LIVE PERFORMANCES IN DIGITAL TIMES: AN OVERVIEW

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Picture: still from the Asphyxia project

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Foreword

Digital revolution is a fait accompli. Having entered the art world, it is dispersing into its reality and changing it beyond recognition. Telepresence, virtuality, digital mobility and online tools become inherent to the professional life of the arts community, increasingly engaged with re-discussing the body and analysing the notion of presence on stage. Are we on the threshold of a total upheaval? Or is it just about yet another "trend"? Giving rise to new art forms, does technology irreversibly transform the very notion of art?

The 'digital shift' is one of the key issues in today's societies all over the world – and therefore something that naturally concerns the performing arts. This mapping explores how digital technologies are used at the different stages of the artistic process (creation, production, dissemination, archiving…) and to what aims (inspiration, audience engagement and development, marketing, sharing…). Pairing a solid theoretical part with a large number of examples from across Europe and outside, it provides an overview of live arts in digital times – which is also the title of the upcoming IETM spring plenary meeting in Amsterdam next April.

We're happy to present this new mapping as a milestone in IETM's reflection on the topic, which includes an article on *Who's afraid of the digital?*, the Amsterdam meeting and a future Fresh Perspectives publication. Stay tuned – and feel free to continue the conversation on IETM members' forum!

The author wishes to thank the experts and professionals who responded to her questions, in particular when information seemed to be lacking for certain topics or geographical reasons, or in order to collect more precise data about specific projects or practices:

Jaakko Lenni-Taattola, coordinator of TNT - Network for Theatre & New Technology: Digital Solutions in Performing Arts (FInland); Thomas Heikkilä, Senior advisor (NORDBUK, Network Funding) at the Nordic Culture Point; Milan Vracar, member of Kulturanova Association (Serbia); Goran Tomka, research and teacher at the Faculty of Sports and Tourism in Novi Sad (Serbia); José-Carlos Arnal, curator at Etopia Center for Arts and Technology (Spain); Pavla Petrova, director of the Arts and Theatre Institute in Prague (Czech Republic); Gordana Vnuk, former director of the EUROKAZ festival (Serbia).

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01.
INTRODUCTION

1.1. Context

While a number of pioneering institutions and artists have become (or have been led to become) ambassadors of digital and technological culture already for decades, the mainstream cultural institutions often show a certain resistance to the new aesthetics and new models of organisation and production that derive from digital technologies. The sources of such distancing could be the fear (or at least the anxiety) of the disappearance of the live, the ephemeral and the singularity of the live performance; of the collective experience; of the disintegration of the stage as a space for humanity, a social link and political forum, both organised and spontaneous. All this could be replaced by an increasingly ill society, hungry for unethical consumption, automated and robotised, ruled by the law of the market and Big Data, which would soon lead to the loss of the human, its actions and skills. The idea behind these fears is that basically culture and technology oppose each other.

This very idea lurks in the background of a certain discourse, widespread in the cultural sector, warning that aesthetic excellence and a certain idea of art is not possible in performing art forms that integrate digital technologies. Too experimental and difficult to mediate for the audience; too focused on technical or technological components and therefore lacking real artistic relevance, or even lacking imagination; requiring specific expertise; de-socialising since the audience can ultimately stay at home and watch a screen; provoking speechlessness rather than real emotion: this kind of performance does not fulfil the social and cathartic contract attributed to live performance for more than 2,000 years. Not to forget the very practical aspect of the technical challenges that such performances pose to the 'classic' equipment of our cultural venues, which would make it impossible – or at least very

hard – to stage them, if ever they were to be programmed.

On another hand, in the last fifty years the introduction of the digital in contemporary visual arts, performative aesthetics and music has been progressively breaking down the barriers of different artistic categories, both in the artists' work and in the venues and institutions inviting them. Digital arts and their results on stage are meant as actual environments integrating the physical participation and the sensorial and critical perception of the audience. Digital arts bring to the fore the role of the technical in the arts, they deal with the reality of parts of the contemporary world and with its technical progress and aesthetic, social and economic changes. Yet it seems that they're not getting the anticipated and deserved recognition by the performing arts world.

We're thus facing the rise of **a sort of parallel world**, a network of specialised institutions – joined by a few rare multidisciplinary ones – attracting other professional figures, other artists, other audiences, and paradoxically claiming to be a stand-alone discipline. **Paradoxically**, because the performing arts world is indeed going in the opposite direction, towards the abolition of borders across disciplines – barriers, we should not forget, that are also ideological, as recently stated by art historian, critic and curator Christophe Wavelet in his article '*Malaise dans le performatif*' ('Unease in performativity') in the *Cahier de l'Onda* (July 2013) '*Les Nouvelles Formes de la scène*'; and as Theodor Adorno (and others before) had already stated in his famous essay *Art and the Arts* (1967).

In a context of structural changes and ideological conflicts, it is useful to refer to wider concepts proposed by some contemporary researchers and intellectuals. We could for example think about the 'Third Industrial Revolution' described by

American economist Jeremy Rifkin[1], or the 'World Wide Lab' mentioned by the French philosopher and anthropologist Bruno Latour[2]. The French philosopher Bernard Stiegler (former director of IRCAM[3], founder of Ars Industrialis[4] and initiator of IRI - Institut de recherche et d'innovation[5] at the Centre Pompidou - France), is particularly active in debates agitating the French cultural world. He considers the dual nature of technique and its tools - mirrored in the debate around technology and digital – and refers to the ancient Greek term _pharmakon_, which is 'at the same time what allows us to take care {of something} and what we should take care of, in the sense of being careful: it is a healing power in the measure and excess in which it is a destructive power'.

1 _Jeremy Rifkin_ is an American economist who has published about twenty books. His very mediatised essay 'The Third Industrial Revolution' illustrates his theory according to which the current digital revolution could mark the beginning of a new mode of organisation based on the social economy.

2 _Bruno Latour_ is a specialist of philosophy and anthropology. He taught in engineering schools including l'École des Mines and is professor at Sciences Po in Paris since 2006. His concepts of a 'World Wide Lab' is well explained in the article The World Wide Lab - RESEARCH SPACE: Experimentation Without Representation is Tyranny

3 _Ircam_ – Institute for research and coordination for acoustics and music is a French scientific research centre focused on music creation and technological innovation, founded by Pierre Boulez in 1969. It develops academic and applied research on creation and production

4 _Ars Industrialis_ – international association for an industrial policy of the spirit of technologies is a cultural and political association created in 2005 by Bernard Stiegler

5 _IRI – Institute for research and innovation_ was created in 2005 within the Centre Pompidou (Paris, France) and became an autonomous research centre in 2008. It explores the domain of Digital Studies, analyses and develops cultural practices enhanced by digital technologies

We're living in a context in which the 'worlds', and namely the world of performing arts – be it from the point of view of institutions, artists or intellectuals – are questioning themselves and are trying to understand and affirm their role in the face of the tidal wave of (new) technologies and of the digital everything, often in focus in the public debate, 'penetrating'[1] and influencing all the domains of our societies and all aspects of life. Opportunities for discussion are multiplying, new professional training opportunities arise, new practices blossom inside cultural organisations, public institutions propose frameworks and put in place supportive policies in the form of funding, agendas or digital strategies at the national level or more widely (see for instance the Digital Agenda for Europe at the EU level).

It's indeed crucial to **engage with audiences**, whose behaviours, relations and cognitive processes have changed – and are still changing – due to contact with digital technologies, the internet and the accessibility and circulation of a huge volume of content on the Web. The new tools offer the cultural sector at large privileged opportunities to reach out to its existing audiences, develop new ones, develop new processes of awareness raising, transmission, artistic and cultural education more adapted to contemporary audiences.

All these issues need to be approached as an **ecosystem**. For example, making a video recording available via streaming requires first of all its digitisation, then the development of a digital platform – which in its turn requires raising funds or creating partnerships, maybe working with some researchers and/or a commercial company, and a number of new activities to give sense to the online platform. All this leads to new questions including: why do we decide to offer a new (digital) approach to a work, or to culture? How to create new partnerships

Andreas Åkre Solberg, Internet Explorer Error Message tagged (*source: Flickr*)

with the research or corporate world when we're not specialists of digitisation, digital development or digital sociology? How to work together with those new partners? How to fund the work? How to manage the project consistently within my cultural organisation? Do I need to reorganise the departments and human resources? Does the staff need specific training? How to communicate with audiences? And who are my audiences and how would they be concerned?

Responding to the needs and interests of its membership, IETM has naturally engaged in these issues via its recent plenary meetings and in publications on topics related to the digital shift[2]. This mapping is another step along the way and aims to give a thematic and geographic overview of the state-of-the-art of the performing arts at this precise moment of the digital era.

This mapping approaches the digital issue as an ecosystem and considers the whole value chain – creation, research/production, documentation, dissemination/mediation. It highlights new trends taking place, the multiple goals and the eminently cross-disciplinary (or at least multidisciplinary) nature of the artistic and cultural activities that are pushing the barriers across, between and outside the different disciplines.

1.2. Methodology

This mapping builds on desk research of reports, studies, statistics, specialised literature and policy documents in the field of performing arts with digital and/or technological components, and on specific aspects (audience development, research etc.). The reports and studies published across Europe are heterogeneous and don't follow a common methodology, mirroring the different degrees of penetration of digital technologies in different countries and significant differences in how national public policies foster innovation and research. An

1 The statistics measure the degree of penetration of broadband internet or of mobile devices (telephones, tablets etc.) in the households, in a corporate sector, etc.

2 IETM published an article about this topic in September 2015, titled Who's afraid of the digital?; the 2016 IETM spring plenary meeting in Amsterdam will deal with 'Live arts in digital times' and a Fresh Perspective publication on these themes will be issued after the meeting.

additional issue that impacts the mapping is the availability of resources in different languages spoken by the author. For these reasons, and because of rapid and dramatic changes in the field itself, this publication is obviously not exhaustive.

A number of experts and professionals (mentioned in the acknowledgements) have been contacted for the mapping, in particular when information seemed to be lacking for certain topics or geographic territories, or in order to collect more precise data about specific projects or practices.

This mapping pursues the following goals:

- to suggest a global vision that considers the whole value chain (as explained above) and thus points out the ecosystemic dimension of live performance in the digital era;

- to map and explain the key issues and problems, in a critical approach that considers all the segments of the value chain;

- to present examples of the different issues at stake by mapping a significant number of relevant artists, institutions or projects from the largest possible number of European countries, as well as integrating some international examples when possible and relevant.

1.3. Definitions and use of terms

It is important to explain some common definitions used in this mapping as well as mentioning how the same concepts can be used and understood differently according to the time, place and discipline from which we look at them.
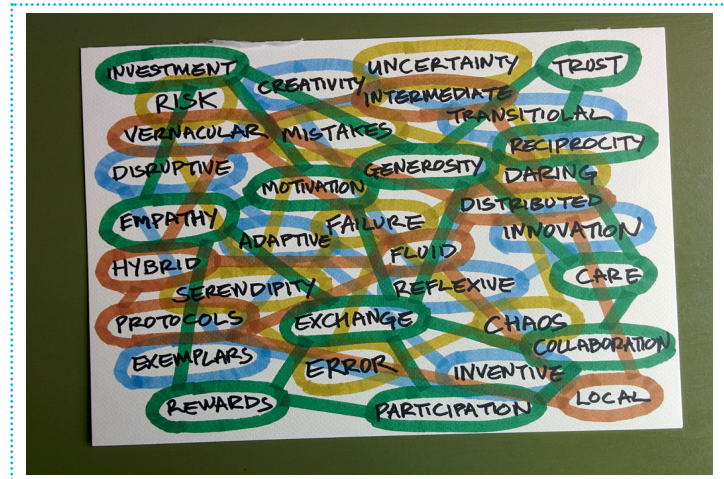
Disciplinary / multidisciplinary / interdisciplinary / trans-disciplinary

In his article *Sur l'interdisciplinarité,* Edgar Morin, French sociologist and philosopher, explains that the concept of scientific

Neil Cummings, Tributary diagrams (*source: Flickr*)

discipline points to

'an organisational category within scientific knowledge; it {the category} establishes the division and specialisation of the work and responds to the diversity of domains covered by the sciences. Although included in a larger scientific ensemble, a discipline tends naturally to autonomy, by the delimitation of its borders, the languages it creates, the techniques it is led to elaborate or use, and possibly by the theories that belong exclusively to it[1].

1 *'(...) une catégorie organisationnelle au sein de la connaissance scientifique ; elle y institue la division et la spécialisation du travail et elle répond à la diversité des domaines que recouvrent les sciences. Bien qu'englobée dans un ensemble scientifique plus vaste, une discipline tend naturellement à l'autonomie, par la délimitation de ses frontières, le langage qu'elle se constitue, les techniques qu'elle est amenée à élaborer ou à utiliser, et éventuellement par les théories qui lui sont propres'. - Edgar Morin,* Sur l'interdisciplinarité, *in* Bulletin Interactif du Centre International de Recherches et Études transdisciplinaires n° 2, Juin 1994. *A version of this text was published in* Carrefour des sciences. Actes du Colloque du Comité National de la Recherche Scientifique Interdisciplinarité, *Introduction by François Kourilsky, Éditions du CNRS, 1990.*

A **multidisciplinary** process gathers representatives of different disciplines around a common object or subject. In a multidisciplinary process, each practitioner from a specific discipline maintains the specificity of its methods, techniques and concepts. Several disciplines get together, each of them tackling the object according to its own parameters; however no single discipline could grasp every aspect of the object using only its own techniques. So, by a shift in meaning, the term multidisciplinary in the arts means for example the mix of different disciplines within a same performance or in a festival.

Also in an **interdisciplinary** process people from different disciplines work together. However here the different approaches to the same object confront one another and the different disciplines establish a dialogue and an exchange. This approach implies strong interactions and a mutual enrichment of several specialists through active cooperation. It requires opening the exchange and overcoming certain disciplinary boundaries. In the arts, an interdisciplinary approach generally means that an object is approached from mixed points of

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view referring to different disciplines and fields. More simply, the term indicates the hybridisation of the artistic forms.

The notion of **trans-disciplinary** derives from interdisciplinary (sometimes used as a synonym). A trans-disciplinary process works on objects that do not properly belong to any specific discipline. The term indicates activities which cross different fields; their common points would be inside a global, borderless system across disciplines. The prefix 'trans-' particularly suggests the idea of 'beyond', the overcoming and overflowing of disciplines, which translates, in the arts, into hybrid or unclassifiable artistic forms. The term is used mostly for artistic creations and less for institutional projects required to refer to socio-political, economic, ecological or scientific dimensions.

Auditorium Theatre in Toronto (source: bublogblog)

Some people in the cultural sector perceive such categories as irrelevant, out-dated and timeworn; they prefer to speak simply about art or the arts, in spite of the recurrent use of such terms. Indeed cultural organisations confront audiences who still need some 'institutional' references in order to classify the arts according to their own aesthetics and values – both of which derive from their own societal background. The language and criteria of the majority of public and private funders too refers to precise and 'classic' categories; these therefore remain strong references in collective representation and public discourse, and deserve specific attention.

Techniques / (new) technologies

The terms **technique** and **technologies**, and especially **new technologies**, are used very often today without much attention or questioning. They commonly indicate, according to Wikipedia, 'technologies that are perceived as capable of changing the status quo. These technologies are generally new but include older technologies that are still controversial and relatively undeveloped in potential, such as 3D printing, preimplantation genetic diagnosis and

gene therapy which date to 1981, 1989 and 1990 respectively'. However, looking more closely, the current meanings of these terms have been influenced by a series of lexical ideologies and some back-and-forth travel between the old and the new world. What histories and representations are hidden behind these terms?

In the first place, the Greek etymology of the term **technique**, *tékné*, means 'art' in the sense of the 'art of...', as suggested by Aristotle in his Poetics when he explains that poetry is mimetic and finds its origins in practice (*praxis*), i.e. in the real human activity, via the lived experience, and therefore empirically. According to Aristotle, representation can be produced 'by art (*tékhné*) or by habit'[1], and he even affirms that 'those who at the beginning had the best natural predispositions slowly progressed and gave birth to poetry starting from their improvisations'[2].

The contemporary definition of 'technique' by the Oxford English Dictionary is: 'a particular way of doing something, especially one in which you have to learn special skills' or 'the skill with which somebody is able to do something practical'. We are in the domain of application, know-how, **arts**-craft, although according to the specific domain the processes can be more or less structured – think of the scientific domain, whose methods are extremely rigorous. There is also a body of work that focuses on the more theoretical/philosophical applications of the term[3].

In the XIX century the term 'technology' began to refer to the objects of the technique and not anymore to philosophical treatises. These objects can be machines, materials or building techniques used by engineers and imply 'industrial or commercial applications in opposition to the domains of 'pure' sciences, research or artistic creation'[4].

1 Aristote, La Poétique, *Text, translation, notes by Roselyne Dupont-Roc and Jean Lallot, Paris, Éditions du Seuil, 1980, p. 43 (the English text is a translation by the editors)*
2 ibidem

3 For a reflection about the use of terms in the French language, you can check the French version of this mapping at https://www.ietm.org/fr/node/5269
4 François Charpin, « Étymologie et histoire du mot technologie »

Starting from the XX century, the idea of **innovation** came in. According to Eric Guichard this would be a true ideological enterprise of 'valorisation of the future' and 'technical determinism', i.e. the idea that the technique elicits social transformations but develops itself free from any social representation. This approach corresponds, for example during the industrial boom of the 1980s, to the identification of informatics as a key factor for the economic growth of that period. The first outcomes of such policies appeared in 1991, when the Clinton government in the USA promoted 'new technologies' as the 'information superhighway' in the framework of the *High Performance Computing Act*.

In the rush to emulate the US approach, boosted by economic hopes and a future-oriented look, Europe risks to forget the necessary reflection about ancient and contemporary techniques and their origins. Europe has quickly adopted the same discourse as the USA, but mostly in a hurry, urged by the need to be in tune with its own times from a political and economic growth perspective. Indeed, several reports published in this sense claim that 'it is time for Europe to exploit the opportunities offered by the new technologies'[1]. Thus the term 'new', apart from giving no actual indication about the timescale, is often refused by purists because of its ideological connotation, as the symbol of a political and economic imperative.

1.4. Some numbers

'Digital culture' is understood in its complexity as a transversal phenomenon touching upon different sectors or domains of society. Within the cultural sector in particular, digital culture is considered in terms of the development of new information and communication technologies, but also regarding public policies encouraging the access and participation of the audience, in particular regarding young audiences (12-24 or 16-24 years old)

1 Eric Guichard, Op. Cit. p. 6

and their digital consumption habits.

From a European perspective, differences in the use of technologies in different countries – including for the cultural sector – can be explained by looking at national public policies fostering the use of technologies, in particular in terms of specific investments in research and innovation.

According to Eurostat, in 2013 investment in research and innovation in all sectors (commercial companies, public sector, higher education and private non-profit organisations) in Europe (EU28) amounted to 2,01% of GDP, against 1,85% in 2008. Differences across countries are high, in particular between North and South and between East and West: among the countries investing more, over 3% of their GDP in 2013, are Sweden, Finland and Denmark, although since 2008 there was a slight decrease (-0,2%) probably due to the global economic crisis. Bulgaria, Greece, Croatia, Cyprus, Latvia and Poland instead, while constantly progressing, do not go beyond 1% of their GDP in investments. Romania, with the least investment, decreased from 0,57% of its GDP in 2008 to 0,39% in 2013. Slovenia, France, Germany, the Netherlands, Belgium and Austria invested between 1,90% and 2,60% of their GDP between 2008 and 2013.

Let's now compare this data with the usage and availability of internet in European households, although research and development concern other technologies as well. While in 2009 30% of Europeans (EU28), i.e. one third of citizens aged between 16 and 74, had never used internet, in 2014 the figure was 18%, closer to the minimal threshold (15%) of non-users fixed by the EU in its Digital Agenda.

Indeed between 2008 and 2013 the number of Europeans using internet at home increased from 53% to 72%. Countries with fewer users (around 30%), like Romania, Bulgaria, Greece, Croatia, Italy and Latvia, registered a constant increase from 20 to 30% until 2013. Other countries registered

a smaller increase, around 10%, however 90% or more of their populations use internet at home (Sweden, Luxemburg, the Netherlands, UK, Norway, Finland and Denmark). Iceland has the highest rate, with 95% of its population using iat home. By the way, in 2012 60% of young (16-24 yrs.) Europeans (EU27) used mobile internet, and these numbers are constantly increasing.

Data about the penetration of a technology like internet in people's daily lives goes hand in hand with necessary and increasingly sophisticated infrastructure as well as national policies that facilitate it. The democratisation of the internet at structural and infrastructural levels benefits from the evolutions and emergence of new usages, discussed further in the chapter about audience development.
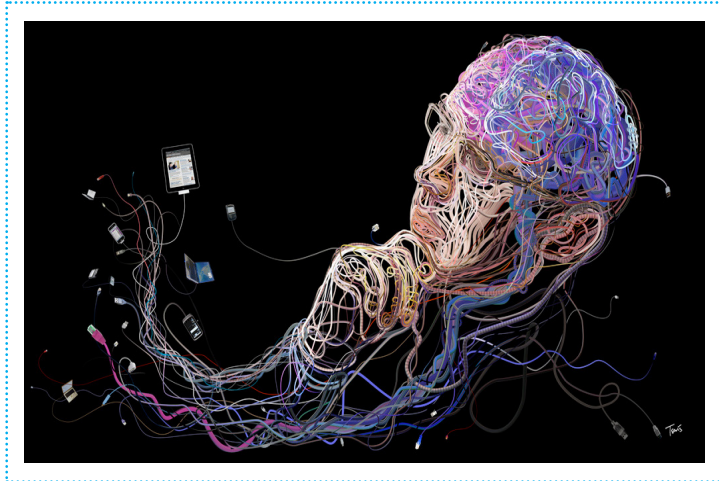
02.

OVERVIEW OF TYPES OF DIGITAL PERFORMANCES

2.1. Introduction

In proposing a theoretical and aesthetic reflection about digital performance it is important to consider the historical context of their emergence. Of course this is not the main topic here, which is to map various issues and problems rather than focus on aesthetic issues; these are treated in several publications that have appeared in the last twenty years, some of them acknowledged today as references. A number of magazines, conference proceedings etc. are also available and enrich the existing literature.

In the frame of this mapping we can mention some publications that are key to understanding the context in which performing arts with technological components have emerged, as well as aesthetic issues related to them:

- Laurel Brenda, *Computers as theatre*, Reading (MA), Addison-Wesley Publishing Company, 1993;

- Birringer Johannes, *Media and performance: Along the Border*, Md, Johns Hopkins University Press, 1998;

- Wilson Stephen, *Information Arts: Intersections of Art, Science, and Technology*, Cambridge (MA), MIT Press, 2001;

- Dixon Steve et Smith Barry, *Digital Performance: A History of New Media in Theater, Dance, Performance Art, and Installation*, Cambridge (MA), MIT Press, 2007;

- Salter Chris, *Entangled. Technology and the Transformation of Performance*, Cambridge (MA), MIT Press, 2010.

picture: Charis Tsavis (source: *Flickr*)

The generic term used to define performing arts with a digital and/or technological component – and used in this mapping – is 'digital performances'[1].

2.2. A quick overview of the emergence of digital performances

Studies on the origins of digital performance usually start with the avant-garde movements of the early 20th century, although we could certainly find earlier examples. Those movements were part of a general trend towards the emancipation of theatre from literature, of the staging from the text, of the director from the predominance of the playwright. This trend started at a moment when, according to various performing arts practitioners and theoreticians of the period, artistic forms and texts staged were not representative of society's evolution following the industrial development of the beginning of the 20th century. The avant-garde then proposed a convergence of the arts, an interdisciplinary approach in which all the arts (music, fine arts, cinema, theatre, dance etc.) and their representatives would mix on stage.

Richard Wagner, with his *Gesamtkunstwerk* ('total work of art'), would be a precursor of this trend. Following his steps, and more specifically in theatre, **Georg Fuchs**, art critic, poet, director, artistic director and theoretician, aimed to 're-dramatize' the stage and advocated an organic and rhythmic theatre, where he wanted to welcome all strata of society. He elaborated a global programme called *Künstler-Theater* ('the artists' theatre'), launched in Munich in 1908, which also included a total revision of the theatre's architecture and its whole machinery, and where Fuchs invited artists from all disciplines to work together.

The roots of contemporary digital performance can be found also in the dramatization and theories around puppets, namely those by **Maeterlink** and **Edward Gordon Craig**, who thought of puppets as a replica of the ideal actor. They questioned the necessity of the physical co-presence of the real actor-character and the spectator in order for the *mimesis* (and the *catharsis*)

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1 For a more complete explanation about the use of specific terms in the French language, you can check the French version of this mapping at https://www.ietm.org/fr/node/5269

to happen. This conception is mentioned today in discourses against the machine, avatars and the virtual on stage – which we could compare to puppets - wherein the actor-character disappears.

In the industrial context and following the ravages of World War I, movements like **Futurism**, **Dada** or **Bauhaus**, that explored the mechanisation and automatisation of society, used technique as a symbol and reconfigured the space by using mobile scenes and screens, letting the actor disappear and claiming the necessary integration of radio and telephone with the theatre.

In parallel, the staging by **Erwin Piscator**, a fervent representative of a political and epic theatre (namely with the 'The Good Soldier Švejk' staged in 1928 with young Bertolt Brecht), marks a crucial step in the renewal of theatre. It introduced technique backstage, in the machinery and on the stage, in order to respond to an aesthetic need (faithfully staging a picaresque story, with a great number of characters and many changes of settings), as well as to a will for political emancipation. Indeed Piscator considered that drama of his period (except for Schiller) didn't mirror (historical) reality, or more precisely, didn't reflect the actual audiences who had just survived WWI and had to face an unprecedented economic crisis as well as the rise of Nazism. So the aim was to stage a text – originally written for the theatre or not – able to convey an uncensored reality allowing the masses to face their economic and social alienation by staying as close as possible to their own current and recent life experiences.

The second big movement constituting the beginning of the digital performance was the avant-garde of the 1960s, corresponding with the advent of informatics – although definitely not widespread yet and still a very advanced technology requiring substantial means and the collaboration of specialised researchers and engineers. With the increasingly general dissemination of informatics in the 1980s, followed by the internet and then the web in the 1990s,

picture source: _Flickr_

more and more artists became interested in these new processes as a societal factor, and in the new possibilities these technologies offered in terms of relationships with the audience. We can mention here several artists, leading figures and experiences well known today by the general public, such as:

- The cybernetic works by **Nicolas Schöffer**, French fine artist of Hungarian origins;

- The event '9 Evenings: Theatre and Engineering', part of the work of the association **E. A. T – Experiments in Art & Technology**, gathering artists like John Cage, Robert Rauschenberg, Yvonne Rainer and Steve Paxton among others, as well as engineers, and presenting around ten experimental performances;

- The stage designers **Josef Svoboda** (Czech Republic) and **Jacques Polieri** (France);

- More recently (since the late 1980s), the Canadian director **Robert Lepage.**

2.3. A quick overview of contemporary forms and artists

For the sake of readability, examples included in this mapping are grouped into broad categories defined from the point of view of the recipient (the audience). Another possible approach might be to look from the point of view of the stage and on the different devices or technical interfaces adopted. This mapping also aims to give as many examples as possible of contemporary artists, companies or collectives without any subjective aesthetic or qualitative considerations. The reader is invited to deepen her/his own exploration starting from the links provided.

Considering artistic creation we can look at some broad aesthetic categories, each of them grouping different technical devices; however some of the artists/companies or forms mentioned in the text combine several devices into the same work.

Digital performances combining computer graphics, 3D images, as well as cinematic techniques, Pepper's Ghost, tulle or cyclorama, in some cases interactive – in real time or recorded – via technical manipulation from outside of the stage. The images are part of the stage design.

Among the artists using the cyclorama or tulle on the forestage (technically simple but very effective) one can mention 'Biped' by the American choreographer **Merce Cunningham**, which had a 'democratising' effect for this technique among the general public. Cunningham collaborated with the **Open Ended Group** made up by Marc Downie, Shelley Eshkar and Paul Kaiser, very active in creating arts in the public space namely with 3D films.

In 2010 the Belgian company **Artara**, directed by Fabrice Murgia, produced the performance 'LIFE : RESET / Chronique d'une ville épuisée', exploring the theme of loneliness in big cities and the new phenomena of social networks and virtual identities. In a hyper realistic setting a young woman dances alone, on the forestage in front of a stretched canvas, accompanied by projections and light games fusing images into the canvas.

We mentioned the Pepper's Ghost, a centuries-old technique that makes people and objects 'appear' and 'disappear' via an optic illusion. Originally using a mirror, this technique today uses a – quite expensive – special film angled at 45°, usually put on the forestage, which can be enhanced via 3D projections or others. The celebrated Quebec company **4d art**, directed by Michel Lemieux and Victor Pilon, uses this process in several creations.

Several French artists use these techniques:

- **Jean Lambert Wild**, recently appointed Director of the Théâtre de L'Union-Centre Dramatique National du Limousin, namely with his historical creation 'Orgia';

- **Compagnie 14:20**, directed by Clément Debailleul and Raphael Navarro, mixes new magic, juggling and dance. Their new creation 'Wade In The Water' will premiere in November 2016 at the Théâtre National de Chaillot;

- **Joris Mathieu** (Compagnie Haut et Court), Director of Théâtre Nouvelle Génération (Lyon, France) since January 2015, frequently uses this kind of technique, for example in performances and installations like 'Le Bardo' ou 'Urbik_Orbik'

- The young theatre company **Ex Voto à la Lune** directed by Emilie-Anna Maillet with their performance by Jon Fosse, 'Hiver' (2014).

A great number of artists and theatre companies, choreographers and groups working across disciplines use the combination of interactive digital images (digital images, 3D elements, mappings or movement captors) superposed to the real action on stage. In some cases these are one-off experiences, but some artists engage in a long-term exploration of such procedures. To mention a few:

- The theatre company **The Builders Association**, led by Marianne Weems, and their performances 'Continuous City' (superposing virtual spaces to the real scene) or their creation 'Sonntag:Reborn';

- 'THEATER', a show using 3D images and avatars by the Swiss-German-Belgian company **Superamas** (theatre and dance) that occasionally uses technologies;

- The French company **Shonen**, led by dancer-choreographer and Gobelins-laureate animation films creator Éric **Minh Cuong Castaing**, heavily uses digital technologies and immersion in 3D digital images on stage;

- The Italian dance company **Interactive Dance Company**, directed by Ariella Vidach, explores all the possibilities ranging from digital images combined with captors worn by dancers who interact with the global equipment in real time, to movement captors acting on sound or visual elements;

- The French theatre company **l'Unijambiste**, directed by David Gauchard;

- The Australian company **Chunky Move** directed by Anouk Van Dijk (who collaborates occasionally with Falk Richter) with their performances 'Glow' and 'Mortal engine';

- The digital and circus company **Adrien M et Claire B** follows a similar exploration;

- The Norwegian company **Verdensteatret** realises hybrid forms crossing installation, performance and music in order to create choral forms, in particular using cinematic techniques;

- The Swedish company **Cabaret Électrique** mixes theatre, dance, mime and puppets and superposes movement capture over the work on stage, so that animated characters move on stage together with the real actors.

11

ETM MAPPING

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'Augmented' performances in which the scene and/or the actors are interfaced via captors or technological and/or digital objects

In these cases the space of the performance, and the perception the audience has of the actors/performers, changes due to the sound or visual emphasis that create a synaesthetic relationship with the performance.

Among the companies using captors, either fixed (on stage) or mobile (worn by the actors/performers) we can mention:

- A historical representative of this technique is the American artist Mark Coniglio with his company **Troika Ranch**, also at the origins of the software Isidora (mentioned in the chapter about research and production);

- Chris Ziegler (Germany-Switzerland) and his company **Moving Image**s, associated to the SINLAB in Switzerland (see also the chapter about research-creation);

- The dance company **Pulso**, directed by Rocio Berenguer (Spanish artist based in France for the last 5 years), and its shows 'Homeostasis' and 'Corps/Non-Lieu', with the immersion of the audience. Here the image captured by a surveillance camera is video-projected and translated into sound through special software developed for the performances;

- The French choreographic company **Mobilis-Immobilis** proposes different performances and installations;

- The German collective **machina eX** creates performances by transposing the conventions of videogames onto the theatre stage. The audience, split into groups of 15-20 people, is invited to 'play' on the stage to solve enigmas and live an adventure. The artists animate the scene and the set via a very ingenious technical set, which includes the use of a huge number of captors.

Performances using artificial 'performers' or virtual characters

Different kinds of artificial characters can be present on stage, like robots, androids or humanoids – the more accomplished simulations of humans. As already mentioned when speaking about puppets, this kind of work originated in the avant-garde of the early 20th century, especially in experiments around automatons or mechanisms that made the actor disappear. This idea of an artificial performing presence leads to reflection on the presence of the actor on stage and the ideal 'total presence' created with puppets. Some examples:

- The Japanese director Oriza Hirata founded the company **Seinendan** in 1983. A theoretician, he also developed the 'contemporary colloquial theatre theory'. In collaboration with Osaka University he developed several performances using robots, including 'Metamorphosis' (2013), 'Three Sisters', 'Sayonara' and 'I, worker';

- The Romanian artist **Aurélia Ivan** studied theatre at the Bucharest Conservatoire, then at the École supérieure nationale des arts de la marionnette in Charleville-Mézières (France). Her last show, 'L'Androïde [HU#1]' (2011) involves a robot;

- Israeli director and stage designer **Amit Drori** creates performances integrating open-source technologies, videos and robots, often made of wood. His creations include 'Savanna – a possible landscape' and 'Gulliver';

- The fine artist **Kris Verdonck/A Two Dogs Company** also works with performance, for example 'H, An Incident', a performance for 9 performers and 10 musical robots;

- With his show 'Re : Walden' (2012), the French director and researcher **Jean-François Peyret** questions and transforms the use of avatars.

12

LIVE PERFORMANCES IN DIGITAL TIMES: AN OVERVIEW

Digital performances that connect (an)other stage – either real or virtual – and play with the interconnection of different spaces of performance, perception and reality

- The project 'Chez Icke' (as it was called in Berlin and Düsseldorf) by the German playwright **Gesine Danckwart** is made of a technical device and a bar, welcoming audiences, performers and 'barvatars' as well as internet users communicating from home via streaming and chat. The device can be adapted according to the place where it is held: for example in Zurich (Switzerland), at the Theater Gessnerallee Zurich, it was called 'Chez Ois' (2015) and had specific features;

- In 'Joseph' (2011) the Italian director, choreographer and performer **Alessandro Sciarroni** plays in real time in front of the webcam of his computer connected with Chatroulette, an online chat website that pairs random people from around the world together for webcam-based conversations. The performance exists also in a version for young audiences, 'Joseph_kids' (2013) ;

- Also the Canadian company **Les petites cellules chaudes** works with Chatroulette for their 'ishow' (2015);

- The American company **New Paradise Laboratories/Whit MacLaughlin** has created 2 cyber-performances, 'Extremely Public Displays of Privacy' (2011) and 'Fatebook: Avoiding Catastrophe One Party at a Time' (2010) – they both connect real and digital spaces;

- **Superamas**' 'Your dream' (2010) proposes a diffracted reading and other virtual spaces of the performance in video-retransmission, avoiding the randomness of other works that use online forums (like Sciarroni's work with Chatroulette);

- In 'Katastrophe' (2011), 'Brickman Brando Bubble Boom' (2012) and 'House in Asia' (2014) the artists of the Spanish company **Señor Serrano** play with scale, using miniature models, video projections and real-time video editing;

- With the projects 'Twin Rooms' and 'Room', the Italian company **Motus**, founded by Enrico Casagrande and Daniela Francesconi Nicolò, confronts and overlaps different past stagings of the same performance with the action happening on stage.

Alessandro Sciarroni, 'Joseph Kids' at Le Phénix (2015)

13

Out-of-stage works that involve the audience – mostly individual spectators – through tools allowing them to move inside the scene or interact with what they perceive, in a virtual recreation of the stage
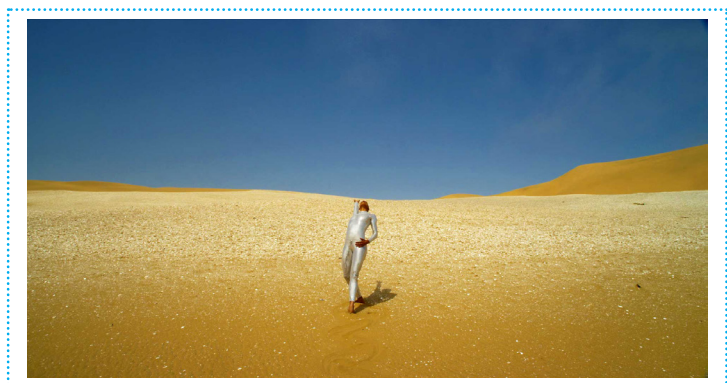
This can be done using **virtual reality equipment** (like oculus rift), also in association with captors:

- Eric Joris, director of the Belgian company, **CREW**, develops the technologies for his works in close collaboration with researchers and scientists at Hasselt University. He proposes immersive productions and installations, like 'Terra Nova' (2011) and 'C. A. P. E' (2010-2014), creating different versions adapted to each city where the works are staged;

- The installation for all audiences 'La chambre de Kristoffer' (2015) by the French company **Ex Voto A la Lune** is part of their larger trans-media project for young and all audiences called 'KANT'.

In other cases, the tools used are **cinematic processes, interactive videos or audio interaction**:

- **Chris Ziegler/moving images** is a very productive director, multimedia artist and stage designer; he collaborates with many choreographers, namely Emmio Greco, former director of ICK Amsterdam and new Director of the Ballet de Marseille, on a number of projects involving interactive technologies or augmented scenes. He also makes immersive works, like 'PARADISO - senses + spaces' (2013) ;

- **Magali Desbazeille** is a French plastic artist who makes performances, net-art and installations. In 2010 she created the interactive video installation 'Tu penses donc je te suis', in which the audience is invited to immerse themselves; a second version of the work is currently being developed;

- **Illegal Oedipus** is a Hungarian collective of video makers, computer programmers and performers. They recently created an immersive installation, 'Sans Papiers' (2015). Through their works they aim to engage the audience by creating a critical space to discuss contemporary social issues;

- **Marco Donnarumma** is an artist of Italian origin based in the UK. Protean performer, musician and sound architect, he creates performances and installations. 'Septic' (2014) and 'Nigredo' (2013) are two participatory and immersive installations; the latter, created at STEIM (the Netherlands), utilises a bio-technological tool developed by the artist in open-source, called 'Xth Sense', that transforms the activity of organs and bodily fluids into sound.
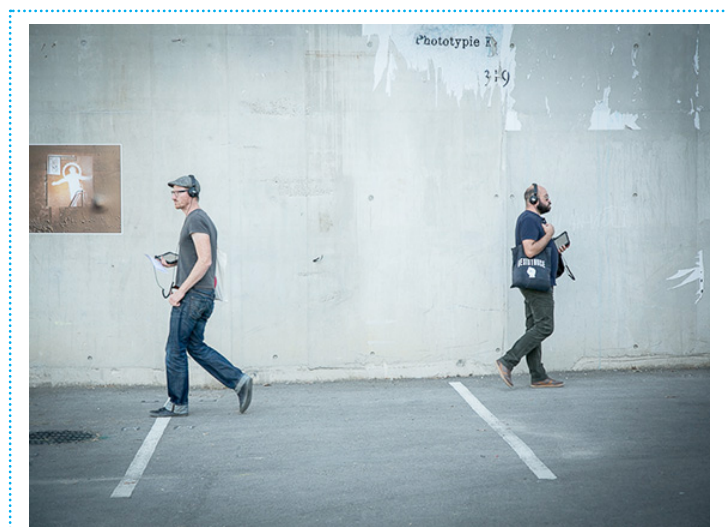

'Paradiso - senses + spaces' by moving images (picture: Gregory Colbert)

14

Walking performances inviting the audience to move around on the stage or in the public space

These forms can use tools like head-phones and/or location-based media, i.e. devices (usually mobile ones) using geo-location (like GPS, geographic information systems, QR codes, etc.).

- **Janet Cardiff and George Bures Miller**, a couple of American artists, have been developing their 'walks' since 1991, first audio, now also video. For their audio walks they have developed a particular technique of tri-dimensional sound diffusion in which the 'walker' immerses themself;

- The same tri-dimensional sound diffusion has been used by the Swedish collective **Lundahl & Seitl** for their audio-guided visit 'Symphony of a missing room', mainly used in museums but adaptable to different places;

- The British collective **Blast Theory** (founded by Matt Adams, Ju Row Farr and Nick Tandavanitj) develops new, hybrid forms using interactive media that involve the audience through web, live performance and real-time video transmission. Many of their works use walks in public spaces. For example, in 'Fixing Point' (2011), 'A Machine To See With' (2010) and 'Ulrike And Eamon Compliant' (2009). The collective also develops games, interactive concepts on low-tech (mobile phones) or high-tech, like their latest creation, 'Karen', installations etc.;

- Apart from their documentary theatre works, the German collective **Rimini Protokoll** (founded by Daniel Wetzel, Helgard Haug and Stefan Kaegi) has since its beginning invented walks, like 'Audiotour Kirchner' (2000). More recently they've developed the concept 'Remote X', that they adapt to the cities hosting them: 'Remote Avignon', 'Remote Berlin', 'Remote Paris', etc. They've also created a walking audio performance around the traumatic issue of young refugees fleeing on boats, called 'Evros Walk Water – Ein Cage Re-enactment' (2015);

- **IN SITU** (European network for artistic creation in the public space) has recently co-produced two audio-walking performances: 'like me' (2013) by the Dutch artist **Judith Hofland** and 'Walk With Me' (2014) by the Dutch collective **Rob Van Rijswijk & Jeroen Strijbos**;

- The French collective **InVivo** launched their creation 'Blackout' in December 2015, an immersive sensorial journey for one spectator, who walks guided by headphones through a space organised in several immersive cells;

- The company **Des hommes penchés**, directed by the French theatre director Christophe Huysman, explored the possibility to write a performance in the public space with 'Pas à Pas' (2013).

'Walk with me' by Rob Van Rijswijk & Jeroen Strijbos, Marseille, 2015 (picture: Marion Ribon, source: Lieux Public)

15

Trans-media performing arts

Trans-media storytelling is a technique coming from cinema and gaming; in principle it doesn't concern the live performing arts. It developed in the context of the convergence of production and distribution equipment under the leadership of big corporations/ groups. Interestingly, this convergence is not conceived as the replacement of the old media by the new, but as an **interaction among the different media or platforms**, in which the audiences play a crucial role in the creation and circulation of information. The media convergence is supposed to create a flux of contents on a variety of media platforms. Trans-media storytelling basically aims to connect all these contents through a narration, creating a common universe for all such contents. It is therefore about multiple extensions, or fragmenting the same story created by the flux and links across media and platforms, while at the same time letting the user/audience play a key role in deciding the evolution of the story itself. The trans-media approach in the performing arts is still at its beginning but it is developing. Because of the very nature of the trans-media approach, the experience can combine traditional media (writing, drawing, comics), new media, low-tech and high-tech tools; it can combine public space, stage and virtual space, stretch along time to create series', be part of a joint curatorial project by the cultural organisation hosting it, etc.

- The Belgian company **System Failure**, directed by Leslie Mannès and Louise Baduel (both coming out of P.A.R.T.S.) is developing a trans-media live performance project called 'Human decision'. The narration is developed through three elements: apart from the performance itself, 'HD Investigation' is a questionnaire the audience is invited to fill in before the performance and that will influence the development of the story; and before or after the show people can watch the tutorials 'HD Practice';

- The Swiss dancer **Lina Schlageter** and the French performer **Zoé Philibert**, are developing a trans-media dance project called 'Attitudes' which translates the attitudes of pop or variety singers into poetic writing, starting from online video collections. The project is composed of several parts and is meant as a playful laboratory that includes workshops, a ball inspired by Michel Reilhac's 'Bal Moderne' (which is made of texts free of choreographic interpretation) and an internet site where the partitions are made available and the audience can upload and share their own dance videos to feed into the online library and the collection of movements;

- The French collective **Kom.post** (also based in Berlin) develops research on theatre and radio writing and the different situations of listening and participation they can create. 'Je n'ai qu'un toit du ciel, vous aurez de la place' is a series of radio fictions, written as serials, accompanied by a booklet as additional narration;

- The company **Olga Mesa & Hors Champ - Fuera De Campo**, directed by Olga Mesa and Francisco Ruiz De Infante, works around an ambitious project entitled 'Carmen/ Shakespeare', a series in several acts, with several extensions including workshops, performances, a film and a website, 'Lillas Pastia', allowing for different forms of interaction with the work;

- The project 'KANT', by Émilie-Anna Maillet/compagnie **Ex Voto A La Lune** (already mentioned) has been conceived as a trans-media project. The narration of the theatre work 'Kant' will extend into the immersive installation for a single spectator 'La Chambre de Kristoffer' and a QR code path developed as a 'Labyrinthe cosmogonique';

- The Swedish stage designer, architect and director **Thomas Bo Nilsson**, ex-member of the Danish company SIGNA, has created 'MEAT', an installation piece lasting 240 hours (10 days) presented only once at the Festival FIND by the Schaubühne in Berlin. The work includes some extensions in live stream, Facebook relations and dtirect meetings with characters who can influence the story.

- ORGAniSMeS is a project under development by the French 'trans-media company' **Dorsa Barlow**, directed by Mael Le Mée; a work-in-progress is programmed in October 2016 at the Hexagone - Scène nationale Arts et Sciences (Meylan, France). This ambitious project combines live performance, a collaborative internet site, a travelling participative installation and two web-series' – video and audio – and is devoted overall to 'the contemporary fabrication of bodies and their possible future mutations'.

Artivism

Many experiences combine art and hack- and cyber-activism into activist digital performances. We chose just two examples to describe in detail, since they raise a particular interest.

- The first case is the project 'Transborder Immigrant Tool (TBT)' (2009) by the American collective **Electronic Disturbance Theater 2.0**, founded in 1997 by Ricardo Dominguez, a professor at the University of California in San Diego and a hacktivist. The group is a collective of cyber-activists, critical theoreticians and performers simultaneously developing a theory and a practice of non-violent actions across and between digital and non-digital spaces. Their project focuses on the illegal border crossing between Mexico and the USA that has already cost the lives of over 10,000 immigrants. The collective recycled some cheap mobile phones, equipped them with a GPS system, and developed software that 'aspires to guide 'the tired, the poor', the dehydrated—citizens of the world—to water safety sites. Concomitantly, its platform offers poetic audio 'sustenance''. In 2010 the project provoked a wave of controversy: some Republican members of Congress, the FBI's bureau fighting against cybercrime and the university at which Dominguez is an associate professor, launched investigations. Although the political aim was to stop the collective and its actions, all the complaints were eventually withdrawn for lack of evidence. The documented project is still exposed in different art institutions.

- In 2013 **Christian Diaz**, an Austrian visual artist and precarious worker temporarily employed at the ticket office of the Burgtheater in Vienna, decided to come out of the shadows on the day the prestigious theatre celebrated its 125 years under the theme 'What theatre do we dream about?'. A few months before, Diaz had realised that he was not employed directly by the theatre but by a sub-contracted security company. Indeed since 1996 the holding society of the Austrian national theatres had ordered the externalisation of all the reception and ticketing services of the public theatres – a decision made of course in the context of budgetary cuts for the cultural sector in Austria. The company that was sub-contracted was the Anglo-Danish security company G4S (formerly Group 4 Securicor), one of the most highly listed companies on the English stock exchange with over 600,000 employees in different countries, active in private prisons, security of mines in Africa and South America, security of transport, pipelines, nuclear plants... The outsourcing of low qualified jobs obviously brings a low minimum wage and reduced rights, and indeed the company is under scrutiny by several human rights organisations.

On October 12, 2013, after a speech by Bernd Bicker, the theatre's former dramaturg who advocated for 'a sharing theatre', Christian Diaz wrote a text, called a video-maker friend of his (who recorded the whole happening), jumped on the stage before the opening performance and denounced the ironic discrepancy between the theme of the meeting and the outsourcing of activities dealing with the audience to a company like G4S, as well as the working conditions of the staff. The theatre's Intendant stopped him during his speech and asked him to leave the stage. However this happening became the 'non-coordinated movement' (*Unkoordinierte Bewegung*). The film of this poetic action of resistance was shared via Facebook, Twitter and the website of the movement; Diaz's text was published by *Nachtkritik*, one of the most influential arts critique sites and forums in the German-speaking area. Through digital technologies, namely Web 2.0, the intervention went viral and widely surpassed the Austrian frontier. Diaz is continuing his work and documenting it on the website.

17

03.

RESEARCH - PRODUCTION

The inter-penetration of artistic creation and digital technologies highlights and questions new interactions between research and creation, redefines the different aims of production and the consequent changes affecting the status and role of the artist. In short, these new partnerships embody new types of production and engender new modes of dissemination of the works, but they also cause a necessary sharing of the capital – not only the symbolic one – among the different partners. This phenomenon is also part of the larger political economic context. We should keep in mind that the background is not only the casual encounter of different spontaneous creativities, but responds to precise organisational strategies. As mentioned, the issue is a necessary economic revitalisation requiring the imperative of creativity and the obligation of technical progress, now embedded in the political discourse as well as in national policies and instruments.

That said, this mapping is limited to a taxonomical approach, i.e. describing the phenomenon of research-creation and its institutions, listing the venues of hybrid artistic production and the tools that facilitate and allow artistically hybrid works.

3.1. Research-creation

In order to talk about research-creation specifically in the framework of digital performance, it is necessary to recap some specificities of research, the arts and the context from which all this has emerged.

The notion of 'research' in the performing arts is not new. On one hand, we call research an activity undertaken in the framework of university education (master, PhD); this kind of activity implies a theoretical distance between the researcher and the object of research. The approach

La Friche la Belle de Mai, Marseille, hosting Zinc (picture: Caroline Dutrey)

is interpretative; it is 'a research about the arts' as Henk Borgdorff[1], teacher-researcher and specialist in research-creation, calls it.

On the other hand, for the artist, research can be the time of creation, possibly long, that includes the trial and error necessary to ultimately get, at the end of the 'process' to the artwork, usually perceived as singular, innovative and/or experimental. This is also the most widespread definition in the discourse and policies of cultural institutions that call themselves places of research and creation. To this category we could add 'research at the service of the arts', i.e. applied research, which is prospective: in this case the art is the objective (not the object) of the research; the research provides knowledge for the creation process and implies, in certain cases and contexts (e.g. schools of applied arts), its capitalisation.

However, new terms have begun to appear in the last 15 years. We speak about 'artistic research' and more specifically 'research-creation', what Borgdorff calls 'research in arts', terms embedding a new phenomenon, hard to describe since theoretical discourses and practical forms vary according to geographical contexts.

This overlapping of meanings, collective representations, theories and practices in this domain, also predetermined by different cultural approaches (whether from the point of view of sociology or epistemology) makes it hard to find a common definition. In their dossier on research-creation and technologies in contemporary theatre Izabella Pluta and Mireille Losco-Lena nevertheless suggest an open, liminal definition of research-creation:

> 'An artistic work which doesn't have a purely aesthetic goal (…). (…) There is research-creation when other practitioners, belonging to the artistic or other fields like those of knowledge and technique, can find elements likely to nurture their own activities in the produced works and the processes which led to their creation.

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1 See the website of the Amsterdam University of the Arts for most of his publications: http://www.ahk.nl/en/research-groups/art-theory-and-research/publications/

Research-creation therefore implies, basically, a sharing and it takes place in the constitution of one or more communities of interest around objects and processes of the art.'[1]

Several elements of this approach should be highlighted in order to best understand research-creation – in all the concerned disciplines:

- Multiple objectives of the artistic work, implying also forms, supports or means of demonstrating conceived for other usages or for other kinds of viewers/audiences;

- Dialogue between the artistic work and the research associated with other communities of interest (domains and disciplines) that aim to act as mutually nourishing bi- or multi-lateral contaminations;

- The notions of horizontality, sharing and collaboration among different communities.

Let's briefly consider other elements alongside this first definition: first and foremost an institutional context that has particularly fostered the emergence of research-creation in its contemporary meaning and secondly, the main broad trends of its practical application.

The emergence of research-creation and its progressive institutionalisation have been obviously marked by historical and geographical aspects (e.g. Finland has practiced research-creation since the 1960s) and the diversity of research cultures (e.g. North America has a very different approach to the theories and practices of research,

Studio Nomad installation at PLACCC Csepel Festival, 2013 (picture: Balazs Danyil)

compared to Western Europe). Besides this, however, a key issue is the specificity of the European political context and in particular the Bologna Process, initiated in 1999 and leading in 2010 to the European space of higher education, that has encouraged the development of research-creation. The agreement aimed to harmonise higher education systems across Europe, to strengthen competitiveness within Europe and worldwide. The main issue is the harmonisation of degrees, in particular bachelor, master and doctorate, also in arts schools (theatre, dance, music, fine arts etc.) which traditionally depend, in countries like France, on the Minister of Higher Education and Research. Whether or not the process actually had an impact on the institutions in the various countries, it has required a rethink on research, including in arts schools, in all the European countries.

This new dynamic goes hand in hand with a proliferation of a first main trend, i.e. the notion of 'artistic research' or practice-as-research, especially in the specific context of arts research and in the broader spectrum of human sciences. According

to this approach, knowledge circulates so that research sheds a new light on artistic issues and nurtures different fields and disciplines. The scientific potential lies in the fact that the research and its results take concrete form. In countries which are only starting to move in this direction there is a lively discussion about the scientific validity of such research 'protocols', i.e. a critical stance regarding their evaluation, refutability, reproducibility and the capitalisation of knowledge that can derive from them, since traditionally this is produced and transmitted in writing. More broadly, such protocols question the concept of 'experience' in the sense of scientific research and of the possibility for an artistic process to redesign its framework. In France, for instance, this question has been embodied in the 'Sondes', experimental or 'exploratory' events gathering artists – in residence or not -, researchers, scientists and the public around unfinished artistic objects; these events were directed by Franck Bauchard (currently interim director at la Panacée, Montpellier) at La Chartreuse - Centre national des écritures du spectacle, between 2009 and 2012.

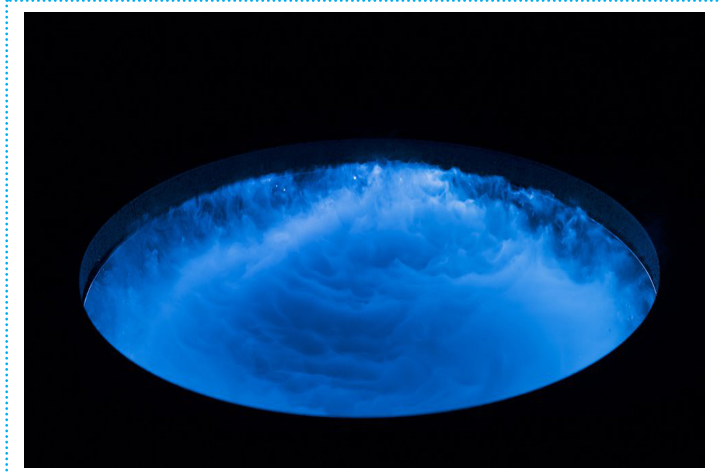1 Izabella Pluta and Mireille Losco-Lena, Pour un topographie de la recherche-création, in LIGEIA – dossiers sur l'Art, dossier Théâtres Laboratoires : recherche-création et technologies dans le théâtre aujourd'hui, n° 137-140, janvier-juin 2015, p. 39-46 (translation by IETM)

The second main trend of research-crea-tion – the most interesting for this mapping – concerns the domains of exact sciences and technologies and is not always linked to a university degree as in the case of practice-as-research. Partnerships and practices can be either institutional or more flexible, paving the way for new types of associations and skills that we could call 'informal' or amateur (DIY, autodidactic, hacking etc.), which necessarily lead to new economic models. This trend does call into question the recognition of such informal practices by the institutions. This kind of research-creation is more and more frequent and can take different modalities:

- They can happen in partnership with the private or corporate sector, in which case there is an interest (obviously also economic) in their own development and where there is a commitment between financial partners;

- They can happen only in a collabora-tive logic, through common practices based on common interests;

- They can stem from the initiative of some type of conglomerate, gathering institutional structures (and possibly also private companies): for instance an institution representing artists, a university, an associated institution or company capitalising the results or the objects created for its own development;

- They can also start from within an artistic team partnering with a uni-versity scientific community or some individual 'specialists', with public or private funding;

- They can imply the participation of non-specialist audiences as 'public witnesses' or users, to provide feed-back about the research.

Les Baltazars, 'Nebula', creation realised in the frameworkof the OSSIA project

Let's then move to the institutions of research and university education that inte-grate artistic research for production aims, either by proposing specific programmes or by partnering with cultural organisations or artists; but we can also think of the venues devoted to the creation of artworks with technological components, or of multi-disciplinary cultural structures that have embedded the technological dimension in their production and dissemination activ-ities. Companies and artists can collab-orate with these kinds of institutions or with companies; or they can team up with key individuals, or gather as collectives with heterogeneous skills and know-how corresponding to the hybrid nature of the works they propose – as illustrated by the examples below.

Places for research and production of digital performances

- **Austria**

Artistic Technology Lab – Vienna University Of Applied Arts

The Lab is an artistic research project conceived as an interdisciplinary research centre, focused on contemporary practices in arts and technologies. It investigates contemporary digital arts practice, the transformation of the aesthetic and the role of the arts in the age of the connected society.

- **Belgium**

Numediart (Mons)

In 2007 the University of Mons (UMONS) founded NUMEDIART, the institute of new media, arts and technology. It works in the domains of audio, image, video, movement capture and bio-signals for applications in which the interaction man-computer aims to create an emotion.

University Of Hasselt – The Expertise Centre For Digital Media (Edm) (Hasselt)

EDM's approach is based both on theoretical and applied research and on research-development. This research institute specialises in man-computer interaction, infographics, multimedia networks, digital vision and virtual environments.

A.Pass – Advanced Performance And Scenography Studies (Brussels)

A.PASS develops a favourable context for artistic research through a research programme around performativity and set design.

- **Finland**

The Centre For Practice As Research In Theatre T 7 - University Of Tampere

The centre is aimed at developing practices related to the artistic, production and technical operating cultures within theatres. At the same time, university-level research and publications are produced as part of basic and post-graduate degrees. It is also developing the TNT project (see below) in collaboration with RIKSTEATERN (Sweden).

- **Germany**

Design Research Lab – Berlin Arts University

The DRLab works on research in interdisciplinary design to give media coverage to the gap between technological innovation and the real needs of individuals. The laboratory explores intelligent textiles, man-machine interaction and various communities of the digital society.

- **Ireland**

Trinity College Dublin - Atrl /Arts Technology Research Laboratory

ATRL is an interdisciplinary research centre in performance, cinema and music created to explore the emergence of new art forms combined with new technologies.

- **Spain**

I2CAT – The Internet Research Center (Barcelona)

I2CAT is a research and innovation centre focusing on Research & Development + Internet, advanced Internet architecture, applications and services. It collaborates with private companies, public administrations, universities and final users, including artists.

- **The Netherlands**

Media And Performance Laboratory - Hku/University Of The Arts (Utrecht)

The laboratory practices applied research to develop creative and technological solutions for health, education, culture and the design of public spaces.

- **United Kingdom**

Institute Of Creative Technologies, De Montfort University (Leicester)

This is an institute of multi-, inter- and trans-disciplinary research about the practice, theory and history of creative technologies. It applies its research through artistic projects, audience development activities and trans-disciplinary collaborations of all kinds. Its activities are funded by the National Endowment for Science Technology and the Arts, the Joseph Rowntree Foundation and several partnerships in R&D.

Centre For Contemporary And Digital Performance and **Design And Performance Lab** - Brunel University Research Centre (Leicester)

The research activities of these institutions focus on a trans-disciplinary approach integrating the arts, theatre writing and performance, staging and set design with digital technologies.

Faculty Of Performance, Visual Arts & Communications Leeds

The main fields of activity of this research unit are live performance and the cultural industries, specifically the relationship with audiences and their engagement, the body

and its representation, digital performance, the venue and the performance.

- **EU, regional and international**

European Project 'Performigrations', initiated by the 'Participact' laboratory of Bologna University (Italy – project leader)

Based on the idea of the migratory experience, the project aims to add to the cartography of its territory the dynamics, complexity and diversity of experiences brought about by the flow of people, through events and collaborative artistic experiences.

The project gathers 6 partners from Europe and 5 from Canada: the Research and Innovation Center (Athens, Greece); Biografilm festival - International celebration of lives (Bologna, Italy); Genus Bononiae – Bologna City Museum (Bologna, Italy); INET-MD Institute of Ethnomusicology – Centre for music and choreography studies - (Lisbon, Portugal); MK Institut für Medien- und Kommunikationswissenschaft (Klagenfurt, Germany); IIC Montreal – Institut Culturel Italien (Montreal, Canada); Bluemetropolis Foundation (Montreal, Canada); Concordia University - Mobile Media Lab (Montreal, Canada); Société du centre Culturel Italien (Vancouver, Canada); Université Ryerson (Toronto, Canada).

TNT – Theatre & New Technology (Nordic Countries: Finland, Iceland, Sweden, Norway)

During the period 2015-16, the project aims to create a Nordic network of arts, artists, freelancers, socio-educational organisations, theatres, festivals, researchers and other specialists in order to facilitate and support the use of new digital technologies in the performing arts. The other partners of the projects are the Lillehammer University College (Faculty Of Television Production And Film) and the Iceland Academy Of The Arts (Department of Performing Arts). The project is funded by the Nordic Culture Point and Nordplus Horizontal.

- **Switzerland**

Sinlab - Experimental Stage Laboratory (Lausanne)

The Sinlab is an experimental project that works at the intersection of performing arts, sciences, architecture, engineering and philosophy. This laboratory for artistic research is a cooperative project gathering several research and higher education institutions: the École Polytechnique Fédérale De Lausanne (EPFL); La Manufacture (HETSR HES-SO); the University of the Arts in Zurich (ZHDK); the Ludwig Maximilians University in Munich (LMU) and the University Tsinghua in Beijing/China.

- **Australia**

School Of Visual And Performing Arts – University Of Tasmania

The Tasmania University of the Arts (Inveresk) proposes an artist in residency programme for arts professionals in the fields of visual arts, theory and history of the arts, theatre, curatorial practices and production.

- **Canada**

Hexagram – UQAM (Montreal)

Hexagram gathers researchers specialised in the creation and study of art works using different digital or analogical techniques. Its mission is to animate and coordinate research-creation in the domain of media arts, to support experimental creation and to foster, in this domain, artistic innovations and the development of new and productive methodologies. This programme has developed Hexagram – Concordia (international network of research-creation in media arts, design, technology and digital culture ; its research programme 2014-2020 develops across three axes: sense, embodiment and movement; materiality; ubiquity. From Hexagram and Hexagram Concordia originated the Laboratory

of research in technochoreography – LARTECH, created by Martine Epoque and Denis Poulain.

- **New Zealand**

Colab - University Of Auckland

COLAB gathers a diverse community of researchers and external experts from the arts, design, computer, animation, game design, engineering, mecatronics, architecture, business and organisational development. COLAB has started the ATAATA, arts-and-technologies residency programme, in collaboration with the Institut Français de Nouvelle Zélande.

Research - Production

- **Austria**

Ars Electronica Futurelab (Linz)

Ars Electronica's activities are articulated around four pillars: the Ars Electronica Festival (since 1979), the Ars Electronica Centre - a museum of digital and technological art -, the Prize Ars Electronica – awarded during the festival – and FUTURELAB, an interdisciplinary research and innovation centre mixing art, technology and society.

- **Belgium**

Imal – Center For Digital Cultures And Technology (Brussels)

IMAL integrates an arts centre producing exhibitions, conferences, concerts and performances ; a media lab allowing artists to research, test, share and exchange with and about new technologies ; and – since 2012 – a fabLab, artistic workshop in digital creation.

Cecn - Centre Des Ecritures Contemporaines Et Numériques (Mons)

The CECN is based in a theatre, le Manège-Mons, and focuses on education, production and awareness-raising of digital technologies applied to the performing arts.

- **Czech Republic**

International Centre for Art and New Technologies – CIANT (Prague)

Ciant is an international platform for research, production and diffusion focused on the creative use of information and communication technologies in the arts. It collaborates with several other institutions such as Hexagram in Canada.

- **France**

Ircam - Institut de Recherche et Coordination Acoustique/Musique (Paris)

IRCAM is a French centre for scientific research devoted to music creation and technological innovation, founded in 1969 by Pierre Boulez. The centre combines university and applied research with creation and production.

Le Cube – Centre De Création Numérique (Issy-Les-Moulineaux)

Le Cube aims to foster creative dynamics while opening a collective reflection about the transformation of society; it is both a playground for experiment and a workshop for creation. Le Cube develops activities of digital practice open to all audiences, hosts a co-working space, organises creative residences and has an artistic programme. It also publishes a magazine featuring prospective analysis about the digital society.

Centre Des Arts D'enghien-Les-Bains (Enghien-Les-Bains)

The CDA is a place for the development, creation and dissemination of arts, digital technologies and sciences. It has an artistic programme and organises festivals (Bains numériques - biennale internationale des arts numériques d'Enghien-les-Bains and Paris Images Digital Summit); artistic residencies; a numeric lab – incubator for innovative start-ups in partnership with the Académie des Sciences-Institut de France; offers technical expertise for the development of new technologies, artistic projects in the public space and set design; finally it coordinates an international collaborative platform for the sharing of expertise and co-productions, the RAN.

Ma Scène Nationale-Pays De Montbéliard (Montbéliard)

This multi-disciplinary theatre, supporting creation and diffusion, stems from the collaboration of four structures that developed into an ensemble: Allan (national theatre), l'Arche (theatre for young audiences), MALS -Théâtre de Sochaux and Ars Numerica (a venue for the digital creation and production).

L-EST/Laboratoire Européen Spectacle Vivant et Transmédia (Belfort And Montbéliard)

L-EST is a territorial cooperation project gathering three structures: Viadanse - Centre chorégraphique national de Franche-Comté in Belfort, MA scène nationale (national theatre) - Pays de Montbéliard and Granit scène nationale in Belfort. It aims to create a space for experimentation and creation with a European dimension together with artists and researchers, combining live performance and trans-media. L-EST offers grants for artistic research and organises events.

L'hexagone – Scène Nationale Arts et Sciences (Meylan)

This multidisciplinary structure for creation and diffusion is active since 2001 combining arts, sciences, technologies and territorial actions. L'Hexagone organises the Biennale Arts Sciences RENCONTRES-I. In 2007 it created the Atelier Arts Et Sciences, a residential research laboratory for both artists and scientists, in collaboration with the CEA Grenoble (Commission for Atomic Energy and Alternative Energies).

ZINC/Arts et Cultures Numériques (Marseille - Friche Belle de Mai)

ZINC's activities are organised around several axes: artistic production; mediation inspired by popular education activities and mixing artists, art works and audience; sharing of resources and creative development of tools. ZINC includes two venues – Transistor and LFO (Lieu de fabrication ouvert) – and a fablab; it has developed a number of stable partnerships within la Friche Belle de Mai and the PACA region, namely with PRIMI - Pôle Transmédia Méditerranée; AMI - Aides aux Musiques Innovatrices; IMéRA, institut d'études avancées de l'université d'Aix-Marseille, and others.

- *Germany*

Zentrum Für Kunst Und Medientechnologie (Karlsruhe)

The ZKM hosts two museums, three research institutes and a multimedia library. The centre thus works on the whole value chain: research and production, exhibition and performance, archives and collections. Through its research and production activities it intervenes at the theoretical and practical levels gathering artists and scientists from different disciplines in order to create artistic works and to develop new knowledge.

- *Spain*

Factoria Cultural – Vivero De Industrias Creativas (Madrid)

Factoria Cultural is a space for the creation and development of business activities in different domains of the arts, communication and new technologies, including all the cultural and creative industries.

Etopia_Center For Art And Technology (Zaragoza)

Etopia is a project by the Municipality of Zaragoza and the Knowledge Foundation – Zaragoza, supported by the Spanish ministry of Industry, Energy and Tourism. It was conceived as a centre to develop creativity, innovation and entrepreneurship in the digital city of the future. The centre is open to a heterogeneous audience made of engineers, researchers, entrepreneurs, amateurs and artists.

- *The Netherlands*

STEIM - The Studio For Electro-Instrumental Music (Amsterdam)

Steim is a research and development centre for music and new music instruments for the performing arts. The works developed there are always related to the direct physical actions of a musician. STEIM offers residencies for composers, interpreters, multimedia artists and the development of interfaces with the performing arts, especially dance.

V2_Institute For Unstable Media (Rotterdam)

V2 is an inter-disciplinary centre for research, production and diffusion, focused on the intersection between arts and technologies. It organises the Dutch Electronic Festival.

- *EU and international*

Art & Science - European Digital Art And Science Network

This network, funded by the EU programme Creative Europe since 2015, gathers seven European partners (cultural organisations), two scientific institutions acting as tutors - CERN and ESO – and Ars Electronica Futurelab, which offers innovative techniques and production facilities for trans-disciplinary works.

- *Australia*

ANAT - Australian Network For Art And Technology

This Australian network aims to catalyse experimentation and innovation through arts, science and technologies. ANAT's research programmes are open to researchers and artists.

- *USA*

EMPAC - Experimental Media And Performing Arts Center (Troy)

The EMPAC is located in the campus of the Rensselaer Polytechnic Institute. It includes four performance spaces and hosts artists and researchers in residence working at the intersection of arts, science and technologies.

Other venues for dissemination of digital performances: festivals

The dissemination of digital performance is evolving rapidly as mainstream venues increasingly present such works, although clear programming strategies are yet to appear. It is more of a trend, linked both to the dominant discourse on new technologies in the public debate and to supportive policies. Added to this of course, is the aesthetic evolution of artistic creation. And there are specialised venues (some listed in the previous pages) organising festivals focusing on digital performance. Finally, in the last 15 years most digital arts festivals, originally focused on contemporary visual arts or electronic music, have been increasingly integrating live digital performances in their programmes. Here we list some festivals from the two latter categories – those in specialised venues and those specifically focused on digital arts.

- *Austria*

Festival Ars Electronica (Graz)

Ars Electronica, founded in 1979, is certainly one of the first – and today amongst the most important internationally – festivals integrating all the domains of artistic creation and technology in the broadest sense. It awards around 10 prizes.

- *Belgium*

Transnumériques Biennale (Brussels)

Transnumériques is a festival of emergent digital cultures that proposes open experiences and diverse, new and hybrid artistic practices in the context of technological development. It focuses on young talents and emerging practices.

- **Belgium and France**

VIA Festival (Mons, Maubeuge and Jeumont)

The VIA festival is a multi-disciplinary festival integrating a very broad programme of digital arts.

- *Bulgaria*

DA Fest – International Digital Art Festival (Sofia)

DA Fest is an international festival organised by the National Academy of Arts. It presents new trends in the digital arts domain (digital videos, interactive performance and installation, net art, sound art). The festival aims to create a favourable environment for culture and education in the digital arts and to build a platform of dialogue among artists, students, researchers, teachers and critics.

- *Czech Republic*

Enter 6: Biopolis International Art | Sci | Tech | Biennale Prague

This festival explores the connection between the natural and the artificial, in relation to issues of the body and data.

- *Denmark*

Clickfestival (Helsingor)

Clickfestival is an innovative festival working at the intersection of science, art and technology.

- *Finland*

Pixelache Helsinki Festival (Helsinki)

Pixelache Helsinki is a festival of electronic art and sub-cultures that takes place in Helsinki since 2002. The programme includes lectures, workshops, exhibitions, shows and concerts.

- *France*

Festival Biennale Les Bains Numeriques organised by the Arts Centre of Enghien-les-Bains

The Festival Bains Numeriques is an international festival of digital arts focusing on performances and art in the public space. Every year it works on a specific theme and issues a call for projects and/or participation.

Biennale Arts et Sciences Rencontres-I (Meylan)

This Biennale was initiated by Hexagone Scène nationale Arts et Sciences in partnership with public and private partners and associations from the cultural, scientific and corporate sectors of the Grenoble region. The Biennale explores the relation between arts and sciences (artists and scientists) and plans to integrate other sectors: industry, education, urbanism, entertainment, tourism and others.

Futur En Seine organised by Cap Digital (Paris)

Futur en Seine is an international festival showcasing, each year for ten days, the latest digital innovations from France and abroad to professionals and to a larger audience.

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Seconde Nature (Aix-en-Provence)

This festival was created by Biomix and Terre Active, two associations based in Aix-en-Provence that work with electronic music and multimedia arts. Seconde Nature leads a multidisciplinary cultural project mixing electronic music, sound art, visual and performing arts; during the year it supports artists developing their projects and has a cultural mediation programme for the exhibitions it hosts.

Bouillants - Festival D'arts Numériques (Brittany region)

Bouillants is a space dedicated to digital artistic expression and to citizenship. The association Le Milieu organises this event in partnership with the private company SAGA. The festival covers the whole Brittany region and includes exhibitions, meetings, workshops, projections, artists' residencies and cultural actions.

Interstice Festival (Caen)

The Interstice Festival focuses on international visual artists and musicians working on the relations between sound, image, object and space.

Festival Accès)S(, Cultures Électroniques (Pau)

This festival looks at technologies from the artistic and anthropologic point of view. It focuses on artistic practices that question the effects of the widespread diffusion of technologies on our cultures and societies. It explores citizens' relationships to their space and time in the age of globalised exchange.

- ● *Germany*

Transmediale Festival (Berlin)

Transmediale is a festival that develops through the whole year and creates new links among art, culture and technologies. All the activities of the festival aim to foster a critical understanding of contemporary culture and politics.

Cynetart – International Festival For Computer Based Art (Dresden)

CYNETart is an international festival of computer-assisted art, created 15 years ago by the Trans-Media-Akademie (TMA) in Hellerau. Every second year the festival awards a prize of €20,000; it also awards a sponsorship and an artistic grant funded by the Ministry of Science and Art of Saxony.

European Media Art Festival (Osnabrueck)

EMAF is a multimedia arts forum offering a space for the encounter of artists, art commissioners, diffusers and expert audiences. The festival aims to be a place for experimentation and a laboratory allowing the creation and presentation of extraordinary works, experiences and projects.

Phaenomenale (Wolfsburg)

This arts + science festival was born by merging the artistic associations of Wolfsburg and Pheano, later joined by other partners (including the City of Wolfsburg). The festival collaborated with research institutions, like ZKM in Karlsruhe and the Technical University of Braunschweig, as well as with internationally renowned artists such as B. Karl Bartos and Harun Farocki. Since 2013 Phaenomenale has awarded a prize for 'Social Media Art'.

- ● *Greece*

Athens Media Art Festival (Athens)

This Festival aims to gather a worldwide community of artists and audiences and encourages all aspects of digital creativity by hosting Greek and international artists. The festival was launched in 2005 with the aim of offering a platform for video art, contemporary art and performing arts. In the following ten years the Festival evolved to include several art forms such as web art, interactive installation, animation, digital arts and performance, exploring all the creative aspects of digital technology and culture.

- ● *Hungary*

Placcc Festival (Budapest)

The Placc Festival is focused on in situ creation and the arts in public space. It works with artists who have very different practices and includes issues around technologies in its reflections and programme.

- ● *Iceland*

Sequences - Real Time Art Festival (Reykjavik)

This ten-day festival presents progressive visual art and focuses in particular on time-based media: performances, stage works, sound works, video and interventions in public space.

- ● *Italy*

The Rome Media Art Festival (Rome)

This festival, promoted by the Fondazione Mondo Digitale, focuses on the relation between arts and technology. It works as a bridge linking artists, research centres, schools, universities and enterprises, bringing young generations closer to a new way of using and understanding technology.

Teatro e Nuove Tecnologie by Teatrale Initinere (Bergamo)

The Teatro e Nuove Tecnologie festival is a project initiated in 2012 by the Teatrale InItinere association; it explores art in public spaces and multimedia arts.

- *Slovenia*

MEMEFEST - Festival of Socially Responsive Communication and Art (Ljubljana)

Memefest is an international network of people interested by social change via a sophisticated and radical use of media and communication. It is about creating, thinking, researching, training and working on the intersections between arts, science, communication, activism, theory and practice.

- *Sweden*

Mixitputfest Digital Performance Festival (Karlskrona)

The festival uses digital art exhibitions, performances, public conferences, seminars, workshops and collaborative readings as well as online media channels to explore how contemporary media combine physical and digital environments and how they encourage new methods for creation, expression and participation.

- *The Netherlands*

Testlab_Invisible Cities (V2, Rotterdam)

Since 2006 V2 has organised a bi-monthly meeting called TestLab, targeting artists, scientists, technicians, theoreticians and students who work at the edge of different disciplines using digital technologies. The basic idea is that feedback by experts, colleagues, users and audiences is crucial in the process of development of interactive art, for which audience participation is very important.

Visitors to TestLab therefore often become participants, and participants become their own audiences.

Dutch Electronic Art Festival (DEAF) organized by V2 (Rotterdam)

The DEAF festival offers a large programme including art, technology, science and society. DEAF proposes a broad range of activities, including a major art exhibition, installations, concerts, performances, lectures, workshops and an academic symposium.

Oddstream Festival (Nijmegen)

The festival lasts ten days and offers various experiences focusing on art, design and technology.

TodaysArt Festival (The Hague)

Since 2005 this festival gathers Dutch and international artists, thinkers and audiences. TodaysArt is a trans-disciplinary platform for international pioneering creators willing to explore new possibilities and forms of expression. Inspired by real issues, TodaysArt aims to promote and foster innovation, creativity and the interest of the audience for contemporary technological developments in the arts, culture and society.

Biennale SRTP (Eindhoven)

The festival brings art, technology, experimental pop culture and science to a large and diverse audience. Any forward-looking discipline can participate in this platform – from electronic music to dance, from performance to contemporary arts and design, from robotics to film.

- *Canada*

Biennale Internationale D'art Numérique - BIAN (Montreal)

This biennale – focused on disciplines other than the performing arts – consists in a large exhibition accompanied by vernissages and special events offering artistic journeys entirely dedicated to digital arts.

Elektra Festival – ACREQ (Montreal)

This cultural event presents works and artists combining cutting-edge electronic music and visual creation issuing from new technologies (animation, installation and robotics). Elektra creates links between different creative media such as music, video, cinema, design, game and sound or interactive installation in connection with the most advanced digital technologies.

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Before and Behind the stage – Examples of digital tools facilitating the creation of 'traditional' or digital performances

Many of the tools necessary for the development of a production are developed by artists themselves or in collaboration with universities or the specialised structures mentioned above. The multiplicity of tools developed corresponds to the variety of forms of performances put on stage, although it is becoming more common to re-use the tools. Listing all such tools would mean listing almost all the existing artistic forms, and would be the object of a separate publication. However it is possible and worth mentioning that new stage forms created from new (and) digital technologies necessarily lead to changes backstage concerning the direction, equipment, the stage, set design and so on. They influence the norms and protocols for exchanging information by integrating new functions and by using software that works in a global system. Such changes must thus be considered in the evolution of practices, technical equipment and also in the training of technicians. In the pages below we mention some recent developments – including some currently under development – and we recall the contexts in which they emerged, the technologies, processes and skills at stake.

- One of the best-known and widespread softwares in Europe and the USA is **ISADORA**, for which a number of online resources, tutorials and forums are available, together with regular training sessions organised by experts from the cultural sector. ISADORA was created by Mark Coniglio, from the US company Troika Ranch, in 2003; it is a graphic programming environment compatible with Mac OS X and Microsoft Windows and allows for the real time manipulation of digital videos. It can be integrated with other software to increase its functionalities.

In 2008 in France, GMEA - Centre de Création Musicale d'Albi-Tarn and LABRI - Laboratoire Bordelais de Recherche en Informatique created the research platform **Virage**. Today they coordinate the new project OSSIA - Open Scenario System for Interactive Application, funded by the National Research Agency. OSSIA gathers knowledge into a number of software applications that allow users to combine different kinds of digital contexts in an intuitive manner to write new scenarios for interaction. The project includes among others the software i-score that allows a non-linear management of timing of different media. Other French institutions have joined the project as partners: ENJMIN - École Nationale du Jeu et des Médias Interactifs (Angoulême), ISTS - Institut Supérieur des Techniques du Spectacles (Avignon) and ENSATT - École Nationale Supérieure des Arts et Techniques du Théâtre (Lyon), as well as the companies Blue Yeti (Royan) and RSF (Toulouse).

- **Clarisse Bardiot**, already mentioned above, conceived and initiated the software **REKALL**, that she developed in collaboration with the company Buzzing Light and with Thierry Coduys, a key person in the digital domain, founder of the company La Kitchen, that provides artistic creators with its know-how in informatics, electronics, sound and video engineering. The executive producer of REKALL is Le Phénix Scène nationale de Valenciennes together with a number of public and private financial partners. Artists can use REKALL in different ways: as an instructive tool or a framework for developing the creation of a digital work (especially in the case of a re-enactment). It provides a video timeline to which the user can add documents of all kinds and formats, as well as technical information. It is a collaborative tool since many users can work on it; and it allows the documentation and conservation of the works. The system avoids the problem of the rapid obsolescence of digital formats and documents by allowing a large number of formats and compatibility possibilities.

- The **DRAMA** project, developed by Dominique Martinez and Mathieu Pouget of the University of Toulouse (France), has a very complete approach as it proposes different tools: DRAMAtexte, an indexing tool that highlights scene directions added to the text by the director or the author; DRAMAscène, a tool for the visualisation of the staging; DRAMAsurtitrage, that helps with subtitling; and a Serious game, Pit' Paj.

- Finally it is worth mentioning the project **Viset**, funded under the EU's Creative Europe programme, that gathers four partners: Kulturanova and the Faculty of Management (both in Novi Sad, Serbia), Koniclab in Barcelona (Spain) and Pacific Stream in Liverpool (UK). Viset aims to promote the use of advanced digital technologies in different art forms and cultural events, and to show the many social, economic, commercial and cultural advantages of such technologies for the arts. It pursues its goals in particular by promoting the development and use of **virtual set designs** created via interactive technologies, augmented reality and remotely controlled applications.

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3.2. Documentation - Archiving - Conservation

How do we document and/or archive a work, or some (or all) of the works (of an artistic movement, of a key artist etc.), and why? What about the ephemeral art par excellence – the performing arts?

In order to discuss these issues we can start from a simple fact: **documenting** implies gathering homogeneous or heterogeneous elements – objects, writing, pictures, images, films etc. – that are **archived**, conserved and protected with care in order to prolong their life, because they have a strong and representative historical, aesthetic and/or symbolic value (and sometimes an emotional or metaphysical meaning). This is all about saving a trace of history, or rather of a history constructed through and because of these elements, in order to build a memory. Whether it is the ultimate goal of this accumulation or not, its result is a collection. Collecting means therefore to build and obviously to acknowledge a heritage.

Live arts are considered as 'non-collectionable'. The works depend on the presence of the artists (actors, performers, dancers, musicians etc.). They cannot live independently from the artists who realise them, as is the case for fine arts or visual arts – a fact that has excluded them from the art market and collections. And yet, since the last 15 years or so, the new trend generated by the performative works of the 1960s has opened the way to a new approach, since by their very nature these works allow the possibility of immaterial conservation. These new practices, moreover, are very different from the habits and systems established by the institutions that hold collections of material works. So for instance the Fond Régional d'Art Contemporain de Lorraine (France) has started to collect immaterial works that take the form of 'proposals of works, rather than their tangible realisations'[1]. For its director, Béatrice Josse, calling into question the very act of collecting means to reflect 'about the perennity of the works and of the structures collecting them'[2]. Between 2012 and 2014 the Tate Modern (London) has gathered international artists and researchers in order to reflect on new processes of conservation, through the research network Collecting the Performative - A research network examining emerging practice for collecting and conserving performance-based art.

In the performing arts field so far, collecting activity has concerned text-based drama (or the dramatic universe of an author); for choreography, notation can be considered a form of documentation. However, text in the theatre has begun to lose its preeminent position while scenography and directing have become disciplines in their own right with a whole theoretical and critical apparatus, thus they have gained increasing importance. Alongside the finished work, one can include the whole time devoted to rehearsals and elaboration before the performance, in other words the whole creative process, up to its actual appearance. This new understanding of the performing arts represents a preliminary step for their documentation.

With the rapid democratisation of technological tools and public policies fostering their inclusion in the domain of documentation and archiving, namely through digitisation, a reflection has begun in favour of documentation that focuses on the process, thus moving critical attention from the playwright to the director, from the text to the staging and so on, beyond an approach that studies already 'institutionalised' texts.

Different kinds of documentation and conservation of the performing arts exist today, if we look from the point of view of the staging:

- An approach focusing only on the staged production, mainly through video or audio recording;

- Another approach that also includes the creative process, in which archived documents or objects can be very diverse (be it for digital performances or other types).

In the case of digital performances, there is an additional issue to consider: that of 'conservation', or rather **preservation**, since digital performances are particularly fragile given the rapid obsolescence of the technological tools with which they've been created or that they use.

Preserving a trace of the (digital) live performances, in spite of their ephemeral nature, responds to several needs and offers different possibilities:

- Teaching, analysis and university research;

- Mediation, artistic and cultural education and audience development;

- Transmission to other artists and audiences;

- Allowing for repeating or the re-enactment of a work.

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1 In Carnets de bords
2 ibidem

Online archiving/documentation of the performing arts

The techniques for documenting and archiving digital works – and the harmonisation of such techniques – are serious issues. Such projects are probably a trend that will increase in coming years since documentation and archiving also respond to specific audience development strategies (see the next chapter) - in particular for museums and heritage.

There are several performing arts archives and collections; examples listed below focus on the staging and direction of certain works rather than on the works of specific authors/playwrights.

- *Denmark*

Odin Teatret Archives

This online archive focuses on the history of Eugenio Barba's Odin Teatret.

- *France*

Numeridanse – international online video-library of dance

This online video-library, accessible for free, collects videos, collections of national and international artists, educational tools and resources to understand dance and its history. It is led and coordinated by the Maison de la Dance in Lyon and is managed by a community of professionals from the field.

- *Germany*

TanzFonds Erbe

This programme – a sub-programme of TanzFonds, together with TanzFonds Partner – is funded by the Federal Foundation for Culture and Heritage (Kulturstiftung des Bundes). The programme starts from the fact that the history of modern and contemporary dance is only known by a restricted audience, in spite of the international renown of artists like Mary Wigman, Rudolf von Laban, William Forsythe and Pina Bausch. Madeline Ritter, former director of Tanzplan Germany, and Ingo Diehl, former head of the training programme of Tanzplan Germany, thus conceived TanzFonds.

The candidates for TanzFonds Erbe choose certain historical choreographers, works and/or themes they want to work on, in order to highlight their continuing importance today. All approaches are allowed. This public programme has already supported 41 projects. The artists funded by TanzFonds Erbe undertake careful research through different archives, in collaboration with other experts, and also clarify issues around authors' rights. (Indeed the use of historical documents is expensive and it is not always clear who holds authors' rights and the right of use and diffusion of such contents.) The artistic process is documented and uploaded on the website of TanzFonds, where the general audience can access a living history of dance, usually accessible only to a few experts. The productions originated in the process are then diffused as well.

- *Greece*

Digital Library of the National Theater of Northern Greece

This library offers digital versions of all the documents, archives and videos of the productions of the Greek National Theatre.

- *European, regional and international*

APAC - Association Of Performing Arts Collection

This network of specialised collectors of live arts in the UK and Ireland includes museums, archives, libraries, organisations and individuals who meet regularly in order to discuss and share ideas and knowledge.

ECLAP E-Library For Performing Arts (in the framework of the Europeana project)

ECLAP aims to foster a coordinated approach to the online archiving of all the performing arts across Europe. It offers solutions and tools to help performing arts institutions to access 'digital Europe' via a network of major European institutions in the field, linked to the Europeana project.

Cuban Theater Digital Archive (Cuba-USA)

The CTDA is a resource for the research, teaching and learning of theatre and performance culture in Cuba, as well as for related domains. The archive includes documents filmed and digitised in Cuba and abroad, resources and information about theatre on the island.

- *Australia*

Performing Arts Collection - Arts Center Melbourne

It is the largest collection of live arts in Australia.

- *USA*

MIT Global Shakespeare

The Global Shakespeare archives are collaborative projects allowing on line access to performances of Shakespeare staged all around the world, as well as essays and documents produced by researchers. This project aims to honour the diverse ways in which Shakespeare's texts are received and produced in the world.

UBUWEB

This free online archive includes a large number of resources related to different avant-gardes (performances, videos, sound, ethno-poetry etc.). UBUWEB is an independent, non-funded initiative launched by Kenneth Goldsmith, who also launched the TV channel UBUWEB.TV. Another resource is UBUWEBDANCE.

Herewith some documentation projects managed by artists:

Inside Movement Knowledge

This was a collaborative and interdisciplinary research project for the development of new methods of documentation, transmission and conservation of the knowledge of contemporary dance and choreography. It lasted between 2010 and 2012 and involved 5 partners: AHK – LKAO/ Art Practice and Development Research Group/Amsterdam School of the Arts; AHK /Dance Department/Theaterschool, Amsterdam School of the Arts; U_Utrecht / Department of Media and Cultural Studies, University of Utrecht (Theatre Studies); ICKamsterdam – Emio Greco | PC and NIMK/Netherlands Media Art Institute.

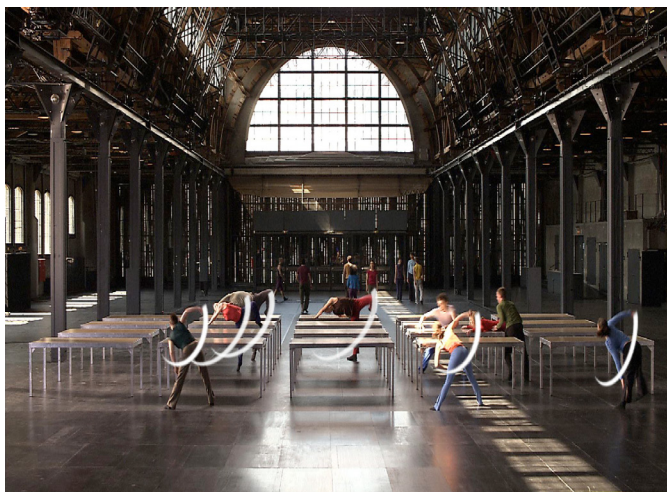## The Forsythe Company – 'Synchronous Objects' and 'Motion Bank'

The website 'Synchronous Objects' documents the writing and composition process of 'One Flat Thing, reproduced', a choreography by William Forsythe (2000), through the visualisation of data (namely of the choreography structure). The idea behind 'Motion Bank' is instead to create an archive of dancers' movements.

Documentation of digital performances: a specific approach

Documenting digital arts - and in particular digital performance - presents a number of additional problems compared to other art forms. Such problems relate mostly to the rapid and planned obsolescence of the technologies used. In addition digital works are 'fragile' because of the tools used to produce them, tools that are not common but rather specific to the specific creation.

It is therefore necessary when elaborating a methodology to document such work, to take into consideration a number of elements including their development, the system version, the system configuration, the format etc. Then it would be possible to reconstitute the genesis of the performance and to consider its whole creation process.

In this sense we see the emergence of some international research projects aiming to define recommendations for the documentation of digital performances, in terms of methodologies and priorities. We can mention for instance the Digital Performance Archive, which exists already but will soon include on line consultation; and the open-source software REKALL, developed by **Clarisse Bardiot** (and already mentioned in the text), also used as a tool for documenting and analysing creative processes.

Still from annotated video illustrating allignments, the way in which William Forsythe designs relationships in space and time (credits: 'Synchronous Objects Project', The Ohio State University and The Forsythe Company)

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3.3. Audience development - Dissemination

Let's start with some basic assumptions and sketch the general context in order to address the issue of audience development in the digital era, so as to understand the challenges and issues it raises as well as the new practices it generates[1].

For over 30 years audience development activities have flourished across Europe in all the artistic and cultural domains. Even if there are different results in the various countries, this question is crucial today for all cultural institutions in the EU. It responds both to a will to foster the appropriation of the arts – arts for all – and to a belief that the arts and culture are fundamental ingredients for 'well-being', and for consolidating societies by promoting values such as openness, sociability, hope, equality, etc. The core idea is to encourage civic consciousness by shaping it through symbolic and transcendental activities and exchanges – via the arts and culture. Something that the political sphere can hardly encourage in the collective and individual conscience of its citizens. Moreover, the audience development issue embodies the trans-disciplinary dimension par excellence.

The recent study _Audience building and the future Creative Europe Programme_ by EENC [2](2012) underlines the lack of data about 'the existing (and potential) audiences in Europe ', but it stresses statistics showing that 'the number of visitors to traditional cultural institutions is decreasing' . Numbers vary to a great extent depending on the geographical area, the position in an urban area, in a 'rurban' or rural area.

1 IETM has commissioned a publication specifically on audience development (to be published in early 2016, thus this current mapping tackles the issue by focusing specifically on the role played by digital technologies.
2 The European Expert Network on Culture (EENC) is a group of experts created in 2010 in order to advise the European Commission – DG Education and Culture regarding cultural policies.

The first institutions involved in audience development actions have been those particularly suffering from this decrease in attendance – namely museums and heritage institutions. They have developed specific strategies targeting specific audiences: youngsters, seniors, people with disabilities etc.

We can try and express some thoughts:

- Audience development activities seem to be gaining importance for European and international cultural institutions, as we can see in their discourses. In some countries, especially over the last 10 years, national audience development agencies have been created, such as The Audience Agency in the UK and one in Australia , or the German Mobiles Beratungsteam - offices within the cultural or citizens' services of the different Länder that specialise in mediation about issues like racism or neo-Nazism but that also collaborate with the cultural sector on specific projects;

- The cuts in public funding (or their lack or very low levels in some countries) for cultural institutions alongside the more prominent role of cultural policies may have increased the need and urgency for audience development strategies;

- Increasing competition with other leisure activities and easier access to other options via digital media push the cultural institutions towards the adoption of new audience engagement approaches that are more engaging and more participative – and this especially in the performing arts;

- Funders appreciate data about the presence (and increase/decrease) of audiences, especially at a moment when 'evaluation' is based mostly on economic data (e.g. sale of tickets).

picture from the '_Be SpectACTive_' project (credits: Be SpecACTive)

The existing analyses suggest certain trends and questions raised by the use of digital tools in audience development strategies:

- The possibility to enlarge and diversify audiences through new media and digital tools;

- The fact that technologies facilitate access to information and allow the audience to organise their own visits, decide to participate and how to engage with the cultural contents;

- The need for reflection about the transition between audience development and engagement;

- The need for human resources and training inside cultural organisations to allow for the development and evolution of audience development strategies;

- The fact that the main motivation to attend is the social nature of cultural activities, and it is therefore necessary to present the *online* digital cultural experience as content that complements the live *offline* experience;

- The strong engagement of young people with popular culture (TV, role games, videogames, comics, music, street arts, street dance like krump, etc.), with media and new technologies in general;

- The fact that the new technologies generate trans-national dynamics;

- A fear of losing the know-how and artistic skills required in the creation of the performing arts;

- The cultural sector's fear that digital contents may replace the 'live' experience, thus hindering the allocation of public funding for live performing arts;

- The increasing tendency to build creative and strategic partnerships between the cultural sector and the digital technology sector.

According to reports carried out in the UK, across the EU and in the USA, interaction between the audience and the artistic or cultural contents in digital environments can fall into four categories: access and information, learning/transmitting/sharing, discovering/testing, creating/sharing. These are explored further below.

Access and information

This aspect mainly concerns the possibility for audiences to be informed about the programming and to find correct information to plan their visit. It thus relates mainly to **digital communication and the marketing approach** of cultural organisations. The most common activities for a broad spectrum of audiences (from youth to elders) are the use of websites or social media (Facebook, Twitter) with dates and venues of a performance, as well as online ticket sales.

For the user to have a pleasant experience and ultimately make a choice, several elements have to be taken into consideration. First, some basic observations:

- New reading habits generated by the web (fixed or mobile). Since the internet has spread widely, people read not less but differently, and the habit of reading on a screen leads to specific habits of browsing and skimming through texts, finding keywords and reading in a non-linear way. Furthermore, different kinds of informative elements (writing, audio and video) on the same page do not hinder comprehension of the contents but rather are more engaging;

- The web and new technologies can still elicit intimidation - as can the arts, their status, and artistic or cultural contents which create a feeling of non-belonging or ignorance in users. (This is claimed in a recent study by MTM London about the reaction of audiences to online cultural contents.)

Paatrice Marchand 'Labyrinthe cosmogonique' - QR installation (source: website Ex Voto à la Lune)

While responsive design (adapting contents according to the medium) is definitely important, it is not enough to 'seduce' the audience by facilitating their appropriation of information.

On the other hand, if most cultural organisations have at least a website, a Facebook account and a Twitter account, the question is how to harmonise such tools and make them work organically. How to use them and for which kind of information? How does the different information that is spread across various platforms interact together? These and other questions must be addressed to ensure relevant information dissemination. In practice, far from being purely technical questions, these aspects refer to the need to 'curate' contents.

Let us add that, according to the proceedings of the conference 'Arts For All – Connecting New Audiences' held in San Francisco in 2008 by the Wallace Foundation, the promotion of an artistic or cultural activity cannot be reduced to the classic question, 'What service/activity do I offer my audience?', but should rather be, 'What is the experience that I create for my audience?'. The crucial issue seems to be the capacity to create meaning while establishing an emotional relationship, and more precisely the capacity to translate the values defended by the arts and culture (by means of the works presented and the activities proposed), or other specific values, so that they become understandable.

Learning/transmitting/sharing

This aspect can correspond to a spontaneous activity of the audience, or to an activity elaborated and planned by the cultural organisation. It concerns 'educational' activities in the broadest sense, for example:

- From the audience's perspective, looking for additional information about an artist or a work, watching a video excerpt, etc.;

- From the cultural organisations' perspective, supporting the public's research for such information and a certain serendipity of finding related information;

- Or else, elaborating some structured tools to integrate the projects aiming at artistic or cultural education or learning.

From the point of view of the audience, studies confirm that watching an excerpt of a theatre or dance performance can be crucial in deciding to actually go and see it. It is quite common indeed to provide this kind of support, and both artists and venues do it (venues can for example provide the technical equipment needed to create films, interviews, clips from the backstage etc., and some of them have a personal YouTube or Vimeo channel embedded in their social hub). **The Australian Ballet**, for example, proposes mini-documentaries and has created a website presenting its history, The Australian Ballet Story, as a time-line. Others provide tutorials, as the BBC did with its website Strictly Come Dancing.

Studies also confirm that people are sensitive to key information sources such as magazines or influential personalities whose success is similar to trust in a brand. Examples include magazines like *Time Out* in the UK and the USA or specialised forums like *Nachtkritik* in Germany, but also friends or acquaintances whose opinion is deemed important. Festivals like Drama Festival in Budapest (Hungary) or Re:Visions festival in Warsaw (Poland), for example, have engaged 'multipliers' via social media, asking people to voluntarily share information about the festival, their own opinions and experiences on their personal Facebook profiles.

There aren't many structured projects using new technologies in this sense, but the current examples and activities under development, especially in Europe, suggest that new tools will soon appear. Among existing examples we can mention:

- the project Spectacle en Lignes, initiated by the **Théâtre des Célestins** in Lyon (France), whose main goal is to 'build a corpus of rehearsal videos of live performances and to explore the uses of such an archive for education, research and mediation. By adopting a trans-disciplinary approach, the project develops around three complementary axes: a sociological axis for the study of audiences and of the practices included in the archive; a technological axis for recording and publication processes and Open Access issues; an axis dealing with mediation for audiences, to imagine new possibilities for the archive'[1]. The partners of this cross-sector project are: LIRIS (CNRS/Lyon1), Imagine (INRIA), CERILAC (Université Paris7); the Théatre des Célestins and the Festival d'art lyrique d'Aix en Provence; the IRI – Institut de recherche et d'innovation (already mentioned in the introduction to the mapping) and an innovative SME, Ubicast.

- The project **La Fabrique du Spectacle**, elaborated under the scientific direction of Sophie Lucet, professor in theatre studies at the Université Rennes 2 (France). 'La Fabrique du Spectacle is a web portal dedicated to the capture of emblematic artistic creation in the contemporary European scene. Starting from an immersive research methodology in which the researchers analyse the modalities of the production process, a series of interviews with the members of the creative team and specialised researchers allows for questioning the relationship with the work during the creation of a performance. These interviews are combined with recording of rehearsals and run-out, images of specific moments of the creation. Other kinds of content add to these videos: pictures, set, director's notes, articles written by researchers...'.

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1 Translation by the editors

LIVE PERFORMANCES IN DIGITAL TIMES: AN OVERVIEW

We can also mention the EU-funded project **PLATFORM shift+**, led by the Pilot Theatre (York, UK) and gathering 11 partners from 9 countries. The goal of the project is to explore teenagers' digital habits, not well known by cultural organisations, and to help artists, programmers, customer relations staff etc. to explore and become acquainted with digital tools and their use, while also examining the way they can contribute to writing for the theatre and to creation in general.

Another interesting example is the EU-funded project **Be SpectACTive**, gathering 12 partners and aiming to strengthen audience engagement with creators, their works and the cultural venues. The project includes research, production, creative residences, workshops and conferences, as well as working on artistic presence on the web and in interaction with internet users and potential audiences.

Other projects focus on the development of digital skills, for example **ADESTE** - Audience DEveloper: Skills and Training in Europe.

Discovering and testing

We consider here the experience of a user who decides to watch a performance online, not searching for additional information, but to decide whether to go or not to the live performance. The main problem of availability of an online performance (real-time retransmission or recording) concerns the cost, and the fact that the online version becomes an alternative to live attendance. The main websites or organisations that propose this service, formerly pay-only, have recently decided to make the videos available for free - an example is **Classiclive**. In Anglo-Saxon and Northern European countries it is quite common to make such contents available for free in order to gain new audiences.

Among existing dissemination projects via television or web are the partnerships developed by **Arte TV** with the Festival d'Avignon, Festival Lollapalooza in Berlin, Jazz à La Villette (Paris) and others. The **Aerowaves** network now streams in real time the works of emerging choreographers involved in its festival Spring Forward.

The distinction between the online offer and the live experience can help artists and cultural organisations understand their audiences' expectations and ensure that they perceive the two kinds of offers as complementary. In the case of online gaming, the success of many videogames comes from their social function (chat, meetings between communities of players, etc.), which has largely gained importance over the playing component (the game itself). The cultural sector could also learn from the video gaming sector that focuses on interpersonal exchange, feelings and emotional components by linking it to the game.

Creating and sharing

This concerns the audience's participation via their own creativity and initiative, fostered by the cultural organisation's information and promotion of activities. It also relates to amateur and self-taught practices as well as to user-generated content (UGC, also called 'transformative works'). These represent only a niche, as indeed only a minority of users engage spontaneously in this kind of activity: the EU average was 11% of total users in 2008 and it is close to zero in some countries. Looking at data available in 2008 however it is interesting to note that the countries with a higher number of people uploading self-generated content (texts, images, pictures, videos, music etc.) are Estonia and Iceland (22% and 20%). This may suggest that their peripheral geographical situation plays a role and also that such activities are seen to be democratic modes of production. The Netherlands, UK, France and Hungary follow closely, while countries with lower numbers of UGC are Romania, Belgium, Italy, Portugal, Greece, Slovakia and Bulgaria (all between 3% and 7%). Czech Republic has the lowest rate – 2%.

Participation is most commonly enhanced by playing: users are asked to produce a picture or re-use visual or audio content. This, by the way, poses authors' rights issues that the European Commission is working to solve in order to facilitate these increasingly-adopted practices.
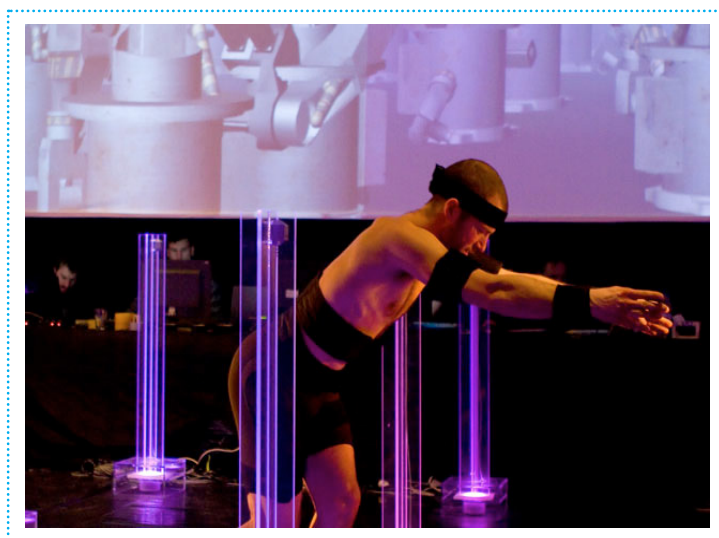

Image from Prague dance Hackathon (source: Europeana Space)

Some projects, initiated by organisations or individual artists, combine education and artistic practice: the project Digital Voices by the UK-based company Blast Theory, the laboratory for social innovation The Patching Zone (the Netherlands), and the Finnish company Translocal all go in this direction, combining an exploratory approach engaging young audiences (16-24 years old) with difficult backgrounds via mobile and/or online technologies, and at the same time developing tools and processes to help the youngsters to re-use such technologies.

An even more trans-disciplinary example – though less common in the cultural sector – is the so-called **edit-a-thon**, events gathering communities of amateurs, specialists and translators to share their knowledge about a certain topic and put it on websites with open and re-usable contents, like Wikipedia. To name just two French examples, the Musée du Quai Branly in Paris and the Festival d'Avignon have recently organised similar experiences.

Other practices developed in the domain of media and technologies are start to appear in the performing arts field, like the **hackathon** – originally an event gathering web/software developers, designers etc. with a project in mind and aiming to develop a prototype application in a pre-defined time. The hackathon applied to the performing arts can lead for example to a *dance hackathon*, like The Prague Dance Hackathon proposed by the Czech project EuropeanaSpace, which asks participants to use or re-use materials from dance history and to combine them with technological processes.

04.
CONCLUSIONS

'excited atoms', the study carried out by Judith Staines in 2010 (commissioned by IETM and published by On The Move) explored different forms of virtual mobility in the contemporary performing arts. The basic question behind the study concerned how the new modes of production could respond to environmental concerns. However the author quickly realised that cutting carbon emissions was not the main concern of what appeared to be artistic practices developing in specific environments and using specific tools. This was a separate world, and a world whose wide range of technical possibilities, new languages and specialised vocabulary was overwhelming. More than five years later the conclusions of the study, based on research and interviews with artists and professionals, are still valid, but the more coherent and abundant data at our disposal today allows a better understanding of how these 'new' forms of production work, the processes taking place and their relations.

The present mapping of live performance in digital times aims to build a pragmatic overview and inventory integrating as many examples as possible, looking at the most important elements of the value chain. It also aims to highlight new possibilities inspired by examples and experiences, especially through the short explanations illustrating each paragraph and to show this ecosystem as an opportunity, both for creators and for cultural institutions. This ecosystem requires 'displacement' and questions our usual, consolidated ways of thinking and working.

Certain issues and domains would deserve a more specific approach, for example the impact of digital technologies on authors' rights and intellectual property rights, the change in professional profile and status especially for artists (here only briefly mentioned), and the analysis of the impact of technologies on the dissemination of works.

Finally the trans-disciplinary dimension, characterising many of the examples included in the text, could help to build a complementary prospective mapping that might focus on the possible influences and transpositions of models from other sectors – like digital technologies – with positive effects, namely creating favourable conditions for the spontaneous development of a positive economic, social and creative activity. This is what is testified by the emergence of the *fablabs*[1] and *living lab*[2] experiences.

1 More details about the functioning of the fablabs are available on the website of the International Association of Fablabs
2 For more information about the living labs check the website of the European Network of living labs. We can mention as examples the living lab The Bridge by French Tech or the one by artist and researcher Diego Ortiz, who collaborated with a community of citizens and public and private organisations in order to adapt a mobile application developed for an artistic project into a tool for a touristic path in a natural park