the latter decides whether

a singular action, a mood etc. should follow and 'hands over' to the relevant generator. (Ihmels, 2006)

As becomes clear from this passage, the greatest difficulty the research team faced was how to define precisely which creative decision each generator should make, and how to balance freedom of choice for a given algorithm with minimal framing by the author. In his conclusion Ihmels goes as far as claiming that

Investigating the basic conditions of deliberate design is the most urgent challenge in the realm of generative art. Automation of design processes can only be applied successfully if the author provides sufficient framing to adequately implement intended creative goals. This may involve smaller or larger degrees of freedom or constraints in the use of the parameters. The crucial part however, is always a deliberate definition of those basic conditions that influence generation.

You Get as Much as you Generate.<sup>133</sup>

Consequently Iro Laskari (2006) employs the term 'system creator' to describe the (film) director's work in generating cinematic narration based on the application of Artificial Life techniques. Here the director's tasks in the creative process are reevaluated and described as a 'hypermontage' process, a term designating the creation of navigable hypertext structures, which provide a unique and interactive cinematic experience for the user of such a system.

One of the most popular 'system creators' is Lev Manovich, who has also extensively theorized his creative processes. His well-known *Soft Cinema* (2002, with Andreas Karatky) introduces valuable concepts, if not paradigms, which demonstrate how randomness can be made operable and serve artistic concerns. Four key ideas (algorithmic editing, database narrative, macro-cinema and multimedia cinema) were particularly useful for our second case study (see this chapter, 7.3), in that we attempted to establish corresponding concepts and tools for the choreographic work with interactive systems for the stage.

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<sup>133</sup> Ibid.

## 4.2 Galanter's definition for Generative Art

Philip Galanter (2003) defines Generative Art as “any art practice where the artist uses a system, such as a set of natural language rules, a computer program, a machine, or other procedural invention, which is set into motion with some degree of autonomy contributing to or resulting in a completed work of art”.

Galanter suggests that the term ‘generative’ should be viewed as a *method of artistic work* rather than an art form or a particular artistic attitude, as generative tools can be employed for the most diverse reasons. As mentioned above, we consequently approach ‘generative techniques’ as a set of rule-based or algorithmic (artistic) procedures, which are ‘set into motion with some degree of autonomy’ contributing both, to the creative process and the presentation of a work of Digital (Live) Performance.

According to Whitelaw (2006), new media art practices have integrated Artificial Life (A-Life) and Artificial Intelligence research and computation techniques, as is widely known. Genetic algorithms for example imitate the way the DNA functions, in that ‘genotype’ (the code written by the programmer) causes the corresponding ‘phenotype’ (the graphic user interface and the media) to appear. Another example are agent-based systems, which may simulate interaction in an artificial environment, or exhibit the behavior of flocks. Cellular automata can account for yet another technique, denominating the affecting or being affected by ‘cell neighbors’ in a formal system.

Galanter's (2003) broader approach is based on complexity sciences, and includes further systems under ‘Complex Generative Art’: swarming behavior, parallel computational agents, neural networks, L-systems, chaos, dynamical mechanics, fractals, reaction-diffusion systems, emergent behavior, and all manner of adaptive systems.

So what can be considered a ‘generative technique’ in the realm of (live) performance?

Galanter's definition is sufficiently open to include generative art practices outside of the field of computation: “*any art practice* where the artist uses a *system*, such as a

set of natural language rules, (...) or other procedural invention, which is set into motion with some degree of autonomy contributing to or resulting in a completed work of art” can be considered a generative technique (my emphasis in italics.) In other words, there has been a long history of generative procedures in the performing arts. Ihmels and Riedel exemplify:

Wolfgang Amadeus Mozart developed a ‘musical game of dice’ that contained most of the elements that today are associated with generative tools. The piece carries the explanatory subtitle ‘Composing waltzes with two dice without knowing music or understanding anything about composing. For this, Mozart composed 176 bars of music, from which sixteen were chosen from a list using dice, which then produced a new piece when performed on a piano. Sixteen bars, each with eleven possibilities, can result in 1,116 unique pieces of music. Using this historical example, the methodology of generative art can be appropriately described as the rigorous application of predefined principles of action for the intentional exclusion of, or substitution for, individual aesthetical decisions that sets in motion the generation of new artistic content out of material provided for that purpose. With regard to the piece of music mentioned, it was not a matter of a unique playing by the composer. A work sheet for Adagio KV 516 shows an outline developed from principles similar to those that apply to the game of dice. It can be assumed that behind this process was a serious method that Mozart sometimes used for his compositions. (Ihmels & Riedel, 2004)

Galanter (2003) discusses the same example and comments: “Perhaps Mozart knew intuitively that pure random music isn’t terribly interesting because he found a primitive way to mix order and disorder. The short pre-composed measures provide order, and the throw of dice provide disorder”.

In dance many choreographers have experimented with similar ideas and (generative) techniques. Trisha Brown for example designed and explored extensively what she came to term ‘dance machines’:

Hewn from principles greater than the choreographer’s personal imagination, Brown has called her scores ‘dance machines’ - objective mechanisms that collaborate with the choreographer to determine the where, when and how of the dance. In



*Accumulation* and *Locus*, Brown built structures in front of the audience, so that the excitement of discerning them became a pleasure of viewing. In later multilayered works, the formal structure became a nearly invisible undergirding, subliminally suggesting priority of thought as a foil to the instinctive dancing. The 'machine' in *Primary Accumulation* was mathematical serial progression, in *Man Walking Down the Side of a Building* spatial progression from the top to bottom, in *Locus* numerical-linguistic-spatial co-ordination of gestures, in *Line-up* the forming and dissolution of lines, in *Set and Reset* a rectangular progression that traced the stage edges. (Bremser, 1999, p. 39-40)

Applying some of the concepts we have introduced so far, one could conclude generative techniques are generally employed when artists wish to create entire systems, or just sub-systems, that operate with varying degrees of autonomy, and provide opportunities for the system creator, other artists (for example performers), or the audience to collaborate; and secondly, which behave in unpredictable yet meaningful ways. At the same time their use doesn't imply any conceptual or ideological stance - they rather are tools, a recourse for the most diverse artistic projects. In other words, generative techniques in the performing arts don't differ in essence from those employed in any other artistic field. They are a genuine example of Lycouris' transdisciplinary or extra-disciplinary vocabulary (see chapter one, 2.3.3). Since generative techniques are as old as art itself (Galanter prefers to adopt a historically continuous approach, which sees an increase in technical complexity over time, rather than the emergence of a radically new art form), the idea of 'metacreation' (Whitelaw) may also seem exaggerated. If artists in all epochs have employed generative techniques, they have acted as 'system creators' at all times. Their systems and sub-systems have served during different phases of their artistic processes, and may have been presented to an audience or not. In our perspective the term 'metacreation' more adequately describes a shift of focus towards generative processes and techniques, and their eventual presentation to an audience.

American choreographer Kenneth King (2003) for example has described his work in less spectacular, yet very specific terms. Distinguishing between 'choreographer' and 'dancemaker', he compares his approach with the work of a programmer:

As a dancemaker I program structural and organizational options rather than just set, specifically repeatable phrases, so the generation of (im)pulses, and the tracking of 'circuits' in space, activate the firing and fielding of signs and signals that synchronistically become part of the formal performance process. (King, 1983, p. 4-5)

King's dancers therefore train in diverse styles, techniques and systems to eventually arrive at working within a dance as an algorithmic generative system, based on the idea of *processing choreography*, which is close to what today is often termed *real-time choreography*. King consequently proposes the term 'synergetic training' to describe the intricate demands on dancers, who are asked to make complex compositional decisions as they are performing. Part of their preparation is to bring information from other fields and art forms "to the dance, in order to discover a larger organic understanding of the moving body". In the realm of digital (live) performance the term 'synergetic training' most clearly describes the kind of training a performer needs to undergo, which is why we have dedicated an entire chapter to the subject (see chapter five).

Friederike Lampert (2007) arrives to the conclusion that the meaning of the term choreography has changed since the 1950s, as dance improvisation has evolved from just being a tool in the choreographic process to frequently being an integral part of live performance. She discusses several models of improvisation and their respective methodologies in their historical context.

In many cases choreography can be seen as '*slowed-down improvisation*', allowing more time for the use of compositional techniques and structuring of a work. On the other hand the improvising dancer, who uses the same craft as the choreographer, creates '*instant compositions*'. In this sense improvising dancers can be seen as several choreographers on stage.

### **4.3 'Generative Scores' and 'Living Archives'**

In the context of digital (live) performance, 'instant composition' for example within an interactive computer vision system, requires even more intense multitasking, because as the performer is navigating the matrixes of movement possibilities, s/he has simultaneously to take on the role of a visual artist.

Interestingly, there is a long tradition of employing techniques from the visual arts in the choreographic process: the note or sketchbook, designs of floor patterns or figures of the dancing body, descriptive definitions of certain poses and steps, left alone visualizations of ideas for scenic design, the use of objects, lighting or interactive technology.

A choreographer's sketchbook tends to primarily be used as a generative tool in a specific creative process, though it may contain ideas and information that can be explored and developed within several projects on other occasions (DeLahunta & Bevilacqua, 2007).

In contrast to the sketchbook, comprehensive dance notation systems such as Laban or Benesh notation rely upon formal conventions to produce dance scores, which primarily aim at preserving and re-staging choreographies. However, as these systems require long periods of study due to their complexity, they are generally not used in the process of choreographic creation, or for real-time generation of choreography in performance (DeLahunta, Barnard, Nimmo-Smith, & Ramponi, 2006).

It is intriguing how the choreographers Halprin, Cunningham and Dunn, and subsequently the Judson Dance Theatre started to use *scores as generative tools* for movement research and dance composition, and later for structured improvisations performed to an audience. In context with other groundbreaking innovations (the use of 'found' movement and actions of all kinds; the introduction of chance and indeterminate structures; the utilization of the collage principle as the dominant structuring device) the generative score became a *living archive*, simultaneously documenting the conceptual work of its author and generating physical vocabularies, interaction between performers, and their organization in space and time.

Today sophisticated digital hardware and software is affordable and accessible for choreographers and other artists involved in the creation of a new performance work. Digital technology can support all phases of the creative process, production, presentation and marketing of the work, and recently has become an important factor in the conception and development of new choreographic resources.

Chris Ziegler, interactive media artist and designer, has been working since 1993 developing choreographic and dance information interfaces. Over the course of several years Ziegler collaborated with choreographer William Forsythe and his company at the time, Ballett Frankfurt, on innovative ways to build up and access a digital video archive of rehearsal and performance videos (Ziegler, 2007). A combined archiving and teaching tool was developed for the choreographies *Loss of Small Detail* (1991) and *Self Meant to Govern* (1994), and led to the design of a cross-linked archive of theory and practice (interactive lectures, rehearsal and performance videos).

In 1999 a CD-ROM entitled *William Forsythe: Improvisation Technologies, A Tool for the Analytical Dance Eye* was released, introducing the larger public to a more general description of Forsythe's movement principles and a set of tools to generate new structures through the reorganization of existing movement material.

Through a decade of work with *Improvisation Technologies*, amongst other digital choreographic tools, I came to highly value opportunities to explore its potential through very diverse groups of users (dancers, actors, designers, animators and multimedia artists). Their particular approach based on their training, vocabulary, unique artistic perspectives and the present working conditions bring a wealth of information back to choreography.

In our perspective the concept of a *living archive* thus indicates another important dimension: a particular user's interaction with the archive represents a unique possibility, which is *latent* in the archive, and *manifested* through the user's individual exploration and application, or adaptation of the proposed movement and compositional principles.

On the other hand *the dancer can be viewed as a living archive himself*, who brings a wealth of latent information to the investigation: his training, often in several systems, experience with different choreographers and collaborating artists, personal life experience, particular cultural and historical background among other factors (Odenthal, 2005). This latent information, can be activated and transformed in the process of improvisation, or real-time choreography, in this case through the exploration of and interaction with the digital archive.

The conception of the living archive employs a holistic perspective of the choreographic creative process and the live performance, as it combines visible and lasting aspects of the work with the invisible and ephemeral dimensions, both of which come into being in the moment of interaction.

In some cases the *generative score* can be seen as the structuring device of such a living archive. In Forsythe's choreography *Self Meant to Govern* (1994) for example the dancers are provided with information usually stored in a score: a time-code allows for sequencing the sections of the piece; letters that correspond to a movement vocabulary of 135 sequences are shown in random order on monitors on stage, spatial references for the movement material can be deduced from the graphical presentation of the letters, and lists of possible transformative actions are displayed at the dancers entrance points of the stage.

Another example is Myriam Gourfink's work *This is my House* (2005), which uses overhead monitors displaying interactive scores generated in real-time: while the dancer's follow the onscreen instructions, their movement is simultaneously analyzed through a computer vision system and influences the generation of elements the score will contain in the next moment to come.

**THIS IS MY HOUSE**  
2005

**LEXIQUE**

Le "langage" inventé hérité de la Cinégraphie Laban (Labanotation) rend possible une division de l'espace selon les choix personnels du chorégraphe, et c'est selon ce découpage que les signes se modulent et se transforment à l'infini. Le principe de base est une boule traversée par un axe. La boule peut être divisée de façon régulière ou irrégulière, pour des raisons liées à la réalité physique, l'axe correspond à la gravité. Cependant dans certains cas - expériences extra-terrestres en apesantour ou économie d'écriture - l'axe peut suivre l'inclinaison du corps, le référent est alors l'axe des pieds à la tête (voir chapitre sur la clef d'axe corporelle).

chaque partition se lie de bas en haut et de gauche à droite. Pour la première partie de "This is my house", le quintette, le découpage est expliqué plus bas.

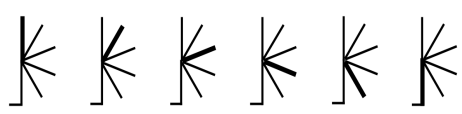
Le front de référence pour "This is my house" est le lointain.

Uniquement pour le quintette de "This is my House", quand rien n'est spécifié, chaque partition invite à la reprise des indications le temps de l'affichage de la partition. Si dans la colonne de reprise quelque chose est spécifié, alors il faut l'appliquer (voir le chapitre des reprises)


© Myriam Gourfink 2005

**Le niveau - plan vertical**

Une autre famille de signes renseigne sur les mouvements effectués par le danseur sur le plan vertical (le niveau). Dans les exemples suivants l'espace vertical est divisé en cinq, la tige noire correspond au niveau demandé.



ces deux niveaux au choix      ces six niveaux au choix      la partie grisée indique que le niveau est entre les deux tiges en gras celles-ci incluent      la partie grisée indique que le niveau est entre les deux tiges en gras celles-ci excluent



© Myriam Gourfink 2005

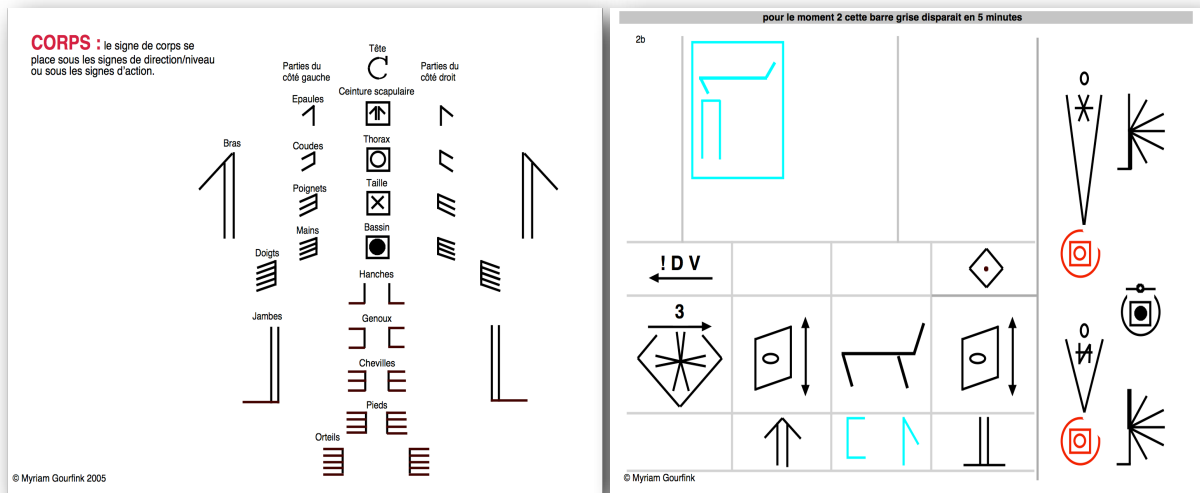


Figure 10. Excerpts from the score of Myriam Gourfink's work *This is my House* (2005). The symbols were created by Gourfink and compiled in a lexicon. They represent different kinds of instructions for her dancers that these can read and interpret like a written language.<sup>134</sup>

In the field of Digital (Live) Performance, gesture analysis supported by computer vision systems (like in Gourfink's work), and artistic application of 3D Motion Capture technology has been a strongly emerging line of investigation during the past decades, closely related to the topics of generative scores and living archives.

3D Motion capture data files consist of the information where a particular set of markers (which attached to the performer's body) was located at a particular moment in space. This information can be applied to a virtual figure, or may be used to generate audible or visual information, or it can function to trigger off all kind of media. Information in a motion capture data file can be used entirely, or in part, and combined with information from other files.

*Openendedgroup* artists Paul Kaiser, Shelley Eshkar and Mark Downie have pioneered a number of collaborative projects, for example with choreographers Merce Cunningham, Bill T. Jones and Trisha Brown, exploring a variety of possibilities using Motion Capture technology in installations and life performance situations.

Interestingly, motion capture archives can be said to contain less than meets the eye when a performer's movement is captures, because the initial visualization is a set of

<sup>134</sup> Gourfink provides detailed descriptions of excerpts of her scores and symbols on her website: <http://www.myriam-gourfink.com/scoresThisIsMyHouse.htm> accessed April 2011

moving dots on the screen, which is considerably less than the information we receive when looking at the live performer. But in combination with another software application this data provides endless potential for application: mapped onto a virtual figure, the movement can be viewed from a variety of (camera) angles; the motion of fragmented body parts can be visualized and/or copied onto another body part; any movement can be edited in spatial terms and its timing, just to mention a few basic possibilities.

Again, the concept of the *living archive* describes the generative potential of the captured information, which can be seen as the dynamic aspect of this advanced recording technology. We will return to these concepts and their concrete application in the discussion of our case studies.

#### **4.4 Correspondences in complexity science theory and performing arts theory**

##### **4.4.1 Lampert's theorization of dance improvisation**

So far we have discussed concepts of improvisation within digital (live) performance settings, and suggested the notions of *generative score* and *living archive* as generative techniques. Returning to Friederike Lampert, we will now examine some aspects of a model she presented in her dissertation on dance improvisation, which reveal surprising correspondences to a model presented by Philip Galanter in the context of his analysis of generative art systems from the perspective of complexity sciences.

Lampert (2007) builds her model through developing and interrelating concepts of improvisation advanced by Kent de Spain and Anna Halprin.

The graphic in figure 11 visualizes de Spain's perspective of improvised movement passing through stages of action (when a decision has been made) and stages of superposition, in which the performer senses a moment of suspension, a moment that contains simultaneously a great number of (movement) possibilities and choices.

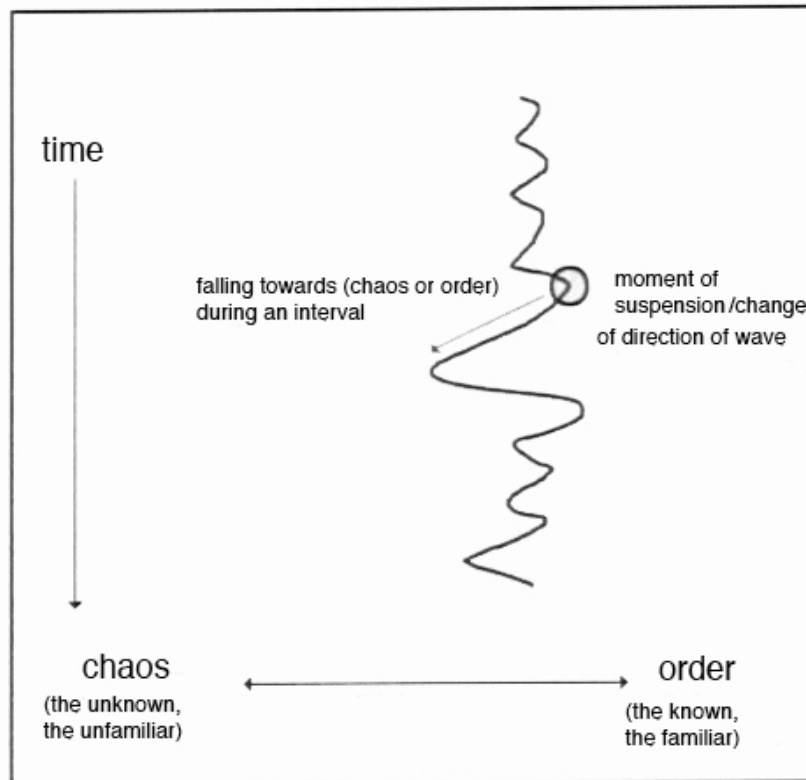


Figure 11. Improvised movement in form of a wave<sup>135</sup>

This moment of latency is designated 'Schwebezustand/ Wellenumbruch' (superposition and change of direction of the wave). Following a new impulse to act, the performer continues to move satisfying either 1) the desire to continue the previous movement, 2) the desire to vary the previous movement, or 3) the desire to break with the previous movement. In short intervals of time the improvising performer oscillates between moments of discovery and surprise, when s/he is 'falling' towards unknown, unfamiliar movement, or 'recovering' towards the familiar, known movement patterns and qualities.

<sup>135</sup> This graphic was translated from German to English and adapted from Lampert (2007, p.136)



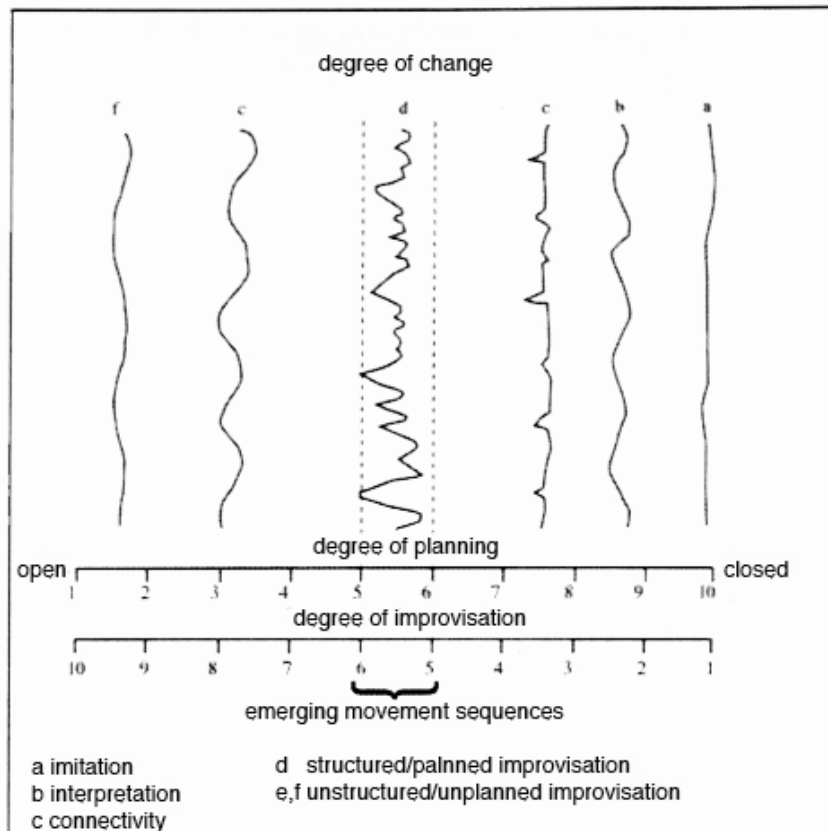


Figure 12. Degrees of Improvisation<sup>136</sup>

In figure 12 several waves with varying amplitudes visualize the degree of change, or emergence of unfamiliar, unknown movement in relation to the degree of structure/ planning of the improvisation/choreography, and the degree of the improvisational 'freedom' given to the performer. Imitation of (someone else's) movement represents the lowest degree of improvisation on a scale of one to ten, which Lampert adopted from Halprin. Interpretation designates the variation of one or more parameters of the original movement material and scores two or three on the scale. Connectivity denominates the recombination of any units of the original movement material and the degree of improvisation is between three and four. Imitation, interpretation and connectivity all score very high on the planning scale.

<sup>136</sup> This graphic was translated from German to English and adapted from Lampert (2007, p.187)

Structured improvisation is characterized by similar or identical degrees of planning and improvisation (between five and six values on both scales). According to Lampert structured improvisation represents a complex challenge for the performer, and provides a fertile ground for emerging (unfamiliar and unknown) movement material, patterns, qualities, or compositions.

On the contrary, a higher degree of improvisational freedom (seven to ten values on the scale) in unplanned or unstructured settings does not result in emerging properties or qualities of the movement, but tends to (re)activate existing bodily knowledge, which Lampert describes as the 'habitualisierter Körper' (habitualized body), employing sociologist Pierre Bourdieu's terminology and concepts. Lampert claims that surprising artistic innovations do rarely arise in unplanned improvisation, and that such settings are more often used in the context of dance therapy, trance dance, authentic movement, meditation, and so forth.

Lampert's findings and theorization is exceptionally useful in several ways. First, she addresses the myth of 'free improvisation' equalling highest manifestations of (artistic) creativity, and replaces it successfully with a differentiated model of degrees of improvisation that can be used to serve very different necessities. Second, her conclusion that the emergence of the unknown (or innovation) is the result of thorough preparation, taking risks, and very specific efforts, implies a number of important consequences for designing the creative process and planning the performer's preparation, which we will address in detail in the following chapters. From our perspective Lampert's most valuable model can be further developed in order to design creative strategies at the different stages of the development cycle of a Digital (Live) Performance, as she does not specify the use of different improvisational forms and tools within the creative process of a single choreographer or team, but deduces from her analysis of the working processes and methods of well-known choreographers in different genres and styles of contemporary dance. We suggest that different degrees of improvisation and planning can be employed at the diverse stages of the development cycle for specific purposes, such as becoming familiar with an interactive system, creating movement material, or composing the micro and macro structures of a Digital (Live) Performance. It is also important to keep in mind that Lampert developed her model based on 'pure movement'

improvisation, and consequently does not consider more complex interaction with objects, the set, or the real-time interaction with media.

#### **4.4.2 Generative art systems and complexity theory**

In the beginning of the chapter we have identified and discussed the use of chance as a generative tool in artistic creation, and seen that several authors view randomness as a problematic factor since it produces mainly insignificant, or meaningless results. Three terms can be listed to recapitulate successful generative strategies:

1. Variation: maintain identity, produce diversity (Corcuff).
2. Hybridization: the 'conceptual combination' of rules/algorithms. (Cohen,Whitelaw)
3. Adaptive self-modification (Cohen, Downie), eventually resulting in emergence-capable systems (Carini).

Galanter claims that systems employing such strategies can be characterized as 'artificial chaotic systems'. Though chaotic systems are often difficult to predict, they will exhibit structures different from purely random systems. Chaotic systems often display highly complex structures and characteristics, which should not be reduced to the complexity of the underlying algorithms. Drawing on complexity science and information theory, Galanter applies the concept of 'effective complexity' (EC) to (generative) art theory. Based on the ideas of Murray Gell-Mann, one of the founders of complexity science, Galanter suggest EC as a concept that can be conducive to understanding any generative art system.

In the chart below three parameters are referred, which indicate different levels of complexity: information content, compressibility, and degree of order. Information content tells of the 'surprise' a given communication can exhibit. As a simple example we may think of poetry, a highly complex form of language in terms of *meaningful* surprise. Random combinations of words of the same language may display an even higher degree of information content, but the complexity is less for the reader, because of the insignificance of the sentence. Similarly, compressibility of a string, or text depends on recognizable consistent patterns of the language, such as statistical frequencies of letter combinations that can be compressed out. Text messages sent

via mobile phone provide a good example for such compression. Order and random/disorder consequently represent the absence of underlying structure, patterns, redundancy of natural languages, and compressibility.

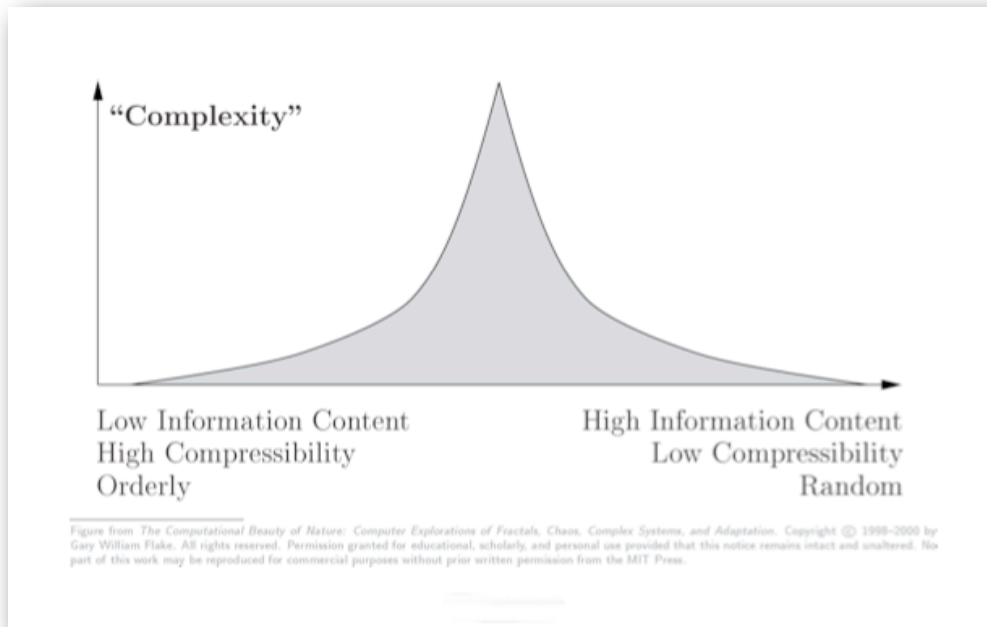


Figure 13. Effective complexity

Complexity therefore arises and peaks *between* the extremes of low and high information content, low and high compressibility and between order and randomness. Galanter explains:

To measure EC Gell-Mann proposes to split a given system into two algorithmic terms, with the first algorithm capturing structure and the second algorithm capturing random deviation. The EC would then be proportional to the size of the optimally compressed algorithm that captures structure. (...)

The important point (...) is that complexity science has produced a robust general paradigm for understanding and classifying systems. Systems exist on a continuum from the highly ordered to the highly disordered. Both highly ordered and highly disordered systems are simple. Complex systems exhibit a mix of order and disorder.

Galanter (2006)

Galanter goes on to situate different generative art systems according to their complexity on the continuum from the highly ordered to the highly disordered, or randomized:

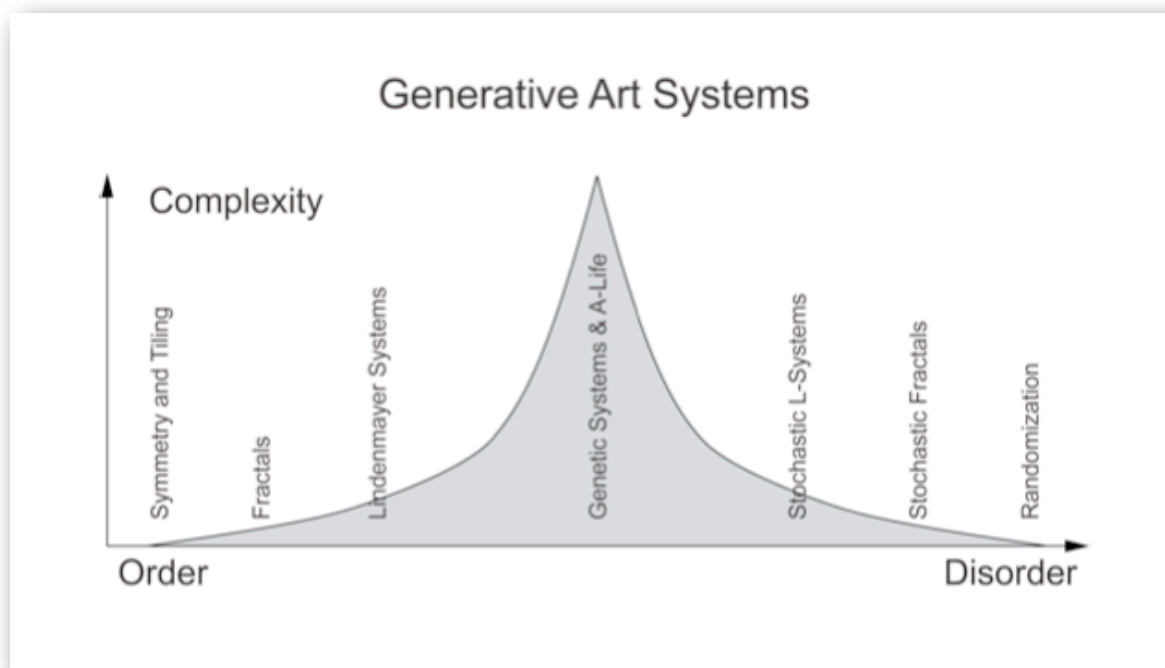


Figure 14. Complexity of Generative Art Systems

Galanter's model exhibits striking correspondences with Lampert's model of dance improvisation, and her analysis of procedures employed by the choreographers Amanda Miller and William Forsythe, which she also situates on the respective scales of the degrees of planning and improvisation.

More importantly, Lampert's model visualized her important observation that artistic innovation in improvisation, or genuinely emerging movement material and structure in improvisation are result of a successful mix of planning and improvisational freedom. This mixture represents a high degree of complexity for the improvising performer, whose *responsive body* has to dance fast and to think fast at the same time.

Galanter's diagram contemplates the degree of *effective complexity* in generative art systems, and places generative techniques such as genetic systems and a-life at the center of the scale. These are techniques, which exemplify those generative strategies we have outlined above, are powerful tools for the creation of *meaningful* generative art systems.

Parallels can be drawn between constituent parts of the two models. Murray Gell-Mann's algorithm measuring structure in a generative systems can be linked to Lampert's levels of planning an improvisation/choreography; and Gell-Mann's

algorithm measuring random deviation corresponds to Lampert's level's of improvisation. The level of change, which Lampert describes as the emerging movement innovation at the crossover of certain levels of planning and improvisational freedom, can be viewed in the perspective of 'efficient complexity', and analyzed according to the parameters of information content, compressibility and degree of order/randomness.

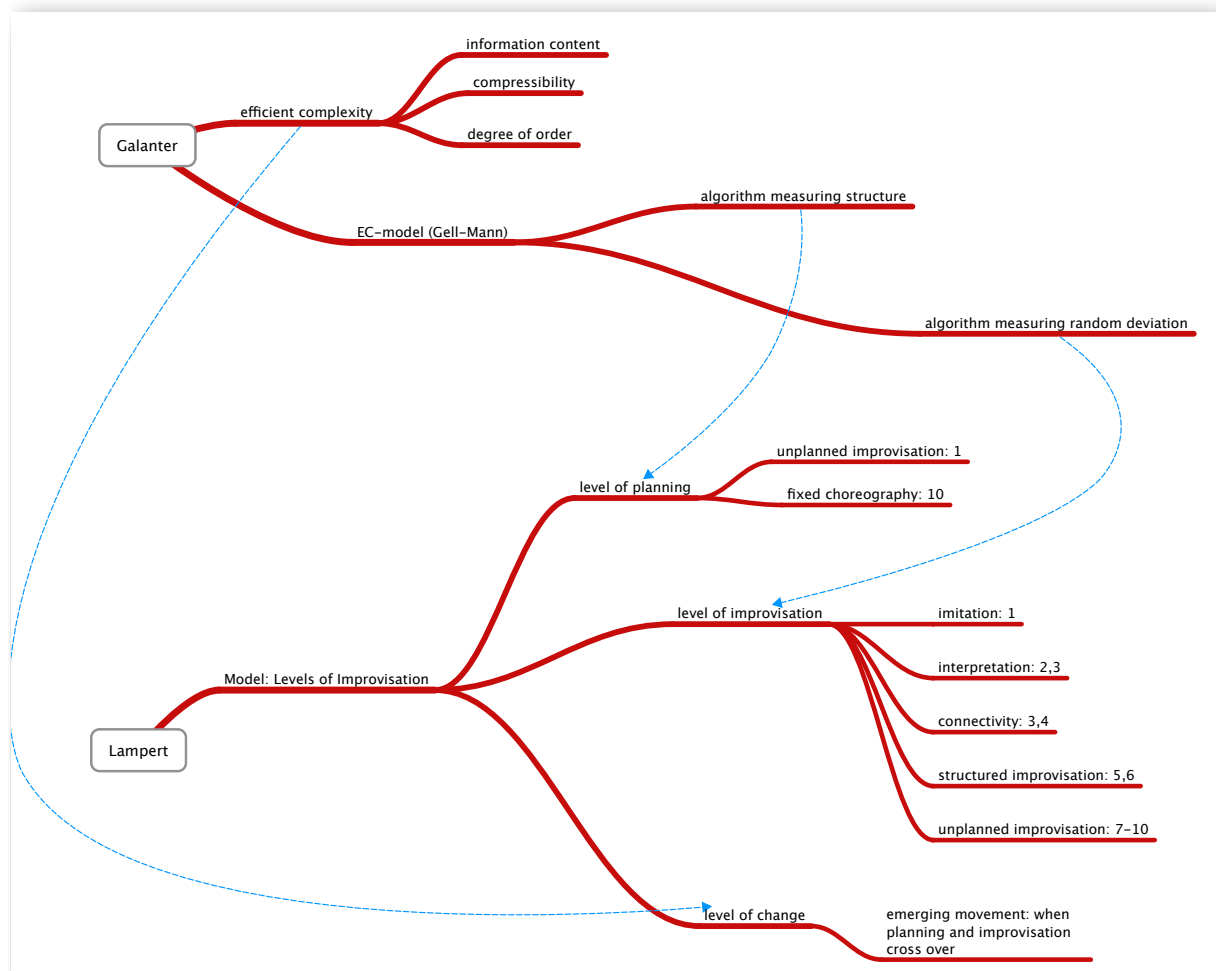


Figure 15. Correspondences between Galanter's and Lampert's ideas

The 'surprise' factor related to the information content for example, corresponds to the moment of 'falling' towards the unknown in Lampert's model (compare figure 12); compressibility directly relates to the recognizable structures and known movement patterns of the 'habitualized body'; and the degree of randomness or order can be linked to the production of insignificant or meaningful movement.

Vice versa, the design of improvisational strategies may be assimilated in the programming of a generative system. For example, digital artist Mark Downie created a software device called *Fluid* during his collaboration with Trisha Brown as a result of his observation of the 'devising process', which the choreographer employs frequently in her creative process. Downie essentially transferred the idea of 'devising' and enabled his 'intelligent agents' to take self-modified adaptive decisions regarding the motion capture data retrieved from the live performers.

It can be inferred that such improvisational and choreographic strategies provide excellent examples for the programming of generative systems.

Digital media theorist Tom Duscher writes:

Productions for dance or ballet are still interesting today for the development of generative media, not only because of the appearance of many synergetic characteristics of performance, but because there are some similarities the conception and notation of the work and the programmed media to be found. This is because choreography is based on a system of rules, instructions and algorithms, which coordinate body, movement and space. And yet, it is the individual expressivity of the performer that mark the particular character of the performance. It is therefore very instrumental to examine how this rule-based system of algorithms can be adapted for the programming of media. On one hand to create the correlation between real movement and audio-visual interpretation, and on the other hand to introduce the improvisational moments of dance to the programming of media. Contrary to acoustic interpretation through body and movement, the improvised image is a crucial theme nowadays. (Duscher, 2006, p. 420, my translation)<sup>137</sup>

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<sup>137</sup> Inszenierungen für den Tanz oder das Ballett sind deswegen auch heute noch für die Entwicklung generativer Medien interessant, weil hier nicht nur viele synergetische Merkmale der Performance zum Tragen kommen, sondern sich auch in der Konzeption und Notation des Werkes einige Ähnlichkeiten zu den programmierten Medien ergeben. Denn Choreographie basiert auf einem Regelwerk, auf Instruktionen und Algorithmen, um Körper, Bewegung und Raum zu koordinieren. Und dennoch sind es die individuellen Ausdrucksmöglichkeiten der Tänzer, die den Charakter der Aufführung prägen. Es ist also aufschlussreich zu untersuchen, wie dieses algorithmische Regelwerk auch auf die Programmierung der Medien anzuwenden sind. Einerseits, um die Korrelation zwischen realer Bewegung und audiovisueller Interpretation zu erzeugen und andererseits um die improvisatorischen Momente des Tanzes in eine Programmierung der Medien einzubringen. Im Gegensatz zu den akustischen Körper- und Bewegungsinterpretationen ist heute das improvisierte Bild ein bestimmendes Thema. (Duscher, 2006, p. 420)

Later in his essay, Duscher goes a significant step further in suggesting 'improvisational moments' should be introduced to the programming of media in to achieve an equivalent of the performer's 'individual expressivity'. Our concept of the 'living archive', which resonates with Odenthal's notion, and Lampert's concept of the 'habitualized body', alludes to the importance of individually and collectively *meaningful (shared)* references. If we consider the habitualized body, or the living archive a vast database, the moments of individual expressivity can be prepared through the technique of metadating media files, as successfully demonstrated by Lev Manovich and Andreas Karatky in *Soft Cinema* (2002). Metadating in combination with algorithmic editing of the media files can produce significant, meaningful moments for the viewer of such nonlinear cinematic narratives, which correspond to the 'improvisational moments' in dance that Duscher mentions above as a desirable effect, or qualitative improvement in media programming.

Let's return to Duscher's affirmation that it is "very instrumental to examine how this rule-based system of algorithms can be adapted for the programming of media ... to create the correlation between real movement and audiovisual interpretation". This is a very important point. While Johannes Birringer has stresses the need for the development of adequate performance techniques for the work with interactive technologies in live performance (see our discussion in chapter two, 2.1-2.4), Tom Duscher reveals the other side of the same coin: what are the adequate programming techniques for the work with interactive technologies in live performance?

Fascinating as this subject (of transferring methodologies from contemporary dance to new media art) is, our investigation cannot cover this ground, which deserves to be investigated in much more depth. Instead, we wish to reiterate at the point that the research question underlying this investigation focuses on how to propose a methodology for the design of creative strategies for the use of new media technologies in Digital (Live) Performance *from the performer's perspective*.

Due to the choice of this delineation we will only occasionally touch upon the programmer's perspective, intending to remind the reader that the methodology we propose by nature is bi-directional. In fact, it is largely due to the inquiries into the digital artist and programmer's work that we find ourselves in the position to design new strategies for the (performer's) use of interactive technology. As much as



Lampert’s findings are important for the programmer who wants to introduce human qualities to his/her systems, Galanter’s ideas have been crucial for us in theorizing and understanding the nature of improvisational strategies in Digital (Live) Performance.

Birringer’s desire to see ‘dance transformations’ or ‘acting transformations’ happening in real-time resembles Lampert’s ‘degrees of change’, of genuinely exciting moments during real-time choreography, or improvisation. While Lampert’s model shows why these moments are very hard to produce (the performer has to think fast, or process several compositional parameters, *and* dance fast, or remain responsive), the following diagram shows, why such ‘transformations’ are virtually impossible to achieve in improvisation:

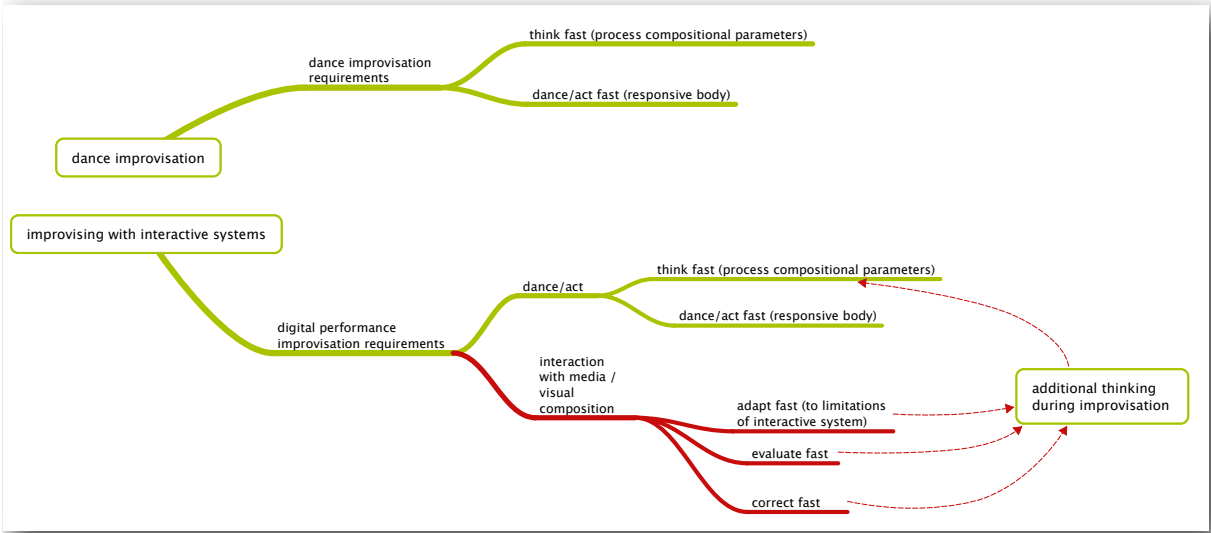


Figure 16. Additional requirements in Digital (Live) Performance improvisation

The interaction with media and resulting real-time visual (or sonic) composition requires a performer to do a lot of additional fast thinking during the improvisation (red branches in the diagram). Every interactive system is designed with its particular characteristics and limitations, which the performer needs to know well enough to adapt to from moment to moment. Such adaptation not only guarantees the adequate use of the systems potential, but provides the basis for creative decisions. Instant evaluation of the interaction therefore includes functional as well as artistic criteria. In case of negative evaluation the decisions have to be corrected when possible. Because of the additional thinking during improvisation with an interactive system, the performer hardly will maintain sufficient responsiveness to allow unknown and

surprising movement material to emerge, particularly, as such material might be counterproductive for the visual or sonic composition, which s/he tries to accomplish simultaneously.

A digital environment conducive to improvisation might therefore be less complex in its programming, or the degree of improvisation maybe reduced to levels one to four (imitation, interpretation, and connectivity). At this point revisiting the Troika Ranch's *sphere of interactivity* model (see chapter two, figure 4) offers an interesting approach to integrating Lampert and Galanter's ideas.

The y-axis (in the Troika Ranch model) can be read as integrating Lampert's entire model: the term 'improvised' represents the level of improvisation starting at value 1 at the bottom and reaching 10 at the top, where the term 'composed' corresponds to the degree of planning, which starts at value 10 (fixed composition), and descends to value one at the bottom. At the same time both terms can be associated with Galanter's order and disorder axis, along which he situated complexity in the center.

This leads us to various intriguing observations. The x-axis in the Troika Ranch model for example describes the *physicality* of the performer working with an interactive system. Suppose we are using a complex generative interactive system, situated at the center of the y-axis, the performer in this model would certainly not use a maximum of physicality (for example highly technical dance phrases), but rather act somewhere in between a musician playing his (new media) instrument, and employing physical strategies for such interaction.

It can be certainly objected that the y-axis could slide along the x-axis indicating a higher or lower degree of physicality, but this model is called a *sphere* on purpose (as opposed to a *cube* of interactivity), which points towards a decrease in multidimensionality as we move toward any of the extremes.

Building on the same logic, the *perceivability* of the interactivity for example, represented by the z-axis of the model, decreases towards the extremes of very high physicality (a dancer performing technically challenging phrases, see example above), or hardly any physicality (extremely simple gestures cause great media events). Interestingly, interactivity would also become imperceivable if the extremes of unplanned improvisation (or the equivalent of programming with very high randomness) and fixed composition are reached.

The choice of the sphere as a geometric form to visualize relations and proportions of some constituent elements of interactivity in Digital (Live) Performance also indicated that the greatest range of creative possibilities lies in the center, between extremes and balancing several, sometimes disparate artistic concerns.

## 5. Mimesis of thought

The bidirectional transfer of concepts, ideas, techniques and methods between contemporary dance and new media has been a fundamental tool in developing our methodology, and not surprisingly reflects a major tendency in contemporary art practice, the 'mimesis of thought'. Art historian and media theorist Boris Groys (2008) claims:

(..) one might say that the minimalist and conceptual art of the sixties and seventies regarded the individual artistic decision as a single option within a larger system of options. Therefore (art) progressed from a mimesis of nature towards a mimesis of thought. This (progression) can be interpreted as both, a radicalization of, and the overcoming of the classical avant-garde. The classical avant-garde abolished the mimesis of nature in the name of the free and spontaneous thought. The art of the sixties and seventies viewed any thinking as systematic and rule-based, and therefore as something that could be replicated. (Groys, 2008, p. 115-116, my translation)<sup>138</sup>

Though Groys develops his ideas based on the analysis of fine art in the sixties and seventies, he implies at several points in his essay that art today is generally characterized by a rational, systematic and rule-based approach. Contemporary artists, he claims, work project-based. They often present work in public, which is in essence closer to the *documentation* of their artistic vision and processes. Groys states that the finished traditional art object thus has been replaced by the open

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<sup>138</sup> (...) man kann sagen, dass die minimalistische-konzeptualistische Kunst der sechziger und siebziger Jahre die individuelle künstlerische Entscheidung als eine einzelne Option in einem übergreifenden System von Optionen verstanden hat. Deswegen ist sie von der Mimesis der Natur zur Mimesis des Denkens übergegangen. Darin kann man, wie gesagt, sowohl die Radikalisierung wie auch die Überwindung der klassischen Avantgarde sehen. Die klassische Avantgarde hat die Mimesis der Natur im Namen des freien, spontanen künstlerischen Denkens abgeschafft. Die Kunst der sechziger und siebziger Jahre hat jedes Denken als systematisches, regelgeleitetes verstanden und somit auch als ein solches, das seinerseits abgebildet werden kann. (Groys, 2008, p. 115/116)

(ongoing) art project. Serial production in minimalism for example situated the exposed object in a much larger context of theoretically infinite numbers of objects that could be generated based on a code, or system of production rules. In much the same way most art today references artistic vision and process as a *sample* of many more possible generations.

Certainly Groys's ideas resonate with the movement research and experiments carried out by choreographers in the sixties and seventies. Inevitably Merce Cunningham comes to mind, who had been dancing with Martha Graham, an icon of the modernist avant-garde in dance. Cunningham overcame the 'free and spontaneous expression' in modern dance just in the way Groys describes, progressing from the mimesis of nature to the mimesis of thought. A famous example is Cunningham's 'mimesis', or transfer, of Einstein's well-known statement 'There are no fixed points in space', which led him to revolutionize the way he staged his choreography, and denied the audience the traditional central perspective on the work. In fact the examples for a 'mimesis of thought' abound in contemporary dance and in Digital (Live) Performance, and Groys' approach applied to performance theory would be a magnificent subject for further study.

Important for our investigation is Groys's stance that contemporary art practice is systematic and rule-based, because the classic avant-garde's spontaneous and free thought represents an artistic practice, which would not be transferrable or replicable by transfer of concepts, ideas and artistic methods. Thomas Metscher (2001) introduced 'mimesis' as a cardinal category for a dialectical theory of the arts. According to this author mimesis is a way of reflecting reality, which in itself is a form of reality, and as such can be considered an ontological and epistemological category. At the same time mimesis covers the relation between nature and culture, and therefore constitutes an anthropological category. Based on these perspectives, Metscher discusses the importance of mimesis for art theory. For him, mimesis reveals the concealed, turns the invisible perceivable, and in this way creates a world from the human perspective.

Metscher draws on theories from Aristotle, Benjamin, Adorno, Lukács, Holz and Ricœur to develop a very differentiated notion of mimesis. In particular Walter Benjamin's conception resonates with Groys and is most useful for us:

All culture, particularly writing and language, is constitutes an archive of historical experience. Benjamin obtains this very significant thought from the notion of non-sensuous similitude. Non-sensuous similitude refer to structural correspondences (homologies and isomorphisms), which cannot be discerned through sensuous appearance of objects and signs (but are reflected by the structure of such objects and signs). Writing and language consequently constitute an archive of historical experience, because they constitute an archive of »non-sensuous similitude, of non-sensuous correspondences«. In a language entire eras of history are sedimented - language is the most complete archive of non-sensuous similitude.<sup>139</sup> (Metscher, 2004, p.10, my translation)<sup>140</sup>

Benjamin's 'non-sensuous similitudes', or structural correspondences, are aptly described by Groys's (artistic) 'code', a set of invisible production rules capable of generating the artistic work. Interestingly William Forsythe has named one of his *Improvisation Technologies* 'movement isometries'. Isometries, or isometric isomorphisms, describe the congruent mapping of metric spaces, in this case, of movements carried out by different parts of the human body. As Forsythe explains in a short video lecture, movement isometries should maintain similar characteristics as a particular movement is 'transferred' from one part of the body to another. In his book *William Forsythe - Denken in Bewegung*<sup>141</sup> (2004) Gerald Siegmund terms this principle 'kinetic isometries' and elucidates:

Thus the form of a bent arm pointing upwards corresponds to the same form of the left arm pointing downwards. The line between upper and lower body serves here as the axis along which the form of the movement is mirrored. Forsythe extends the

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<sup>139</sup> Alle Kultur, vor allem Schrift und Sprache, ist ein Archiv historischer Erfahrung. Benjamin gewinnt diesen äußerst folgenreichen Gedanken kraft des Begriffs der unsinnlichen Ähnlichkeit. Unsinnliche Ähnlichkeit verweist auf die, der sinnlichen Erscheinungsformen nicht ablesbaren strukturellen Korrespondenzen (Homologien und Isomorphien), die Dingen und Zeichen eingeschrieben sind (die Reflexionsstruktur solcher Dinge und Zeichen). Sprache und Schrift nun sind ein Archiv geschichtlicher Erfahrung, weil sie »ein Archiv unsinnlicher Ähnlichkeiten, unsinnlicher Korrespondenzen« sind. In der Sprache sind ganze Geschichtsstufen sedimentiert - sie ist das vollkommenste Archiv der unsinnlichen Ähnlichkeit. (Metscher, 2004, p.10)

<sup>140</sup> Metscher's book was published 2001 by Aisthesis Verlag, Bielefeld, and republished 2004 by transcript Verlag, Bielefeld. Year and pages numbers refer to the latter edition.

<sup>141</sup> 'Denken in Bewegung' translates to 'Thought in Motion'

concept still further, not only through transferring the forms onto the parts of the body, but through transferring the energy of the movement as well. The energy as the flow and the power of the movement is transferred to another part of the body, preserved, and continued from a different place. (Siegmund, 2004, p.53, my translation)<sup>142</sup>

Throughout his insightful essay Siegmund analyses the many techniques of transferences that Forsythe employs to explore non-sensuous similitudes of philosophical, mathematical, architectural and artistic nature. Forsythe continues and explores an artistic practice, which had been advocated by pioneers such as Halprin, Cunningham, Dunn, and subsequently the Judson Church Theatre group members. A fine example of ‘mimesis of thought’, or ‘non-sensuous correspondences’, is the transfer of principles and compositional elements from Minimalism/Fine Arts to Choreography that Yvonne Rainer (1968) suggests:

Table 4  
*Transfer of Principles by Yvonne Rainer*

<b>Objects</b>	<b>Dances</b>
<b>eliminate or minimize</b>	
1. role of artist's hand	phrasing
2. hierarchical relationship of parts	development and climax
3. texture	variation: rhythm, shape, dynamics
4. figure reference	character
5. illusionism	performance
6. complexity and detail	variety: phrases and the spatial field
7. monumentality	the virtuosic movement feat and the fully extended body

<sup>142</sup> So entspricht die Form eines angewinkelten Armes, der nach oben gehalten wird, der gleichen Form des linken Armes, der nach unten gehalten wird. Die Linie zwischen Unter- und Oberkörper dient hier als Spiegelachse für die Bewegungsform. Darüber hinaus weitet Forsythe das Konzept noch aus, indem er nicht nur die Formen auf die Körperpartien überträgt, sondern auch auf die Energie der Bewegung. Die Energie als Fluss und Kraft der Bewegung wird auf eine andere Körperpartie übertragen, erhalten und von einem anderen Ort aus fortgesetzt. (Siegmund, 2004, p.53)

<b>substitute</b>	
1. factory fabrication	energy quality and 'found' movement
2. unitary forms, modules	equality of parts
3. uninterrupted surface	repetition of discrete events
4. nonreferential forms	neutral performance
5. literalness	task or tasklike activity
6. simplicity	singular action, event, or tone
7. human scale	human scale

The introduction of 'found' (or pedestrian) movement, repetition, neutral performance of task (like) activities, simplicity and equality in movement and compositional structures, were expanding the choreographic materials and methods, particularly characterizing the movement research of the Judson Church Theatre group members (Rainer, 1968, 2002). In Rainer's as in Forsythe's case 'mimesis of thought', or transfer of principles and concepts, is used as a generative technique to expand their respective compositional 'toolkit'.

## **6. Generative techniques**

### **6.1 What do we generate?**

From both examples presented above, Yvonne Rainer's and William Forsythe's conceptual approaches to choreography, it becomes clear that generative techniques can be employed at all stages of the creative process to a greater or lesser degree. To discuss in more detail, which generative techniques we have explored at what stages of the creative process, we would like to recall the model we suggested in chapter two (4.3):

Development Cycle in Digital (Live) Performance

*Creation Cycle*

- 1\_ Artistic concept: research and training
- 2\_ Creating material
- 3\_ Designing strategies for interaction

4\_Performance dramaturgy: developing micro- and macro-structures for the performance of the work

*Iteration Cycle*

5\_Documentation of the work

6\_Re-staging or recreating a work

Looking at the stages of the development cycle, we see that different generative techniques are necessary to produce the respective results:

1. Ideas and methods
2. Material (or content)
3. Structures at different scales (or form).

Ideas (artistic concept of the project) and methods are typically generated in phase one of the creation cycle; movement and media exploration at stage two provide the (raw) material; and micro- and macro-structures are generated at stage four of the creation cycle. Naturally none of these stage is disconnected or isolated from the other phases, nor do they necessarily succeed one another; rather should they be regarded an interconnected network of constituent components of the creative process. Zuniga-Shaw and Lewis's diagram is very helpful in visualizing the complexity of the creative process:

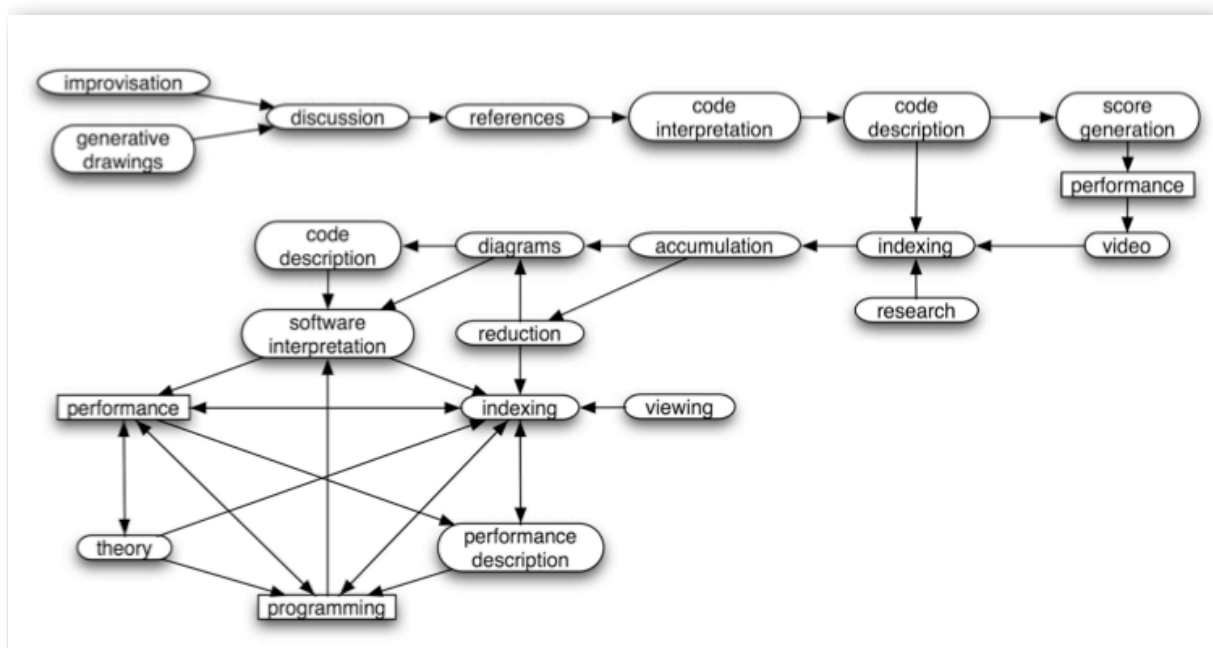


Figure 17. Zuniga-Shaw & Lewis: Indexing and Evolving Lexicons as Collaborative Methods



We use the concept of development cycle therefore as a tool for analysis and task designing, rather than an adequate model of the complex process in the studio. Certainly it has not gone unnoticed that stage three (designing strategies for interaction) was excluded from our discussion of generative techniques. One reason is the insignificant use of generative techniques at this particular moment of the process. For the most part digital artists plan their interactive strategies quite carefully to allow for the generation of content and/or structure to occur in surprising and interesting ways. Another reason is quite simply that we have dedicated chapter four to the design of strategies in specific and diverse interactive situations.

## **6.2 How do we generate ideas, material and structures?**

### **6.2.1 Ideas and methods**

In chapter two (4.2 and 4.3) we have suggested that one of the most powerful tools for the generation of artistic ideas is the careful design of research questions. Design consultant and creativity trainer Mario Pricken's *KickStart catalogue* (of over two hundred questions stimulating artistic research) was presented as an exemplary methodology, which Pricken has extended into other disciplines (see *Visual Creativity*, 2004) and complemented with a set of hundred cards for creative sessions. In the booklet accompanying the card set Pricken writes:

If you decide to really get involved with this playful tool for creativity, you are on your way to demystify the myth of creativity and perceive advertising for what it is: creatively designed communication, which typically follows replicable patterns.

You can test this provocative affirmation yourself: choose a few excellent works from any given advertisement festival that you perceive as captivating, successful and appealing. Take a few moments to find out, whether you recognize the basic pattern of this idea in our set of KickStart cards. (Pricken, booklet of *Creative Sessions Cards*, my translation)<sup>143</sup>

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<sup>143</sup> Sollten Sie sich ernsthaft auf dieses spielerische Kreativ-Tool einlassen, sind Sie auf dem besten Weg, den Mythos Kreativität ein wenig zu entzaubern und Werbung als das zu erkennen, was sie ist: Kreativ gestaltete Kommunikation, die überwiegend nachvollziehbaren Mustern folgt. Diese provokante Behauptung können Sie selbst überprüfen: Wählen Sie ein paar ausgezeichnete Arbeiten eines x-beliebigen Werbefestivals, die Sie als spannend, erfolgreich oder überzeugend empfinden. Nun nehmen Sie sich ein wenig Zeit, um herauszufinden, ob Sie die Grundmuster dieser Idee in den Kribbeln-Karten wiederfinden.

It is intriguing how Pricken here describes what we could term ‘non-sensuous correspondences’ underlying most advertising campaigns, and beyond, most visual communication. Most importantly, Pricken goes a step further, and provides two relevant tools for artistic practice: derived from his ontology of advertising campaigns, he offers his *KickStart catalogue*, a compilation of principles stimulating one’s own design of production rules; and second, a practical tool (the set of cards), which helps to generate ideas through *exploration, concretization and combination* of the principles.

William Forsythe’s CD-ROM *Improvisation Technologies* is a much more modest undertaking (in terms of scope and methodology of his system), but had a strong impact in the dance community because of the unusual openness about his creative process, its excellent multimedia design and pioneering role as a ‘digital dance school’. Like Pricken’s system, it builds on a ‘generative index’ (to borrow Zuniga-Shaw’s term) identifying and categorizing the movement principles central to his artistic project, provides forms of visualizing them (video lectures and filmed examples danced by the company members overlaid with graphic commentary), and stimulates one’s own exploration and application of these techniques.

At a higher degree of abstraction we suggest that there are two main generative strategies that have been successfully used and applied to the most diverse individual artistic processes:

1. Indexes, glossaries, or lexica of terms and principles relevant to the respective work; which have both, a documenting and a generative dimension. In a subsequent step to the compilation of the indexes, ideas are generated by exploring and concretizing the terms and principles, and by *conceptual combination*. For the generation of ideas and methods physical tools (such as the set of cards, scores, etc.) and digital tools (such as a software application) are frequently used. These tools build on the indexes compiled previously.
2. Mimesis of thought, or transfer from one to another discipline are useful to generate new, or develop existing techniques, methods, or principles. Indexes or glossaries are also helpful for this second strategy.

In conclusion, the main strategies we identified are *conceptual combination* and *conceptual transfer* of principles and methods, and both strategies benefit greatly from the compilation of glossaries or indexes of terms relevant to the particular artistic project.

### 6.2.2 Material

In Digital (Live) Performance contexts, generating material (or content) implies exploration and creation of movement and of media, particularly, where interactive systems are involved. Regarding movement exploration and the creation of movement material three forms of generative strategies can be distinguished: the devising process, rule-based improvisation and composition, and recursive modes of working (the latter is referring to transfer between different disciplines).

Jo Butterworth (2009) describes the (dance) devising process as follows:

Essentially ‘dance devising’ involves the dialectic between the acts of making and doing, of creating and performing, and of being an artist and/or interpreter. By implication, the roles and responsibilities are shared. Perhaps by collaborative methods, or through collective decision-making processes, the creation of dance as art is attempted by more than one artist. (Butterworth, 2009, p. 189)

Result of her doctoral thesis, Butterworth presents her *Didactic-Democratic spectrum model*, which lists five generic choreographic processes with different form of collaboration and devising techniques:

Table 6

*Jo Butterworth, Didactic-Democratic spectrum model*

Process 1	Process 2	Process 3	Process 4	Process 5
<b>Choreographer role:</b> Choreographer as expert	Choreographer as author	Choreographer as pilot	Choreographer as facilitator	Choreographer as collaborator
<b>Dancer role:</b> Dancer as instrument	Dancer as interpreter	Dancer as contributor	Dancer as creator	Dancer as co-owner

Process 1	Process 2	Process 3	Process 4	Process 5
<b>Choreographer skills:</b> Control of concept, style, content, structure and interpretation. Generation of all material.	Control of concept, style, content, structure and interpretation in relation to capabilities/ qualities of dancers.	Initiate concept, able to direct, set and develop tasks through improvisation or imagery, shape the material that ensues.	Provide leadership, negotiate process, intention, concept. Contribute methods to provide stimulus, facilitate process from content generation to macro-structure.	Share with others research, negotiation and decision-making about concept, intention and style, develop/ share/adapt dance content and structures of the work.
<b>Dancer skills: convergent:</b> imitation, replication.	Convergent: imitation, replication, interpretation.	Divergent: replication, content development, content creation (improvisation and responding to tasks).	Divergent: content creation and development (improvisation and responding to tasks).	Divergent: content creation and development (improvisation, setting and responding to tasks, shared decision-making on aspects of intention and structure.
<b>Social interaction:</b> passive but receptive, can be impersonal.	Separate activities, but receptive, with personal performance qualities stressed.	Active participation from both parties, interpersonal relationship.	Generally interactive.	Interactive across group.
<b>Teaching methods:</b> Authoritarian.	Directorial.	Leading, guiding.	Nurturing, mentoring.	Shared authorship.
<b>Learning approaches:</b> Conform, receive and process instruction.	Receive and process instruction and utilize own experience as performer.	Respond to tasks, contribute to guided discovery, replicate material from others, etc.	Respond to tasks, problem-solve, contribute to guided discovery, actively participate.	Experiential. Contribute fully to concept, dance content, form, style, process, discovery.

While the generation of all material in processes one and two are tasks for the choreographer in his respective roles as expert or as author, the dancer starts to be a

contributor, creator or co-owner from process three on. Process three, four and five include content development and creation based on improvisation and responding to tasks, which is congruent with the generative processes in the second phase of the development cycle in Digital (Live) Performance that we presented above.

We might add, that our second strategy for generating (movement) material emphasizes the rule-based improvisation and composition as a generative technique, because this denomination allows for structural correspondences with other rule-based systems in Digital (Live) Performance, for example the algorithms that characterize the behavior of interactive systems.

Our third strategy for movement material generation, the recursive mode of working, alludes to the transfer of principles, methods and ideas from one artistic discipline to another within a Digital (Live) Performance project. The Zuniga-Shaw and Lewis diagram in figure 17 for example displays a recursive mode of working as a bi-directional flow between programming and software interpretation, indexing and performance, or theory and performance. In our case study in the next section of this chapter we will come back to this specific concept.

### **6.2.3 Structure**

We distinguish between micro and macro structures at the fourth stage of the development cycle in Digital (Live) Performance. Micro structures organize movement and media material spatially and in time, contain information about the performance quality, and determine the arrangement of smaller units into sequences. Macro structures serve as a compositional framework for micro structures. Even in highly improvisational settings they represent the rules established beforehand, the cues that were decided upon, and the interrelationships between the various micro structures and media. Macro structures contain information about the relation between elements that might be generated, they are less frequently generated themselves. In the example of Manovich and Karatky's *Soft Cinema*, macro structures work as follows:

While filmmakers such as Peter Greenaway and Mike Figgis have already used a multi-screen format for fiction films, thinking about the visual conventions of Graphical User Interface as used in computer culture gives us a different way to do macro-

cinema. If a computer user employs windows of different proportions and sizes, why not adopt the similar aesthetics for cinema? In *Soft Cinema*, the generation of each video begins with the computer program semi-randomly breaking the screen into a number of square regions of different dimensions. During the playback different clips are assigned to different regions. In this way, software determines both temporal and spatial organization of a work, i.e. both sequencing of clips and their composition.<sup>144</sup>

In this example the clips and audio tracks represent the micro structure (database) of *Soft Cinema*, whereas the ‘algorithmic editing’ and creation of the ‘database narrative’ represent the information contained by the macro structure. Put in less contemporary terms, the macro structure of a traditional performance would contain scenes, acts, and the overall coordination of the performance elements, such as the set, light design, sound, etc. Often macro structure information is stored in (physical or digital) cue sheets, which is a derivative from a complete score composed of structural and technical information allowing for the coordination of the several strands. We will explore some of these ideas in our second case study presented in this chapter.

## 7. Case Studies

### 7.1 Background: the *TeDance* Project

During 2006 and 2007 the Technical University of Lisbon/FMH hosted and organized the *TeDance* (Technologically Expanded Dance) Project in collaboration with a variety of other academic institutions, artistic research centers and theaters in Portugal. The project provided opportunities for research in the fields of Contemporary Dance, Motion Capture, Animation, Augmented Reality, Computer Vision, Engineering and Programming.

My participation as a choreographer and movement researcher in the *TeDance* project aimed at developing creative strategies for Motion Capture sessions and Computer Vision setups, as well as developing generative techniques for the use of motion capture and motion tracking data in the process of creation and performance.

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<sup>144</sup> <http://softcinema.net/form.htm> accessed January 2011

Artistic residencies at CENTA (Center for Experimentation and New Tendencies in the Arts) in July 2006, and the Teatro Aveirense in April 2007, provided opportunities to join visual and media artists, musicians, dancers, performers, choreographers, engineers and programmers allowing for collaborative experimentation. Research was conducted in a series of specific workshops, and outcomes were shared and discussed between participants and visiting guests. Parallel to the workshop program our own artistic work was developed and presented as work-in-progress at Teatro Aveirense and at the international *TeDance* Conference in Lisbon in November 2007.

The concepts of the 'generative score' and the 'living archive' were central to our choreographic research within the *TeDance* (Technologically Expanded Dance) Project. During the two years of *TeDance* in 2006/07 we looked into the possibilities of developing creative strategies for Motion Capture sessions and Computer Vision setups, as well as developing generative techniques for the use of motion capture and motion tracking data in the choreographic creative process.

Working with these technologies we felt that the holistic approach described above might allow us to best contribute to the development of transdisciplinary methodology in the field of technologically expanded life performance. Consequently we focused on the interplay of (Motion Capture and Computer Vision) technology, archive, user (groups), specific working conditions and objectives.

## **7.2 First case study: artistic laboratory at CENTA**

During the artistic residence held in July 2006 at CENTA we experimented with motion capture files, which were imported to *Poser 5*. This character animation software was interesting to work with because of its intuitive interface, varying forms of visualization of the animated figure, and, interestingly, because of its limitations and 'errors' (e.g. humanly impossible movement due to the interpolation of poses). Researchers and artists of the *TeDance* team were participating in a movement laboratory, consisting of daily workshop sessions investigating the transfer of concepts, principles and methodologies with the focus of generating new creative strategies.

In one of the workshops participants were asked to learn the (ballet) movement of an animated figure (we had imported a motion capture file into *Poser*). Only the arm of the figure was made visible, and participants were challenged to complement the learned sequence of the arm's movement using the rest of their bodies through improvisation.

After showing their movement studies to each other, the original movement data was revealed. Participants reacted surprised, because they had not recognized the learned movement as 'ballet'.

Instead, everybody used different (dance) techniques in the process of learning the sequence, integrated the movement in their particular preexisting (trained) knowledge (Modern Dance, Ballet, Dance Theatre, Contact Improvisation, Yoga and Tai Chi), and applied different tools to generate the complementary movement: one dancer created a narrative based study (treating the arm as a character), another tried a duet using physical contact (imagining a complementary body partnered by the arm), yet another developed a solo investigating where the body weight of the arm could be in relation to the rest of the body.

Fernando Galrito, the animation specialist on the *TeDance* team, in turn was inspired by the idea of an isolated floating body part in space and asked a few dancers to work with him on a short pixilation film. The dancers were filmed frame by frame in gravity-defying positions, creating the illusion of floating along the floor, the walls or the ceiling of the studio. Watching the pixilation film, we asked ourselves, what (choreographic) technique would help to turn the filmic illusion into something physically possible?

Consequently the following workshop addressed the issue of embodying humanly impossible movement. The animation software *Poser* allows for the creation of a wide range of both physically possible and impossible poses, but the interpolations between the poses are somehow limited (though editable), and often produce distorted results.

We saved a series of poses from the (ballet) motion capture file from the day before and randomly connected them letting *Poser* create the transitions through interpolation.

The result was a fascinating, physically totally impossible sequence of new movements.



We enjoyed working with the distortions and physical impossible movement as stimuli for improvisation: how can a dancer 'fly' or defy gravity, how can you turn your head around 360° several times, how can you pass your arm through your own or someone else's body?

While 'flying' or gravity-defying movement of the virtual figure was resolved in partner or group work and led to interesting movement ideas, distorted virtual bodies 'unfolded' in three-dimensional space: a leg wound up like a screw could be interpreted as a quirky multiple turn on that leg.

The work inspired by the distorted virtual bodies expanded our view of what a satisfactory or interesting transition between poses could be, and so dancers were asked to create 'interpolations', or unlikely transitions between any two predefined poses.

Again, interesting resultant movement ideas were filmed, and selected frames were imported into *Poser* as a background picture for rotoscoping (i.e. the *Poser* figure was animated to match the dancers' poses on the photograph as closely as possible).

Finally those new poses were saved in *Poser's* library, so that they are available for future animations.

The possibilities that this *recursive mode of working*, or continuous bidirectional transfer provides, became obvious to everybody through these exercises: the saved poses from the library now would open up new possibilities for interpolation, and the virtual movement material could inspire further improvisation, which again could be filmed and rotoscoped.

Though it felt like we had just scratched the surface in our exploration of developing creative strategies using one particular motion capture data file, it had become very clear that the potential for the generation of (new) movement material was inextricably linked to the generation of working methods. It seemed we had tapped into another (living) archive: the reservoir of transdisciplinary compositional tools, which can be seen as a synergetic effect of the continued interdisciplinary dialogue.

### 7.3 Second case study: artistic laboratory at Teatro Aveireense

In preparation for the second *TeDance* residency at the Teatro Aveireense in the north of Portugal we used a more sophisticated software, *3D Studio Max*, which recently integrated *Character Studio*, a software for biped-animation.<sup>145</sup>

*Character Studio* allows, amongst many other possibilities, to mix several motion capture data files, which are mapped onto a figure and organized hierarchically. This way an arm movement of one file can be mixed with the torso of another file and the legs of yet another file. Possibilities are endless, as the speed also can be separately adjusted (for more information on *Character Studio* see also discussion in chapter two, 3.1).

We started to experiment with a commercially available motion capture data file package by *Stockmoves*, as it provided a variety of samples of different captured activities, such as sports, dance, and everyday activities organized by categories of movements (jump, fall, walk, slide, etc.). We were particularly interested in the possibilities that mixing motion from data files of very diverse origin could provide (a boxer's arm movement on a skater's lower body performing a ballerinas pirouette, etc.).

After experimenting extensively with a selection of twenty mocap files from different categories of movement, we came to the following conclusion: in our artistic perspective the most interesting mixtures of motion files did actually NOT result from a mixture of different forms of activity, but *within the same kind* of movement vocabulary.

In our perspective the characteristics of a particular movement vocabulary determine to a large extend, whether the mixing of motions makes any artistic sense.

It also became clear from these experiments that larger files containing several movement phrases, should be broken down into much smaller units for the sake of more specific experimentation in the motion mixer.

Golan Levin, Jonathan Feinberg and Cassidy Curtis have presented a collaborative work, which inspired our research: *Alphabet Synthesis Machine* (2001), an

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<sup>145</sup> *Character Studio* is identical with the *Motion Flow Editor* in *3D Studio Max*

'interactive online artwork, (...) which allows one to create and evolve the possible writing systems of one's own imaginary civilizations. The abstract alphabets produced with the software can be downloaded as TrueType fonts, and are entered into a comprehensive archive of user creations'.<sup>146</sup>

The idea of producing an 'imaginary (movement) alphabet' corresponded to the necessity we felt to break down movement phrases into smaller units, as we were looking into exploring the combinatory potential of fragments of mocap data files. We clearly were moving away from the concepts of 'movement phrases' and 'movement vocabulary' as we started to adopt terminology and methods commonly found in new media art practices.

Lev Manovich and Andreas Karatky's work *Soft Cinema* suggests the possibility of re-inventing media based on the development of new interfaces that make use of 'metadata' of media stored in a database. The database of *Soft Cinema* consists of a few hundred of video clips, which are 'metadated': keywords are assigned manually, or generated automatically through image processing software.

These keywords describe content (geographical location, people in the movie, etc.) and formal aspects (dominant color, dominant line orientation, contrast, camera movement, etc.).

Among several ideas that are explored in *Soft Cinema*, the concepts of 'algorithmic editing' and 'database narrative' were instrumental for our choreographic research. 'Algorithmic editing' here means that a program assembles the video track by selecting the clips according to algorithms, which represent compositional choices, for example: 'select the clip closest in color to the previous one'.

'Database narrative' describes the approach to start with a large archive of media and generate a potentially unlimited number of narratives from it, as opposed to working from a script.

During the second *TeDance* residence we investigated correspondences of these concepts and our choreographic research. To begin with we programmed an interactive particle system in the software application *Isadora*. Particles are objects, which are programmed to emerge in a certain point of origin on the screen, follow a

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<sup>146</sup> See <http://www.alphabetsynthesis.com/> accessed January 2011

motion path, or remain in a position, and disappear after a certain amount of time (life span).

Particles can be still images, moving images, or text. For our purposes we chose text fragments from William S. Burroughs's *The Electronic Revolution*. Ideas for the creation of an 'abstract movement alphabet' derived from this text, as well as the transference of parameters of a particle system (appear, disappear, point of origin, life span, acceleration, velocity, etc.) to the movement research.

In first phase each workshop participant (a group of performing arts students and professionals) created an abstract movement alphabet. In the next phase of the residence two exercises were introduced to experiment with the concept of 'algorithmic editing', which we interpreted as 'assembling material through the use of rules'.

Employing the idea of the motion mixer, every performer had to mix movement ideas to different degrees. In five defined areas of the stage the percentage of the mixes were determined in analogy to the motion mixer tool in *Character Studio*. The percentages were used to help the performer to divide the body into basic sections, and blend fragments of the original movement ideas in different combinations.

To our surprise this exercise was very successful. The mix of motions didn't represent a major difficulty for the performers, because they had invented the movement themselves, and, contrary to the software's (lack of) capacity, their bodies' intelligence helped them to organically combine the fragments in harmonious ways.

Experiments with the mix of movement ideas from different performers naturally turned out to be more difficult: movement had to be appropriated from the partner, and sometimes did not fit in the alphabet that had been developed.

A second exercise was based on a concept from Burroughs's *The Electronic Revolution*: 'a word is an image – a sequence of words are moving images'. A simple key was developed which allowed for correspondences of the movement alphabet and the written word, so that any word in a text could be 'translated' into movement. Again, assembling sequences of movement in this generative way was very

successful, as the repetition of movement ideas in different recognizable rhythmic and spatial patterns created the sensation of a visual text.

In a discussion following the session we addressed the difference between working with 'movement phrases' and assembling movement material 'algorithmically'. It was interesting that many participants felt that as they were watching their peers perform they could make perfect sense of the assembled material.

During the final sessions of the residence we experimented exploring simple interactive particle systems programmed in *Isadora*. Text fragments and single words from *The Electronic Revolution* were generated according to the performers' position, movement acceleration and size relatively to the camera, which served to track the movement based on the contrast of the performers' white silhouette (white clothes) against the black background.

A few descriptions of the respective movement material and the particle systems (acceleration, direction, position or origin, size) served as 'metadata' to generate aesthetically coherent combinations of performers/movement material and particle systems.

Reflecting about the second *TeDance* residence, we felt that sharing an understanding between similar creative processes in contemporary dance and new media art provided us with interesting concepts and ideas for practical experimentation, which often resulted in expanding existing working methods rather than introducing radically new approaches.

We suggest that generative techniques in both artistic areas lend themselves to such a shared understanding of the creative process using interactive technology in live performances. Exchange, comparison and transfer of working methodologies, principles and (compositional) elements can generate new specific vocabularies and procedural inventions, as we experienced during the *TeDance* residencies.

We see from the table below that the correspondences between the programming of generative software and the use of generative techniques in choreography can be established during different phases of the artistic work (see development cycle, 6.1).

Table 5

*Correspondences between the programming of generative software and the use of generative techniques in choreography*

<b>Generative software program</b>	<b>Generative techniques in choreography</b>
Database	<p>Set movement material in performance, which was generated at stage two of the development cycle (DC)</p> <p>Generate movement material in performance (stage five of DC)</p>
Metadata	<p>Descriptions of movement material are generated in creation the process to organize the material (stage four of DC)</p> <p>Descriptions are used to generate movement material in performance (stage five of DC)</p>
Algorithmic Editing	<p>(Compositional) rules are developed to process movement material (stage four of DC); there is a set structure of rules used during the performance (stage five of DC)</p> <p>(Compositional) rules are navigated and applied during performance (stage five of DC)</p>
Options for interaction	<p>Generating movement material with the aim to create certain visual effects (stage three of DC)</p> <p>Set movement material as input to interactive system (stage three of DC)</p> <p>Navigating compositional rules to work with movement material according to visual cues in performance (stage five of DC)</p>

Interestingly, from the audiences point of view there may not exist the slightest hint of generative elements within a work, when the performance is highly structured and all parameters clearly defined (see Troika model above).

However, the performer on the other hand may feel constantly 'on the edge': the 'instant composition' within an interactive system requires multitasking, as the performer is navigating the matrixes of movement possibilities he has simultaneously

make decisions as a visual artist (see the discussion of Lampert's model of improvisation above).

In working with interactive particle systems we consequently found the complexity of generative possibilities increasing. The performers at the residency tended to shift between working from their personal movement database, and a direct exploration of a specific particle system: which movement causes what kind of visual effect? Some of the movement generated to create a specific visual event was not in itself satisfying or meaningful to the performer, choreographer or audience, but perfectly valid as part of an interactive system explored in live performance.

These shifts between (and temporal layering of) different working methodologies reminded us of Kenneth King's term *processing choreography*, which describes the performance of dance works that make it possible for us to see 'the dancer's awareness, intelligence and spontaneity allowed to function on stage'.

#### **7.4 Reflection**

In summary, generative techniques are often employed in fluid models of collaboration between choreographers, performers and media artists in Digital (Live) Performance situations.

We introduced the concepts of 'instant composition', 'generative score' and 'living archive' referencing the work of some eminent artists working in this field, in order to prepare movement laboratories as part of two artistic residencies within the *TeDance* Project.

The first laboratory at CENTA aimed at testing the possibilities of Motion Capture data files, perceived as living archives, and developed transdisciplinary working tools between choreography and character animation. A second movement laboratory at Teatro Aveirense investigated correspondences between concepts and working methods in new media arts and choreography. The ideas of 'abstract movement alphabets', 'database narratives' and 'algorithmic editing' were tested in an interactive computer-vision environment.

We confirmed that the holistic collaborative approach toward the conception and application of (digital) technology for the creative process and live performance not

only expands choreographic resources through the provision of hardware and software tools, but more importantly, challenges existing notions and methods of contemporary choreography. There is still a great potential in the correspondences between different artistic visions and working methodologies to be discovered in order to design new creative strategies.

We would like to highlight two aspects worthy of future research, which evolved from our investigation: the fluid models of collaboration in these kind of interdisciplinary teams; and the variety of possible forms of interactivity in digital (live) performance. We share the view of many choreographers and media artists working in the field of digital (live) performance that we are still in the beginnings of exploring the full potential that transdisciplinary working methodology offers, and hope to contribute with this research on generative techniques for the creation of ideas and methods, movement material and generative structures for live performance.



# Chapter Four: Interactive Situations in HCI contexts

## 1. Chapter Introduction

This chapter is dedicated to the exploration of our methodology in the field of interactive situations in HCI contexts in Digital (Live) Performance. As an introduction to this popular field in Digital (Live) Performance, we distinguish between different forms of interactive situations and systems. In the following we draw on existing substantial theorization to examine relevant notions of the term interaction and interactivity, as well as taxonomies and classifications of interactivity in Digital (Live) Performance. Subsequently we introduce our own classification of eight categories of interactive situations in HCI contexts, and discuss examples of well-known artists and practitioners.

The chapter concludes with a case study, which examines the design of creative strategies within the eight categories of interactive situations in great detail. To this end six scenes from the award-winning Digital (Live) Performance *.txt* (2006-2009) by Fernando Nabais, Fernando Galrito and Stephan Jürgens have been selected, which can be consulted on the DVD accompanying this dissertation.

## 2. Notions of Interactivity

So much has been recently written on ‘interactivity’ that we don’t see any necessity to contribute yet another definition or model. Even in the emerging field of Digital (Live) Performance substantial theorization of this important concept has been put forward by authors such as Dixon, Rubidge, Birringer, Popat and others, which allows us to limit ourselves to outlining a few basic and consensual ideas. Furthermore, by distinguishing the elementary forms of interactive situations, and narrowing down the discussion to the particular categories of interactive systems used in Digital (Live) Performance, we wish to contribute with our discussion of designing creative strategies for interactive situations from a different angle: rather than taking the technical features of a particular interactive system as a point of departure, we suggest eight categories of common artistic strategies, which can be combined and employed in a single piece using a single or several interactive system(s). Thus our

focus will be on specific working methods within these categories, and shall be exemplified and discussed by means of our case study.

## 2.1 Interaction and Interactivity

In his frequently cited article on 'interactivity' Jens F. Jensen provides a thorough survey of theories about the concept within the fields of sociology, communication studies and computer sciences or informatics. Commenting on the background of the concept, Jensen writes:

As Michael Jäckel (1995), among others, has pointed out, the concept 'interactivity' extends - perhaps not surprisingly - from the concept of 'interaction'. A concept which generally means: 'exchange', 'interplay', 'mutual influence'.

However, if we focus on individual fields of scholarship, the concept takes on many, very different meanings. In medical science, 'interaction' describes the interplay between two medications given at the same time. In engineering, 'interaction' refers to the relationship between, and actions of, two different materials under stress. In statistics, 'interaction' represents the common effect of several variables on an independent variable. In linguistics, it refers to the influence on language behavior of bi-lingual children (Jäckel 1995). In other words, the meaning of the concept 'interaction' depends on the context in which it is used. Concepts are called *multi-discursive* 'when they can be found with significantly different meanings or connotations according to their use within different discourses' and thus 'depend to a very large extent on their context for their meaning to be clear' (O'Sullivan 1994: 190). 'Interaction can certainly be said to be a multi-discursive concept. (Jensen, 1997, 1999, p. 165)

Naturally 'interactivity' as extending from 'interaction' can be said to be a *multi-discursive concept*, similar to the notions of 'digital' and 'performance' that we discussed in chapter two. Jensen goes on to examine the use of the term 'interaction' in sociology, communication and media studies to arrive at the informatic conception. His conclusion (that different contexts give rise to different meanings and usages of the term) is consensual and shared by other authors, such as Wilson (2002), and Dinkla (1997). We have mentioned earlier in this chapter, that the main

differences between sociological and informatic definitions reflect the type of interaction in question (human-machine versus computer mediated communication). Next, Jensen discusses different theorist's efforts to define 'interactivity as criteria', and concludes that several approaches share the tendency "to exclude various media which are considered interactive and an inability to use the definition to differentiate between various forms and levels of interactivity, etc".<sup>147</sup> Contrary to these approaches, he builds his own model, a cube of interactivity, on the conception of interactivity as continuum with multiple dimensions. After presenting a variety of important theories and models ranging from one to numerous dimensions, Jensen gives his own definition and proposes four main dimensions:

(...) interactivity may be defined as: *a measure of a media's potential ability to let the user exert an influence on the content and/or form of the mediated communication.* This concept of interactivity can be divided up into four sub-concepts or dimensions which could be called:

1. *Transmissional interactivity* - a measure of a media's potential ability to let the user choose from a continuous stream of information in a one way media system without a return channel and therefore without a possibility for making requests (e.g. teletext, near-video-on-demand, be-your-own-editor, multi-channel systems datacasting, multicasting).
2. *Consultational interactivity* - a measure of a media's potential ability to let the user choose, by request, from an existing selection of pre-produced information in a two-way media system with a return channel (video on demand, on-line information services, CD-ROM encyclopedias, FTP, WWW, Gopher, etc.)
3. *Conversational interactivity* - a measure of a media's potential ability to let the user produce and input his/her own information in a two-way media system, be it stored or in real time (video conferencing systems, news groups, e-mail, mailing lists, etc.).
4. *Registrational interactivity* - a measure of a media's potential ability to register information from and thereby also adapt and/or respond to a given user's needs and

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<sup>147</sup> Ibid. p. 172

actions, whether they be the user's explicit choice of communication method or the system's built-in ability to automatically 'sense' and adapt (surveillance systems, intelligent agents, intelligent guides or intelligent interfaces, etc.).<sup>148</sup>

In a final step Jensen integrates these four sub-concepts in a three dimensional graphic cube (transmissional and consultational interactivity are represented along the x-axis of the model as they both can be seen as a selective form of interactivity. Within this 'cube of interactivity' 12 different types of interactive media are placed so that their main interactive characteristics can be visualized.

While the cube's readability seems not clear to us regarding (our) habitual expectations of a scaling from lesser to more interactivity of the respective kind along the x, y and z-axis of the model, Jensen's categorization presented above provides a useful framework to discuss the type of interactive systems and media employed in the context of a digital (live) performance.

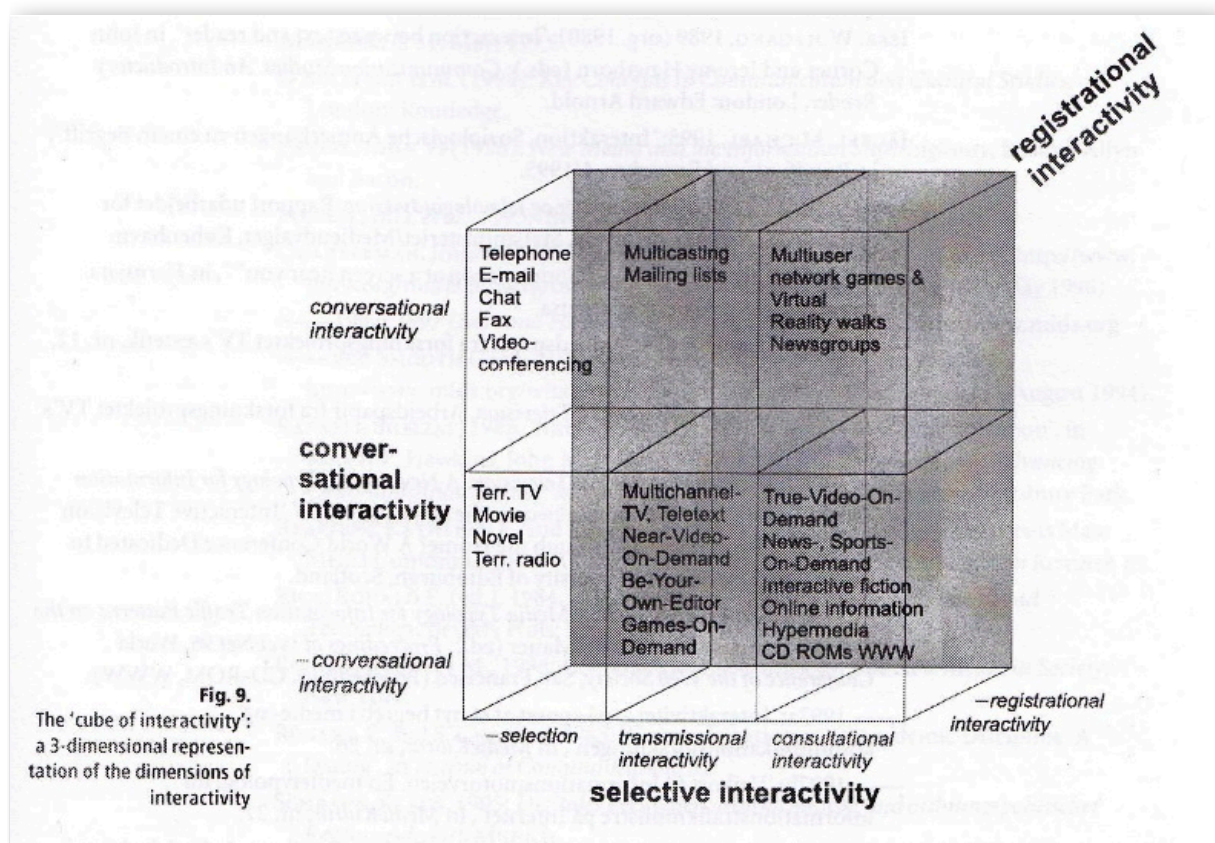


Figure 18. Jensen's Cube of Interactivity

<sup>148</sup> Ibid. p. 183

Furthermore, Jensen's categories show very clearly why interactivity needs to be examined considering diverse and apparently contradictory concepts of interactivity to cover the entire range of interactive media and systems available today. While the first two forms of interactivity are solely acceptable as 'interactive' in the light of informatic concepts, the latter two categories would be difficult to include, if the paradigm of real-time interaction central to the informatic concepts were predominant. Here, the sociological concepts are more influential, which doesn't surprise if we consider that Jensen wrote his article in 1997, and today's Web 2.0 technologies (such as blogs, social networks, or interactive information sharing sites, etc.) need to be included. Still, while Jensen's survey provides a very solid and illuminating overview of theories addressing the issue of 'interactivity', his concepts do not entirely serve for the field of Digital (Live) Performance, because neither the specific situation of (live) performance is contemplated, nor are interactive systems in this context adequately describable in Jensen's terms only.

## **2.2 HCI and CMC interactive situations**

The terms HCI (human-computer interaction) and CMC (computer-mediated communication) provide a simple yet most helpful distinction of the elementary forms of interactive situations in Digital (Live) Performance. Human-computer interaction implies man-machine interaction, and historically roots in a concept of interaction constructed in the context of informatics and computer sciences. Here, interaction describes the functions, degree and forms of control that can be exerted over the performance of programs processing (large) amounts of data. Consequently the informatic concept of interaction does not necessarily imply communication. Computer-mediated communication on the contrary refers to human to human communication mediated by machines. Asynchronous (as in writing an email) or in real-time (as in participating in a video conference call), CMC generally obeys to the rules of human communication. In discussing CMC interactive situations, both informatic conceptions as well as sociological definitions of interaction are useful. The latter describe 'interaction' as a reciprocal relationship between two or more people, and therefore accurately describe CMC situations, whilst the same concept may not be apt in HCI contexts. Accordingly, we have dedicated this chapter to

exploring working methods within the eight suggested categories of interactivity in HCI contexts.

Another reason for adopting this perspective is the fact that CMC makes use of the human-machine interface, too. Examining the potential of HCI settings in Digital (Live) Performance allows us therefore to understand CMC contexts quickly, whereas the opposite does not hold true. CMC technology is mostly available through use of the Internet (email, user groups and social networks, chat rooms with video conferencing capabilities), and requires a low learning curve in comparison to the use of frequently custom-built hardware and software in HCI contexts within Digital (Live) Performance.

### **2.3 Classifications of interactive work**

Sarah Rubidge (2000) draws on Simon Penny to establish four categories of interactive work:

1. Screen-based hypertextual or hypermedia works; exemplified by art works presented on CD-ROM, or on the internet
2. Instrumented architectural space (or electronic sensitised spaces); exemplified by large-scale installation/performance environments
3. Mapped virtual and real environments; which include works constructed using 'virtual reality' technology and some electronically sensitised spaces
4. Interactive telepresence and interactive internet environments; which produce works in which the interactor and subject of the interaction are on different sites (Penny 1996, cited in Rubidge 2000, p. 154)

While Rubidge uses these categorizations as a framework for discussion in the context of her thesis, she calls attention that

The adequacy of these categories is open to question. They are not exhaustive, and frequently overlap. For example, hypermedia works are presented in the context of mapped virtual and real environments as well as on computer monitors. 'Screen-based works' are not confined to computer monitors, but may constitute part of an

electronically sensitised space. Mapped virtual and Instrumental Architectural Spaces could be said to overlap.<sup>149</sup>

These basic categories of interactive artwork are useful for our investigation, too, in that they allow for delineation of the work we will discuss in this chapter (first and second category). However, we will not consider work employing virtual reality technology (third category), or interactive telepresence and internet environments (fourth category). In our perspective Penny's categories also reinforce the distinction between HCI and CMC contexts for Digital (Live) Performance, even though there are certainly examples of mixed forms within a single art work.

Regarding interactive systems, Johannes Birringer (2008) has recently proposed distinctions that characterize several types of Digital (Live) Performance environments based on an ecological understanding. Birringer writes:

Dance has always been a live expressive organism, based on a fundamental physical-sensory relationship to space and the world, to perception/cognition, and to subjectivity, if we retain an anthropocentric perspective. From a biocentric perspective, 'movement' can be studied in many diverse species and geographies of the world, and these performance worlds inform the natural/cultural environments of human dance practice. (...)

Digital dancing, decidedly not posthuman, has nothing to do with the synthetic 'engineering' of steps or movement phrases, or with copying the motion of figure animation (as Merce Cunningham appeared to do when he used the LifeForms software as inspiration for his recent choreography), but everything with the overall physical behavior of the system. Movement bridges organic and inorganic forms, it evolves as a coupling with technically expanded virtual domains. Contrary to the assumption of disembodiment often associated with VR and telematics, the interactive coupling always involves sensory synthesis in an expanded biofeedback system. It is the convergence of movement with the hyperplasticity of space enabled by multimedia interactivity in real-time processing that I define as an interactive environment. (Biringger 2008, p. 120-121)

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<sup>149</sup> Ibid. p. 155

In bringing movement as the shared dimension of physical and virtual worlds to focus, Birringer arrives at establishing the following distinctions of Digital (Live) Performance environments:

1. *interactive environments* (based on sensors or motion tracking and real-time processing, and a dynamically evolving dialectic between artificial ecosystem and human agents);
2. *derived environments* (motion-capture based re-animations of bodily movement, or liquid architectures which can also be networked and reintroduced into live telepresence or telerobotic communications between remote sites);
3. *immersive environments* (Virtual Reality based, e.g. the 'Cave' or panoramic installations that integrate the user, via stereoscopic devices, into the polysensual illusion of moving through the space);
4. *networked environments* (telepresence, telerobotics, and online collaborative multi-user platforms allowing users to experience dispersed bodies or actions and to interact with traces of other remote bodies, avatars, and prostheses).
5. *mixed reality environments* (interplay of live and prerecorded audio/video, mixing and combining the parameters of the previously mentioned environment types for performers or users).<sup>150</sup>

Birringer's conception of interactive (performance) systems as ecological systems, in which organic and inorganic forms coexists, and their movement "evolves as a coupling with technically expanded virtual domains" shifts the focus from disembodiment discussions and interface analysis towards a more holistic understanding of the performance space as a programmable environment. Here movement material is 'programmed' and 'processed', media 'choreographed', source code 'performed', and physical performance techniques are developed to inhabit the digital 'ecosystem'.

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<sup>150</sup> Ibid. p. 118



However, though the overall conception is very useful in establishing a framework for discussion of designing strategies for interactive situations, we feel that Birringer's proposed categories cannot be easily adapted in the context of this investigation. If 'derived environments' are included in this list of interactive systems solely by virtue of their use within networked and /or telepresent settings, they merely constitute a particular form of the fourth category ('networked environments'), and should not be introduced in their own right. If, on the other hand 'derived environments' are not an integral part of a larger 'networked environment', the question arises as to why they form a category under the heading of interactive systems. Certainly 'derived environments' could also be interactive, if combined or integrated in the first category (interactive sensor-based systems), or the fifth category ('mixed reality environments'). But still there would be no justification for a category in its own right. Reducing Birringer's description of 'derived environments' just to 'motion-capture based re-animations of bodily movement, or liquid architectures', opens up interesting discussion of another paradigm in the discussion of interactive systems: does such a system have to be processing data or information *in real-time*? If we consider HCI contexts, the answer would be clearly 'yes', as informatic definitions stress real-time response capacity of the machine as a key feature of interaction and interactivity. CMC contexts on the contrary may operate in real-time (video-conferencing for example), but just as often employ asynchronous forms of interaction (email or social networks for instance).

In accordance with Birringer's description of the characteristics of a 'derived environment' the audience or user of such an environment might perceive an asynchronous form of interactivity, in other words, s/he might recognize the movement qualities of the motion-captured performer in the 're-animation or liquid architecture' that is presented. It is in this latter perspective that we consider 'derived environments' as an important category of digital ecosystems, even though it was most probably not suggested in this sense.



Figure 19. BIPED (1999) by Merce Cunningham

Interestingly one could refer Merce Cunningham's *BIPED* as probably the most well-known example for a 'derived environment', as it fits Birringer's description perfectly: Kaiser and Eshkar's re-animations of the motion-captured movement of Cunningham's dancers are sometimes complemented by liquid architectures, which at times provide entrances and exits in the virtual domain. Curiously, in this particular example, the original motion-captured sequences have been 'synthetically engineered' by Cunningham and the collaborating programmers and digital artists, as we have discussed in detail in chapter two (3.1). This seems to suggest that Cunningham's working methods, and for that matter, anyone else's who employs 3D figure animation software in their choreographic processes, should not be excluded from the category of 'derived environments'.

Another thought provoking example are Trisha Brown's 'offline-performances' of *how long does the subject linger on the edge of the volume...* According to Birringer (2008) Brown experienced difficulties in touring with the entire real-time motion capture system, and performed the work in Paris, London and New York playing back Downie's celebrated 'thinking images' from a DVD, which in Birringer's view, defeated the interactive purpose.

In other words, Downie's *intelligent agents*, epitome of the most sophisticated interactive systems for live performance today, were experienced by these audiences

as 'liquid architectures', a form of 'derived environments'. More precisely, Downie's *intelligent agents* were experienced *in an asynchronous mode of interactivity*. Whether their experience was less exciting than the audience at the Monaco Dance Festival is impossible to tell, but this example clearly raises the question of what interactive systems in digital (live) performance mean to an audience witnessing professional performers engaging with them. Beyond the category of 'derived environments' we also need to examine forms of interactivity, which (from an audience's point of view) could be termed 'perceived' interactivity (where in fact the spectator considers performative actions to be considered when they are not created or intended), and 'illusionary' interactivity (when the false impression of interactivity is created purposefully with or without the audience being aware of the illusion). To better discuss these inquiries we shall now turn to reviewing some influential concepts of interactivity.

#### **2.4 Categories of interactivity in Digital (Live) Performance**

Steve Dixon (2007) has recently proposed four categories or levels of interactivity, which clearly resemble Jensen's categories presented above: navigation, participation, conversation and collaboration. *Navigation* in Dixon's view means basically to browse and select content provided through diverse media formats. Regarding live performances, Dixon exemplifies that the audience "assist the navigation of live performances", such as an actor assembling the unique narrative of each performance from a database of seventy stories. Interesting here for our investigation is the viewpoint of the user, and eventually an audience observing the user. *Participation* thus means to join in, to contribute something to the artwork. Again, Jensen's terms seem more accurate and clearly define the kind of interactivity at stake; Dixon on the other hand provides detailed description and analysis of particular artworks that display the typical characteristics of each category. And it is precisely through such detailed analysis that Dixon arrives to the conclusion that although artworks "can be argued to operate in all four of our interactive categories (navigation, participation, conversation, collaboration), our classifications emphasize which paradigm is most dominant and significant; and differentiate relative levels of openness of interaction" (Dixon 2007, p. 584). Here Dixon refers to motion-sensing installations, and discusses in particular a genre of installation work, in which visitors

can activate media events by means of triggering devices, such as a mat containing footpad pressure sensors. Rightly Dixon comments that “the sense of direct agency is limited and interactivity operates more on the level of cooperation than conversation - it could be even argued that it is merely navigation, since moving to a certain place to activate a specific effect differs little from clicking a mouse to achieve it”, Dixon 2007, p. 584).

*Conversation*, the third category, describes a meaningful conversation with the interactive artwork, real interchange and exchange. While Jensen limits his definition to the characteristics of technologies that serve to facilitate the conversational process, Dixon emphasizes qualitative aspects, such as the significance of the interaction from the user’s viewpoint. Interestingly, Dixon’s fourth category *collaboration* represents the highest degree of openness of interaction, while Jensen’s final category *registrational interactivity* describes highly sophisticated technology, yet a *reactive or adaptive form of interactivity* (surveillance systems, intelligent agents, intelligent guides or intelligent interfaces, etc.).

In (Dixon’s) *collaboration* situations, the user’s interaction alters the artwork or interactive performance significantly, which makes the user a performer, or even co-creator.

*Navigation* and *participation* do not require specific knowledge or training to interact. Usually a set of simple instructions are provided in written form, or may be given by a person guiding through the installation or performance. *Conversation* and *collaboration* may require more preparation, or even some form of introductory training, before the interactive work can be fully experienced and explored. Short term introductory sessions and workshops are frequently offered to this end. Navigational, participational and conversational interactivity *do not alter the artwork/ performance significantly*, and in this respect differ essentially from collaborative interactivity.

## **2.5 Digital (Live) Performance and the notion of the ‘Open Work’**

Furthermore, interactive situations of the *collaboration* type have important implications for the creative process and its theorization in the performing arts and in Digital (Live) Performance. In this context Sarah Rubidge (2000) has presented an important thesis entitled *Identity in Flux: A Theoretical and Choreographic Enquiry*

*into the Identity of The Open Dance Work*, which offers compelling insights into the collaborative engagement between choreographic and interactive digital art practices. Chapter three of her thesis is dedicated to the discussion of notions and historical examples in music and dance of the 'Open Work', which makes its appearance as a named mode of presentation in Western Contemporary Art in the middle of the 20th century, and can be characterized according to Rubidge as follows:

The open work is a deliberate artistic extrapolation of the inherent openness, the 'textuality' of all works of art, indeed of any culturally emergent entity, and as such could be said to actualize, the 'Text'.

From at least the 1950s artists have experimented with works in which the accepted role of the author as sole determinant of the form the work takes in performance is deliberately undermined, and in which the actual enactment of the 'work of the work' becomes its *raison d'être*. However, rather than limiting the openness of the work to the realms of spectator experience and performer interpretation, many artists extended the notion of openness to include variability not only in the semiotic but also in the organizational structure of the work itself. In doing so they actualized the notion of the work of art as being a becoming-object, giving it a life as 'a work in movement' (Eco 1989: p.14).

(Rubidge 2000, p.36)

Rubidge thus introduces multiple dimensions of the 'Open Work', which can be described as:

- Negotiation of the authorial control, which can be shared to varying degrees
- Open-ended compositional process (work may be different, or even be altered from production to production)
- Degrees of openness regarding each parameter of the creative/choreographic process

These aspects of the 'Open Work' undoubtedly resonate with our own framework and methodology presented in the previous chapters. Regarding the negotiation of authorial control for example, we believe that this dimension is at times extremely

convoluted in Digital (Live) Performance, particularly when combined with open-ended compositional processes and its constituent parameters. Lampert, Galanter and Butterworth, among others, have been extensively referred to address this complexity.

Entering the realm of collaborational interactivity we consequently enter the realm of the 'Open Work', to which we suggest adding yet another dimension: the 'openness of key concepts and terms' (as they are used by the different elements of an interdisciplinary team working on a digital (live) performance), which change significantly over time and thus allow for regular renewal of perspectives on artwork of such complex nature. Sarah Rubidge (2009) has recently extended such a key concept regarding interactive installations. Drawing on John Austin's speech act theory and Judith Butler's ideas on identity formation, Rubidge affirms that the notion of the 'performative' ought to be reviewed from a philosophical perspective beyond the usage of the term in the context of artistic performance and performance discourse. According to Rubidge "Austin argues that a performative utterance actively produces the state of affairs to which it refers, contrasting it with a constative utterance, which describes or represents a state of affairs" (Rubidge 2009, p. 364). Rubidge interprets the 'performative utterance' as 'creative utterance' and concludes:

It either generates a new state of affairs, or modulates an existing one to create new configurations in the existing set of artistic conditions. Performative language and/or events thus do not *re*-present what is already known, but create and present something new. (...)

In conventional theatre performances, the identities and state of affairs generated by a performance are not open to re-inscription. Rather than the moment of performance being the source of a new event, or a radical modulation of the scripted events, the play or dance is intended to be repeated as a predetermined form. Thus, they are only performative in the sense that they involve performance. (Rubidge, 2009, p. 364)

Based on these thoughts Rubidge distinguishes between a 'weak' and a 'strong' sense of the performative, meaning respectively an 'ordinary' and a 'philosophically stringent' sense of the performative. Consequently a 'strong' sense of the performative requires a particular kind of performance technique:

Only in improvisation can a new state of affairs be brought into being (one in which the precise form is not predictable when the improvisation begins). Improvisation in performance consequently is performative in the strong sense. (Rubidge 2009, p.365)

Of the three types of works that Rubidge differentiates for her further discussion of 'performing installations' the latter two are of importance for our debate (of notions of interactivity):

1. choreographed performances that take place in an installation rather than in a stage environment;
2. choreographed or improvised performances in an installation environment which incorporate a measure of interactivity between responsive technological systems and performers;
3. interactive engagements in an installation environment between 'audience' members and responsive technological systems that give rise to informal performance events.<sup>151</sup>

Regarding the notion of the performative in interactive situations, Rubidge explains:

In choreographic performative installations that are more closely tied to the Austinian notion of performativity, performers actively intervene in the development of a choreographed performance event as it unfolds (e.g. improvised events) and/or change the shape or texture of the environment in which they are performing, either through the structure of their movement, or the more subtle and variable dynamic qualities with which it is performed. Since the 1990s this type of performance event has tended to be characterized by the use of interactive technology. Here performers actively modify the visual or sonic environment in which they are moving as they dance, thus generating a 'performative' event in the strong sense. The event might be pre-choreographed, involve an element of pre-choreographed performance, or be improvised.<sup>152</sup>

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<sup>151</sup> Ibid. p. 365

<sup>152</sup> Ibid. p. 369

We have selected these quotes from Rubidge's article on performance events that take place in (interactive) installation environments for brief analysis of some of its implications for our investigation. In other words, this article raises a number of useful questions for debate and subsequent clarification of the terminology used within our own underlying theoretical framework.

Our first observation concerns the very different utilization of the identical theoretical references (John Austin's speech act theory) by media art curator Inke Arns as presented in chapter one (2.5) of this thesis. Here we referenced Arns proposing that program code ought to be seen as *performative text*, because the source code (or *genotext*) generates all sorts of audiovisual surfaces and output (or *phenotext*).

Linking this observation to Austin's speech act theory, Arns writes:

Austin's speech act theory regards speech essentially as action and sees it as being effective not on the merit of its results, but in and of itself. This is precisely where speech act theory meets code's assumed performativity: '[when] a word not only means something, but performatively generates exactly that which it names'. (...) Accordingly, when I speak of the performativity of code, I mean that this performativity is not to be understood as a purely technical performativity, i.e., it does not only happen in the context of a closed technical system, but affects the realm of the aesthetic, political and social. Program code is characterized by the fact that here 'saying' coincides with 'doing'. Code as an effective speech act is not a description or a representation of something, but, on the contrary, it directly affects, and literally sets in motion, or even 'kills', a process. This 'coded performativity' has immediate and political consequences on the actual and virtual spaces (amongst others, the internet), in which we are increasingly moving and living: it means, ultimately, that this coded performativity mobilizes or immobilizes its users. Code thus becomes Law, or, as Lawrence Lessig put it in 1999, 'Code [already] is Law'. (Arns 2005, p.6-7)

In Arns perspective Austin's 'performative utterance' is not at all creative, but the very opposite, code is Law. Source code is generating all four types of interactive system described by Jensen from the most basic one way media systems without a return channel to the most sophisticated *intelligent agents*. From Arns' point of view aesthetic, political and social dimensions are inherent in the source code, in other words, implicit in the programmer's writing.



It seems to us that the same holds true for scores as they are used in the performing arts: any score in music, dance or theatre provides the necessary instructions for the live performance in a latent state, which become manifest when they are executed. Whether these instructions determine every single aspect of the performance, or leave a great amount of interpretative freedom reflects aesthetic, political and social dimensions inherent in the score, in other words, reflects the artistic vision of its author(s). However, all scores contain 'coded performativity'. The fact that code represents a particular language with its rules and conventions, constitutes another strong argument against the interpretation of the performative utterance originating an entirely 'new state of affairs'. In Rubidge's example the phrase 'I pronounce you husband and wife' represents such a new state of affairs. While this certainly is true, it also is only true when uttered by a particular person (a registrar) in a particular situation (the marriage ceremony at the city council) witnessed by particular people (the witnesses at the marriage), and only if an official document is signed by all protagonists involved in the ceremony. The same phrase pronounced by a priest at church without a civil marriage may not have any legal consequences, depending on the religion in question. In conclusion, it is the 'social code' including the legal dimension with its laws that allow for a new state of affairs for the married couple, their families and the community. One might argue though, that for society this particular wedding is reinforcing the existing state of affairs. In other words, the code itself is not altered in the least.

We may therefore ask: what is a 'new state of affairs' in the realm of Digital (Live) Performance, or, in this case, within performing in an interactive installation? It seems to us that Dixon's last category of interactive works (the user's interaction alters the artwork or interactive performance significantly) would correspond to Rubidge's quest for a performance as 'a radical modulation of the scripted events'. Rubidge explains in footnote 19:

Here 'interactive technology' refers to multi-stranded interactive systems which use performers'/participants' behavior to activate them and the imagery to which they give rise. Dynamic tracking systems (e.g. video tracking, radio tags) or 'switch' sensors such as pressure pads send messages concerning the activity of performers/ participants to a bespoke computer program to activate the interactive technology.

Through the participant behavior tracked by these sensors the volume and texture of sounds might be modified, video images or computer graphics blurred, distorted, multiplied, changed in size or color, or overlaid with other images, or the rhythm or spatial positioning of virtual images or sounds altered. Parameters of participant behavior used to alter the imagery include direction or velocity of travel in the space, the size or velocity of an action, the proximity of participants, either to each other or to the designated features in or of the installation environment. (Rubidge, 2009, p. 376)

From this explanation it would follow that these interactive systems could best be described as navigational (where something is activated), participatory (where parameters of the performer/participants movement modify media) and eventually conversational (where trained performers engage systematically) with the systems' possibilities. From the perspective of interactive system design though one could argue with Arns that on the level of the code itself there are no changes at all. Consequently the change in the 'state of affairs' is limited to a certain degree of improvisational freedom given to the performer/participant. It is questionable though whether these kind of choices given to the performer/participant 'significantly change the work' itself. An untrained participant most frequently draws on a very limited range of movement ideas, which may be extended through imitation of what other performers/participants do. According to Lampert such improvisation mainly draws on habitual movement and rarely leads to artistically interesting moments (see our discussion in chapter three, 4.4.1). Additionally many video tracking systems work based on spatial parameters, in other words, it is detected where someone performs in relation to the camera, and data such as the tracked object's (person's) size, velocity, horizontal and vertical coordinates are provided. What kind of movement someone performs does not matter for these interactive systems. Only if the incoming video stream is used as a source of images that can be processed in real time, the movement itself, its form and qualities produce differentiated results.<sup>153</sup>

In our perspective interactive systems such as described above by Rubidge are not dynamic at all on the programming level, but relatively limited and static; they

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<sup>153</sup> In this case the captured video is not used to track the performers' movement (in other words, the video stream is not analyzed based on contrast or color), but processed and/or edited like prerecorded video.

resemble a 'sensitive instrument' (in Mark Coniglio's words), which needs to be played by a skilled musician to produce artistically relevant results. Certainly Rubidge has a point claiming that the non-trained participant in a performative event can contribute to an aesthetically and artistically convincing result, but from our perspective this is not the point.

As our investigation focusses on the development of creative strategies for interactive situations in Digital (Live) Performance, we do not need to discuss differences of (lay) participant and (trained) performer's interaction. If our methodology benefits professional performers, our strategies can be modified, simplified and adapted to other environments and groups of interested people (see CENTA case study in chapter three). On the contrary, creative strategies that produce satisfactory results for (lay) participants in performative interactive installations, may not fulfill the (professional) performer's criteria for successful interaction with the system. It is from this perspective that we suggest that the last of Dixon's categories (collaboration) is the most difficult to define, and within the framework of our investigation will be limited to the discussion of professional artists' collaborations.

Returning to the question of what constitutes a 'new state of affairs' in the realm of Digital (Live) Performance, it seems to us that interactive performance systems such as the ones mentioned by Rubidge belong to Birringer's 'first generation' of interactive systems, and do not represent a 'new state of affairs' on the level of programming the code, but have evolved into a widely spread practice available to non-specialists and specialists alike. Nevertheless the use of first generation systems can obviously result in a 'new state of affairs' as many other aspects of the creative work go. On the other hand, the use of second generation interactive systems do not imply per se a 'new state of affairs'. Frequently new and adequate creative strategies and performance techniques have to be explored and tested, before the 'interactive environment' or 'digital ecosystem' as a whole with all its human and non-human components can be considered a 'new state of affairs'.

What we had in mind when we suggested above that a fourth dimension of the Open Work (entitled 'openness of key concepts and terms') should be added to Rubidge's existing three dimensions, are situations where identical concepts and terms used by

the collaborators of a particular project vary significantly because of the differing contexts they are habitually used in. In chapter one (3.8) we have discussed Shaw and Lewis' collaborative process, which was accompanied by the continuous compilation of 'generative indexes for performance in the interstices of dance and computer science'. Their first step was to carefully examine existing lexicons of programming, contemporary dance, drawing, technology-based art and other writings and research. Based on this preparatory investigation they proceeded to discuss intersecting approaches and establish their own expandable and evolving lexicon, which, significantly, *often would contain multiple conceptions*. Most frequently collaborators in such interdisciplinary projects do not spend that much time and effort to clarify their conceptual positions and resulting application of terms, but work (probably less consciously than Shaw and Lewis) with multiple conceptions within the same project.

### **3. Strategies for Interactive Situations in HCI Contexts**

In the previous sections of this chapter we have introduced Jensen's cube of interactivity and Dixon's categories of interactivity in Digital Performance. Jensen's model is useful to look at the media's potential for a specific type of interactivity, while Dixon's taxonomy focuses on the user of a given interactive system.

We have entitled our own theoretical contribution 'Strategies for Interactive Situations in HCI Contexts' to differentiate our approach, stressing two particular aspects:

1. The choice of the term 'interactive situations' implies a more holistic view similar to Birringer's 'digital ecosystems', which does not so much distinguish the human (performer) from the machine (the interactive system), and does not separate the technology involved from its creators (the digital artists, programmers and engineers). In this perspective designing creative strategies therefore often involves interdisciplinary collaboration starting right from the early conceptual stages of the development cycle.
2. Interactive situations are limited in this chapter to HCI contexts, because in CMC contexts different strategies can be applied, which we will not discuss in this dissertation.

### 3.1 Perceived Interactivity

When an audience interprets the relation between media events and performative actions on stage as interactive, but in fact there is no such connection (in real-time), we can speak of *perceived interactivity*. Merce Cunningham's well-known choreography *BIPED* (1999) invites such audience's interpretation of the dancer's movement and its relation to the huge virtual figures projected on a transparent scrim.

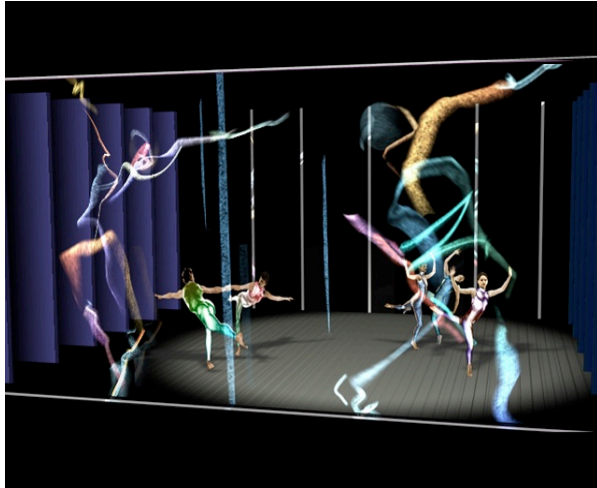


Figure 20. *BIPED* (1999) by Merce Cunningham

As the figures, some resembling human form, some not, were animated based on the motion captured sequences retrieved from Cunningham's real dancers, audiences intuitively establish relationships between the performers and the virtual figures. Through chance procedures real and virtual movement sequences can coincide, anticipate or repeat in time, which clearly provokes the notion of interactivity. Nevertheless there is no 'direct' interactivity, in other words, there is no definite relation established between performers' action and media events. However, we include this creative strategy in our categorization, because it is a valid option in interactive settings, as we will see in the context of our case study below.

### 3.2 Illusionary Interactivity

From an audience's point of view illusionary forms of interactivity can be perceived as an illusion, or not. In the latter case the audience perceives an event as a certain type of interactivity, when in reality it is a different form of interactivity.

Sometimes illusions are purposefully created to be deconstructed through revealing the mechanics of the effects, often aiming at a critical reflection of the utilization of the media in question. An example of deconstructed *illusionary interactivity* will be provided in our case study below.

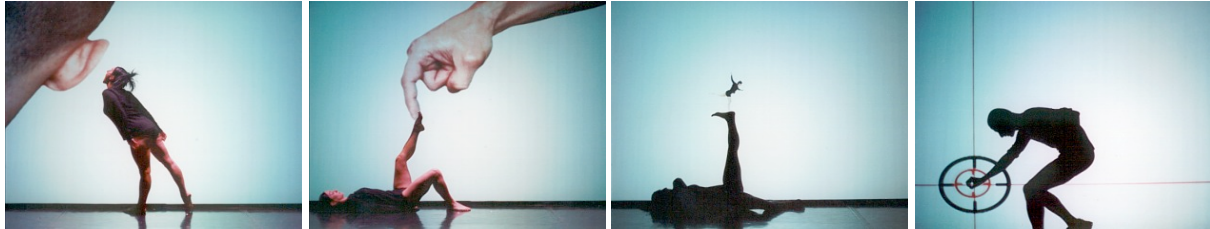


Figure 21. Images from the stage version of *mini@tures* (1998-2001), Cie. Mulleras

In other cases the audience is aware that a fantasy is produced and enjoys the skills involved in creating the illusion, for example in the stage version of *mini@tures* (1998-2001) by the French company Mulleras (figure 21), where the live performers seem to be an integral part of the projected images. Here the audience clearly perceives that a real dancer stands very close to the screen, and ‘interacts’ with a simple projection of a prerecorded video, which is projected from the back to avoid shadows. All actions are evidently well rehearsed and timed, which allows the audience to enjoy the playful illusions consciously.

### 3.3 Sensitive Instruments

Comparable to a traditional musical instrument, the *sensitive instrument* describes an interactive situation, in which the performer’s sensorial input is mapped to a media output. Like playing a piano the performer can trigger media events, or control certain parameters in a way that will always produce identical or very similar results.

Controlling the system’s parameters maybe as simple as activating a media event, or require trained skills, for example in the case of real-time composition and manipulation of video footage or particle systems. However, the *sensitive instrument* is a responsive interactive system, which does not evolve in and by itself.

Robert Wechsler’s humorous solo *Head Lights - a demonstration* (2008) represents a clear example of the sensitive instrument. Wechsler controls the activation of musical samples and stage lighting by precise gestures, which are mapped spatially in *EyeCon* and communicated to *Max/MSP*.



Figure 22. Video stills from *Head Lights - a demonstration* (2008) and *A Human Conversation* (2007) by Robert Wechsler/Palindrome

*A Human Conversation* (2007) is based on the same technique, but does not activate lights. Multi-user input is possible with *sensitive instruments*, as long as the performers are tracked separately by means of chroma key techniques, or spatial separation.

### 3.4 Extended Instruments

Although the terms ‘extended’ and ‘augmented’ can be used as synonyms, and both signify the expansion of the possibilities for interaction, we feel that an interesting distinction can be made. In our perspective interactive systems of the ‘sensitive instrument’ type can be extended, without becoming something altogether different. For example, if the media database used for the sensitive instrument becomes ‘dynamic’ (as in Lev Manovich’s *Soft Cinema*) we can denominate such a system an ‘extended instrument’, because the performer’s actions may remain exactly the same. A dynamic database produces altering combinations of the content that is activated and manipulated by the performer, very much like a musician may decide to play a synthesizer instead of a piano, allowing him/her to play different samples on the same keyboard.

*Extended Instruments* introduce variation or even randomization in the media output of the interactive system, but do not necessarily require different actions of the performer.



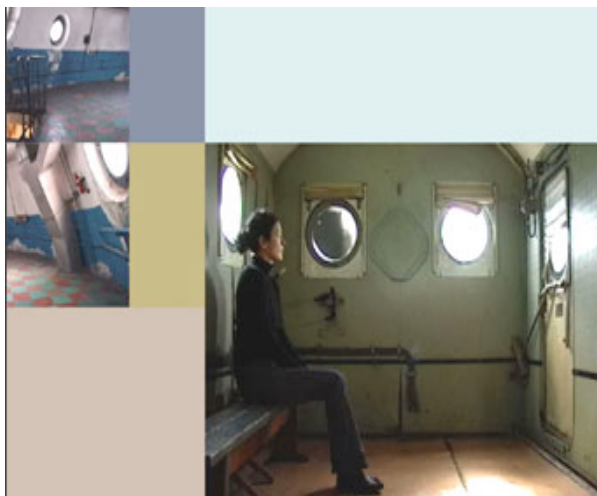
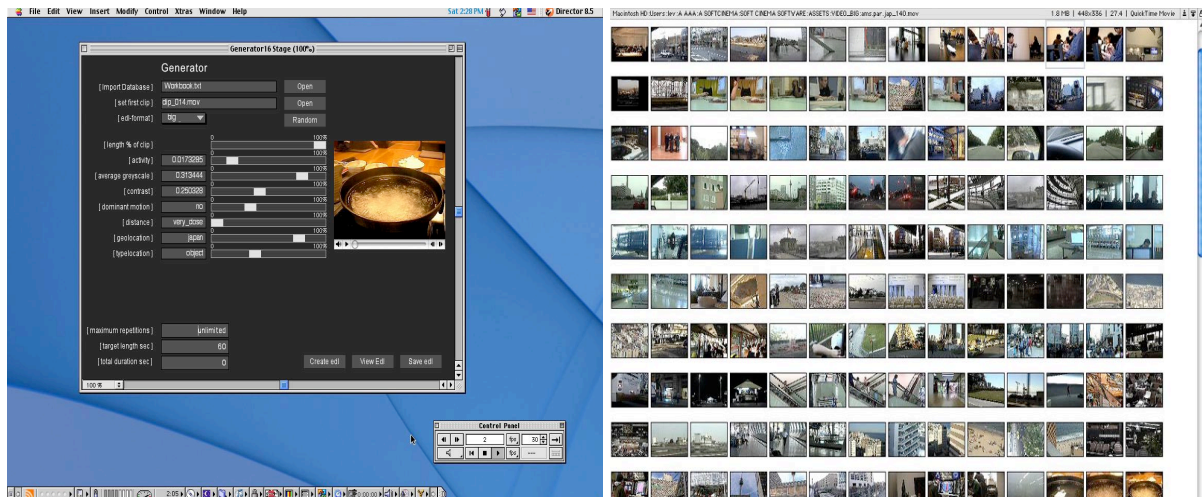


Figure 23. Images of the software which selects video clips from the database to assemble them in the layout of *Soft Cinema*

### 3.5 Augmented Reality Systems

Motion properties and characteristics are augmented in these type of interactive situations through corresponding audiovisual mappings, which allow a synaesthetic approach to exploring such systems. Content is created in real-time through the performer's interaction with the system.

*Glow* (2006) and *Mortal Engine* (2008) by digital artist Frieder Weiss and the Australian company Chunky Move can be considered *Augmented Reality* systems, in which the real-time generation of motion graphics surrounding the performer's bodies simultaneously resembles a digital instrument 'played' by the dancers and augments movement properties and qualities visually.



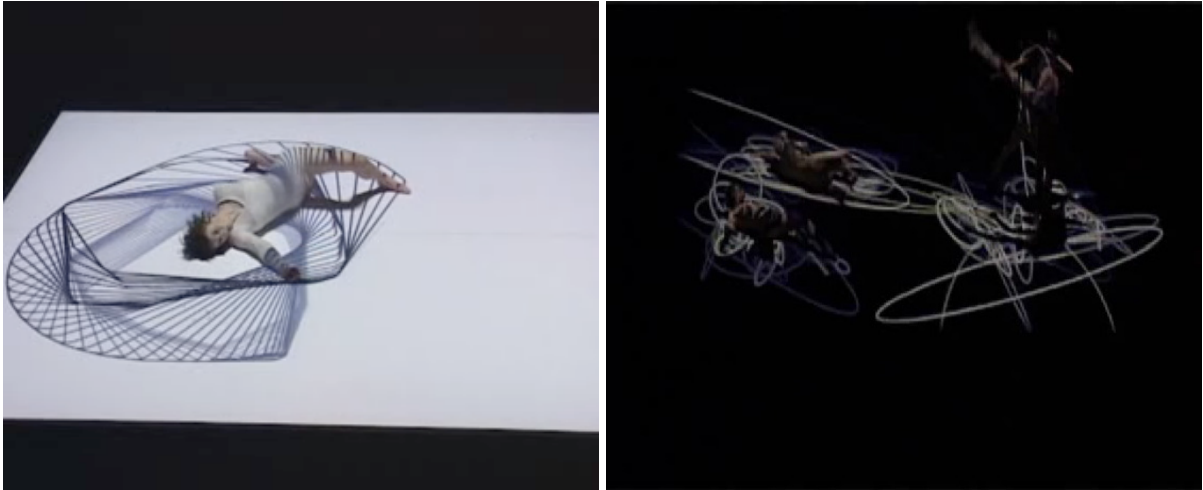
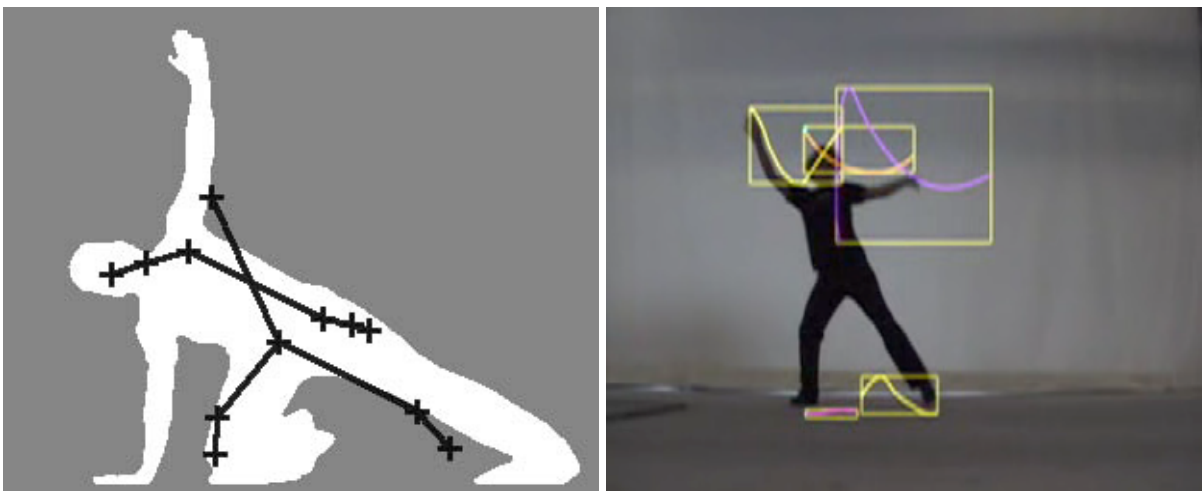


Figure 24. Video stills from *Glow* (2006) and *Mortal Engine* (2008) by Frieder Weiss/Chunky Move

### 3.6 Gesture Analysis Systems

Interactive systems built on gesture analysis techniques provide computational models for qualitative motion analysis. Mark Coniglio for example used the motion tracking capacities of the *EyesWeb* software in combination with his own application *Isadora* for Troika Ranch's production *16 [R]evolutions* (2006).

*EyesWeb* helped him to generate a twelve point skeleton and communicate the data of each point's motion pathway to *Isadora* via a local network.



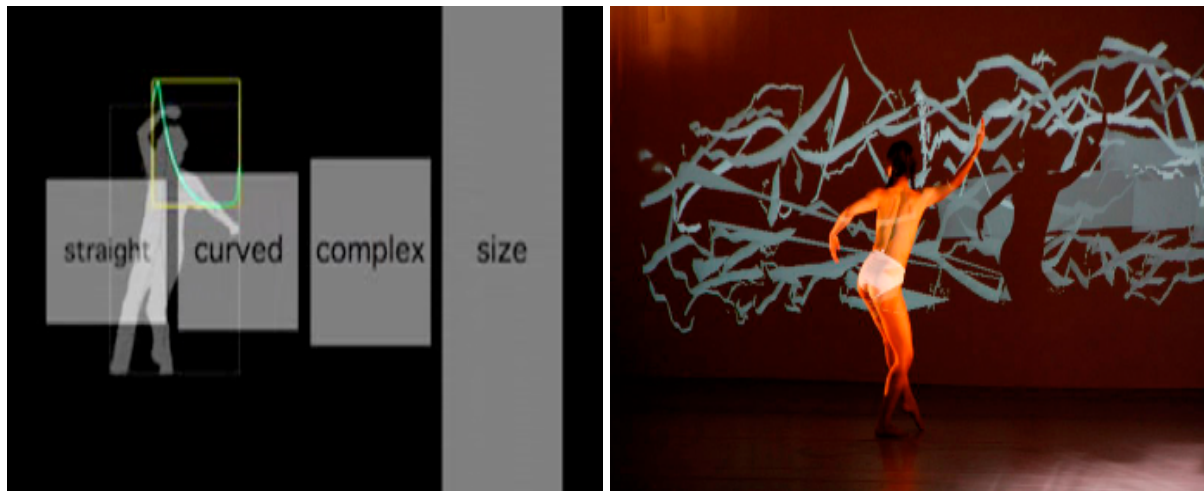


Figure 25. Video stills from a video about the technology in *16 [R]evolutions* (2006) by Troika Ranch

An *Isadora* module called 'gesture' which Coniglio wrote for this particular project, allowed him to quantify parameters close to an audience's experience of a gesture, such as velocity and acceleration, or, less obvious, simple, complex, jittery or angular. The gesture module then would break down the motion trajectories into meaningful units, which could be carefully linked to visual and sonic aspects of the performance.

Frédéric Bevilacqua, leader of the Real Time Musical Interactions team at IRCAM - Institute for Music/Acoustic Research and Coordination in Paris, has been developing a gesture-follower with his collaborators, which compares a motion-captured performed gesture in real-time with a set of prerecorded examples stored in a database (see also chapter one, 3.9). To this end machine learning techniques are adapted from the field of artificial intelligence research, and combined with 2D or 3D motion capture technologies. The gesture-follower was developed through several collaborations with renown contemporary choreographers, such as Hervé Robbe, Myriam Gourfink and Emilio GrecoIPC.

In Myriam Gourfink's work *This is My House* (2005) the movement of the dancers is based on a written score,<sup>154</sup> which is displayed on twelve screens positioned above the performers. As the piece progresses the dancer's movement is analyzed by the

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<sup>154</sup> See also chapter three, 4.3

gesture follower. The results of the analysis feedback into the interactive score, altering the instructions given to the performers in real-time.

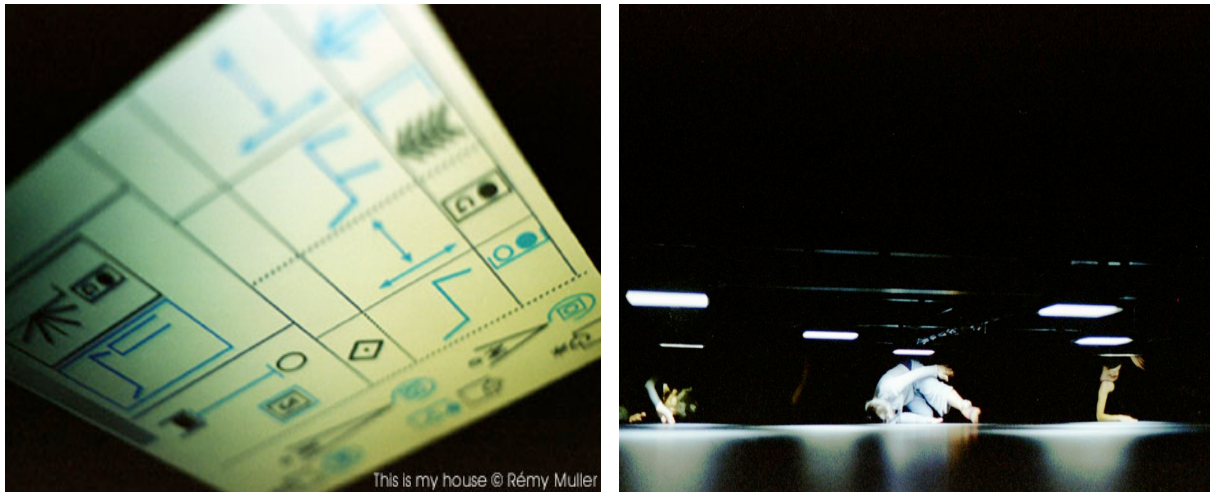


Figure 26. Images of the interactive score projected above the dancers in Myriam Gourfink's *This is My House* (2005)

In this example the combination of a generative score and use of high level parameters for the gesture analysis allow for an approximation of a dialogue-like situation between computer system and performers (here 'resonance' or 'synchronicity' between the dancers are qualitative criteria for the systems decisions).

### 3.7 Intelligent Agents

Digital artist, programmer and artificial intelligence researcher Mark Downie has been presenting astounding interactive installations, compositions and projections in pioneering collaborative projects, such as *How long does the subject linger at the edge of the volume...* (2005) with choreographer Trisha Brown. Rejecting the prevalent mapping approaches, Downie has based his work on the concept of 'autonomous agents'. Downie's agents are systems programmed to interact based on their own specific logic resembling natural systems or bodies, with their individual structure (perception system, action system and motor system) and forms of decision-making. These sophisticated interactive systems were developed and programmed based on Downie's Artificial Intelligence research (see diagram in figure 27).

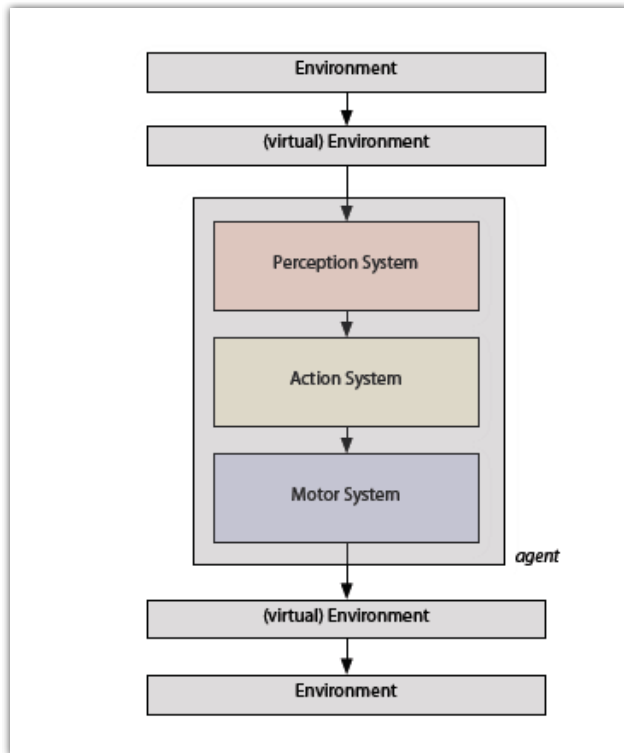


Figure 27. Mark Downie's model of the components of his autonomous agents <sup>155</sup>

In *How long does the subject...* an optical motion capture system provides the data of each marker attached to the dancers' bodies in real-time. In each scene different agents interact with the captured data in new ways, generating complex graphics, which are rendered in real-time.



Figure 28. Images from *How long does the subject...* (2005) by Trisha Brown in collaboration with Mark Downie

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<sup>155</sup> This diagram shows the three components of the (software) agent, a concept adapted from AI research, which Mark Downie suggests in substitution of the term 'dance technology' and interactive arts 'mappings', see Downie's thesis, p. 39

Downie's agents seem to 'perceive' the dancers, 'act' and 'move across the stage' according to the incoming motion data.

The 'intelligence' of Downie's agents is characterized as "acting in the world as far as judged by outside observers' and 'not confined to particular computational language", but rather "arises out of the agent's interaction with the world".<sup>156</sup> Downie developed such an interaction tool during the collaboration with Trisha Brown, when he couldn't write code fast enough during the rehearsals. He observed how Brown delegated some of the problem solving to her dancers, and, inspired by this method, programmed FLUID, a tool capable of writing and correcting code, as well as remembering every step of the working session.

Downie's agent framework thus can be called an interactive situation, in which the agents are 'open forms' rather than 'mappings', autonomous enough to "maintain a dynamic disequilibrium with their environments".<sup>157</sup>

The term 'agent' is more frequently used now, in an attempt to describe systems that interact with certain autonomy with incoming data.

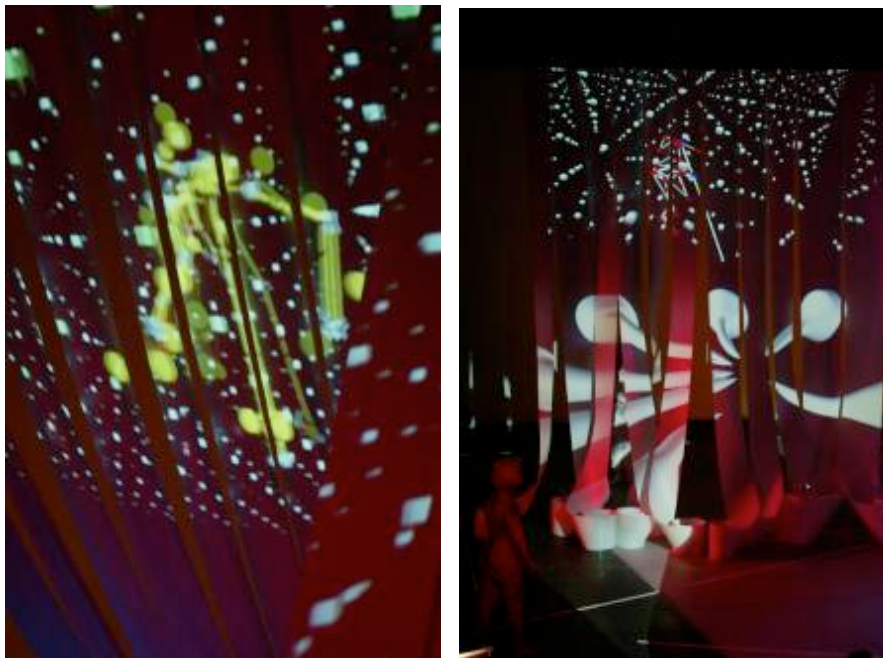


Figure 29. Images from *Pycta* (2006), Altroteatro

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<sup>156</sup> Ibid., p.39

<sup>157</sup> Ibid. p. 443

The Italian company Altroteatro, directed by choreographer Lucia Latour and architect Orazio Carpenzano, for example uses a live optical motion capture system and software tools to generate 3D architectural structures in real-time. In *Pycta* (2006) the dancers simultaneously generate these autonomous environments and are immersed in the projections.

### **3.8 Expert Operator**

A media artist, a programmer, an engineer, a technician - all these professionals are sometimes involved *during* live performances as expert operators, who may have a certain autonomy to make creative decisions. The advantage of collaborating with a human being as part of the interactive situation is obvious. There are many limits to what can be 'perceived' and 'understood' by a programmed interactive system, for example the dancer's intention; the (dramatic) nature of the relationship between two performers; the specific significance of a gesture in a particular culture; the life state of the performer, which subtly changes the communication with other performers and audiences; or the specific conditions of the performance environment, which influence particularly works of more improvisational nature.

Another evident advantage of working with an expert operator is of rather pragmatic nature: why would I want to program highly complex code for interactive media events, which can be created in a simple and direct way with existing theatre technology and expert operator (who often grants a superior level of both, control and flexibility)?

Thirdly, and most interestingly for our investigation, the expert operator is a most valuable ally in designing interactive situations for Digital (Live) Performance, because through his/her collaboration it is almost certain that the most practical solution is found, artistic concerns are preserved, and new research questions can be formulated, such as how to improve an interactive system.

In our case study we will elaborate more on the role of the *expert operator* discussing concrete examples of our own creative process.



## 4. Working methods

Before we proceed to present the reader with our case study, a few comments regarding our working methods maybe helpful.

Six scenes from the Digital (Live) Performance *.txt* (2006-2009) by Fernando Nabais, Fernando Galrito and Stephan Jürgens have been selected for a case study in the context of this chapter. Following an overall introduction to this work, each scene will be briefly described and can be viewed on the DVD accompanying this dissertation; the scene name corresponds to the video excerpts' titles. Each scene was chosen for several reasons:

1. To analyze examples of a given category of the eight forms of interactivity discussed in the previous section of this chapter.
2. To provide a first hand insight into the creative process of developing creative strategies for our own artistic work, which correlate with the compositional principles, concepts and ideas that can be found in our *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance*.
3. To discuss how the use of these principles can inspire concrete (artistic) research questions in the context of three central ideas identified below; and in the context of a specific dramaturgic narrative (inspired by William S. Burroughs' *The Electronic Revolution*).

The following table provides an overview of the scene names (and respective title of the video excerpts); the form of interactivity with reference to the previous section of this chapter; the name of the creative strategy from the *Evolving Glossary* for consultation purposes; and the page references to *The Electronic Revolution*, if relevant for the particular scene.

Table 7

Useful references for the case study below

	Scene name	Form of interactivity	Creative strategy (glossary)	The Electronic Revolution' reference page; other texts
1	Fake voice recognition	Illusionary (3.2)	Illusion; Accessibility (perception)	fake 1: p.4 fake 2: p.11 fake 3: p.36
2	Storyboard	Combination: Expert operator (3.8) & Augmented reality (3.5)	Prototype; Avatar	p.28
3	Cut-up rain	Perceived (3.1)	Immersion	cut-ups from Jarmusch and Burroughs
4	Text wall; Backpack	Augmented reality (3.5)	Simplicity	text messages from audiences, Jarmusch quotes
5	Three Tape Recorders	Augmented reality (3.5)	Transfer	p.7ff.
6	New alphabet	Expert operator (3.8)	Depth of processing	Levine et al. Alphabet Synthesis Machine

## 5. Case study

### 5.1 Introduction to the work<sup>158</sup>

*.txt* is an interactive performance work, mediated by several sensorial technologies, that explores contemporary transversal forms of artistic languages. The result is the creation of a unique vocabulary articulated physically, through interactive soundscapes, visual composition and real time choreography; an array of artistic expressions that support the dramaturgic intention.

<sup>158</sup> The following introduction was adapted from the blog <http://txtwork.wordpress.com/about/> accessed January 2011



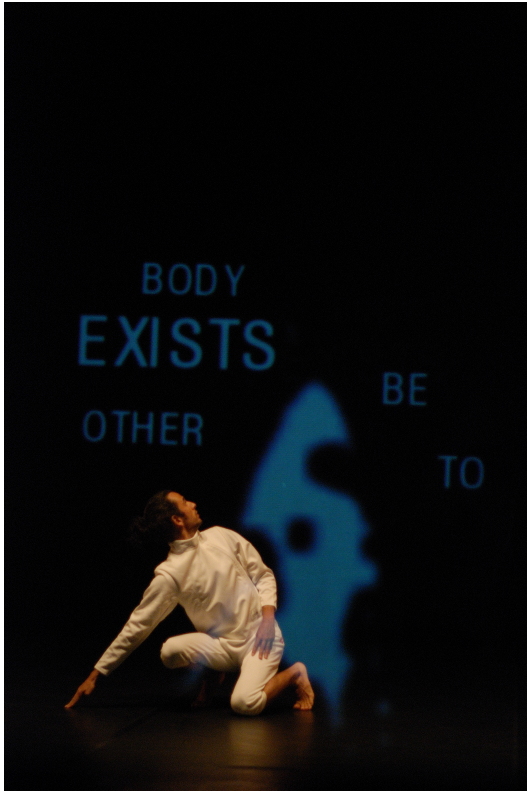


Figure 30. *.txt* (2009) by Fernando Nabais, Fernando Galrito and Stephan Jürgens

The project's central ideas are:

**1. 'The big-bang' of (artistic) language: the birth of a gesture, a sound, an image and their evolution and relation to the performer throughout the piece**

In *.txt* images and body are one. Words are as important as gestures or as images derived from words. They exist to spur strong reactions, by their own value and movement. And motion is sometimes vital to captivate the imagination.

The images, movements and bodies should rise above the screen and scenic space alike, beyond grammatical, syntactic, semantic and semiological formulations. They constitute a dramaturgic, emotional, sensitive whole, and should become a transcendental experience that can take you to another place, towards another emotion, and induce your particular kinesthetic experiences.

**2. Considering interactivity as a medium in itself, the interface between the performer and technology is explored as content**

The nonintrusive tracking of the performer by computer vision technology, and the gestural interpretation algorithms, along with the ability to simulate reactions through

behavioral descriptors, expand the concept of responsive stage towards a living-like environment, where the performer is simply one of the components.

The piece also aspires to reinforce the perception of real time interaction with participatory content by the audience. *.txt* audiences are encouraged to revolutionize power structures through the subversive manipulation of the electronic media surrounding us. Through sending text messages just before the performance starts, this empowered 'spectActor' can take part in the dialogue happening on stage by adding content to the interactive environment.

Physical simulations like particles systems, bird flocking or potential fields applied to typography and its evanescence to abstract communication symbols constitute the performer's universe. Its evolution, behavior and emotions are determined by the performer's interaction with it while keeping an autonomous emergent behavior.

### **3. Critical reflection of convergences between art and science in its social, historic and aesthetic dimensions is a part of the performance itself**

Centering the visual imagery in text and typography *.txt* pays tribute to a plethora of great digital art works, from installations to performances and electronic poetry, in all its forms, that contributed to digitally explore these media.

'The Electronic Revolution' by William S. Burroughs (1971) serves as a dramaturgic base to develop the narrative structure along the lines traced above. In his essay, Burroughs identifies essential questions about the use and abuse of media technologies. Furthermore, he proposes artistic ideas, as well as humanistic concerns, that have been inspiring the narrative dimension of '*.txt*' project. Some of the compositional devices shared by many artists of his time are revisited, refined and transferred to other areas. His famous cut-ups, for example, can be compared to sampling techniques today applied to all kind of fragments of digital and analog media materials.

## 5.2 Fake voice recognition scene(s)

Table 8

*Overview of the seventeen scenes in .txt ( scene under scrutiny highlighted blue)*

scene name		scene name	
1	Giant text	10	Text Wall & Backpack 2
2	Fake voice recognition 1	11	A body made of text
3	Scrabble	12	Text cloud
4	Fake voice recognition 2	13	Fake voice recognition 3
5	Storyboard	14	Three Tape Recorders
6	Virus fight	15	Letter soup
7	Text Wall & Backpack 1	16	Explosion of words
8	Cut-up rain	17	New alphabet
9	Hand controls text		Interactive credits

The first scene we will look at in this case study is called ‘Fake voice recognition’ and repeats three times throughout the work (see table 2 above) in variations. Though apparently an extremely simple scene, it is of great dramaturgical importance.

In the previous, opening scene of the piece (Giant text), a young man dressed in a white fencing suit (but without the fencing mask and his blade) explored the stage as if inspecting a room he has entered for the first time. He gradually discovers that the fragments of giant letters projected onto a transparent scrim relate to his position and movement in the room. Learning that the letters become smaller as he retreats, he reveals the word ‘EXISTS’ at the end of this scene.

When the young man reenters the stage in the second scene (Fake voice recognition 1) he has a device at his disposal, which seemingly produces both, the spoken and the written word. As he utters loosely connected words into a microphone, these are amplified, and simultaneously appear projected on the screen. Since the piece is announced as an interactive performance, the specialized audience may assume that voice or speech recognition technology is utilized. The general audience simply witnesses how the young man creates the following fragments:

a word  
a sequence  
is  
moving  
are  
images of words  
an image

In scene three (Scrabble) these fragments remain on the scrim and are manipulated through the dancer's movements into the following sequence:

a word is an image -  
a sequence of words are moving images

In the first version of *.txt*, shown as a work-in-progress at the *Monstra* festival at Maria Matos Theatre in Lisbon (2007), scene one (Giant text) did not yet exist and the dancer spoke these sentences in the microphone to open the piece. A specialist audience member came to see us after the performance and talked specifically about the opening scene, convinced that we had used a sophisticated speech recognition software, and wanted to know all about it. To his surprise he heard that we had programmed a simple scene in *Isadora* and operated the projected text with simple clicks on the keyboard.

This incident was very instructive for us. On one hand it revealed that specialist audience members may expect that state-of-the-art technology such as the most recent speech recognition technology will be undoubtedly used if at hand, no matter what the artistic and dramaturgical concerns might be. In other words, unintentionally we had created an *illusionary form of interactivity*. On the other hand other (non-specialist) audience members commented that they had liked the performance, because "the dancer performed in incredible synchronization with the video projection". This latter comment clearly indicates that they had no idea of the interactive situation, or technology involved.

Subsequently we decided for the final version of *.txt* to repeat the scene three times and introduce clear hints that the voice recognition was fake, or, for those who did not seek to understand the technology, that something in the system was not working as expected.

Scene four (Fake voice recognition 2) therefore introduced an excerpt from *The Electronic Revolution*:

‘You boys have a rep for making trouble. Well come on out and make some. Pull a camera breaking act and I’ll call a Bobby. I gotta right to do what I like in the public street’.<sup>159</sup>

This extract was spoken by the performer, and again the words simultaneously appeared projected on the scrim. Only, this time a few ‘errors’ were introduced in a way that the attentive audience could recognize them:

Table 9  
*Original text from The Electronic Revolution and modifications in the Fake voice recognition 2 scene*

original text	modifications
You boys have a rep for making trouble.	You boys have a <b>reputation</b> for making trouble.
Well come on out and make some.	Well come on out and <b>try me</b> .
Pull a camera breaking act and I’ll call a Bobby.	Pull a camera breaking act and I’ll call <b>the police</b> .
I gotta right to do what I like in the public street.	I gotta right to do what I <b>want</b> in the <b>public</b> (the word ‘street’ is omitted).

While the ‘deviating voice’ (the projected words) was manifesting subtly in this scene, the *Fake voice recognition 3* scene evidences a crisis.

Here, the final paragraph from *The Electronic Revolution* is quoted:

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<sup>159</sup> Ibid. p.28

That is what this revolution is about. End of game. New games? There are no new games from here to eternity.  
 END OF THE WAR GAME.<sup>160</sup>

The performer's spoken words are contradicted by the projected words:

Table 10

*Original text from The Electronic Revolution and modifications in the Fake voice recognition 3 scene*

original text	modifications
That is what this revolution is about.	That is what this revolution is <b>NOT</b> about.
End of game. New games?	Beginning of the real. Old-fashioned?
There are no new games from here to eternity.	There are infinite possibilities in every single moment.
END OF THE WAR GAME.	BEGINNING OF THIS PIECE.

At this point it is obvious for the audience that no causal relation exists between the performer's action (the spoken word) and the media event (the projected word). Nevertheless there is a conversation between the two voices, which are contradicting each other. The performance was announced as 'interactive', hence there must be a different relation between the spoken and the projected written word. In other words, there must be a different kind of interactivity at work than the straight forward speech recognition, which was assumed during the first Fake voice recognition (scene two).

In the perspective of our classification of eight strategies for interactive situations in HCI contexts presented above in this chapter, scene two, four and thirteen show a progression from an *illusionary form* of interactivity to an *Expert operator form* of interactivity. Before we analyze how these strategical choices support the dramaturgical function and artistic-humanistic concerns in this production, we are

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<sup>160</sup> Ibid. p. 36

now able to demonstrate more clearly, how the principles of *illusion* and *accessibility* from our *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance*<sup>161</sup> have been explored in the conception of *.txt*.

The form of illusion mentioned in the *Evolving Glossary* that interests us here is *cognitive illusion*, which results from the interferences of the assumptions we hold about the world with our sensorial input. Concretely, the spectator holds assumptions regarding the cause and effect of the media event (the appearance of the projected word) in scene two. Most probably a straight cause and effect relation between the spoken word and the projected word is assumed. “Multimodal forms of perception in live performance ... lend themselves to artistic exploration of sensorial illusion”, reads the entry on the principle of *accessibility* in the *Evolving Glossary*. Here, two specific aspects of accessibility are discussed: *perceptibility* (between cause and effect of the media event) and *operability* (the amount of control given to the performer over the media event).

Successively the cognitive illusion (i.e. the assumption that the performer produces spoken and projected word simultaneously) is deconstructed throughout the three Fake voice recognition scenes. In scene two the amount of control given to the performer seems to be absolute: he is the creator of the spoken and written word. In scene four this assumption is shattered: the slips between spoken and projected word raise questions: if there is no speech recognition, are the words programmed and triggered? Which text is the original, which the is the correct version? Who fails? It must be the performer who fails? Can a system fail?

In scene thirteen we witness clear opposition between the spoken word and the projected word, and the performer clearly is not in control of the written word. In conclusion, we might call this process of deconstruction (of the original assumption) *perceiving our illusion*. Or, in the perspective of our methodology, the combination of two principles - the *perceptibility of (cognitive) illusion*.

It is noteworthy that the exploration of these two principles did not so much happen during the (first) Creation Cycle of the creative process (see discussion of the Development Cycle in chapter two, 4.3), but resulted from the audience response

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<sup>161</sup> For the sake of better readability, we will use the term *Evolving Glossary* (in Italics) from now on, when we refer to our ‘Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance’

mentioned above, and the opportunity to publicly present two beta versions of the final performance. Re-staging some scenes, deleting other scenes, and developing new scenes naturally leads into a second loop of the entire Development Cycle; and proved a fertile ground for the combination of a successfully explored principle (illusion in this case) with another one (turning the illusion perceptible).

From the dramaturgical point of view the shift from the assumption that the performer is the creator of both, the spoken and the projected written word, to the deconstruction of this illusion is of great importance. As mentioned in the introduction of this chapter section, the central ideas of *.txt* (the origin of artistic language, interactivity as content of the performance, critical reflection of convergences between art and science) resonate with William Burroughs' essay *The Electronic Revolution*, which we discovered half a year into the process of creating the first version of the piece.

Burroughs' essay starts with the astonishing headline 'FEEDBACK FROM WATERGATE TO THE GARDEN OF EDEN'. He writes:

In the beginning was the word and the word was god and has remained one of the mysteries ever since. The word was God and the word was flesh we are told. In the beginning of what exactly was this beginning word? In the beginning of WRITTEN history. (Burroughs, 1972, p.4)

Burroughs advances the ironic theory that "the written word was literally a virus that made spoken word possible" and thus moves the discussion from the mythological to an apparently scientific plane. Subsequently he unveils mechanisms and strategies of mass media manipulation during the Watergate scandal to arrive at concrete instructions for subversive electronic revolution. The experienced breakdown of trust and confidence in the government and mass media during Watergate simultaneously allows for the disclosure of power strategies pursued by authorities for centuries in the name of the written word: the holy bible, rules and laws, and so forth. The eminent shock over the discovery that one's own government is corrupt and evil implies a profound shock for the entire value system, which is probably why Burroughs returns to the basis of this system and questions it; hence: FEEDBACK FROM WATERGATE TO THE GARDEN OF EDEN.



The idea of 'creation' implies a creator. It implies responsibility for 'good' and 'evil', and a consciousness thereof. It implies rules and laws, obedience and disobedience. In the case of the story of the Garden of Eden it implies the equation good=obedient, and evil=disobedient. For centuries the authorities have claimed that they rule on the creator's behalf, out of the creator's will, or supported by the creator. Even most recently, in the twenty-first century, the President of the U.S. justified another war against Iraq as a *holy war* against the evil.

In consequence *The Electronic Revolution* aims at 'END OF GAME'. In other words, to stop authorities from violating UN resolutions, the Human Rights charter, the Geneva conventions and so forth; the written word here being international laws and conventions.

END OF THE WAR GAME, specifies Burroughs in the final sentence of his essay. But then, he seems to be right when he states: 'There are no new games from here to eternity'. More than three decades after his proposal to start an electronic revolution, the idea of subversion has been absorbed and become a major theme in American film and cinema. If the (fictional) American government itself, or its representatives, or affiliated institutions and agencies are evil (in Burroughs' words they play THE WAR GAME), a (fictional) hero appears and saves the nation from their own evil rulers or elements. It is interesting, that drastic means are entirely justified by the purpose, so that the hero is allowed to break about any civil or military law and convention, including killing other human beings. The subversive element is usually an evil element, which has infiltrated the authorities, while the hero relies on and collaborates with the few or the only trustworthy good element left in the authorities.

Another major theme in American film and cinema is the just fight against dictatorships to free the population and install a democratic system. Obviously, most drastic military means are justified to kill the corrupt and evil. From the extensive worldwide proliferation of these films we can certainly conclude that they have an important function for the image that the United States seek to project of themselves nationally and internationally.

On the other hand, the absorption of the subversive into mainstream American film and cinema is a very intelligent political strategy. Military aggression and violence towards other countries are justified by fighting the evil; and the subversive is

portrayed as another form of evil, which a hero will eradicate through military means. So did the electronic revolution fail? Did it never happen?

Burroughs is not clear as to where his electronic revolution might lead. END OF THE WAR GAME is utopia, as he himself writes a sentences before the final phrase: "There are no new games from here to eternity". We may conclude that it is not possible to end war and install lasting peace, and that the electronic revolution is an ongoing challenge, which needs constantly to renew its strategies.

On a deeper level of interpretation however, the whole myth of creation is at stake. If there is a beginning, a creation, a creator, there needs to be an end. THE WAR GAME certainly is such a kind of end: the end of humanity, physically, ethically, morally and spiritually. THE WAR GAME is a form of apocalypse, as the famous film with the same title suggest.

In consequence there cannot be an end of the apocalypse, of THE WAR GAME, without an end of the myth of creation. The 'Feedback from Watergate to the Garden Eden' indicates the breakdown of a value system, and the electronic revolution contributes to the breakdown augmenting the chaos and confusion that the perversion of these values by the authorities causes.

Though many of the concerns raised in *The Electronic Revolution* are shared by us, the main question seems to be: how can subversion lead to trust, confidence, creativity and more humanity?

Scene thirteen (Fake voice recognition 3) therefore contains crucial artistic and humanistic concerns, which we feel go beyond *The Electronic Revolution*.

Table 11

*Original text from The Electronic Revolution, modifications and artistic-humanistic concerns in the Fake voice recognition 3 scene*

original text	modifications	concerns in .txt
That is what this revolution is about.	That is what this revolution is <b>NOT</b> about.	This is a different revolution. We affirm that there are different sets of values.
End of game. New games?	Beginning of the real. Old-fashioned?	1. End of the myth of creation = beginning of realization that we need to globally respect and collaborate with very diverse value systems. 2. Is it old-fashioned for an artist to propose a vision, utopia, a set of values?
There are no new games from here to eternity.	There are infinite possibilities in every single moment.	Daisaku Ikeda: 'Our present problems are made by humans. They can be resolved by humans'.
END OF THE WAR GAME.	BEGINNING OF THIS PIECE.	1. The beginning of this piece refers to scene one. 2. Following scene 13 starts the conclusion of .txt

We will go further into discussing our artistic and humanistic concerns and vision in the analysis of the remaining selected scenes. To conclude the reflection on the three Fake voice recognition scenes, we can reiterate that the shift from an illusionary form of interactivity to the *Expert operator* form of interactivity reflects on a dramaturgical plane the evolution of the protagonist's worldview throughout the piece.

Scene 13 epitomizes a conflict between theories of (social) revolutions aiming at changing the other, and on the other hand the difficult process of changing oneself and trusting that the environment will reflect these changes. The projected word conveys this latter worldview and represents a turning point in the piece. Throughout the following three scenes (14-16) the young man explores Burroughs' instructions

for subverting media, and its consequences, to arrive at the conclusion that a different approach is necessary. The final scene (New Alphabet) refers to the beginning scene of the piece. Although in the beginning is the word, there is no creation. The word the young man discovers is 'EXISTS' thus hinting at a worldview of continuity. There is mystery, there is discovery. The young man reveals a seeking spirit, a quest for understanding his environment, his life.

In the final scene he creates a new alphabet, an expression of his new ability to communicate in a different way, based on a different value system, with his environment.

### 5.3 Storyboard scene

Table 12  
Overview of scenes in *.txt*: Storyboard scene

scene name		scene name	
1	Giant text	10	Text Wall & Backpack 2
2	Fake voice recognition 1	11	A body made of text
3	Scrabble	12	Text cloud
4	Fake voice recognition 2	13	Fake voice recognition 3
5	Storyboard	14	Three Tape Recorders
6	Virus fight	15	Letter soup
7	Text Wall & Backpack 1	16	Explosion of words
8	Cut-up rain	17	New alphabet
9	Hand controls text		Interactive credits

'Storyboard' is the fifth scene of *.txt* and shows the young man dancing through a series of very concrete everyday actions, which are sequenced in a way that a story of theft and armed conflict slowly unfolds. A white silhouette is projected onto the screen, which mirrors the dancer's movement in real time. Periodically a photogram of a particular gesture is taken. These frozen white silhouettes serve the dancer to

relate himself, i.e. his white mirror with the photogram in a way that the story can be advanced.

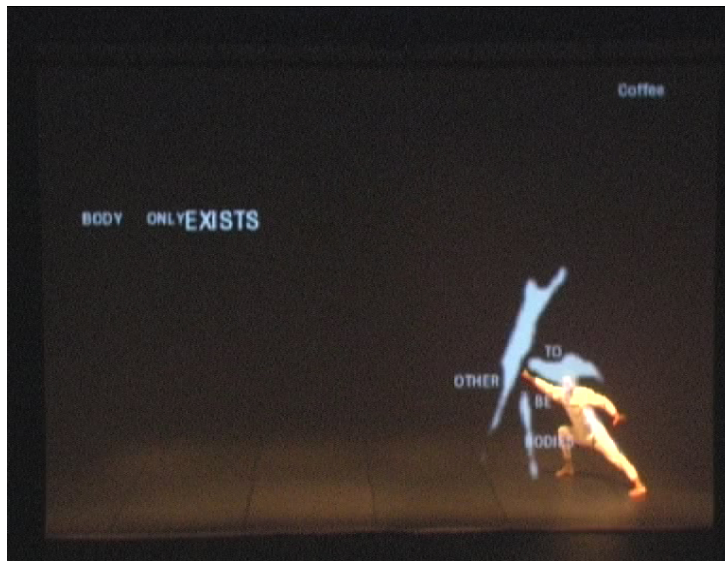


Figure 31. Video still from the Storyboard scene of *.txt* (2009)

A particle system consisting of eight words is made active in the beginning of the scene. The words form the sentence 'A body only exists to be other bodies', which quickly disintegrates as the particles flock towards the white mirror of the performer. Programmed to gravitate towards the outer contour of the silhouette, the particles form fragments of new sentences, some nonsensical, others poetical, such as 'only be body', or 'be exists to bodies'.

'A body only exists to be bodies' references a section from *The Electronic Revolution*, which evokes film scenes in its storyboard like written, densely interlaced imagery. Taken out of its context, the enigmatic phrase lends itself to reflect the ways our existence is embedded in a vast network of other human beings, without whom we could not be.

The young man quite literally is 'other bodies'; he quickly slips into different characters populating two clearly defined areas on stage. Two intertwined stories unravel at these sites, the bus scene and the crime scene. First various characters are introduced, three observers, someone turning his back on the scene in a gesture of shock, a life saver, someone pointing to the floor, and yet another observer walking backwards quite disturbed. This last character transforms into the first person on the bus scene, securing himself by holding a handle. Another passenger sits opposite to

him. A third character stands bent over in pain, as a thief comes on the scene and steals a purse from the aching passenger. The sitting passenger stands up and confronts the thief. Both get involved in physical conflict. The (stage) space widens as they fight, and someone comes running from the opposite side of the stage.

The action continues at the crime scene (as if a filmic cut had been executed), and after recalling the different observers and the life saver, we see a person lying on the floor, probably dead. Another 'filmic cut' takes us back to the bus scene, the running character now arrives to help the thief and shoots the passenger. Shocked over what he did, the running character walks upstage and freezes with his back to the audience in the identical gesture of shock as one of the observers in the crime scene. Here the two scenes fuse (for whom was able to make his connection), and the killer leaves the stage.

It is left open to the audiences' interpretation whether both scenes (the bus scene and the crime scene) in the end belong to the same story, or not. Resembling Burroughs' cut-up technique, the fragments make sense in themselves, but it is open to interpretation whether the connections between fragments are aleatory, or constitute a complex and sophisticated storyboard. Continuity in such texts, written or performative, is not achieved through their narrative structure, on the contrary, there often seems to be no clear beginning or ending. The flux of reading such a text rather requires an active involvement of the spectator, who is invited (1) to let the randomly retrieved blocks of words surrounding the white mirror silhouette resonate and make spontaneous sense; and (2) to establish connections between the sequences of the crime scene and the bus scene, so that s/he can find meaning in the narrative building blocks.

In fact the 'Storyboard' scene, which is under scrutiny here, can be seen as *pars pro toto* for the entire work: *.txt* is constructed upon the premise that 'reading' the performative text is an intimate, spontaneous and unique act of active engagement of the spectator with the live performance. Such engagement is not only stimulated by compositional tools and choices, but constitutes content in several scenes of the piece. Here, the dancer's act of generating narrative building blocks and sequencing them in real time, is observed by the audience as *content of the scene*, as much as the actual story of the crime.

We mentioned above that one of the main ideas of *.txt* is the exploration of the interface between interactive system and performer as content. In the Storyboard scene the presence of some intelligence can be felt, as the performer's expressive still poses are always followed by the appearance of a new photogram. Probably only a few spectators, who sit next to the expert operator in the audience, will observe how the photograms are triggered in real time by means of the keyboard of a portable computer. From the perspective of our classification of eight strategies for interactive situations in HCI contexts, the Storyboard scene represents a combination of the *Expert operator* and a simple *Augmented Reality system*. The latter allows for the composition of expressive shapes and the surrounding word particles, while the former requires the dialogue with the programmer, who sits in the audience. Differing from most of the other scenes in *.txt*, the Storyboard section is tightly choreographed, so that the expert operator knows exactly what comes next. Timing and spacing however are the dancer's responsibility. At times the programmer may vary the succession of photograms that he takes, for example during a fall to the floor, which the dancer executes in slow motion.

Truly dialogical in nature, this form of interactivity also raises interesting questions about the use of 'avatars' and/or 'digital doubles' (Dixon) in Digital (Live) Performance.<sup>162</sup> Commonly seen as a user's representation of her/himself, the avatar frequently incorporates human characteristics and feats, as well as capabilities and powers beyond the physical world.

In Hinduism the word avatar connotes purposeful descents of the Supreme God Vishnu from higher spiritual to the lower realms of existence. We suggest to adapt the idea of 'purposeful descent' and establish an additional definition of the avatar in Digital (Live) Performance: *an avatar is a virtual element, clearly distinguishable from physical elements in a performance, which embodies a specific dramatic function*. 'Purposeful descent' here can be interpreted as 'artistic intention'.

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<sup>162</sup> Conceptually close to the origins of the word avatar is Steve Dixon's term 'digital double'. Elaborating on Artaud's notion of theatre's double, he categorizes the double as (1) reflection, as (2) alter ego, as (3) spiritual emanation and as (4) a manipulable mannequin. In this framework the avatar and the digital puppet (3D models) fall into the category of the manipulable mannequin. However, for our *Evolving Glossary* we have chosen to use the term 'avatar' and its definition of 'purposeful descent' of the god Vishnu. In Digital (Live) Performance 'purposeful descent' can be seen as 'embodying dramatic function', which leaves more possibilities open than Dixon's categories.



Four types of avatars appear in *.txt* throughout the various scenes. Three kinds of avatars derive from the silhouettes of the performer that is tracked in real time: 1. the white mirror, 2. the contour, and the invisible silhouette. The last category of avatars are text avatars of different sizes and behaviors. Text avatars (or word particle systems) are always programmed in *.txt* in such a way that they manifest a 'behavior' towards the silhouette avatar, for example attraction, repulsion, flocking and so forth. Alternatively word particles can 'enter' the silhouette avatar body (in its invisible version), and compose a human form (see scene eleven).

In the Storyboard scene the avatar takes the form of the white mirror, whilst the word particles are programmed to gravitate towards the outer limits of the silhouette.

Values for this attraction are not high, so that the particles will only move when close to the avatar, allowing for text fragments in space, and others close to the avatar.

Velocity values are also fairly low, so that the dancer can 'loose' some words moving away from them quickly, or attract other words moving near them slowly.

Both, silhouette and word avatars do not represent the user (the dancer onstage), nor do they fit any of Dixon's four categories of the digital double. Avatars in *.txt* rather embody artistic intention: their dramatic function is to provide a sensorial experience of otherwise highly philosophical ideas, such as 'interface is content', or 'the big bang of artistic language'. Throughout the Storyboard scene the audience witnesses a dialogical process of creating a complex nonlinear narrative between *Expert operator*, *Augmented Reality system* and dancer. Simultaneously some mechanisms of the interactive system are revealed so that the audience observes how the elements and structure of the story is constructed. In this perspective the avatar(s) can be seen as an embodiment of artistic intention and craft.

From the very outset of the *.txt* project the Storyboard scene has been an important section of the three work-in-progress versions and the premiere presented publicly between 2007 and 2009. In its first version, the scene was loosely choreographed and made use of the software *Isadora*. An interestingly ambiguous film loop was projected on a huge transparent screen, behind which the dancer explored a series of predefined poses. As he paused any of the poses, the expert operator in the



audience took a photograph of the pose, which was superimposed on the projected image. Up to five different photographs could be used simultaneously, thus multiplying the figure of dancer, or reducing the number of the avatars.

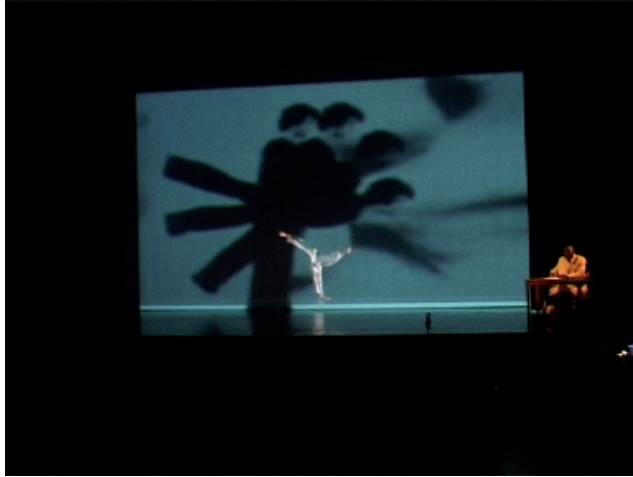


Figure 32. Video still from the Storyboard scene of *.txt* (2007)

Here the expert operator had the quite demanding task to compose groups of figures based on correlating poses. To this end the dancer was exploring the concept of ‘negative space’, or the space surrounding a shape previously assumed. Both, expert operator and dancer were challenged to conjointly develop meaningful situations through structured improvisation.

For the following versions the scene migrated to a different custom-built software named *YVision*, developed by programmers of the renown Portuguese company *YDreams*. Various creative strategies were explored enabling the dancer to make full use of the interactive system, while the expert operator did not need to change his method (of triggering the photographs) so much as he had to learn to dialogue with the choreography.

At first the idea of ‘negative space’ was maintained and refined; then the word particles were introduced, and finally the storyboard was elaborated and defined. Between the first work-in-progress version and the final premiere version we explored creative strategies and alterations in the interactive design during four artistic residencies. Our *Evolving Glossary* contains a principle, which describes this working methodology accurately:

*concept, throwaway, and evolutionary prototyping.* The entry on prototyping describes these three categories:

In concept prototyping sketches and storyboards are employed to explore design ideas in the most cost-effective way to develop design requirements and specifications in preparation of the more cost-intensive phases of the development cycle.

Throwaway prototypes are utilized to gather relevant information regarding performance and functionality of the product to be developed. These kinds of prototypes are usually discarded once the desired information is obtained.

Evolutionary prototypes are characterized by their constant iterations: design requirements and specifications don't delineate a final product, but rather lead to the next iteration of the design.

The three year creation process of *.txt* included four artistic residencies and three public performances of beta versions before the premiere, and employed all three forms of prototyping. As mentioned above, the first iteration of the interactive system design was entirely programmed in *Isadora*, which is a suitable software for the development of *concept prototypes*. Such prototypes may be later migrated to a different, more sophisticated programming environments, as it was the case with the first and second iteration of the Storyboard scene.

In our case *Isadora* also allowed for the use of *throwaway prototypes*. A choreographer can quickly become familiar with its intuitive programming environment, and design interactive systems, which can be explored outside of the studio or theatre. In rehearsal or residency situations we quickly tried such prototypes, and subsequently decided, which one of the ideas was worth pursuing and exploring in more depth. As programming in *YVision* is based on writing code, and *Isadora* allows assembling and tuning modules in a graphical, intuitive way, ideas were often sketched in *Isadora*, and later migrated to *YVision*.

*Evolutionary prototypes* in *.txt* both include single scenes and entire sections of the performance. Even the final version of the piece (premiered in 2009) may be altered in the future according to the stage dimensions, lighting conditions and technical setup at the performance venues.

Concluding our discussion of some aspects of the Storyboard scene, it seems to us that the exploration of the concepts of *Avatar* and *Prototyping* is probably less obvious than the application of other principles from the *Evolving Glossary*, such as *Camera Space*, *Performance Code*, or *Stillness*. Much could be still said about the latter three principles as they have been extensively experimented with during the creation process of *.txt*, and in particular in the Storyboard scene. However, it is precisely for this reason, that we presume that the reader will establish links between the discussion of the use of these latter principles in the CENTA and Aveiro case studies in chapter three (7.2 and 7.3) of this dissertation. Our priority in this case study is to provide a survey of the diverse ways in which principles from the *Evolving Glossary* have been used in the creation of *.txt*.

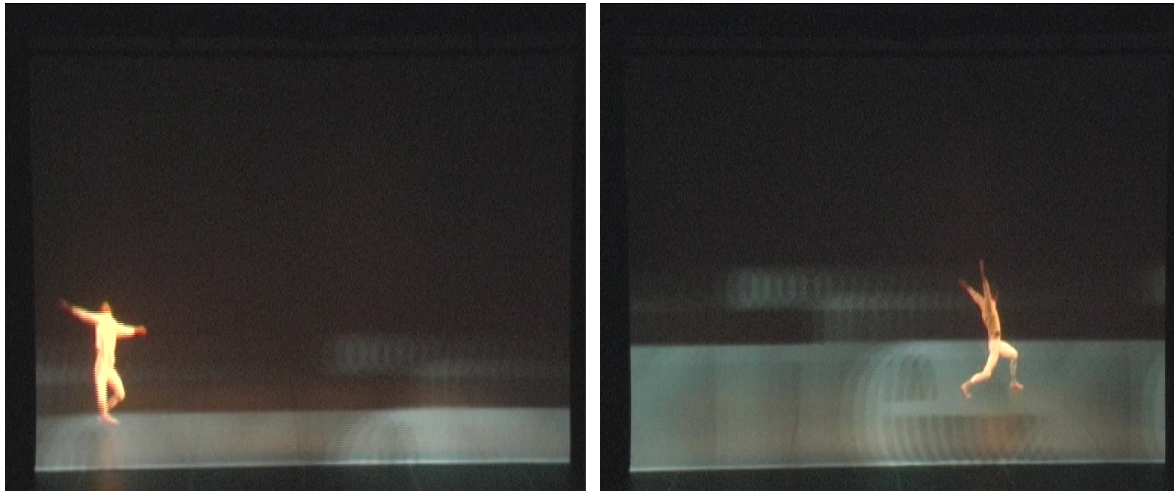
**5.4 Cut-up rain scene**

Table 13  
*Overview of scenes in .txt: Cut-up rain scene*

scene name		scene name	
1	Giant text	10	Text Wall & Backpack 2
2	Fake voice recognition 1	11	A body made of text
3	Scrabble	12	Text cloud
4	Fake voice recognition 2	13	Fake voice recognition 3
5	Storyboard	14	Three Tape Recorders
6	Virus fight	15	Letter soup
7	Text Wall & Backpack 1	16	Explosion of words
8	Cut-up rain	17	New alphabet
9	Hand controls text		Interactive credits

‘Cut-up rain’ is the eighth scene of *.txt*, and consists of two parts. In the first part a number of particle systems are programmed to randomly emit words descending from the top to the bottom of the screen in a vertical line, accelerating their velocity towards the end of the fall, and thus visually creating the effect of a text rain. As the name of the scene indicates, the words compose a text fragment, which in itself is a

cut-up of a larger text. Quotations from William S. Burroughs and Jim Jarmusch alternate. The second part of the scene shifts the particles onto the horizontal plane. In the beginning of this section the words can hardly be read, because they were programmed to gradually enter the screen from the bottom up, thus creating the effect of a stream rising its level.



*Figure 33.* Video stills from the Cut-up rain scene of *.txt* (2009)

Typographical choices vary, as does the velocity of each word, so that the audience is stimulated to read the words in different combinations. Five text blocks are presented in the rain part of the scene:

1. object - crisis - absurd - fear
2. zero - language
3. accident - of - produce - spontaneity
4. illusion - weapon - revolutionary
5. enough - good - to steal - GETS

Every text block appears gradually and successively. For example: enough - enough - enough - enough - enough - good - enough - good enough - enough - enough good - enough - to steal - good - enough to steal - good enough to steal - and so forth.

The 'text river' in the second section of the scene is composed of the word 'exit', which is triggered rapidly, so that one layer overlays another layer with the same

word; the speed of the particles traveling from the right side of the screen to the left side creates the impression of a continuous flow.

Both sections of the scene are not interactive at all. Cut-up rain is the only scene in the entire performance, which does not provide any interactive possibilities for the dancer. Instead, the dancer starts to perform an accumulation of fragments of a movement sequence in different places of the stage. Characterized by mainly vertically oriented movements in the same place, this sequence resembles the energy and movement of the falling words. There is no causal interaction between virtual and physical elements in the scene, but rather a coexistence of similar rhythms.

In the second part of the scene, the dancer performs two longer sequences, which follow the flow of the streaming words from the right to the left side of the stage, and then return against the flow back to the point where he started. Visually it is hardly impossible to dissociate the movement qualities of the dancer's sequence and the streaming words. Naturally an audience relates the different levels of visual information, assuming that some kind of interactivity exists. Apparently the spectator is reassured in this assumption, when the dancer in the following scene clearly reacts in a playful way to word particles appearing as 'word bullets' shot from the same level and side as the 'word river' had appeared before. In the end of the ninth scene he stops the word bullets with his hands and controls the word interactively. What the audience does not know is that the interactive control is only provided in the moment the dancer stops the 'word bullet' with his hand. Naturally a spectator assumes that what s/he has seen before was interactive as well.

However, the Cut-up rain scene is a formidable example for the *perceived interactivity* category in our classification of eight strategies for interactive situations in HCI contexts.

The dramaturgical reason for choosing this strategy is fairly simple: the proceeding scene seven (Text Wall & Backpack 1) marks the beginning of a different environment for the performer, in which he will transform and mature. His environment in the Cut-up rain scene consists of the same texts blocks used in the previous scene; and the fact that he dances his material in an accumulation in loose

synchronization with the rhythms of raining words metaphorically communicates harmony between himself and his environment. Even so, on a deeper level there is no true interactivity with his environment; he is probably only in harmony with what he knows, what he is able to perceive, with his personal universe. Once the 'word river' is swelling and increasing its power and velocity, the words become dangerous, 'bullets', and he falls back into the tendency to want to control his environment.

Along with the choice of *perceived interactivity* as a strategy for this scene, we decided on a closely related principle from the *Evolving Glossary* - the principle of *immersion* - to work on different levels of (audience) perception. Adapted from design theory (Lidwell et al., 2003), our entry mentions two main forms of *immersion*:

Perceptual immersion occurs due to rich sensorial experiences, is easier to design, but is more difficult to sustain during longer periods of time due to the characteristics of our perceptual systems. Cognitive immersion is more difficult to design due to the wide range of human cognitive abilities and personal preferences. Ideally a combination of both types provides rich immersive experiences.

Digital (Live) Performance frequently provides rich immersive experiences, due to its multilayered compositional structure and sensorial input. Particularly interactive pieces invite immersive experiences, both for the performer, and the audience. In the Cut-up rain scene *perceptual immersion* is invited through visual integration of the vertical movement sequence and its placement in the midst of the word rain, and by means of the rhythmic correlations between physical and virtual movement.

*Cognitive immersion* is stimulated through the focus on a few word blocks, which are introduced gradually, so that multiple readings are possible. Choreographic phrases and particle systems were carefully timed, so that the audience does not feel any need to decide whether to focus on the raining words, or on the movement sequence, but is able to take in both layers of visual and kinetic information. Although the dancer never rehearsed his accumulation phrases in the studio with the projection of the word rain, the timings agreed with the programmer allowed for the visual fusion of the physical and virtual elements.

The entry on *immersion* in our *Evolving Glossary* also states:

Oliver Grau has studied illusionary techniques and the phenomenon of immersion in art throughout the centuries to arrive at an in-depth-analysis of image media in virtual realities. For him the opposite of immersion is critical distance, which frequently is achieved through 'staging the difference', in other words, through framing the performative event. (...) Grau claims that loosing critical distance and allowing emotional engagement with the work in Virtual Reality can be achieved through fusing with the image.

Facilitating an immersive experience, or fusion with the visual imagery in this particular scene, was of great dramaturgical importance for us at this point in the performance: while the dancer is immersed in his personal universe, the audience wants to know the impact of their participation in form of their text messages sent the beginning of the performance. As the young man slips back into wanting to control his environment as opposed to living in and with it (scene nine), the 'Text Wall & Backpack' scene is repeated (scene 10). In the following the idea of *immersion* is taken to the extreme: the dancer's avatar changes to the invisible silhouette and is invaded by word particles; in other words, the avatar becomes a body made of text (scene eleven). In conclusion, the principle of *immersion* explored from the Cut-up rain scene on, is a means to involve the audience on a deeper level in the evolution and maturation of the young man character.

## 5.5 Text Wall & Backpack scene(s)

Table 14

Overview of scenes in .txt: Text Wall & Backpack scene

scene name		scene name	
1	Giant text	10	Text Wall & Backpack 2
2	Fake voice recognition 1	11	A body made of text
3	Scrabble	12	Text cloud
4	Fake voice recognition 2	13	Fake voice recognition 3
5	Storyboard	14	Three Tape Recorders
6	Virus fight	15	Letter soup
7	Text Wall & Backpack 1	16	Explosion of words
8	Cut-up rain	17	New alphabet
9	Hand controls text		Interactive credits

Scene seven (Text Wall & Backpack 1) and scene ten (Text Wall & Backpack 2) are identical scenes. Four lines of text messages (sent by the audience in the beginning of the performance) appear across the scrim. Then the young man enters downstage left and slowly walks upstage left, while his white mirror avatar attracts the words from the text block. The audience can read the single words in a new sequence as these gravitate towards the avatar and form a cloud behind his back in the shape of a backpack. Here the text is in the language of the text messages that the audience has sent; Portuguese in our video example.

In terms of our classification of eight strategies for interactive situations in HCI contexts, these two scenes employ a simple *Augmented Reality system*. Although this system provides a much wider range of interaction possibilities, the dancer in both scenes carries out one of the most simple of actions: he slowly walks a straight line. Not surprisingly the principle from the *Evolving Glossary* explored in the Text Wall & Backpack scenes is *simplicity*. A general compositional principle used in the arts, *simplicity* is a 'less is better' concept. Adapting the principle to the field of Digital



(Live) Performance we suggest looking at four central and interrelated aspects: *focus, essence, efficiency* and *clarity*.

*Focus* in the scene under scrutiny is on the act of 'reading', of assembling the word particles in the 'backpack', and the recombination of the words as they do not remain in their original order, but are attracted towards the avatar from different lines of the text block. The *essence* of the scene is the integration of the surrounding text in the universe of the young man, who is literally storing the text messages of the audience in his backpack and takes them onto his journey. The slow speed of his walk, and the clearly defined direction of his path allow for the *efficient* control of the word particle he wishes to attract. These compositional choices allow for *clarity* in communication; the image is as simple and clear as if we witnessed a person on stage sitting at a table and reading a book.

Repeating the same scene in the identical way (only the text is different), also represents choosing one of the most simple dramaturgical tools, indicating that the protagonist enjoyed something, feels the urge to try again, wants to reflect about something, or needs to understand a different aspect of the particular situation. Since the Text Wall & Backpack 1 scene introduces the theme of the young man's conscious involvement with his environment, the repetition and slight variation in scene ten announces an evolution of this theme and maturing of the character. Subsequently, in scene eleven, the young man experiences the environment in an interior dimension, as they word particles compose the body of the avatar, which can be seen as a metaphor for his capacity to open up to his environment and sense inner resonances and correspondences to the outer world. Following this experience and realization, he achieves a new state of freedom and creatively plays with the text clouds in scene twelve.

## 5.6 Three Tape Recorders scene

Table 15

Overview of scenes in .txt: Three Tape Recorders scene

scene name		scene name	
1	Giant text	10	Text Wall & Backpack 2
2	Fake voice recognition 1	11	A body made of text
3	Scrabble	12	Text cloud
4	Fake voice recognition 2	13	Fake voice recognition 3
5	Storyboard	14	Three Tape Recorders
6	Virus fight	15	Letter soup
7	Text Wall & Backpack 1	16	Explosion of words
8	Cut-up rain	17	New alphabet
9	Hand controls text		Interactive credits

We have mentioned above in our discussion of the three Fake Voice Recognition scenes that the last scene in this group (scene 13) epitomizes a conflict between theories of (social) revolutions aiming at *changing the other*, and on the other hand the difficult process of *changing oneself* and trusting that the environment will reflect these changes. The projected word conveys this latter worldview and represents a turning point in the piece. Throughout the following three scenes (14-16) the young man explores Burroughs' instructions for subverting media, and its consequences, to arrive at the conclusion that a different approach is necessary (see 5.1).

Three Tape Recorders, the scene under scrutiny here, consists of two parts, and interweaves three different strands of very specific artistic ideas. One thread addresses the perceptual effects that William S. Burroughs discusses in his short essay on Brion Gysin's cut-up method (Wardrip-Fruin & Montfort, 2003, p. 89-91). Another strand focusses on a section of *The Electronic Revolution* in which Burroughs designs a strategy for subversion put into practice by means of three tape

recorders. A third thread alludes to David Cronenberg's 1991 film *Naked Lunch* about William S. Burroughs' writing process of the novel of the same name.

In Part One of the Three Tape Recorders scene the young man enters the stage with a small blue object in his hands, which suddenly springs open as he shakes it. He walks across the stage with the object under his arm as if carrying a shopping bag. Next, the object becomes a plate, unfolds and becomes a seat, turns into a hat, the top of a carriage, a small tent, and unfolds again to reveal its final form, a cube. These metamorphoses of the object evoke quite different images and interpretations, and thus render a quite complex perceptual phenomenon concrete: looking at the same objects from different perspectives, examining the same object in different contexts, and exploring the physical qualities of the object (rather than restricting it to its designated function) allows for new and fresh readings of the object and situation.

Take any poet or writer you fancy. Here, say, or poems you have read over many times. The words have lost meaning and life through years of repetition. Now take the poem and type out selected passages. Fill a page with excerpts. Now cut the page. You have a new poem. As many poems as you like. (...)  
Shakespeare Rimbaud live in their words. Cut the word lines and you will hear their voices. Cut-ups often come through as code messages with special meaning for the cutter.<sup>163</sup>

For Burroughs the cut-up technique reveals a different dimension *for the cutter*. Whether 'coded messages with special meaning' are legible for the reader of the cutter's cut-ups, is an entirely different question, and has raised intense literary discussion. For some readers, including myself, Burroughs' writings have been more accessible and interesting in combination with the knowledge about his literary techniques, artistic stance and biography.

Observing the young man exploring the object in Part One of the Three Tape Recorder scene, we witness the process of creating new meanings itself (rather than a narrative thread, or dramatic text of some kind). Significantly, this short segment of

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<sup>163</sup> Ibid. p.90

the scene is the only section in the entire piece, *which does not employ any interactive system*. Serving as a kind of prologue for the final part of the work, this rather straightforward sequence of actions introduces the protagonist's attempts at experimenting with Burroughs' revolutionary instructions. It simultaneously induces a more general critical and reflective dimension: the use of the blue cube in Part One and the addition of a green and a red cube in Part Two of the Three Tape Recorder scene clearly enough references the RGB color space as the by far most common color space in consumer photo cameras, camcorders, or computer screens. Through this abstraction from Burroughs' concrete three tape recorder example for media subversion in *The Electronic Revolution*, a more general contemplation of notions of technological liberation is suggested. In other words, scenes 14-16 question what kind of concrete results may be attained from Burroughs' revolutionary strategies in particular, and other revolutionary approaches aiming at changing the other (the neighbor, the government, the system) in general.

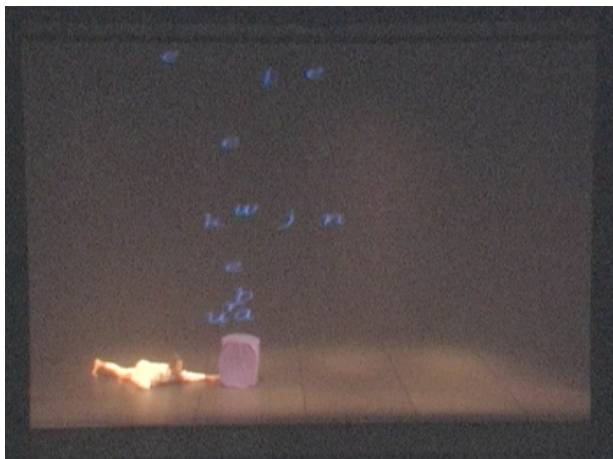


Figure 34. Video stills from the Three Tape Recorders scene of *.txt* (2009)

Part Two of The Three Tape Recorders scene starts with the appearance of blue letter particles emanating from the blue cube as it is moved from one place to another. Throughout the scene the aforementioned green and red cubes are tossed onto the stage, and the young man explores and arranges them in various ways. Red and green letter particles emanate from the respective colored cubes, but as the scene progresses, they start to mix and emerge from different colored cubes. Close to the end of the scene the letter particles appear in greater numbers and eventually fill the entire screen, thus leading fluidly into the next scene called 'Letter soup'. Each

cube is associated with a particular movement vocabulary. Three clearly distinguishable creatures, or forms of behavior manifest as the dancer approaches and manipulates the different cubes.

Throughout the piece several creatures and their particular movement characteristics emerge in different scenes. In an allusion to Cronenberg's film *Naked Lunch* these creatures populate and cohabit the stage environment with more human characters. As all of these figures are embodied by a single performer, we can conclude that each creature expresses a particular mind set and state of being. In Cronenberg's film such creatures appear as 'agents from the *Interzone*', which at times seem to control the writer, and at other times seem to depend on his services. Such ambiguous and strange symbiosis between the protagonist and these extraterrestrial figures enhance the complexity of Burroughs' writing, where drug-induced visions, the very real psychological and legal consequences of killing his own spouse, and the innovative literary techniques merge in astounding and disturbing imagery. One of the most perturbing images is the protagonist's typewriter, which has transformed into an alien head, and whose mouth contains the keyboard on which the writer has to compose his 'reports'.



Figure 35. Video still from David Cronenberg's film *Naked Lunch* (1991)

Cronenberg's film has been an important research reference for *.txt* in that its strong visual imagery indicates an interesting way to gain access to Burroughs' complex universe, particularly to such abstract and intangible themes as control, power structures and manipulation.

Interestingly, *Naked Lunch* was not amongst the key references until very late into the creation process of *.txt*. We started to use excerpts of the film as a way of stimulating 'strangeness' in our movement research for the Three Tape Recorders scene, and later some of the movement material was also introduced in other scenes. Two of the three creatures in this scene emerge from, or stay very close to the ground and move in animalistic ways. The third figure moves upright in the vertical like a human, but displays more mechanic qualities in combination with a certain incapacity to make appropriate decisions.

Rather than witnessing the creation of subversive media texts by using the three tape recorders according to Burroughs' instructions, the audience here is invited to empathize with the states of mind that lead to such manipulation. In other words, the arrangement of the cubes is not indicative of a particular process and result in the form of a perceivable text, but rather secondary: the floating letter particles don't allow for any sense or meaning to emerge. This way possible motivations for revolutionary acts are scrutinized, and the behavior of the performer is highlighted, in contrast to any other of the preceding scenes.

The choice of the suitable interactive strategy for the Three Tape Recorder scene was surprising for ourselves. Originally designed as an Augmented Reality system, the color detection in the tracking process at times malfunctioned, for example resulting in green particles emerging from a blue cube, and so forth. As is often the case, this accidental malfunction was conceptually just what we needed to visually provoke the impression of a system breaking down.<sup>164</sup> At the point where the particles fill the entire screen, the system switches from the cube color detection and local emission of letter particles to a silhouette detection of the performer, including the object he may use at the moment. In the end of the scene he is surrounded by a chaotic and fluid environment programmed to encapsulate him in a small personal sphere. To be encapsulated by the very environment that he himself created through his own 'revolutionary acts' - such a description seems to defeat the purpose of an interactive system. From a dramaturgical viewpoint though, this malfunctioning and claustrophobic environment reflects the consequences of acting in the kind of

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<sup>164</sup> This event during the rehearsal period can be seen as a clear example of the concept of serendipity (see chapter three, ....)

mindset expressed by the three creatures. In summary, the Three Tape Recorders scene employs a deliberately malfunctioning interactive system to substantiate a key philosophical concept present in *.txt: the oneness of self and environment*. In other words, the state of life of an individual who wishes to revolutionize his/her environment, determines what kind of environment will be created; and in turn the existing environment has a strong influence on the individual's life state. Or expressed yet in other terms: the revolutionary tools itself were created in a certain life state; and the user will possibly not escape such influence. In the concrete example of the scene, we might affirm that it is very unlikely that the protagonist can use this particular (malfunctioning) interactive system in a constructive way - unless the internal attitude (expressed through the three creatures) towards the system changes fundamentally.

To work successfully with philosophical concepts and abstract ideas in live performance situations is a challenging undertaking, and to this end we have been working intensely with the principle of *Transfer* from our *Evolving Glossary*. In chapter three (Mimesis of Thought) we have discussed the principle in some depth, and emphasized the non-sensuous similitudes, or structural correspondences, on the three levels of (1) ideas, concepts and principles; (2) practices, techniques and methods; and (3) content. The following table shows such correspondences:

Table 16

*Source material, references and correspondences in .txt*

Source material	Reference	Correspondence
Strand 1: essay <i>The Cut-up Method of Brion Gysin</i> by William S. Burroughs	... cut-ups often come through as code messages with special meaning for the cutter' (for Burroughs they open up a different perceptual dimension)	the process of creating meaning is revealed through the way the young man explores the object (1)

Source material	Reference	Correspondence
Strand 2: essay <i>The Electronic Revolution</i> by William S. Burroughs	- 3 tape recorder section p.7-8: discrediting a rival politician through splicing sex and disapproval tapes - do-the-revolution-yourself philosophy: sample operation against The Moka Bar p. 10-11	- abstraction of the tape recorders, questioning the motivation/ life state of the manipulator (1,3) - RGB color space: consumer technologies (1,3)
Strand 3: film <i>Naked Lunch</i> by David Cronenberg	access to Burroughs' complex universe and intangible themes through visual imagery	movement research inspired by <i>Naked Lunch</i> imagery: kinetic-visual access to the driving forces motivating revolutionary sabotage action (2)

Much could be said about the generative function of these transfers, but we will refrain from such analysis, because this topic has been dealt with extensively in the third chapter. Instead, our focus here is on the non-sensuous correspondences, which allow introducing more concealed dimensions of both, the referenced works, and our piece.

In combination with another entry of the *Evolving Glossary* (Buddhist Principles), we have addressed the concept of 'oneness of self and environment' in the Three Tape Recorder scene; a concept, which brings the entire work to its conclusion, as we will see in the discussion of the final scene. A concept, too, which epitomizes our discussion of designing strategies in interactive situations, because it clarifies the symbiotic relation of performance and interactive system design. In other words, as much as the three creatures exemplify possible life states and the respective motivation for subversive revolutionary acts, the code of the interactive system in this scene encapsulates the life state and resulting tool for the attempted electronic revolution. Hence, a different life state of the protagonist would require a corresponding life state of the interactive system, i.e. it would be a different system with other possibilities. How can an insentient being (the interactive system) reveal a life state? Because, in our example, the programmer carefully designed a system,



which discloses very specific characteristics - color malfunction and subsequent filling of the screen with the maximum number of letter particles to encapsulate the performer's body.

In conclusion, the principle of transfer is bidirectional, and the detailed study of programming the interactive systems in *.txt* would deserve a different case study.

Viewing the piece from the perspective of a 'digital ecology' it might be elucidative to analyze the impact of the choreographic work on the three levels of transfer mentioned above on the programming of the several interactive systems in *.txt*.

### 5.7 New Alphabet scene

Table 17

*Overview of scenes in .txt: New Alphabet scene*

scene name		scene name	
1	Giant text	10	Text Wall & Backpack 2
2	Fake voice recognition 1	11	A body made of text
3	Scrabble	12	Text cloud
4	Fake voice recognition 2	13	Fake voice recognition 3
5	Storyboard	14	Three Tape Recorders
6	Virus fight	15	Letter soup
7	Text Wall & Backpack 1	16	Explosion of words
8	Cut-up rain	17	New alphabet
9	Hand controls text		Interactive credits

New Alphabet is the last scene of *.txt*. The young man inscribes five huge letters of a foreign alphabet in space, the size of his fully extended body. After the completion of each inscription, the letter appears projected on the scrim. Once a word composed of five letters covers the entire width of the screen, four letters disappear, and the remaining central letter increases in sizes until only a fragment of the letter is visible. The young man slowly walks towards downstage center, to the identical place where he started out in the opening scene.

For this scene a new alphabet was generated online through use of the art work *Alphabet Synthesis Machine* (2002) by Golan Levin, Jonathan Feinberg, and Cassidy Curtis. On their web site Levin et al. invite their visitors to create their own alphabets, archive them, and/or download their creations as PC-format True Type fonts. We then imported our alphabet into the systems font catalogue, so that it could be used in *Isadora*.

Golan Levin writes about the project on the web site's home page:

Somewhere between the visual noise of television static, and the visual order of the text you are now reading, lies a fascinating realm of visual semi-sense. Precisely where do the borders of that realm lie? By studying that realm of semi-sense, we surmise that we may come to a deeper understanding of precisely how sense-making occurs at all. To do this, we have written software which attempts to generate artifacts that seem to make sense, but in fact, don't.

The particular goal of this work is to bring about the specific feeling of semi-sense one experiences when one recognizes—but cannot read—the unfamiliar writing of another culture. Our Alphabet Synthesis Machine is an interactive system in which a user guides an evolutionary genetic algorithm in order to create and explore coherent sets of abstract glyphs. Hopefully, these mark-like forms resemble the plausible alphabets of human civilizations with which we simply happen to be unacquainted.<sup>165</sup>

It is in the 'realm of the semi-sense' that the reader of such alternative alphabets perceives the visual characteristics and essential typographical properties more clearly, as he is denied the kind of sense-making within a familiar alphabet. As the user of the Alphabet Synthesis Machine goes through the process of designing his/her own particular alphabet, s/he is given the opportunity to control and adapt a variety of parameters of the glyph. Through this process the user increases his/her (typographical) perception and sensibility in the realm of the semi-sense, because probably none of these creative decisions could be easily expressed in verbal language. Browsing the archive of other user's alphabets, one finds hundreds of highly expressive alphabets reflecting the particular choices and preferences of their creators.

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<sup>165</sup> <http://www.alphabetsynthesis.com/> accessed January 2011

The process of inventing one's own alphabet, and subsequently, language, is a creative as well as a revolutionary act. An alternative to the existing language(s) is presented, and as such, an alternative, represents the danger of a loss of influence, control, privileges on the part of the established systems. Interestingly, it is not enough to just present a (revolutionary) alternative, as it can't be fully understood by the others without an effort to learn the new language system. In other word, it requires acceptance and gradual implementation based on consistent constructive effort. Or, in the perspective of *The Electronic Revolution*, it represents a new virus that needs to be accepted by the host.

When the audience witnesses the young man's creation of his own particular alphabet, spectators are not presented with any kind of solution, but rather with the culmination of a maturing process throughout the piece. Internal changes resulting from his experiences with the exploration of his environment and the revolutionary instructions suggested by Burroughs lead the young man to enter a different path: he now is exploring how internal changes in perception and attitude will reflect constructively in his environment. His approach resonates with the subtle approach of Levine's *modus operandi*. In essence, the user and the audience is presented with the possibilities of *living a creative life*. On one hand such an approach increases the appreciation and understanding of other people's efforts, skills and ideas, and on the other hand it becomes obvious that our own ideas need to be accepted, to find consensus to provoke change on a larger scale.

The design of the interactive system in the New Alphabet scene subtly reflects these philosophical ideas. An expert operator triggers the glyphs as soon as the performer concludes the corresponding movement, and the last remaining letter grows in sizes as the dancer walks downstage center. At this point such a simple system has a number of advantages. Visual clarity of both, movement and the projected glyph, is more desirable than a system, which allows to see the graphic visualization of the dancer's movement instantly. Additionally, the expert operator can decide how much time to allow for the audience to read the glyph, before the dancer continues with the next movement section. The reading time span also alludes to what has been said

above: the delay between movement and the projection of the letters hint at the time span that revolutionary acts need in order to provoke changes on a larger scale.

*Depth of Processing* is the principle from our *Evolving Glossary*, which plays a key role in the conception of the final scene. An excerpt from the entry in our hyperdictionary reads:

Determining factors for the depth of information processing are *distinctiveness*, *relevance* and *degree of elaboration*. Distinctiveness refers to the uniqueness of the information in relation to preexisting experience and other related information.

Relevance refers to the perceived importance of the information. The degree of elaboration refers to the effort that is required to interpret and comprehend the information.

*Distinctiveness* is probably the most obvious factor in this scene: as the projected glyphs stem from an imaginary alphabet the audience recognizes the difference from the familiar and enters the perceptual realm that Levine calls the semi-sense. *Relevance*, or importance of the information is also an evident factor, because New Alphabet is the final scene and it is commonly agreed that the ending of a performance, film, book or other time-based work represents a closure of what is presented. In our case, the last action of the performer, walking to downstage center (the very place where the performance started) and relating to the projected fragment of the glyph (identical action in the beginning) suggest a circular form of the piece. In other words, the performance is framed by very similar, yet distinct scenes. Additional aspects of the relevance of the information can be discovered through looking at the particular relation of the final scene to other scenes in the work:

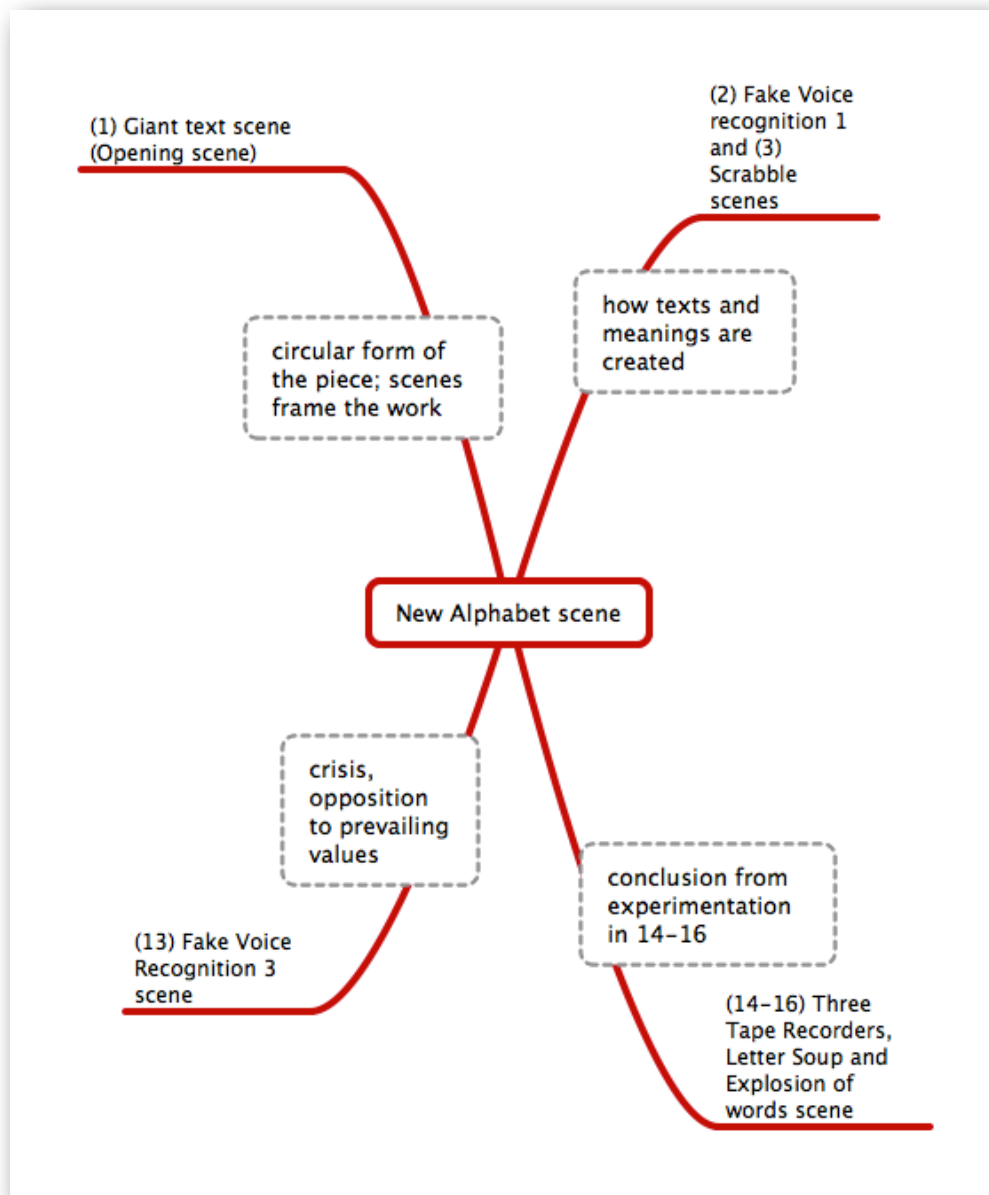


Figure 36. Correlations of the New Alphabet scene and other scenes of .txt

Fake voice recognition 1 and Scrabble are two subsequent scenes dealing with how text units are created and composed to create miscellaneous meanings. They correspond to the New Alphabet scene in that the theme is the origination of an (artistic) language, and contrasts with the final scene regarding the form of expression (verbal versus movement language). Fake voice recognition 3 represents a moment of crisis in the piece, where the spoken word refers to Burroughs' revolutionary views, and the written projected word expresses our contrasting perspective, which manifests most clearly in the final scene of the work. Following scene thirteen, three scenes elaborate on this conflicting views, so that New Alphabet

can be seen as a conclusion from the results of the experimentation with Burroughs' revolutionary instructions, or in fact, more generally with this kind of revolutionary practices.

Nevertheless, some reflection and analysis has to take place to perceive such correlations between the different scenes in *.txt* consciously. *Degree of Elaboration* as the third factor in the *Depth of Processing* principle describes the effort needed to interpret and comprehend the information, and plays the key role in the understanding of the wholeness of the work. In this case study for example, we have dedicated approximately thirty pages so far to the analysis of six scenes of the performance *.txt*, and even so further relevant aspects could be discussed outside the questions we have been focussing on.

Of course the *Degree of Elaboration* factor also plays an important role in the creation of each single scene. We have shown that scenes range from the extremely simple (Text Wall & Backpack 1 scene) to the highly complex (Storyboard scene), and for which reasons such different degrees of elaboration have been chosen. It is worthy of attention that the three factors of *Distinctiveness*, *Relevance* and *Degree of Elaboration* may be combined to improve the *Depth of Processing* regarding the central ideas of *.txt* (the big bang of artistic language, interactivity as content and critical reflection). For example, throughout the various scenes very different interactive systems are used, and various creative strategies may be designed for the same system. This way the idea of 'interactivity as content' is brought up in distinct contexts and elaborated to varying degrees of impact on the audience.

Another excerpt from the entry on Depth of Processing highlights a second important aspect facilitating the audiences' deeper understanding of the work:

From the perspective of live performance and interactive technologies the depth of processing is a key principle to fully engage an audience. If conceptual, thematic and aesthetic *correspondences* between the various elements of a performance can be established, an audience will experience a multimodal processing of the information, which is yet another method to deepen understanding.

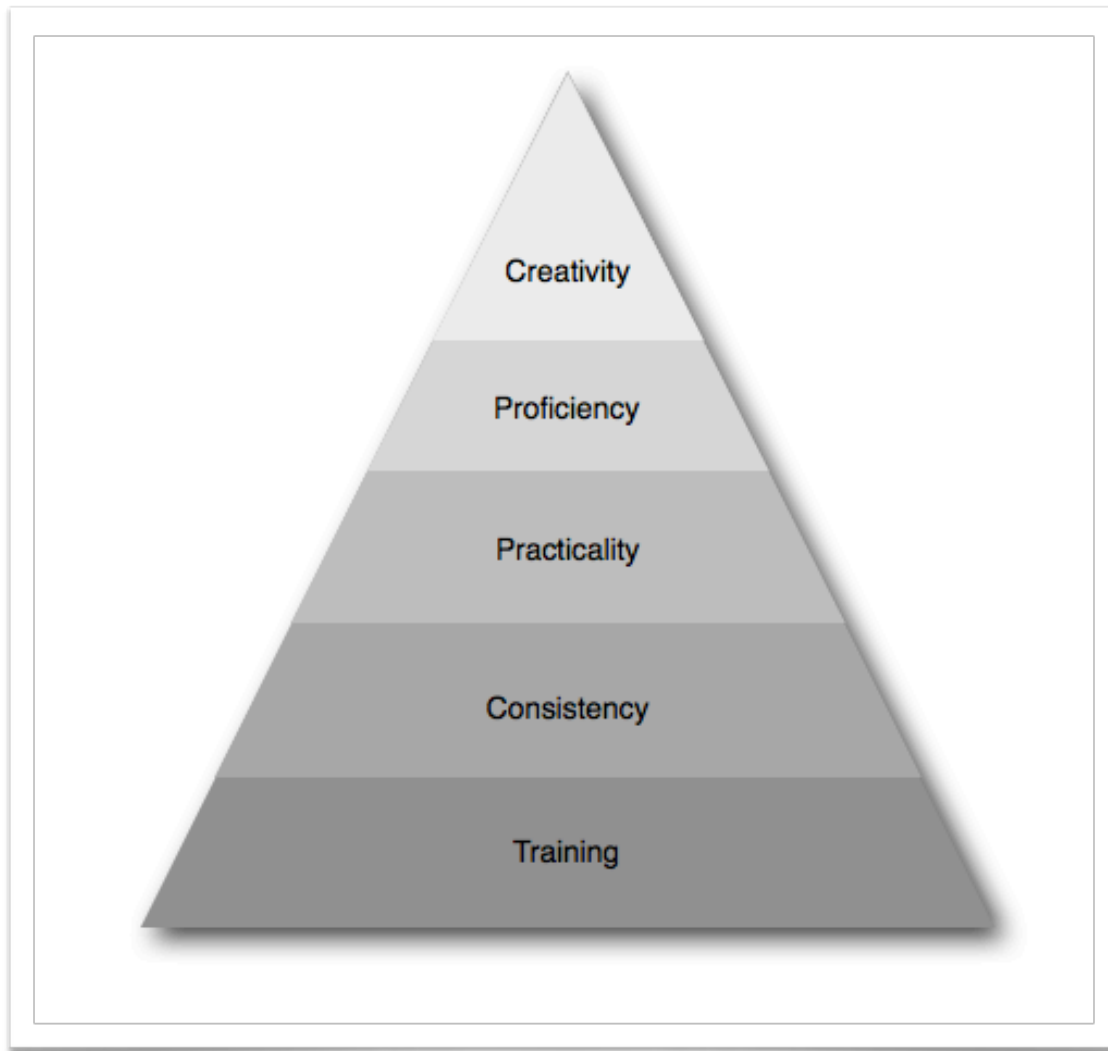
Central ideas from *The Electronic Revolution* for example appear simultaneously in different strands of the performance. In scenes five and six (Storyboard and Virus fight) text fragments (from the Moka Bar incident) are projected and inspired the movement research for both scenes. The Three Tape Recorder scene incorporates Burroughs' instructions for subversion on a dramaturgical level, and use a speech of U.S. President Obama as a soundtrack, which has been spliced and reversed. Beyond the live performance itself, program notes, a web site, and the identification of our references and influences allow for further multimodal processing of *.txt*. Additionally, we have been frequently invited to present our work at conferences and other more informal public events, which also contribute to deepen the understanding of our artistic research and work.

## 5.8 Reflection

Our case study on designing creative strategies for interactive situations in HCI contexts presented the application of eight distinct principles from our *Evolving Glossary* in the context of six selected scenes from the digital performance piece *.txt*. Mostly we have analyzed the articulation between artistic concerns, conception and methods in this case study to show how the classification and the glossary can be used in artistic practice.

Evidently the design of each creative strategy (or combination of strategies) for a given interactive situation results in specific performance techniques. Our classification in combination with the *Evolving Glossary* therefore also provide an array of important tools for the training of the performer in interactive environments.

For example, the *Hierarchy of Needs* principle from the *Evolving Glossary* consists of five levels of essential prerequisites for successful performance (training, consistency, practicality, proficiency and creativity). Each level builds on the previous, so that a pyramidal model best visualizes the performer's needs:



*Figure 37. The Hierarchy of Needs model (adapted from Lidwell, Holden and Butler, 2003) for the field of Digital (Live) Performance*

If we apply the model to the different scenes of our case study, we immediately understand the viability of these categories in preparing the performer. In the Backpack scene for example, the movement is extremely simple (the performer just slowly walks on a diagonal). There is no physically challenging task to perform, the dancer is working instantly on levels four (proficiency) and five (creativity). Since the random generation of new text fragments is the sole focus in this scene, the performer can create subtle variations of stop and go sequences that correspond to the way we read a text with its punctuation marks.

The fake voice recognition scene operates on levels three to five, and requires careful timing of the words spoken into the microphone with the uncomplicated movement sequence. Little practice is necessary for the dancer to be able to coordinate the movement and the visual composition of the projected words.



Quite contrastingly, the Storyboard scene involves all levels of preparation. Some of the mostly fixed choreography is technically challenging and requires regular training, thus allowing for improvised adaptation of the movement.<sup>166</sup> This adaptation of the choreography occurs according to the simultaneous visual composition of the fotograms and their relation to each other. Here, extensive rehearsal on the different levels has been necessary: in each performance venue the angle and field of vision of the camera varies as much as the physical stage space and the dimensions of the screen. In fact the dancer is working through the stages three to five to prepare for this particular setup each time the piece is performed again.

In conclusion, we see much potential for further future research into the subject of specific performance techniques within differing interactive environments, and hope to contribute for both, more precise analysis of existing artistic work, and the development of distinct techniques for the field of live performance with interactive systems.

As we have seen in chapter three (figure 16), the demands on the performer improvising in interactive environments require extensive perceptive training and compositional capabilities, which is why we dedicate the final chapter of this investigation to the subject of synergetic training as an adequate method to face such sometimes overwhelming complexity.

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<sup>166</sup> Corresponding to levels one and two of improvisation in Lampert's model (see chapter three)

# Chapter Five: Synergetic Training

## 1. Chapter Introduction

Chapter five is dedicated to our third area of investigation, the specific training and preparation of a performer in the field of digital (live) performance. In the opening section of the chapter we recall the idea of a 'synergetic training' as suggested by choreographer Kenneth King. Subsequently several notions of synergy from different academic fields are reviewed to arrive at the formulation of favorable conditions for synergetic effects to take place in training for digital (live) performance. The second part of the chapter presents a case study, which examines the design, objectives and outcomes of an artistic laboratory realized with the Dansul Dance Company and other participants in Mertola, Portugal. The chapter concludes with a detailed analysis of synergetic effects that occurred during the laboratory, and establishes possible avenues for further research.

## 2. Synergetic effects in training for Digital (Live) Performance

Much has been already said in the previous chapters of this dissertation about the need for a specific preparation and training of a performer in the realm of Digital (Live) Performance. Three case studies have presented in the chapters three and four to discuss generative techniques and the design of creative strategies in (HCI) interactive systems. In the context of the framework we have introduced in chapter one and two, these case studies exemplified an 'interdisciplinary choreographic' approach (Lycouris) in intermedial live performance (Chapple&Kattenbelt, Boenisch, and others) situations, or Digital (Live) Performance. We concluded from the CENTA case study (chapter three, 7.2) that such interdisciplinary dialogue can produce 'synergetic effects', but we have not defined synergy in the context of digital (live) performance yet, nor clarified, what factors in the performers' training can be favorable for synergetic effects to appear. Most dictionaries generally refer to the Greek root of the word, and subsequently relate the term to the most diverse contextual usages, so that we could conclude that 'synergy' is too vague to mean anything specific in our field. However, looking at the use of the term in the sciences

(namely in system engineering, physiology, and social psychology), there are useful notions of synergy, which we can apply to the field of training in digital (live) performance. Rather than attempting to propose a definition for synergy in Digital (Live) Performance, we will concentrate on identifying some (reproducible) favorable conditions and factors that lead to the appearance of synergistic effects in training and rehearsal.

### 3. Notions of Synergy

#### 3.1 King's call for synergetic training

American choreographer Kenneth King, whom Deborah Jowitt calls 'perhaps our only dancing philosopher',<sup>167</sup> approaches the term synergy from the practical perspective of the daily work with students and his dance company. In his 1984 essay *Transmedia* he states:

One could consider classical alignment and turnout as a kind of technology for locomotion through space, but the tilting, multiple contractions, streamlining of line, pulse, spiral, and the twisting and skewering of line and form by the rotation of the torso - what Merce Cunningham ingeniously discovered - have expanded and changed all priorities. Sometimes I like to try shifting back and forth between 'movement' and 'dance' - they really can't be separated! I like the idea of a technic rather than a technique, because there are larger, organic, holistic connections in the moving body, and another energy source. I mean, with whom or where can one train to move synergetically? (King, 2003, p. 6)

Later in the essay King clarifies his enigmatic choice of words:

I always encourage students to bring something else or o t h e r - an interest, a vocation, a study, system, even another art - to the dance, to discover a larger organic understanding of the moving body. And in the classroom I insist on being a student too and sharing the collective kinetic investigation and exchange.<sup>168</sup>

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<sup>167</sup> See Jowitt's foreword in King, 2003, p. xv

<sup>168</sup> Ibid. p. 8

From these quotations we can extrapolate two important conditions for synergetic effects to occur: (1) an extended view of what dance and choreography is (such as Lycouris 'interdisciplinary choreography'), and (2) the importance of research outside of dance applied to the field of dance/choreography. Though both conditions seem to be often fulfilled in current contemporary dance practice, twenty-six years after King wrote this essay we face the identical challenge today. At the present extended views of choreography need to be elaborated and taught; and research needs to extend beyond what has already been integrated in interdisciplinary choreography. If our goal is to provoke strong synergetic effects in training and performance, we have to work and think beyond the boundaries we encounter in the specific situation with the particular individuals we are working with. Part of designing successful workshop, laboratory and rehearsal situations must therefore be a thorough evaluation of the previous experience and training of the performers collaborating with us. Naturally their backgrounds vary considerably, and the place and time also impact strongly. Regarding the second condition, King clearly indicates that the research (outside of dance) brought to the work in the studio is a vital resource for the process. In our discussion of the 'living archive' (chapter three, 4.3) we have suggested that exploring these (personal) resources can trigger synergetic effects, and eventually even result in a recursive mode of working. In other words, synergetic effects can lead to (unexpected) improvements feeding back into performance methodology and training.

### **3.2 Latash's definition and categories**

So far we have based ourselves on more general definitions of synergy, such as the Oxford dictionary: "the interaction or cooperation of two or more organizations, substances, or other agents to produce a combined effect greater than the sum of their separate effects". Our focus was on the descriptor 'a combined effect greater than the sum of their separate effects', which is used in many fields of endeavor to describe synergies of all kinds. Mark L. Latash, Professor of Kinesiology at Penn State University, U.S., recently published a book entitled 'Synergy', in which he builds a definition for the field of physiology and movement studies, based on several concepts, which are equally useful for our discussion (Latash, 2008). In his introductory chapter Latash presents different examples of collaborative situations,

which cannot indiscriminately be called synergetic. He rather suggests a ten point scale from 0 to 10 to determine the extend to which a collaborative situation might be termed synergetic. Three criteria allow for such classification: (1) sharing, (2) flexibility and stability, or error compensation, and (3) task dependence. These three main components of a synergy also represent the pillars, on which Latash builds his qualitative definition. Sharing, the first component, addresses the distribution of a collective task over a set of elements, for example persons, muscles, digits, etc. If one element produces less (or more) than its expected share, other elements need to show adjustments in their contributions, thus securing that the task is performed properly, compared to what could be expected if all elements acted independently. Flexibility/stability, the second component indicates that a task accomplished by flexible solutions thus providing stability of an important performance characteristic. Error compensation is one important form of employing flexible solutions towards successful task accomplishment.

Task dependence, the third component, is characterized by the ability of a synergy to change its functioning in a task-specific way. In other words, a synergy may form a different synergy based on the same elements during the process of performing a task.

Clearly all components are interrelated, but the degree to which collaborative situations evidence one or more of these characteristics, indicates the emergence of true synergies (versus collaborative situations, in which elements work together in ways that cannot be termed synergetic).

Latash focuses on movement studies and motor synergies. In chapter five of this publication he presents the reader with a classification of motor synergies (kinematic, kinetic, multi-digit, prehensile and multi-muscle synergies), and provides detailed examples. Chapter six of his book discusses an interesting question: whether such thing as a 'normal' (motor) synergy exists? He distinguishes in the following between atypical, suboptimal and changing synergies to provide adequate descriptors for the most diverse situations, in which motor synergies occur. For example, a highly trained athlete will evidence atypical motor synergies, while an elderly person manifests suboptimal motor synergies (= very cautious movement), that prevent him or her from possible injuries.

However, the study of motor synergies in this neurophysiological perspective does not help us really to discuss the kind of synergetic training King suggested, applied to our field of Digital (Live) Performance. Although some of the synergies occurring in Digital (Live) Performance environments can be described from the perspective of movement studies, most of the synergies are of a different order. Latash terms them 'sensorial synergies' and dedicates a separate chapter to discussing the differences. He defines sensorial synergies as follows:

According to the main definition of synergy, this is a neural organization of a set of elemental variables (in this case, sensory variables) with the purpose of stabilizing a certain performance variable. So, a sensory synergy may be viewed as an organization of perception, based on sensory signals from different sources and possibly of different modalities to ensure stable performance of a motor action. But one can also view sensory synergies separately from their potential role in the organization of action. Then, they can be viewed as neural organizations stabilizing percepts. (Latash, 2008, p. 344)

Percepts here indicate our conceptions of the world, which creates the base for our perception of the world. On one hand, percepts need to stable for our perception to work, on the other hand flexibility is needed to react towards unexpected objects and events.

For Latash sensory synergies are a complex and complicated topic, because "there is no adequate language for perception that would be analogous to the language of mechanics for action" (Latash, 2008, p. 355).

However, for us his definition of sensorial synergies is extremely useful, as 'the organization of perception' is precisely a major topic in the training of the performer who uses new media technologies. More exactly, the reorganization of perception, or expansion of the performer's percepts is at the core of his training. Concrete examples include the work with the camera space, the characteristics of different interactive systems, or the gap between corporeal information and the behavior of a projected virtual double of the performer's body.

Since our methodology points in an entirely different direction (towards the design of creative strategies), we consequently do not have to identify adequate elemental variables and performance variables to arrive at a quantitative analysis of sensory

synergies. Instead, we suggest adapting Latash's general definition for synergy and his specific description of sensorial synergies in a broader sense to our field of Digital (Live) Performance, and look into the field of social psychology (namely, small group performance) for further substantiation.

### **3.3. Synergy in small group performance**

James R. Larson (2010), professor of social psychology at the Loyola University of Chicago recently published his research on synergies in small group performance. His focus are task performance groups of maximum twenty elements, which are mutually dependent on each others, as they strive to achieve a common goal. Group members are cognizant of their interdependence and share a common purpose. Larson situates his research of synergy in small task performing groups in the larger area of the study of group effectiveness, which he describes as "the extend to which the group is able to accomplish its task objectives, fulfill members needs, and maintain its integrity as an ongoing system" (Larson, 2010, p.22). He delineates his field of study as "only that part of group performance that relates to task performance in the present",<sup>169</sup> in other words, how well or poorly a group performs, and whether there is evidence of synergy in that performance.

Larson's definition of synergy resonates with the general understanding of synergy across many disciplines:

I define synergy as a gain in performance that is attributable in some way to group interaction. More specifically, a group is said to exhibit synergy when it is able to accomplish collectively something that could not reasonably have been achieved by any simple combination of individual member efforts. Synergy is thus an emergent phenomenon rooted in group interaction. (Larson, 2010, p. 4)

Interesting about his approach is that synergy denotes a 'performance gain', a concept which Larson developed based on more recent theoretical developments in his field, stressing the need to research beyond negative factors in small group performance leading to 'performance loss'. Such 'performance gains' can be assessed on the premise that synergy is simply a performance gain due to group

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<sup>169</sup> Ibid. p.22

interaction, and compared to a clear baseline (the performance of the same individuals working independently without interaction). So, rather than analyzing factors leading to 'performance loss' (compared to an idealized perfect performance of the group), this approach investigates what conditions can lead to synergy manifesting as performance gains in group interaction.

Furthermore, Larson introduces the terms 'weak synergy' and 'strong synergy' to distinguish between two generic degrees of synergy. Weak synergy is defined as "group performance that exceeds the performance of the typical group member when working alone". On the contrary, strong synergy is defined as 'group performance that exceeds the solo performance of even the best group member'. Importantly, weak synergy refers to performance gains that can be achieved at least by some members of the group, when working alone, while strong synergy refers to performance gains that cannot be achieved by even the best group member performing alone.

Among several variables eventually contributing to synergy in small group performance we have selected two that deserve prime attention in the context of our research, motivation and diversity. According to Larson motivation gains can be expected, when all elements of the group identify with the group and task they are performing, and when each member of the group feels they are indispensable. Genuine synergistic performance gains can be expected particularly when "the least capable member realizes that his or her efforts are indispensable to the performance of the group as a whole".<sup>170</sup> For member motivation gains to translate into synergistic group-level performance gains, goal-setting plays a key role. The goals that are set for individuals should neither conflict with each other, nor with the goals set for the group as a whole.

Diversity, which Larson classifies either as surface-level or as deep-level diversity, is a factor that frequently impacts negatively on social integration, but can significantly benefit group performance.<sup>171</sup> More precisely, the group member's skills and abilities can represent an increased range of available resources. If these skills and abilities are relevant to performing the task at hand, deeply diverse groups can be expected to perform better than deeply homogenous groups.

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<sup>170</sup> Ibid. p.287

<sup>171</sup> See Larson's general model on page 313 of the publication under discussion



Both variables are clearly interconnected: synergistic gains deriving from deep diversity in member's skills and abilities can be manifested when the group as a whole works towards an agreed goal, and perceive their individual efforts as indispensable contributions.

Larson's synergy framework provides an articulate and complementary perspective on aforementioned topics, such as multidisciplinary versus interdisciplinary composition of collaborative groups (chapter two), or emergence and serendipity (chapter three). With its focus on task attributes and interaction research, this framework represents an important reference for our investigation, particularly for the discussion of the case study presented in this chapter.

### 3.4 Fuller's contributions

Richard Buckminster Fuller's view on synergy starts with nothing less than the entire universe. Fuller, who called himself a 'comprehensive anticipatory design scientist', investigated what he termed 'nature's coördinate system' (meaning nature's basic patterns) to arrive at a worldwide technological revolution, which would consume less resources, grant sustainable growth and provide all humankind with decent living conditions. Anticipating mankind's future needs, the comprehensive designer's task is to 'coördinate' resources and technology based on scientific laws discovered by means of synergistic principles.

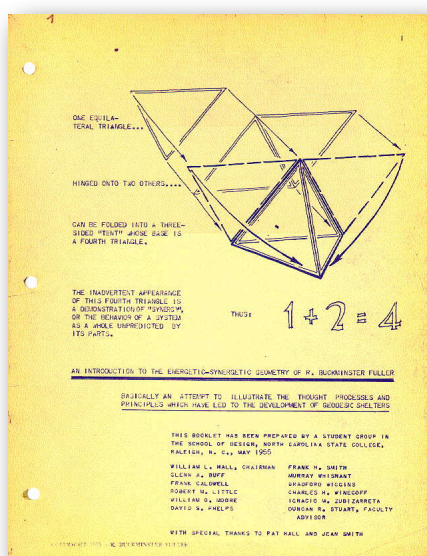


Figure 38. An Introduction to the Energetic-Synergetic Geometry of R. Buckminster Fuller

Figure 38 shows a (quite accessible) introductory example of Fuller's original and innovative geometric system. The explanation reads: "One equilateral triangle hinged onto two others can be folded into a three-sided 'tent' whose base is a fourth triangle. The inadvertent appearance of this fourth triangle is a demonstration of 'synergy', or the behavior of a system as a whole unpredicted by its parts. Thus:  $1+2=4$ "

Arguably the most impressive materialization of Fuller's synergetic geometry is the U.S. Pavilion for the Montreal Expo 67 (see figure 39).

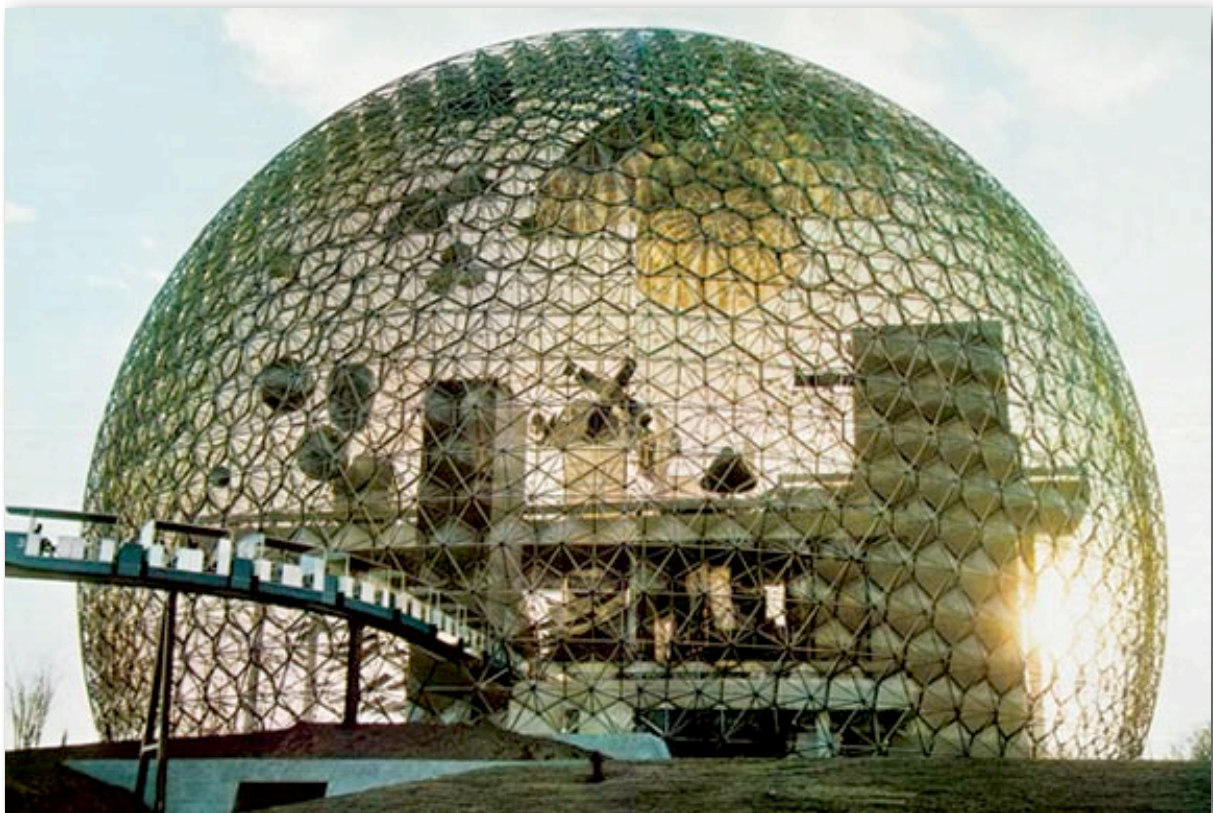


Figure 39. U.S. Pavilion for the Montreal Expo 67

Apart from its breathtaking architectonic beauty, the U.S. Pavilion served as a concrete tangible model for Fuller's lofty ideas and ingenious concepts, which have inspired successive generations of engineers, architects, mathematics, but also artists, curators teachers, and journalists. Fuller's energetic-synergetic geometry was later incorporated in two comprehensive publications of his work, *Synergetics* (1975) and *Synergetics 2* (1979), subtitled: *Explorations in the Geometry of Thinking*. Synergetics thus comprises an entirely new field of studies, the geometry of the physical reality as well as the geometry of thinking, both derived from the discovery

of 'nature's coördinate system'. A very broad discipline, synergetics embraces a wide range of scientific and philosophical studies, including tetrahedral and close-packed-sphere geometries, thermodynamics, chemistry, psychology, biochemistry, economics, philosophy and theology.<sup>172</sup> E. J. Applewhite, a long-term collaborator of Fuller, writes:

Although Fuller declared that he was striving for a style expressing the most accurate and comprehensive observation of experience, he ended up with a whole new and unfamiliar and often polysyllabic vocabulary of his own invention. At the best his descriptions achieve a kind of poetic combination of feeling and abstraction - physical sensations merging into metaphysical patterns. Because it verges on a prose poem I describe Synergetics as a literary rather than a scientific work. In fact when we started to collaborate on the project in 1969 he had an impulse to write the whole book in blank verse - or at least with unjustified right margins. The manuscript as I discovered it after years of gestation had the first two chapters in verse form. (Applewhite, 1986, p. xvi)

The quotation above was taken from Applewhite's *Preamble with a Few Explanations* to the Synergetics Dictionary, an exceptional "comprehensive documentation in one publication of all the major avenues of Fuller's thinking", for which Applewhite assembled 22.000 cards in alphabetical sequence. Fuller's complex language synergies and neologisms often require what Applewhite calls 'tomographic reading', a successive study of interrelated entries. Most of the entries are directly related to passages and sections from *Synergy* and *Synergy 2*. Besides those entries that fall under the habitual category of dictionary definitions (explicit statements of what Fuller means by each term he uses), the *Synergetics Dictionary* also provides another class of entries called *Sequences: Metaphors*. The latter category is composed of narrative sequences that frequently recurred in Fuller's lectures and writings.

Most interestingly, Fuller time and again elaborated on file cards of one of his earlier statements, so that the dictionary became a tool and stimulus to advance the creative process itself.

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<sup>172</sup> See <http://tensegrity.wikispaces.com/Synergetics> for a comprehensive introduction, accessed January 2011

Naturally, “(...) Fuller demonstrates a clear kinship to artists concerned with cross-disciplinary investigation, particularly those navigating uncharted terrain in terms of using or rethinking systems as the basis for individual works or bodies of work”, writes Elizabeth A. T. Smith (2009) in her insightful essay entitled *The Comprehensivist: Buckminster Fuller and Contemporary Artists*. Navigating uncharted terrain implies mapping new terrain, and rethinking systems leads to divergent use (or reformulation) of existing terms and concepts. Clearly it is this creative process that Smith describes here, which gave birth to the *Synergetics Dictionary*, and stimulated Fuller to recursively elaborate on particular entries.

After discussing several examples of shared intuitions and affinities between Fuller and a number of more recent contemporary artists, Smith concludes by drawing on writer Victoria Vesna, who described Fuller ‘as a “performance artist who constructed practical prototypes of some of his visions”, and who points to the persistence of an “invisible aesthetic of integrity’ underlying and unifying all of his work” (Smith, 2009, p. 74).

In the midst of the most severe personal hardships Fuller embarked on a lifelong project, which could have been designed by a contemporary performance artist: he would find out what a single individual could contribute to all humankind through full exploration of his potential. Over the next five decades he documented this project in a diary, later entitled the *Dymaxion Chronicle*, and used the name *Guinea Pig B* as a synonym for himself (which eventually became the title of a book: *Guinea Pig B - The 56 Year Experiment*). While his life arguably can be seen as a performative experiment considering his unconventional methodologies and practices, it is the spiritual dimension of dedicating his life to the benefit of all humankind, which seems most significant to us. Fuller’s work and life are proof to the importance of understanding an element (of any system) in its interrelatedness and interaction with other elements to successfully unveil synergetic principles. More than just one factor in creating favorable conditions for synergy, such a holistic and ethically responsible attitude towards work, collaborators and life in general seems to also resonate with Latash and Lawson’s observations and definitions of synergy. In the following we will present a case study, which serves to introduce our perspective on synergetic

training in Digital (Live) Performance, and examines what synergistic effects have manifested in this particular laboratory.

#### **4. Case Study: Dance & Technology LAB with *Dansul* Dance Company (Mertola, Portugal)**

A four-day laboratory with the members of the semiprofessional Portuguese dance company *Dansul* directed by Paula Varanda will serve us as a case study to discuss specific aspects of synergetic training in Digital (Live) Performance. Along with the five company members another group of nonprofessional dancers with different backgrounds participated in the laboratory. Nobody (except director Paula Varanda) had worked with new media technologies before. Additionally a group of interested high school and university students from different fields joined the laboratory for the last two days. They had been introduced to the software *Isadora* and were interested in seeing its concrete applications in the theatre. Three students of this second group volunteered to operate *Isadora* during the final presentation of the laboratory results. The laboratory took place at the Cine-teatro in Mertola, Alentejo, between the 4th-7th of May 2009. Days one, three and four of the lab were dedicated to working in the theatre with the 'dance group', and day two was reserved for an introduction to programming in *Isadora* (given at the facilities of a high school nearby), which was directed towards the 'technology group'. Both, dance and technology groups were invited and encouraged to participate in the other group's activities. The total working hours of the lab accounted to ten.

##### **4.1 Design and objectives of the LAB**

Given the level of experience and the available total working hours, the overall conception of the lab was directed towards the exploration of a single interactive situation within a smaller group, which ought to be developed during the four days and shown to the other group (and eventually to other interested audience). From the perspective of the participants, each experience was designed to be a unique journey into the world of Digital (Live) Performance, both serving as an introduction to the possibilities of the use of new media technologies in the performing arts, and the experience of a different kind of training necessary for this kind of work. On the other

hand, the lab was designed in a format that would allow for a specific case study on synergetic training in Digital (Live) Performance. To this end we documented every day in a field book, filmed the final presentations, and conducted an open interview with all participants following the public performance.<sup>173</sup>

Most of the following research questions were asked and/or discussed during the open interview, although a few exclusively served the preparation of the lab:

1. What connections would the dancers establish between their movement and the projected interactive video images?
2. How would the movement be influenced and change because of the interaction with the projected image? What adjustments would have to be made in programming *Isadora*?
3. What needs did the dancers have in working with the suggested technologies?
4. What (technical) information would be absolutely necessary for the dancers to work with their specific interactive setup?
5. How would participants react towards an extremely simple setup (as opposed to being exposed to a general overview of possibilities), and towards the suggestion to explore just one interactive set up in depth during the entire laboratory?
6. In summary, what can be identified as a synergetic effect occurring during this laboratory?

Objectives of the laboratory included:

- To investigate in which ways selected principles from our *Evolving Glossary* could be articulated with the aforementioned research questions and provide techniques for the synergetic training of the participants
- To test which categories of constituent elements of artistic laboratories that we proposed in chapter two (4.2) deserved particular attention in order to provide a satisfactory and stimulating experience for the participants
- To reflect upon the methodologies put into practice during the course of the laboratory, and point out correspondences to the workshops designed by Troika Ranch, Wechsler and Lovell/Schiller

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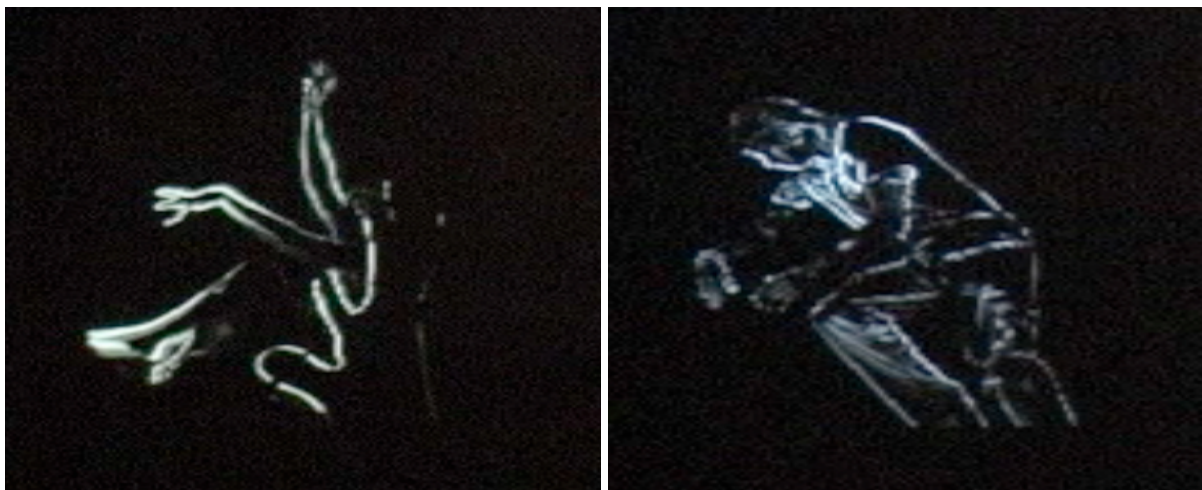
<sup>173</sup> All materials are included on the DVD annexed



## 4.2 Report of the laboratory

Day one of the laboratory started at the Cine-teatro with an introduction to creating movement for the camera. Improvisational tasks were designed for the pyramidal space of the camera, so that participants would understand and use the differences between stage space and camera space. Subsequently the software *Isadora* was presented from a practical perspective: rather than providing a more general explanation, the dancers learned that prerecorded video as well as video live streams can be processed by means of a number of video filters. Following the brief experimentation on the computer, two simple interactive systems were set up: two live video inputs were processed respectively with the difference and the warp filters. The results could be immediately verified on a big screen. One group would explore the difference filter, and another group investigated the possibilities of the warp filter. Both groups were asked to take notes of successful moments of their explorations.

Each filter provided immediate visual feedback of the processed images of the dancers' movements. The difference filter shows the divergences of the current frame of video and the previous; in other words, areas where differences are detected appear brighter, and areas where no changes have occurred, remain dark. As a result one gets black and white images with a peculiar aesthetic.



*Figure 40.* Video stills from the final presentation of the Mertola laboratory (Group One)

If one moves a part of the body, for example, this part will appear as a white silhouette, while the parts one did not move remain invisible. Stop, go and pausing

movement thus became immediate choices in a first exploratory phase. When asked towards the end of the session, what moments worked for them, group one identified five ideas they considered worth developing further:

- a) A projected body composed of several members of the different dancers bodies
- b) The use of chairs, which would not appear in the projected image and provide a base for apparently weightless movement, and a means to appear and disappear behind the object
- c) The combination of different planes (hands of one dancer close to the camera, full body of another dancer more distant in relation to the camera, which in this case created the illusion of one dancer existing in the hands of the other)
- d) Appearing and disappearing as a theme
- e) Quick and bigger movements of the body (or objects) reveal larger areas of the previous frame

Asked, in which context, situation, or type of performance these ideas might be developed, group one responded that their ideas had cinematographic qualities, and reminded them of dreams (or nightmares), of images flashing through their minds. Their ideas resembled old movies and horror films, sometimes with comic moments.

Group two worked with a similar setup. As the dancers moved in front of a fixed camera, the processed live image was projected, so that they could see the effect of the warp filter on their movement in real-time. The warp filter scans through the incoming video stream, and copies a specified number of rows from each new frame, moving downwards as it goes. A greater number of rows copied per new frame results in a faster scanning velocity. Faster movement of the dancers create greater variations from frame to frame.

Notes were taken differently as group two documented their favorite ideas: the dancers preferred to draw movement paths or interesting visual effects, and would attribute one or two key words to help remembering their movement sequences and creative strategies towards the camera and the filter. Their notes are therefore considerably more idiosyncratic and difficult to understand for an outsider, or they simply use a metaphor to help their memory. Being asked about their favorite ideas



group two consequently needed to show what they had been working on. Regarding the second question (in which context, situation, or type of performance their ideas might be developed) group two came up with an ambitious idea: they suggested to project the processed image in the foyer of the theatre in real-time, while the dancers would produce the images on stage in front of the camera. Entering the theatre, the audience would understand how the projection outside was constructed.

Day two was dedicated to an introduction to the software *Isadora*. The session was designed as a single class for interested students from various areas. Although we called them the 'technology group', participants of the dance group were welcome to join and study the possibilities of this software. We managed to cover a range of topics, such as the processing of prerecorded images and video, compositing and live interaction with incoming video and audio streams. Finally, we addressed the issue of creating controls for live interactive situations, an important topic for the remaining days of work with the dance groups. Some students spontaneously decided to join the groups working in the theatre, so that they would get an insight to concrete applications of *Isadora* in live performance contexts.

Besides being offered the opportunity to participate in the technology workshop, participants of the two dance groups had been reflecting about their work during the first day, and were supposed to bring ideas and material to the third day at the Cine-teatro. Both groups warmed up together and were prepared for their specific projects by means of a set of improvisational exercises.

Group one worked under supervision of myself, and group two was lead by the director of the Dansul company, Paula Varanda, with additional comments of myself in regular intervals. Both groups continued to develop their ideas from day one, and were instructed to design a 'storyboard', which allowed for documentation of the interactive strategies, and for sequencing their material for the final presentation. Group one worked well collectively, and managed to clarify their material and organize sequences. However, as group one did not had the chance to work on the stage during this second night, they could no decide how to present their work to an audience. At this point I suggested to perform all their ideas at the balcony (where they had been rehearsing, while group two occupied the stage), and project the

results of their interaction, a black and white mute film, on the big screen of the Cine-teatro. Eventually the audience would understand, that their were live performers present on the balcony, and look up, so that they would realize that the film they were seeing was produced in real-time by the performers on the balcony. Group one liked the idea and decided to rehearse this setup during the final session on the following day.<sup>174</sup> Two students of the technology group accompanied group one's rehearsal and developed a simple patch in *Isadora*, which allowed controlling when the difference filter was active, and when the screen was simply left black. Such moments of bypassing the difference filter became a necessity to change the performers' spatial positions (invisible for the audience) in preparation of the next interaction.

Group two continued to develop new ideas and by the end of session had completed a storyboard consisting of eight short scenes. Some movement was specifically invented to achieve a visual effect they liked, and framed accordingly. In other words, the group would compose the movement and visual effects choreographing for the camera space. The idea to project the work in the foyer of the theatre was abandoned in favor of a much simpler setup: the stage space was split equally in two halves, one of which the dancers inhabited o perform in front of the camera, and the other to project the resulting images.



Figure 41. Video still from the final presentation of the Mertola laboratory (Group Two)

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<sup>174</sup> The video documenting the work of group one goes forth and back between the work on the balcony and the projected image on the big screen, so that it becomes very clear what performative actions produced what kind of visual results.

Other movement material derived from the visual effects of the warp filter, which inspired the group to embody these characteristics in their movement invention. Finally, their storyboard also included indications for different colored costumes, as the group discovered the impact of color on their visual compositions.

Day four, the final day of the laboratory, was dedicated to rehearsals and the presentation and discussion of the work. Following a similar warm-up as day three, both groups were given 45 minutes of practice with the main screen projection. Group one quickly improved the quality of their performance when given the opportunity to work with the theatre's main projection screen, and used the time to run their sequences several times. Both technology students accompanied their rehearsal and operated *Isadora* during the final presentation. Their task was technically not challenging, but they gained a valuable insight to the theatre technicians work during a live performance.

Technology students working with group two were exposed to a much more challenging situation. Under time pressure they had to program and test a control allowing for the regulation of the number of rows copied per new frame of video. In other words, the velocity of the scan needed to be varied for the different scenes that group two had developed. Looking for improvements until the very last moment, group two had even introduced a new scene on the last day, as they discovered a new visual effect achieved through the variation of the distance of a dancer from the camera. This group therefore decided to integrate the new scene and only rehearse their sequence once before showing it in public. Their technicians (or 'expert operators') experienced the challenge of last minute changes; a situation, which frequently occurs in experimental settings and performance work.

Both presentations went very well, beyond everyone's original expectations. Following the public showing to the other group and invited friends, participants of the laboratory joined for an open interview, which will serve as a base for the reflection on the results of the laboratory.

### **4.3 Outcomes**

The general aim of disseminating novel artistic and educational methods in a region of Portugal that is only more recently developing contemporary dance activities (Alentejo) was certainly met by this Dance & Technology laboratory at Mertola. Participants commented on the success of the activities on various levels: their awakened interest in a new area of performance, the joy of working together in their groups towards a final presentation, the positive performance and feedback of this presentation, and last but not least the relaxed and creatively stimulating atmosphere.

From our perspective additional aspects of success can be brought up. The open interview with all participants allowed for the identification of sixteen relevant issues regarding the aforementioned research questions, and proved the design of the lab structure favorable for synergetic effects to occur. In fact this case study was successful beyond our expectations in that we discovered a prototype for elementary synergetic training on an introductory level, which we will discuss in the following section. Finally, the technology group's feedback during the open interview revealed a serendipitous byproduct of the laboratory setup, namely, a better understanding of what motivates the technically oriented students in such interdisciplinary settings (we will also get back to this point).

In the following we will review each of the research questioned outlined above, and discuss the comments obtained from the open interview with the laboratory participants. Although the questions are listed (in the same order as before), both, questions and answers are naturally interrelated.

#### **What connections would the dancers establish between their movement and the projected interactive video images?**

Various participants commented on the impact of the image (projected on the large screen at the rear end of the stage) as a means of increasing the bodies expressivity. Working with the difference filter, for example, students felt that even small, usually hardly visible movements from the audiences perspective, becomes much more

prominent. One dancer mentioned that she felt the image was 'something we could add to our body', a kind of extension or augmentation of the body.

All three comments are indicative of the importance of the immediacy of response in both interactive set ups, and of the perceptibility of the relation between performative action and visual result the participants could obtain (for further discussion see section 4.4).

**How would the movement be influenced and change because of the interaction with the projected image? What adjustments would have to be made in programming *Isadora*?**

Group two (working with the warp filter) commented on an acceleration of the creative process which they attributed to the use of their interactive set up. While they would usually need much more time to develop movement ideas and material (working on a new choreography), they developed ideas, material and structure very quickly to their standards. The dancers were surprised that in the end their movement material could very well exist without the projected image; in other words, their dance sequences made sense to them without the interactive system. On the other hand, movement usually considered 'uninteresting, ordinary' by this group would transform into something 'really beautiful' by virtue of the image treatment. Both observations are interesting to us when brought into relation: probably the latter discovery (of enjoying the visually stimulating effect of otherwise ordinary movement) caused a great freedom of experimentation through lowering the critical assessment of movement during the creation of movement material, and in turn sped up the accumulation of sequences this group considered valuable.

In addition, the group discovered in collaboration with the technology group, that adjustments of parameters, such as the number of rows copied from a frame of the incoming video stream, can dramatically affect the resulting visual effect. This knowledge was then incorporated in their movement experimentation, and different velocities of the scan through the incoming videos were explored. The technology group members on the other hand tried two different ideas (continuous and static numeric control) to help the dance group to create the desired effects. This particular phase of their collaboration with the dancers was mentioned in the open interview as

the most satisfying experience of the laboratory, because the technology students could better understand how programming in a theatre environment might work.

### **What needs did the dancers have in working with the suggested technologies?**

Besides the introduction to using the camera and creating movement for the screen, and getting acquainted with the software Isadora, which we described in the beginning of the lab report in the previous section, participants raised more specific issues in the open interview considering their needs in working with these technologies.

Both groups commented on the changes in approaching the creation of movement material for a choreography: “the filter requires a different strategy, a different way of thinking”, observed one of the participants. Another dancer felt that performing within the interactive set up “was very hard to combine with a clear notion of how the audience would see the work”, because they could not rely on their previous dance experience. Both groups expressed their contentment and pleasure in seeing the other group perform for them, as this was the most efficient way to imagine how their own work might impact on an audience.

Another important observation addressed the different timing of performative action and visual output of the interactive system: “you are forced to pause a lot more - I think we had some fifty pauses! It was weird to stop so often, but the filter would do the rest for us”. This comment by a participant of group two, which was working with the warp filter, clearly expresses that the dancer managed to progress from training the basic functioning of the interactive system to proficiently and creatively using the possibilities of their specific set up. Towards the end of the laboratory, participants of both groups had become accustomed to the specifics of their interactive system, could compensate their initial disorientation regarding their habitual ways of rehearsing, and consciously employ new creative strategies to perform in their respective set ups.

## **What (technical) information would be absolutely necessary for the dancers to work with their specific interactive setup?**

As mentioned above, initial information about the work with the camera and creating movement for the camera space was provided, and a short introduction to the basic principles of programming in Isadora served to quickly start with the practical experimentation. Both filters, the difference and the warp filter allow for instantaneous visual feedback of any performative action, which helps to build immediate confidence and interest in further exploration.

During the following days information was exclusively provided, when participants were asking, or when I felt that their work had reached an impasse. Students of the first group observed that the most difficult moment was to decide how to structure and present their material. At this point I intervened, suggesting a possible format for storyboarding and presenting their sequences, which was happily accepted. Given the composition of this group, students would also have felt difficulties in making such choreographic decisions, as none of them had previous training in this area. Group two progressed differently during this phase of the laboratory, because Paula Varanda (the director of the dance company Dansul) took initiative and the students in this group naturally acknowledged her expertise.

Technical information was only provided when I felt it served the need of the dancers. Besides programming five different velocities for the warp filter (which is described above), the bypass function of the video filters was introduced. For the first group (working with the difference filter), this function allowed to seamlessly progress from one scene to the next, without the necessary changes of the dancers' positions being visible for the audience. Without the bypass function (which turns a filter 'off') certain transitions would have been visible for the audience and destroyed the magic. Technical information was first provided for the technology group, and once the programming work successfully, dancer were introduced to new possibilities.

**How would participants react towards an extremely simple setup (as opposed to being exposed to a general overview of possibilities), and towards the suggestion to explore just one interactive set up in depth during the entire laboratory?**

This question reflects a great concern of mine when designing and planning the laboratory. To be valid as a case study on synergetic effects and the kind of training in Digital (Live) Performance that would favor such events, the laboratory had to follow specific procedures and in-depth study of clearly formulated research questions; particularly, because time was very limited. On the other hand, the laboratory had to be designed according to the composition of the group of participants, and hopefully would consist of interesting and enriching experiences for the dancers. Exploring just a single video filter, or interactive set up, therefore represented a considerable risk.

Surprisingly this concern turned out to be no issue at all. Similar to the comments already referred before, participants were delighted “that something banal could be transformed into something really beautiful”, and therefore technology was not experienced in any way as limiting, but as “allowing our imagination to fly high”. The dancers commented that the work was enjoyable, and therefore they continuously discovered more possibilities, ideas and movement material, even just before the moment of the final presentation. Several participants remarked that they felt ready by the end of the workshop to explore other interactive set ups, but none of them voiced regrets to not have explored a greater variety of different systems during the laboratory. Four factors for their great satisfaction were mentioned in particular:

- Most of the participants knew each other and felt secure in their respective groups.
- Students were confident asking questions whenever they needed to.
- They felt that information was given only when really needed to solve their problems.
- Their ideas were accepted as they were, and instead of imposing other objectives or tasks upon them, tools were provided to realize their intentions.



Interestingly these factors are not specific to our laboratory in Digital (Live) Performance, but reflect important aspects in small group performance in general. Two additional, more personal observations, indicated the importance of the relation between teacher and student: one participant highlighted her differing experiences with teachers, “who often bring much knowledge and expertise to the activities, but sometimes remain very distant”; and another student remarked that she felt the work they had done “was really connected to the environment, in which we worked”. The latter observation is directly linked to the use of participants’ ideas and materials, but beyond this evident connection there was in fact some remarkable integration of the work group one presented in the surrounding environment. As aforementioned, the laboratory took place in an old ‘Cinetatro’, a place where the local community is presented with all kind of events, performances and movies. The presentation of an interactive short film reminiscent of the early period of cinema with black and white images accompanied by piano music, felt strangely familiar and contemporary at the same time.

In conclusion, students were not so much focused on the technical aspects of the interactive system they explored, but rather wanted to know what could be done with it. Since some loose guideline were helping them to develop content within the system they were exploring, they simply incorporated technology as a new tool for the kind of activity they had trained in for a few years: to contribute with their ideas to the creation of choreography, and to perform on stage.

**In summary, what can be identified as a synergetic effect occurring during this laboratory?**

We have selected four situations mentioned in the open interview (and discussed above) that clearly exemplify strong synergetic effects within the definitions presented in the beginning of this chapter.

1. Group two (composed of almost the entire Dansul dance company) talked about the acceleration of the creative process and the discovery that their material might well work without the projected image. Their process can be seen as a good example of King’s description of synergetic training: first, the focus of this group

was on the expansion of choreographic process and the role of the interactive system in the creation of movement material. Second, their habitual choreographic process was enriched by information from the outside (new media technologies in this case). Drawing on Larson's definitions, we consider this process a case of strong synergy. The strongest member in the group (regarding her expertise, experience and position in the group), the company director Paula Varanda, voiced her delight and surprise in working with the interactive technology, and stated on different occasions during the open interview that the group's explorations in unfamiliar territory enriched the company's habitual ways of working.

2. One participant reflected on the sensation of augmentation of the body and its movement. This experience represents a classical example of what Latash would call a 'sensorial synergy'. To recollect his definition, "a sensory synergy may be viewed as an organization of perception, based on sensory signals from different sources and possibly of different modalities to ensure stable performance of a motor action". Many dancers who report similar sensations as this dancer experienced during the laboratory, also observe what Latash calls a new or different organization of perception. A well known challenge in working with the camera space is the opposite direction, in which the digital representation of the body moves: the dancer moves to her right, and the digital double will move to the left.<sup>175</sup> The more familiar the dancer becomes in working within the camera space, the more successfully s/he will incorporate the camera's vision of his/her movement in the individual organization of perception.<sup>176</sup> Describing the sensation of an 'augmented body' indicates successful integration of multimodal sensory signals in perception and in motor action. Besides, as we have seen above, different movement patterns and sequencing are accepted even if they may feel awkward or strenuous, because the visual imagery created through the performer's movement functions as a reward for the physical effort.

3. A different and more simple example of sensorial synergy was reported by a participant of Cape Verdean origins. He observed that the movement sequences

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<sup>175</sup> Unless one opts to flip the image horizontally

<sup>176</sup> Compare Susan Kozel report on performing in Paul Sermon's Telematic Dream installation

choreographed collectively in group one had a very different, much slower rhythm than he was used to. In consequence he had to slow down his movement considerably. However, given the predominantly visual nature of the final work, he thought the process was quite interesting rather than irritating. In the end he was curious whether other filters would have similar effects on his habits, and provide him with differing challenges. Of course, this example also falls into King's quest for research from other fields applied to dance. Finally, this dancer's participation is also a fine example of positive deep diversity and of high motivation in small group performance as defined by Larson. Given his different cultural background and limited time of study (he was on a six month scholarship in Portugal), the dancer could easily have been uncomfortable with the kind of work we were suggesting, or the contrasting movement qualities demanded in the particular interactive set up group one was working. According to Larson strong synergy occurred in group one partially because of his successful integration (his physical characteristics and movement qualities were creatively used), which motivated the performer, and resulted in an overall composition, which could not have been thought of nor achieved without him.

4. We have mentioned in the beginning of this section that the technology students expressed their satisfaction to have had the chance to work in the theatre with the dancers in a concrete set up, which required to adjust parameters of the programmed modules to the performers' needs. This way the students better understood the specific possibilities of the software in a concrete situation, which was considered 'more interesting' by them. Moreover, their important role in the creative process and the final presentation became more evident for them, which compensated for longer periods of inactivity. Interdisciplinary development and problem solving, particularly in the second group, was truly synergetic in an educational dimension. A serendipitous side effect of the laboratory, we discovered that this group of students reacted very differently in the theatre environment in comparison with the second day introduction to Isadora, which was designed as a one day workshop for all kinds interested participants. During the day two session students displayed the kind of behavior and attitude we have observed in dozens of similar workshops and classes: students would listen to those basic concepts

they consider absolutely necessary to start with their own exploration of the software, and later on ask questions according to the difficulties they experienced. With very rare exceptions students seem to dedicate time to get a general overview of the possibilities of this software, and try to establish connections to their existing knowledge and interests. Usually, it is very difficult in such introductory sessions (and maybe not an adequate goal at all) to explore any of the features more in depth. However, in the theatre environment and the particular situation outlined above, students were extremely patient and even tended to use their unoccupied time to observe and understand what the performers were trying to do. This course of events indicates that there ought to be further avenues to explore regarding alternative forms of teaching software such as *Isadora* in less functional and more purpose oriented ways, so that students are motivated to explore the possibilities much more in depth. In ten years of teaching *Isadora* to the most diverse groups of students from different artistic disciplines, I have rarely seen someone advancing beyond the very basic concepts without a strong, consistent individual purpose. The Mertola laboratory results demonstrate that it is possible to provide introductory information *and* simultaneously explore specific features more in depth, even when students don't demonstrate any sense of purpose to begin with. This example seems a particularly clear example of synergy to me, in the sense that Buckminster Fuller suggested that '1+2=4'. In other words, while we worked towards a synergetic perspective of training with interactive systems, we discovered a directly related important (educational) insight to working with technology students, which can be likened to the fourth triangle 'synergetically appearing' when three equilateral triangles are hinged onto each other. A discovery however, which can also be understood considering the three criteria for synergy put forward by Latash (sharing, error compensation and task dependence). Especially the latter element, task dependence (the ability of a synergy to change its functioning in a task-specific way), could be observed concretely, when technology students and performers worked on programming the interactive system in a way that would allow control of different scan velocities for interaction with distinct movement sequences.

#### 4.4 Reflection

This section will refer back to the three main objectives outlined in the introduction to this case study, the first of which reads:

- To investigate in which ways selected principles from our *Evolving Glossary* could be articulated with the aforementioned research questions and provide techniques for the synergetic training of the participants

It is fairly obvious from what we have said so far regarding each of the research questions, that a number of principles from our *Evolving Glossary* have been introduced in the several phases of designing, planning, carrying out and evaluating the Mertola laboratory.

Two research questions in particular can be elaborated drawing on the concepts of *accessibility* and *immersion*.<sup>177</sup> The entry on accessibility introduces two important “aspects of media events occurring in interactive life performance situations: **perceptibility** between cause and effect of the media event from the audience’s perspective; and the **operability** of the interactive system, or amount of control given to the performer over the media event”. Both aspects have been maximized in the laboratory set up: the choice of working with a live video stream of the performer’s actions, and processing these images by means of a single filter to achieve an immediately recognizable effect, reflects the intention of designing an extremely easy-to-access interactive system. This choice enabled the participants to focus on their movement exploration and creation, while they could simultaneously verify whether the visual output of the system was coherent with their ideas. In other words, the interactive set up was carefully designed to challenge the performers’ ‘perceptual and cognitive systems at near capacity, without being exceeded’. Such involvement describes one of eight characteristics of the state of *immersion*, which our entry in the *Evolving Glossary* explains as “a mental state of joyful focused activity, no matter if one reads a fascinating book, cooks a meal, watches an

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<sup>177</sup> 1. What connections would the dancers establish between their movement and the projected interactive video images?

2. How would participants react towards an extremely simple set-up (...), and towards the suggestion to explore just one interactive set-up in depth during the entire laboratory?

interesting movie, or plays football with friends”. Other important conditions met in our interactive set up include: ‘immediate feedback regarding one’s actions and general performance’, and ‘a feeling of overall control’. Without needing to discuss the aspect of immersion in more depth, we can confirm based on the open interview, (1) that several dancers felt various forms of immersion in the work with their interactive system, and (2) that maximum accessibility of the system design translated into favorable conditions for immersion.

Other research questions should be correlated to the principles of *simplicity*, *camera space* and *filters*.<sup>178</sup> The entry for simplicity in our *Evolving Glossary* suggests four interrelated aspects, which have been central to the design of our laboratory: *focus* (to concentrate on few elements), *essence*, *efficiency* (practicality or usability of the essential elements and concepts of a work) and *clarity* (of communication). Here, the aspects of focus and clarity have been combined with the principles of *camera space* and *filters*. Amongst the multitudinous possibilities we chose to use a static single camera on a tripod to provide the live stream. No zooms were allowed, so that the camera space could be quickly explored and would not change throughout the work. The suggested filters (difference and warp) provided an explicit aesthetic, and only allowed a small range of adjustable parameters (see more detailed description in laboratory report, 4.2). In short, through focussing on a few essential elements of the vast areas delineated by the *camera space* and the *filters* principles, we could concentrate on the essence of the laboratory: to efficiently investigate synergetic effects in the exploration of simple interactive set ups. Clarity of communication here refers to both, the communication between participants and lab leaders; and to the communication between performers and their audience.

As we have stated above, this laboratory was successful in an unforeseen way: the principle of *simplicity* had been applied to provide unambiguously clear conditions to investigate synergetic effects in the exploration of specific interactive systems. Beyond our expectations we became aware of more general considerations, which indicate an interesting avenue in the design of educational environments for

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<sup>178</sup> 1. What needs did the dancers have in working with the suggested technologies?  
2. What (technical) information would be absolutely necessary for the dancers to work with their specific interactive set-up?

technology students. On the other hand the Mertola laboratory in itself can be seen as a prototype for introductory workshops in Digital (Live) Performance. The successful combination of the aforementioned five principles from the *Evolving Glossary* (simplicity, accessibility, immersion, camera space and filters) resulted in a useful structure for the prototype.

In the following section we will reflect upon the second main objective, which will help us to 'flesh out' this prototype structure with an adequate methodology. The second objective reads:

- To test which categories of constituent elements of artistic laboratories that we proposed in chapter two (4.2) deserved particular attention in order to provide a satisfactory and stimulating experience for the participants

We remind the reader that in chapter two of this dissertation the following seven categories of constituent elements of artistic laboratories were suggested: (1) Time, (2) Place, (3) People, (4) Ideas, (5) Methodology, (6) Equipment and Technology, and (7) Outcomes. The open interview with the participants revealed an interesting aspect regarding the categories three and four (place and people). Beyond our analysis above (the integration of the laboratory in the surrounding environment), where we have discussed this reciprocity in the work of group one, we will now focus on another concomitant important factor.

Mertola is a small village in the rural region of Alentejo, where most people know each other. My personal impression was that human relationships and social structures in this environment are crucial for the success of daily life in all its dimensions. Probably not conscious of this, participants of the laboratory naturally look(ed) for a close and warm relation with those they are working with, including their teachers and directors. Such relation included the essential aspects of daily life: whether I liked the place I was staying, if I slept well and enough, whether the meals in a particular restaurant were enjoyable and economic, or if I would prefer to try a different place, what my impression of the village was, and certain people I had met and talked to, and so on. On the other hand, participants would appreciate if I asked questions about their backgrounds, families, interests, careers, or dreams for the future. Consequently I received an invitation from one participant, who was an

animation film director, to dinner with her and her Japanese boyfriend, a photographer, in a location where they had filmed before. This location happened to be a rambling collection of houses in the middle of nowhere, one of which a tavern. Two chicken had been killed that day and were prepared for a handful of guests. Later that night a huge middle aged man joined the group, started to play his guitar, and to my surprise sang arias from well-known operas in breathtaking perfection. He had been a famous singer in the Netherlands, before he retired due to severe heart problems.

Returning from this memorable dinner on the countryside to the old convent, where I was staying for the week, the place seemed even more mystic and vibrant to me than during the first two days of my stay: during the dinner I had heard many stories about my host, a Dutch lady, who had been dancing with Dutch National Ballet as a young girl, before she moved with her husband, a photographer, to Mertola, where they bought and recuperated the convent gradually, had a family, and today receives artists in residence, such as myself. Their son, now a well-known young artist himself, constructs impressive animalistic robots and machines from the leftovers of animals of the region, like dogs, cats, storks, ravens, snakes and so forth. In the morning I would sometimes wake up from the sounds of these creatures, which had been activated by their movement sensors.

When I shared some of these impressions the next day (the third day of the laboratory), the participants of group one, which I was accompanying in their process, told me they naturally knew the place I had been to, the opera singer, the convent and my hosts. That night I felt that our conversations influenced some of the imagery the group was creating, and that in fact the work they were doing could not be done in a different place in the same way.

In a subtle way the group was *choreographing topographically*, to borrow Peter Stamer's term to describe such exploration strongly rooted in the surrounding environment.

To conclude this train of thought, it was a simple remark (about my attitude) by one of the participants that sparked my reflection upon the quality of our relations with each other during the laboratory: "it was really good that you connected with everything around". At the time of the interview I did not understand this particular comment, but much later, after the analysis presented above, it became clearer to



me that this participant in particular had formulated complex group dynamics and processes in a more intuitive way.

Not surprisingly, if we revisit the fifteen rules for successful collaboration in creative teams by Mario Pricken (see chapter two, 4.3), we will find that fourteen of them have been put in practice by group one during the laboratory; mostly in this intuitive way, and sometimes suggested by myself.

This brings us to a closely related question: the methodology for our approach. Unlike Pricken, who designed *The KickStart catalogue* comprised of 200 questions derived from ten thousand successful advertising campaigns, we do not start from a catalogue of stimulating questions. Our *Evolving Glossary* rather introduces principles and concepts, which allow designing and reformulating research questions as we go along. In a way this methodology is less meticulous from the very start in that the questions raised in the beginning are not very specific. On the other hand, our approach is based on the experience that participants of our workshops and laboratories commence with rather general ideas, and try fairly obvious solutions, before they discover unique individual materials, which bring up detailed questions. In our experience introductory ideas and concepts are certainly important, as are examples of best practice; nevertheless, the individual participants process seems to be the decisive factor for the particular way that our principles can be elaborated and applied. In other words, we consider the questions brought up by the students an integral and essential part of designing the research questions of a given laboratory, or the artistic problems we pretend to solve. Earlier in this chapter for instance, we have described the process that led to programming different velocities of the scanning in the warp filter, which arose from the curiosity of the dancers whether there was a way to vary the speed of the movement, or, to achieve different visual effects with the same movement. The following section elaborates on this question and demonstrates, how the synergetic effect experienced by the technology students came about, and eventually triggered future development of novel educational settings for these students. Had we used the technique of asking stimulating questions used in a unilateral manner (only us asking the students stimulating questions), we would not have witnessed this kind of strong synergy occurring (us experiencing a process surpassing our own best practice).

Of course, Mario Pricken does not advocate a unilateral communicative process between a workshop leader, or creative director and a group of participants. His fifteen rules for successful collaborative processes rather prove the contrary. However, his system in itself does not seem to *evolve based on the input of the participants*.

In other words, we might say that our methodology comes into being at the moment of interaction between collaborators, and therefore cannot simply be described as a system of methods to be put into practice. Our system rather evolves with whoever we are concretely working with, in the particular time and place the collaboration occurs.

Finally, we would like to recall the extensive discussion of the term ‘dance technology’, and the working definition that we have suggested in chapter two (3.5):

As becomes clear from these quotations, the term ‘dance technology’ can be useful to describe the *outcomes* of practical choreographic work informed by research and theory (and vice versa) *in the form of a (meta-)system*, such as the ones developed by Laban or Forsythe, or, for that matter, by any dance professional developing such a meta system. This perspective comes very close to the Oxford definition for the term ‘technology’ we mentioned above, in which the development of technologies is linked to the application of scientific knowledge; and vice versa, the new technologies advance scientific inquiry. The science in question here would be the field of choreology, or in more general terms, dance studies.

We suggest the following working definition:

*‘Dance technology’ then can be understood as a meta system of the field of dance that allows for the development of particular dance and improvisation techniques, the documentation and analysis of creative work, or the teaching of its principles to students and professionals.*

This line of reasoning puts category six of the constituent elements of the artistic laboratory (equipment and technology) in a different perspective, as we have argued elsewhere (chapter two, 4.2). Applied to the Mertola laboratory, we might say that the equipment (or distributing technology), was fairly basic. Two video cameras, two tripods, two video projectors, and two laptop computers with copies of *Isadora*

installed were everything needed. On the level of programming the software, the patches we constructed in *Isadora* were absolutely elementary apart from the adjustments mentioned above.

Having said that, it becomes more evident that the main technology used during the laboratory consists of a meta system, in other words, our *Methodology of Bi-directional Transfer*. Our categorization of constituent elements of the artistic laboratory can be considered a core component of this methodology, as is the *Evolving Glossary*, or the classification of interactive situations presented in the previous chapter.

In conclusion we can argue that the structure for a possible prototype (of a Digital (Live) Performance introductory workshop) outlined above can be developed through the combination of the core components of our methodology. The structure of the suggested prototype was based on a selection of principles of the *Evolving Glossary*, while the constituent elements of the artistic laboratory provide guidelines for the realization of the research and/or artistic work. Guidelines, which serve to allow the collaborative process to evolve in a dialogical way.

In the next section we will discuss the third main objective of the Mertola laboratory, and establish connections with the methodologies put forward by the influential practitioners we referred to in chapter two. The third main objective reads:

- To reflect upon the methodologies put into practice during the course of the laboratory, and point out correspondences to the workshops designed by Troika Ranch, Wechsler and Lovell/Schiller

A considerable part of chapter two was dedicated to the discussion of the workshop methodologies and performance techniques developed by Robert Wechsler/Palindrome, Troika Ranch, and Bob Lovell/Gretchen Schiller. As expected, many correspondences can be established between their methods and creative strategies; and we have pointed out several examples. However, terms and concepts introduced by these artists also differ as they have evolved from their practice, and are very precisely describing their individual processes. We therefore hope that through contextualizing our own methodology in a field established by these artists, we can

demonstrate that such multiplicity of concepts, terms, techniques and creative strategies is vital to both, preserve and to develop artistic idiosyncrasies.

To begin with, we will look at some correspondences to our methodology. Robert Wechsler

states repeatedly that the perceptibility of interaction between performer and interactive system from the point of the audience is paramount. He even goes as far as to suggest that a performance should include a section where ‘the interactive system can reveal itself to the audience’, in other words, where the interaction is completely transparent, so that in other sections more subtle forms of interaction can be noticed and appreciated (chapter two, 2.3). Wechsler acknowledges that many artists would categorically refuse to employ such creative strategies, and that one might want to proceed differently in another process, or another performance. However, we certainly empathize with his desire to clearly communicate with his audiences and turn his work accessible. Criticism of this approach probably has led to the clarification on his part, that perceptibility, or ‘intelligible interaction’, as he calls it, cannot be separated from artistic concerns. In fact, Wechsler himself has stated that he has seen many examples of a gratuitous use of interactive technology in live performance.

Far from advocating an educative approach towards his audiences, Wechsler works towards a deeper understanding of the spectator, which includes some comprehension of what the interactive technology in use can do. His methodology resonates clearly with Troika Ranch’s model of the ‘sphere of interactivity’ (presented and discussed in detail in chapter two, figure 4).

This model describes the degree of ‘intelligible interaction’ as resulting from a combination of the physicality (and consequently visibility) of the performative gesture with the perceptibility of how the interactive system was designed. Troika Ranch’s model thus addresses the same question from a more detached perspective: it might be a dramaturgic choice to not reveal the performative gesture in great detail (represented by the musician on the x-axis), or to not disclose the inner workings of the interactive system in detail (represented by obscurity end of the z-axis). We have called attention before to the fact that Troika Ranch’s model is a

spherical model, which visually clearly shows that the extreme ends of any axis tend to collapse in a two dimensional, or 'flat' artistic choice.

While we hold this model in great esteem, there is no need to apply it to the Mertola laboratory. Here the choices regarding the accessibility did not concern the audience so much as the performers. The entry on *accessibility* from our *Evolving Glossary* suggests that besides the perceptibility of the interactive system (which naturally is a concern for the performer who needs to train with the system in the first place) the aspect of the *operability* describes the kind and amount of control given to the performer over the media event. If we wanted to deepen our understanding of the kind and amount of control in a particular interactive system, we could use the principle of *affordance* from the *Evolving Glossary* in combination with the former principle of accessibility.

In other words, there are clear correspondences of our methodology with Wechsler and Troika Ranch's systems, as much as there are slightly different angles on the same main issues, which allow focussing on specific details. While Wechsler voices his artistic and pedagogic preferences and provides clear guidelines, Troika offers a relational model, which helps to visualize main components of any Digital (Live) Performance and their interrelatedness. Our own approach is based on a combinatoric logic: principles are often introduced along with a number of key aspects, which can be combined with each other, or other key aspects of other principles. The *Evolving Glossary* is one of three core components of our methodology, and can be combined with the other two modules, the classification of interactive situations, and the categories of constituent elements of the artistic laboratory. In combining these concepts and ideas we can arrive at very specific detail in artistic work, but our system also allows 'translation' of key concepts and methods developed by other practitioners.

At times the terms used by others are identical with the terms we use: the y-axis in the sphere of interactivity model for example describes a continuum with varying degrees of improvisation and composition. In this example it is obviously critical to understand how someone else is using the identical terms oneself uses, and verify whether there is common ground beyond the superficial. Wechsler for instance uses the terms 'looseness' and 'openness of material' to describe a certain quality in the composition of interactive situations, yet insists, that these terms should not be

confused with improvisation. We ourselves have suggested five categories of resourcing improvisation in the entry on *improvisation* in the *Evolving Glossary*. Applying these categories to improvisation in Digital (Live) Performance, we may delineate a very similar practice as Wechsler described above. On the other hand, we relate our understanding of improvisation to Lampert's model of real-time choreography, and her degrees of improvised versus choreographed performance, which in terms are close to the y-axis in Troika Ranch's model. Curiously Wechsler states that "Palindrome's work is probably 80% choreographed, that is, the movements are largely fixed. And yet, even within structured material a certain feeling of play (in the sense of clearance) is necessary in order to generate an interactive effect" (see chapter two, 2.3). Probably not incidentally, 80% of fixed choreographed movement corresponds to an improvisational freedom of 20%, or degrees eight and nine in Lampert's model. These degrees according to Lampert correspond to a situation, in which the performer is given the freedom to interpret certain parameters freely each time the piece is performed.

At other times the terms used by fellow practitioners may be perfectly clear, but not seem to be adequate for use in the context of the work we are doing. Troika Ranch for instance uses a distinction of four different ways of projected video in performance (see chapter two, 2.2). Applied to the work that group two did in Mertola, their video projection might be described as 'Video as an environment with performers on stage', or even as 'Video as a 'character' with a dramaturgically conceived 'behavior'. Both categories are not entirely conclusive. Regarding group one (who projected on the main screen, but performed on the balcony, and challenged the audience to divide their attention to understand how the film was created in real time) the category of 'Video as 'cinema' without a performer on stage' is correctly, yet insufficiently describing the situation.

Another notable example of terms coined by other artists that don't quite fit the work we were doing concerns the comment of the participant of the Mertola laboratory regarding the sensation of an augmented body. Troika Ranch employs the terms 'micro event' (a bodily gesture triggers a video-clip processed in real-time), 'macro event' (a bodily gesture triggers several media at the same time), and 'meta event' (a bodily gesture crosses over into another media) to describe possible forms of gesture interaction with the system. Although the 'meta event' correctly designates the

participant's experience, epistemologically it does not seem to be the most relevant classification, as opposed to an approach allowing to analyze the perceptual changes experienced by the dancer.

Likewise, when Wechsler uses the term 'amplification of gesture', he discusses a very similar phenomenon from a slightly different perspective, and with a focus on the audience's point of view.

Finally, some concepts and terms can be too elaborated to employ in a simple set up, such as the Mertola laboratory. For example Lovell and Schiller's focus on *metakinesis* (the awareness of movement in performers, inanimate objects, and camera movement) would have been an interesting additional area to focus on during the laboratory. On the third day we altered the warm up for the performers, and included more improvisational tasks, as we felt that participants would benefit more from this approach. However, we did not enter the sophisticated field of metakinesis, because there was no need for this kind of preparation: we worked with two static cameras on tripods, and the camera space remained identical during the entire laboratory. Nevertheless, we were aware of the potential for a more integrated work; had the choice of filters been different, or had the cameras been used in a less static way, we would have cared to design a different kind of physical preparation for the work.

A second example: Lovell's concept of the 'eight building blocks for interactive environments' undeniably serves as a powerful tool to understand a sophisticated interactive situation in more depth (see chapter two, 2.4). Yet here it is mentioned as an example of a methodology, which is not adequate for a much simpler set up, but calls attention to the potential of future development of this particular laboratory conception. In other words, ideas, terms and methods employed by fellow practitioners may not be suitable for our own present project, but can serve to be aware of one's limitations in a positive sense.

However, the same model may have been too limited for analysis of the creative strategies in our Digital (Live) Performance .txt, which we discussed in detail in chapter four. From our perspective it was necessary to develop a classification of the different types of interactive situations frequently encountered in the field of Digital (Live) Performance.

In conclusion, every artist's system works in itself for the purposes it has been designed for, and it is a privilege to have access to their methodologies. I am reminded of Buckminster Fuller's geodesic structures: if one equilateral triangle is joined by two identical triangles, a fourth triangle appears as the bottom of a tent like structure, and provides the necessary solidity to build great architectural structures. Likewise, when we develop our methodology in the context of our fellow artists achievements and methods, we often experience strong synergetic effects.



## Conclusion

In my personal evolution as a dancer, choreographer, digital (live) performance maker, interdisciplinary movement researcher and teacher, I have successively come across the areas of generative techniques, interactive system design and synergetic training. If we consider these three areas of our artistic practice and investigation analogue to the three equilateral triangles in Fuller's synergetic geometry, the *Methodology for Bi-directional Transfer between Contemporary Dance and New Media Technologies* would represent the appearance of a fourth triangle, a truly strong synergetic effect. Long before I became aware of artistic research as an emerging form of scientific investigation, my approach to artistic work had been collaborative, interdisciplinary, and characterized by a methodic inquisitive curiosity, similar to the modus operandi of a scientist from a different area. The key moment in this five year journey was Professor Daniel Tércio's invitation to participate in the *TeDance* research project, and his encouragement to reflect artistic inquiry in the context of a PhD program. His thought-provoking and inspiring tutorship created a stimulating environment in which the *Methodology for Bi-directional Transfer* gradually emerged.

In the introduction to this thesis we have formulated our core research question as follows: *How can we provide a flexible, evolving methodology for designing creative strategies for the use of new media technologies in Digital (Live) Performance?* We are now in a position to affirm that such creative strategies can be successfully designed based on a combinatoric logic of employing artistic tools in interdisciplinary collaboration. A selection of such transdisciplinary artistic tools have been compiled in the form of our web-based hyperdictionary, which we call the *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance*. As demonstrated on the introductory web page, entries can be combined to design creative strategies, as well as artistic research questions. However, the combinatoric logic of our *Methodology for Bi-directional Transfer* also entails the application of these artistic tools in the concrete context of the *artistic laboratory*. To this end we have proposed a *categorization of constituent elements* of different lab formats, which supports specific preparation, realization and analysis of the various phases of the creative process, or development cycle.

Naturally, formulating the *Methodology for Bi-directional Transfer* and its core elements allowed to reflect upon my artistic practice, and creative processes in Digital (Live) Performance in general, from a much more informed perspective. As a result we were able to present categories for generative techniques and contextualize these methods within a major tendency in contemporary art practice *denominated mimesis of thought*. We proceeded to clarify notions of interactivity and interactive system design to propose a classification of *designing strategies for interactive situations in HCI contexts*. Resulting from the previous investigations, we finally examined aspects of *synergetic training* to address the complexity of working in the field of digital (live) performance.

As our case studies show, the *Methodology for Bi-directional Transfer* can be employed for artistic creation in all phases of the development cycles, and furthermore provides solid tools for detailed analysis of existing artistic processes and work in the field.

For the same reason the *Methodology for Bi-directional Transfer* has also been very useful in the context of art education programs, both on graduate and postgraduate level. Throughout the past years I have been teaching short term workshops, several week long seminars, and entire semesters in diverse courses, ranging from fine arts and multimedia design to performing arts programs at different national and international art schools and universities. The case study on synergetic training in chapter five has raised an interesting question for future research: whether project oriented teaching and training of the use of new media technologies can offer a stimulating alternative for students in the field of digital (live) performance, as opposed to the common approach to just learning how to use the tools. In such a scenario methodological questions gain practical artistic significance and allow discussing important issues of the use of technology beyond the familiar utilitarian perspectives and critical theory discourses. Since the 2009 Mertola laboratory I have tried to integrate elements from the *Methodology for Bi-directional Transfer* in training and teaching students in different contexts, for example during a week-long workshop in 2010 during the *Poéticas Tecnológicas Conference* at the Federal University of Bahia in Salvador, Brazil. This workshop was co-directed by Armando Menicacci and myself, and introduced the classification of *(Eight) Strategies for Interactive Situations in HCI Contexts* right from the start. During the workshop

various students did not only ask for publications on this classification, but shared their concrete ideas for future projects and research into interactive systems enthusiastically with us. It seemed that this distinct approach encouraged many of them to reflect their communicative intentions regarding the audience on one hand, and their concrete choices of designing their interactive system on the other hand. Subsequently we introduced an abbreviated introduction to the classification in the final public presentation of the workshop, before we showed several short examples developed during the workshop. The audience eagerly engaged in a lively discussion following the workshop presentation, which led us to think that such alternative workshop and presentation formats deserve much more attention, as both, participants and audience appreciated the brief introductions to the underlying methodology.

Some workshop participants and audience members evidenced multimodal professional profiles similar to ours: artist-researcher, artist-engineer or artist-teacher. Particularly in the context of postgraduate study and research an increasing number of professionals takes on several different roles that are essentially rooted in the same individual (often interdisciplinary) interests, competences and projects. Further future research will therefore largely depend on how the evolution of our *Methodology for Bi-directional Transfer* can be efficiently articulated with the (artistic) research interests of other artists, researchers, scientists, or engineers.

For example, we have mentioned above our present involvement in the *Transmedia Knowledge Base for Contemporary Dance* (TKB) project (2010-13) led by linguist Carla Fernandes (Universidade Nova de Lisboa). As the reader might recall, the interdisciplinary TKB project is an international research project envisioning the creation and development of a knowledge base to document, annotate and support the creation of contemporary dance pieces, in Portugal and abroad. A custom built video annotator provides the technological tools for an innovative approach to documentation and archiving of the creative process and live performances of some selected choreographers. Simultaneously the video annotator is explored as a creation tool in the choreographic process. This latter area is where my doctoral research extends into a new research domain, and allows me to test the methodology presented in this dissertation.<sup>179</sup>

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<sup>179</sup> See also Appendix A (DVD1) for more information.

An additional promising research opportunity will arise in the context of a large scale integrating international research project entitled *Connected Theaters*. During three years a consortium of international partners from Brazil, the U.K., the Netherlands, Spain and Portugal will research and develop a 'connected theater infrastructure for enabling distributed collaborative performance'. Three layers (people, theater and network) comprise the infrastructure of the *Connected Theaters* project. A number of specific tasks for each layer will be carried out during the creation, test and execution phases. In the context of this thesis networked distributed collaborative performance falls into an area of digital (live) performance characterized by the use of CMC (computer mediated communication) technologies, which we have not included in our *Methodology for Bi-directional Transfer*. The research design of the *Connected Theater* project therefore represents a unique opportunity to test the *Methodology for Bi-directional Transfer* in a new territory, and further develop our *Evolving Glossary for Interdisciplinary Collaboration in Digital (Live)Performance*.

Furthermore, we hope to contribute to an enriching intercontinental dialogue through the application of our humanistic, artistic and scientific methods and techniques.

Exciting as the opportunity of integrating an international network of theaters in collaborative telematic performances seems at first sight, it will be as interesting and challenging to reflect upon the modes of collaboration, the forms of leadership taken amongst the members of the consortium, the possible impact of the IT industry interests, which provides the technology for the project, and so forth.

It is in this dialogical perspective of interdisciplinary collaboration that we hope to contribute to a more socially responsible development and use of new media technologies. In our perspective digital (live) performance as part of contemporary culture, and education as the base for lifelong growth as a human being can contribute decisively to a future centered on the human being, and to the use of technology towards the creation of an environment, in which everyone can freely manifest their individual potential contributing for the larger whole of society.

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### **Selection of the most relevant online art databases for our investigation:**

UbuWeb, <http://ubu.com/>

ZKM Center for Art and Media Karlsruhe,  
<http://www.medienkunstnetz.de/mediaartnet/>

Dance-Tech.Net, <http://www.dance-tech.net/>

Turbulence, <http://www.turbulence.org/>

Rhizome, <http://rhizome.org/>

ctheory, <http://www.ctheory.net/>

La Fondation Daniel Langlois, <http://www.fondation-langlois.org/html/e/>

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## Appendices

Two DVDs accompany this dissertation. They contain four kinds of supporting materials: text documents, audio documents, a web-site, and video documents. Appendices A-D specify the documents, and on which DVD they can be found.

DVD 1:

### **Appendix A (text documents)**

- Pdf version of the dissertation
- Live-I workshop report (2006)
- Article “Expanding Choreographic Resources: Generative Techniques in Contemporary Live Performance and New Media Art” em “TeDance - Perspectivas Sobre Dança em Expansão Tecnológica”, Daniel Tércio, (ed.), 2009 (circulação internacional com arbitragem científica)
- Book chapter “Transdisciplinary Research Bridging Cognitive Linguistics and Digital Performance: From Multimodal Corpora to Choreographic Knowledge.Bases” with Carla Montez Fernandes in “Performing Technology: User Content and the New Digital Media: Insights from the Two Thousand + Nine Symposium”, Franziska Schroeder (ed.), 2009, Cambridge Scholars Publishing (circulação internacional com arbitragem científica)

### **Appendix B (audio documents)**

- Interview with Troika Ranch directors Mark Coniglio and Dawn Stoppiello (2006)
- Open Interview with the participants of the Mertola Laboratory (2009)

### **Appendix C (web-site)**

- offline version of the “Evolving Glossary for Interdisciplinary Collaboration in Digital (Live) Performance”

DVD 2:

### **Appendix D (video documents)**

- Video clips supporting the case studies in chapters four and five