When Theater Director Collaborates with Computer Engineer

Hybridizations and Methodological Shifts in the *Masque et Avatar* Interdisciplinary Project

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Theater in the Digital Humanities

Today hardly anyone is surprised when theater combines various technologies with live action. After all, this has been the case for nearly forty years, from the large-scale performances of the 1980s through the profound changes in theatrical forms in the first two decades of the twenty-first century. Initially, the Italian Studio Azzurro and Giorgio Barberio Corsetti attempted to create a "new spectacularity." This connected technology with the actors' physicality and employed screens in a playful way, as in the *La camera astratta* performance (1987). The Belgian actor Marc Hollogne went the same route in his famous *Marciel monte à Paris* (1997). He seamlessly merged live action with mediated images and moved between the stage and the images on screen as if by magic. This effect was achieved by the perfect synchronization of the actor's gestures and voice with the cinematic image, which Hollogne called an innovative form of cinematic theater (Cinéma-Théâtre). Robert Lepage's works provide illustrative examples of theatrical experiments seminal for the stage in the 1990s. His theater is still evolving and employs astonishing forms and strategies. Lepage is well known for delving into various possibilities offered by new media, and he involves his entire crew in quasi-scientific research, in cooperation with engineers, roboticists, and other specialists. Screens in various shapes, panoramic (*La Géométrie des miracles*, 1998), concave (*Projet Andersen*, 2005), or convex (*Jeux de cartes. Coeur* 2013), have required interdisciplinary collaboration for their construction, transport, and set-up, as well as proper directorial work and acting techniques (Pluta 2011: 331–342). Another example of crossing the boundaries of the traditional theater performance is the work of Japanese director Oriza Hirata, who uses humanoid robots designed in Professor Hiroshi Ishiguro's laboratory (Pluta 2016: 65–79). Hirata faced the challenge of working with Geminoid, the most complex robot of

our century, which, in its female form (Geminoid F), acted in two performances: *Sayonara* (2009, 2012) and *Three Sisters: The Android Version* (2012) (cf. Grimau/Paré 2011). In recent years, an interesting hybrid of theater and video games has been created, called Game-Theater. One groundbreaking company, Germany's machina EX, challenges audiences to solve mysteries during a performance (called a "game"). The participants, with a variety of media at their disposal, negotiate hypothetical solutions to the puzzle and sometimes even affect the course of the narrative (as in *TOXIK* of 2015).

The question of complex audiovisual dispositives on contemporary stages has been analyzed with a variety of theories. Suffice to recall the concept of digital performance put forward in 2007 to describe performances employing digital technology (Dixon 2007: 3), theories of intermediality (Chappel and Kattenbelt 2006; Bay-Cheng et al. 2010), or the agenda of artistic research (Nelson 2013). A relatively new discipline in this field is digital humanities, a field of education and engineering, which incorporates computing, social sciences, humanities, and art. It merges creativity and research, concentrating on the "digital object" as both a creative tool and a subject of scholarly analysis.

This discipline includes theater. Nic Leonhardt, editor of the *Routledge Companion to Digital Humanities in Theater and Performance*, identifies four areas of theater in which digital objects have gained particular significance (2019): "DH projects" in theater studies; various teaching methodologies which employ theatrical or stage tactics; archival practices; and the digitization of higher education. These issues are tackled by a growing number of research institutions and teams, such as the IFTR "Digital Humanities in Theater Research" work group.

In his "Performing Arts" (2004), published in *A Companion to Digital Humanities*, a volume seminal to this discipline, David Z. Saltz provides a panoramic view of projects in theater, dance, and performance art which could be classified in this field. He also points to a mutation in the performative arts which affects the basic structure of a performance, making it hybrid. Significantly, these changes, which initially called into question the paradigmatic features of the theater, such as the presence of spectator and actor in a shared time and space, are having a growing impact on the creative process. This is experiencing a profound change not only on the stage, but also in the laboratory. Salz observes that such transformations are also affecting traditional theatrical professions, such as sound engineering, video production, directing, and even acting. This point is central to my argument.

Research on technological performance in the digital humanities is an interesting task, because it enables one to grasp and understand the function of the technological parts which, to a large extent, make up a performance that integrates various audiovisual technologies. These influence the performance's aesthetics, without losing their strictly technological character (dispositive, programming).

From this point of view, it is possible to analyze the technological dispositive of the stage, which has been debated in contemporary theater for at least ten years. Paradoxically, however, this apparatus with its digital architecture often receives scant attention in scholarly articles and reviews (Rykner 2014: 207; Orte 2008; Kapelusz 2012). It is worth remembering that the French word *dispositif* has a strong connection with modern philosophy (Foucault, Deleuze, Agamben), which makes its meaning in the context of theater much broader than the English "device," connected with stage design or an elaborate set. For my analysis of an exemplary technological performance, I primarily understand "dispositives" as the technological devices used in a performance to produce a desired visual or sonic effect: screens, monitors, cameras, sensors, tablets, cell phones, robotic prostheses, drones, or binaural headphones. Their materiality becomes part of the aesthetics of the performance, because they can be seen by the audience, and sometimes even operated by them. However, the dispositive also has an immaterial aspect, i. e. the software or the programs, such as Isadora, used by video or sound directors. This aspect of the dispositive is only visible through the effects it produces.

As Salz argued, a digital humanities perspective focuses on the transformations of the theater profession, particularly with regard to technological devices. These changes are partly relevant in the broader context of anthropology and media theory. Such concepts as Marshall McLuhan's "extensions of man" (McLuhan 1998) or Donna Haraway's "cyborg" (Haraway 1999) reflect general tendencies in digital societies in the twenty-first century. The transformation in the theater has led to a situation in which the sound engineers, video producers, and lighting technicians have gained a more significant role in the creative process, on a par with the directors, paving the way for independent work. The history of performing arts has known such situations, with the notable example of the collaboration between Robert Rauschenberg and Billy Klüver in 1996, in the *9 Evenings: Theater and Engineering* project. Consisting of ten performances, this event emerged from close collaboration between ten artists and thirty engineers from Bell Telephone Laboratories (Pluta 2013: 14–17). Each performance had its own technological dispositive, created especially for a given evening. Therefore, it was the engineers as well as the artists who authored the project, which was duly mentioned in the program of each performance.

Even today, *9 Evenings* continues to inspire contemporary art projects, although the relationship between artists and engineers has evolved and now takes various forms. Examples abound. One of the most spectacular results of merging artistic and technological skills is the work of the French performance-maker Adrien Mondot.[1] This software engineer and trained circus artist (specializing in

1 See the website of Compagnie Adrien M & Claire B: http://www.am-cb.net/a-propos

juggling) creates his shows with fellow circus artist Claire Bardaine.[2] These performances include visualizations that function according to the programs and algorithms (particularly eMotion) written by Mondot. A similar combination of skills can be observed in many people of the younger generation: Clément-Marie Mathieu of Thé-Ro (a graduate of École National Supérieure des Arts et Techniques du Théâter), Benjamin Burger from Extralaben, and Rod Guadaram from Okubo Studio (both studying at the Academy of Fine Arts in Zurich), as well as Mathias Prinz from machina Ex (a graduate of the University of Hildesheim). By independent work, I mean a creative endeavor which brings about an aesthetic form (a performance, a multimedia or robotic installation), presented to the audience and signed by the engineer or programmer as his or her own.

The independent creative work of sound engineers, videomakers, and programmers has been discussed for several years in various professional milieus all over the world. In my article, I will focus on France and Switzerland, because it is this environment that I know from experience, and many years of research. As an example, I will quote the debate I organized in February 2014 for the *Pour un laboratoire technologique de la création scénique: Sur la collaboration entre les artistes de la scène et les ingénieurs* symposium at École National Supérieure des Arts et Techniques du Théâtre (Guillemot et al. 2015: 209–217). The debate was titled *Régisseur, ingénieur, bricoleur, chercheur: un entrelacs de pratiques*. It was a rare meeting of French videomakers and sound engineers. The young alumni of this school had a chance to speak about how their profession was changing and going beyond a purely technical dimension, toward creativity and research. One of the symptoms of this transformation is the involvement of engineers and scientists in the creative process. Some of them become members of an artistic team, as with the French group MxM, under the artistic direction of Cyril Teste. This ensemble is composed not of actors, but a tech crew: Julien Boizard (technical director), Nihil Bordures (composer and sound engineer), Nicolas Doremus (cameraman), Patrick Laffont (videomaker), and Mehdie Toutain-Lopez (video designer).

The present article will focus on the collaboration between directors and programmers, and analyses of the mutual exchange of competences within an interdisciplinary research group. My main example is the *Masque et Avatar* (Mask and Avatar) project carried out at Paris 8 University in 2015–2017. I took part in it as a research consultant, and participated in two workshops and the final conference. I will focus on the collaboration between director Georges Gagneré, who acted as a "digital artist" (a term I will explain further on) in this project, and Cédric Plessiet, a software engineer and visual artist learning the art of theater.

2 See the issue of *Ligeia. Dossier sur l'art* no 137–140, 2015, which I co-edited with Mireille Losco-Lena, devoted to theater laboratories and their relationship with artistic practice as research and new technologies.

The centerpiece of my article is an analysis of their exchange of experiences and communication, which involved terminology from both theater and information technology. I will concentrate on the first phase of the project (December 2015 – May 2016), which I had the chance to closely observe, as well as the preparatory period, about which I spoke with both collaborators. The hypothesis is that, on the basis of this collaboration, we can observe the formation of a new type of artist with basic IT skills. In the digital humanities, such a person is called a digital humanities doer (DHer). He or she can code and prepare software, but is also endowed with sensitivity and creative talent.

Masque et Avatar: The Specifics of the Project

To characterize the subject of study, I must characterize the institution responsible for this project, the Laboratory of Excellence Labex Arts-H2H. It works under the auspices of Paris 8 University, and focuses on the relationship between art and new technologies.[3] Lab research is divided into three branches: situations, technologies, and hybridizations. In 2015, Labex Arts-H2H accepted the first version of the *La Scène augmentée* (The Augmented Stage) project, written and submitted by Erica Magris,[4] assistant professor at the Department of Theater at the university. Subsequently, a modified version of the project was submitted with an additional final part, entitled *Masque et Avatar,*[5] prepared by Giulia Filacanapa.

The research for this project was designed to connect theater, science, and technology, and to analyze the function and skills of theater artists in digital technology. Initially, three distinct areas of interest were selected: acting, stage practice, and developing a rudimentary acting method or systematic exercises for actors. Work on these topics was carried out during Cluster Workshops (CW). The interdisciplinary project merging theater, information technology, and video games focused on a single subject: the relationship between a performer (specializing in *commedia dell'arte*) and a digital avatar on a screen. The aim was to investigate the form and the limits of their interactions which took place on stage before an audience composed of project participants (researchers, students, other actors, programmers, and directors). They sat on chairs facing the stage in a classical set-up and had no additional visual equipment (e. g. 3D glasses or headphones).

The *Masque et Avatar* project was composed of two parts: the experimentation with the Kinect and Oculus Rift dispositives phase (from 2015 until mid-2016) and

3 See Labex website: http://www.labex-arts-h2h.fr (accessed 20th December 2017).

4 See the description of the *La Scène augmentée* project: http://sceneaugmentee.labex-arts-h2h.fr (accessed 25 December 2017).

5 See the description of the *Masque et Avatar* project: http://www.labex-arts-h2h.fr/IMG/pdf/masques.pdf (accessed 25 December 2017).

the work with the Motion Capture dispositive phase (from mid-2016 till the end of 2017). Both phases could be described as endogenous, main research lines of the project. They also included exogeneous phases: the participants took part in academic conferences and the results of the project were shown to wider audiences, as during the 2016 Conference of International Federation for Theater Research in Stockholm[6] and at Conservatoire National Superieur d'Art Dramatique in Paris in autumn 2017. The project also involved two conferences. The first, *Luca Ronconi, maître d'un théâtre sans limites,* was organized by Erika Magris and Giulia Flacanapa in December 2016 in Paris,[7] at Istituto di Cultura Italiano and Conservatoire National Supérieur d'Art Dramatique. The second, *Masques technologiques: altérités hybrides de la scène contemporaine*, was the project finale, taking place in December 2017 in Le Cube, Centre de création numérique in Paris, Issy-les-Moulineux.[8] It was accompanied by a presentation of three performative forms: *AGAMEMNON REDUX. Une expérience de masque et de mocap en trois scénes* based on Aeschylus's Agamemnon, directed by Andy Lavender; *La psychanalyse augmentée* by Matthieu Milesi, directed by himself and Duccio Bellugi; and *La vie en rose* by Boris Dymny and Giulia Filacanapa, directed by Filacanapa.

The following people took part in the *Masque et Avatar* project:

1. From Theater Department of Paris 8 University: Erica Magris (lecturer), Giulia Filacanapa (researcher and director), Georges Gagneré (researcher and director);
2. From the Art and Visual Technology Department of Paris 8 University: Cédric Plessiet (researcher, programmer-visual artist), Rémy Sohier (visual artist, lecturer);
3. From the Labex Arts H2H laboratory at Paris 8 University: Mehdi Bourgois (website designer, active particularly in the initial phase of the project);
4. Artists and researchers from various institutions: Duccio Bellugi (Théâtre du Soleil), Boris Dymny (artistic director of di mini teatro), Andy Lavender (lecturer and director from University of Warwick), Izabella Pluta (researcher, University of Lausanne, Les Teinureries – École supérieure de théâtre) and the (mainly second-year) students of the Theater Department, who agreed to take part in experimental workshops.

6 Presented in the "Mask and Technologies: From the Commedia dell'arte to the Digital Avatar" panel (17 June 2016). See conference programme https://www.iftr.org/media/1845/conference-programme-iftr-2016.pdf

7 See the conference program: http://www.scenes-monde.univ-paris8.fr/spip.php?article1371 (accessed 2 December 2017).

8 See the conference programme: http://www.labex-arts-h2h.fr/masques-technologiques-alterites.html (accessed 2 December 2017).

The main assumption of the project was to work together during workshops, in pairs, or individually. The participants worked in a general framework, for example by conducting workshops for students at Paris 8 University (the workshop Idéfi-CREATIC was offered to undergraduates), or in a specific artistic context (Guilia Filacanapa held a workshop with student actors who used the *commedia dell'arte* masks).

The project participants wanted to analyze the possible relationships between the theatrical mask used by an actor and the technological dispositive, whose visible incarnation is the avatar on screen. The project states that theater itself is a place for augmenting reality. A mask is a stage object which "augments" the body of the actor in a metaphorical way. The aim of Cluster Workshop was to develop a series of experiments to initiate a dialogue between practice and theory through three elements: the actor, the mask and the computer-generated avatar.

Giulia Filacanapa worked with actors-students from Paris 8 University, who made up the core of research team from the outset. Filacanapa used the *commedia dell'arte* masks, made of leather by a contemporary artisan Stefan Perocco from Meduna. During the final conference of the project, Filacanapa said that, although *commedia dell'arte* masks are rarely used in contemporary theater, they provide a valuable teaching tool, used in nearly every European theater school, when training performers. The avatar, generated by a technological dispositive, is rarely employed in actors' training, but is more and more salient in hybrid performances that connect theater, dance, and video games.[9]

The project was interdisciplinary and transmedial. In the first draft of the *Scène augmentée* project (2015), Erica Magris described this method as experimental. The project involved a variety of elements: background survey, historical research, working out theoretical assumptions and practical solutions, exercises for actors and interaction with the dispositive, group discussions, perfecting the dispositive, and participation in the work of the *Observatoire critique* (Critical Observatory), which organized discussions with students and audiences about the workshops and exercises. Quite soon, the method took the form of artistic research, involving the formulation of hypotheses, a multi-phase work in progress, and the final outcome: three performative forms and a post-conference publication. (Fig. 1)

9 The most prominent example is ART (Avatar Repertory Theater), which operates in the virtual environment of Second Life. See http://www.avatarrepertorytheater.org/home (accessed 6 October 2018).

Fig 1. Masque et Avatar, Cluster Workshop. An actor in a commedia dell'arte mask and an on-screen avatar in a white mask.

It is interesting to take a closer look at this project in terms of this research on the digital humanities, because of the technological dispositive and the process of perfecting the digital tools, attuned to the main premises of the project. *Masque et Avatar* could be seen as the smallest research unit within the digital humanities, i. e. a DH project. The authors of *A Short Guide to Digital Humanities* argue a project like this can involve various parties, such as research institutes, partner institutions, and students (Burdick 2012: SG4). It can include art institutions (e. g. theater or museums), research centers (e. g. libraries) or units (e. g. institutes or laboratories), as well as commercial production institutions (e. g. enterprises and technological consortia). The term "DH project" has a double meaning in this context. First, as a noun, a project is a structure with specific research aims, "a kind of scholarship that requires design, management, negotiation, and collaboration" (Burdick 2012: SG4). Secondly, as the authors of *A Short Guide to Digital Humanities* explain, the verb "to project" refers to a "scholarship that projects, in the sense of futurity, as something which is not yet" (Burdick 2012: SG4). A DH project is carried out by partners from different scholarly disciplines, who can form groups with various competences, but who aim at a complementarity of functions. This situation requires the coordination of work, so that the experiment produces the desired effects.

The participants of *Masque et Avatar* had to meet the challenges posed by both meanings of "project." On the one hand, they strove to find a common denominator for the results they achieved in theater, video games, and information technol-

ogy. On the other, they looked for points of contact and hybridisation between different sets of data, as to establish a coherent set of coordinates for various levels of the project. A significant point in the discussion was the positioning of the actor in front of the Kinect camera, because the body interacted with the avatar and was seen by the audience at the same time. The actors and the director Giulia Filacanapa used the terminology of theatrical space and body movement, for example, for the position of the head or the posture. If an actor puts on a mask, he or she has to pay closer attention to the position of the neck and arms. The programmers talked technicalities: they established the parameters of the space in which the actor's body would be captured by Kinect, came up with the working question for the actor in the exercise ("Who am I playing for at this moment?"), and instructed the actor that the side screen showed an image of the body which helped control movement. Moreover, one of the effects of work and discussions in the initial phase of the project was the neologism "manipulactor," which means "a numerical collaborator which uses a gamepad/joystick to work in unison with the mocaptor which moves the avatar controlled in real time by the latter by means of a combination of captured movement."[10] Therefore, the discussions and experiments were part and parcel of the process of conducting this research; they enabled spontaneous exchanges of views, which let the project evolve.

The Effects of Exchanging Experiences during Cluster Workshops

The original value of the research I refer to here lies in the practical stage exercises and the experimentation with the dispositive during cluster workshops. In the first phase of the project (2015–2016), the workshops included practical work and theoretical reflection. The discussions were systematic. Specially invited scholars presented theoretical introductions to each workshop or papers in a mini-conference, followed by an impromptu discussion with workshop participants. The space of a dialog opened up in a spontaneous way, because the discussion focused not only on the hypotheses, but also on the difficulties in verifying them and on the mistakes made in the course of working. The relationship between the speakers and the participants was non-hierarchical.

The "Mask and Technology: Immersion, Expression and Interaction" (CW≠1) cluster workshop took place on 11 and 12 December 2015. I took part in it, together with the core team of the project, invited artists and researchers, and students interested in the topic. The theoretical part took one afternoon and the practical an entire day (Fig. 2, Fig. 3). The venue was Studio Théâtre of Paris 8 University,

10 A definition by Georges Gagneré, from our email exchange on 20 December 2017.

a small theater venue with basic editing and lighting equipment. The following presentations were included in the theoretical part:

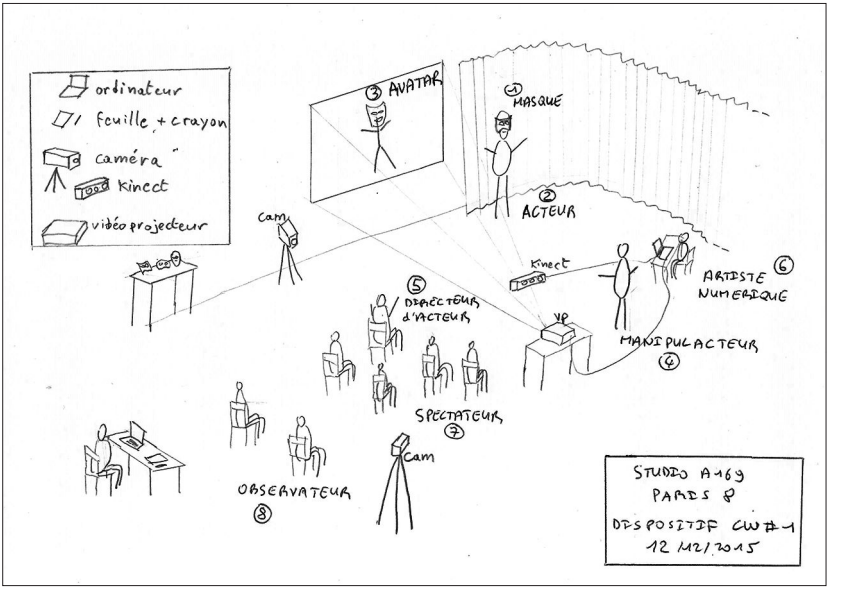
1. A lecture on experimental work involving avatars (Georges Gagneré, Cédric Plessiet)
2. A paper on acting in masks in the new *commedia dell'arte*, accompanied by a presentation of acting exercises (Giulia Filacanapa)
3. A presentation on observation protocols and archivization of workshops (Erica Magris, Mehdi Bougeois)
4. A presentation of the main assumptions of the project (Erica Magris)
5. A paper on the relationship between artistic practice as research and technology (Izabella Pluta)

Fig. 2: Masque et Avatar, Cluster Workshop.

An interesting moment of this meeting was the presentation by The Masque Collective, demonstrating a dispositive that projects a mask and can be worn by an audience member. It was a metal construction with a screen in the form of a mask and a miniature projector. The whole device can be attached to the body with belts. The user can see a chosen mask on the screen, which is also visible on the outside

(the screen is made of cloth). As a result, the *commedia dell'arte* mask confronted the concept of a technological mask. The participants could try out the device and see for themselves that, even in an immaterial form (such as an image), a mask performs its basic function, which I have already mentioned. The demonstration proved that the avatar on screen can become a technological mask for the actor, and therefore, his or her extension.

Fig. 3: Masque et Avatar, Cluster Workshop.



The practical part was composed of three sets of exercises, or "experiences":

1. Immersion: the participant entered the space of play and tried to act as an avatar, by taking a position in front of the Kinect camera, using gesture and posture.
2. Expression: the participant animated an avatar, trying to express the basic emotions through the body.
3. Interaction: the participant animating an avatar tried to interact with another participant, who entered the space of play (with or without a *commedia dell'arte* mask).[11]

11 See WC#1 flyer: http://sceneaugmentee.labex-arts-h2h.fr/content/cw1-masque-et-technologies-immersion-expression-interaction.

This stage of the research was meant to test the potential expression and interaction in various configurations, primarily between the performers (student-actors from GenteGente!! and theater students), the characters in masks, and the avatar (which could have a human face or a white theatrical mask), as well as the audience (students, researchers, and artists). The next exercises used techniques of improvisation in masks. The space was clearly divided into the performing area and the auditorium, with the audience sitting in front of the screen (an immersive dispositive, situated on the right, Fig. 4). The transitions between these areas were smooth and the discussions between actors, students, and researcher-observers were bound by no rules. For a limited time, each participant could wear a mask and try to act in it and interact with the avatar. The workshop was recorded and the participants were asked to fill a record of their observations. The aim was to reach preliminary conclusions about the results of the workshop and this phase of the project, while gathering material to be stored in the database (which has not yet been designed to be interactive). Georges Gagneré has created the Tiki platform, on which he gathered a large portion of the materials (recordings, journals written by directors and actors, photographs, and drawings), but it is accessible only to the project participants who have an access code.

Fig. 4: Masque et Avatar, Cluster Workshop, space arrangement.

In these experiments blending theater (as a domain of creativity, experimentation, and intuition) and information technology (a science based on mathematics and codes), it is interesting to analyze how the participants communicated and

what solutions they introduced to cooperate. Their aim, after all, was to work out a common denominator and coherent meaning for the project.

In the digital humanities, Mark Stefik points to the function of digital sensemakers, people who work in the Internet and select meaningful information out of the constant flow of data (Stefik 2011: 38). According to Stefik, in digital sensemaking meaning emerges out of the structure of hypertext and is "mediated by a digital information infrastructure, such as today's web and search engines" (ibid). He connects the term with the information which the user finds through various search engines, which is a futile task, because the questions the user asks are usually answered in a cursory, fragmentary and unconvincing way (ibid).

Even though the participants of *Masque et Avatar* gather information from the Internet and other sources in various ways, they are confronted not only by the sheer amount of data, but also by the fact that much of it is organized in databases. In this case, digital sensemaking as defined by Stefik takes the form of discussions, sharing information, exchange of knowledge, and striving for a "common understanding" of many elements. The idea of an Internet platform implies an exchange of information. This platform confirms the initial hypothesis concerning an analogy between the premises of the *Masque et Avatar* project and the perspective of the digital humanities.

The CW≠1 cluster workshop and its consecutive installments foregrounded the process of exchange and hybridization of knowledge and experiences between the participants. Also it enabled the transfer of professional competences between collaborators. The *commedia dell'arte* performers had a chance to be confronted with a new stage situation: they had to learn to interact with an avatar on screen. They had to modify their posture and the head position to which they were used after years of training *commedia dell'arte* techniques. For director Giulia Filacanapa, the context of information technology was also a challenge because of the technological dispositive which the artist intuitively used, without knowing the technical principles on which the equipment was based. It is worth stressing that mask, avatar, and the technological dispositive were the main topics of discussion from the outset. The software operating the devices was constantly developed, in accordance with the evolving experimentation. The questions which spontaneously cropped up at various junctures (such as: How to inscribe in the exercise the Chinese shadow effect, which appears in the projection as a shadow of the masked actor?) provided crucial reference points. Through openness to happenstance and flexibility in formulating conclusions, the project evolved effectively and without the stoppages that could have resulted from a too-strict adherence to the initial mandate. The hypotheses developed too, sometimes revealing weaknesses of the project, a failure to assess the situation, or a poor solution, resulting from the lack of experience in this field which is still new for the theater.

The Director and the IT Specialist: Creating Dialogue and Cooperation

Jean-Paul Fourmentraux made a few interesting remarks concerning the changes various professions undergo in interdisciplinary projects that merge art and technology.

> At the interface of various environments which make use of technological innovation, this injunction to creativity occupies a central place and tends to redefine the work and professional identity of the actors engaged at the crossroads of techno-scientific research and contemporary art practices. (Fourmentraux 2012: 11)

Although Fourmentraux speaks from the point of view of the discipline called arts and sciences, his observation also applies to my subject, particularly to the competences of the director and IT specialist. The CW≠1 cluster workshop provided a good example of how different professional competences can cross-breed, particularly in the cooperation between director Georges Gagneré and visual artist Cédric Plessiet.

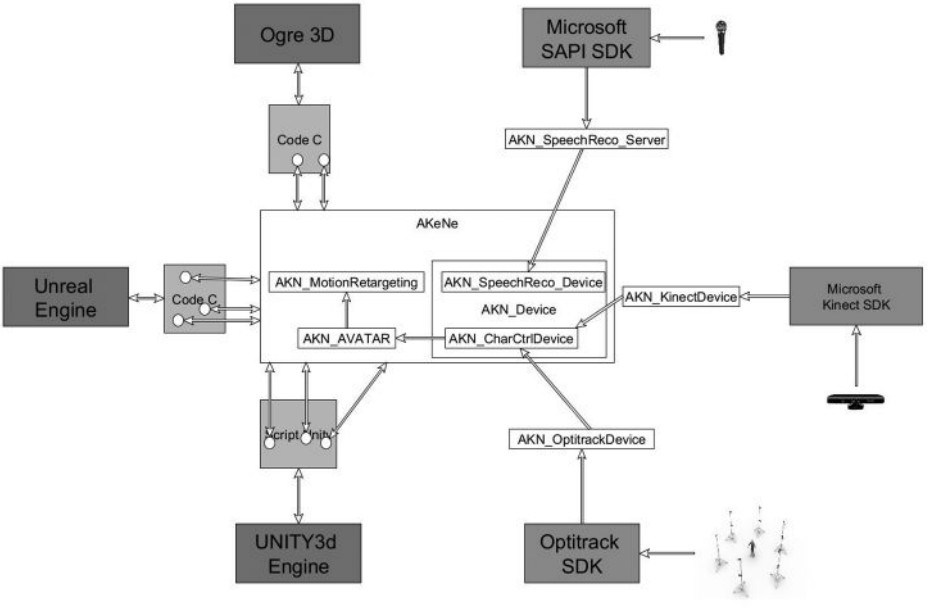
While working on *Masque et Avatar,* Gagneré could capitalize on his experience as a director and scholar. He has worked with new technologies in live performances for years, and has taken part in many artistic and scholarly projects. He holds a PhD in theater studies and teaches at the Faculty of Theater at Paris 8 University. He often stresses that when working in theater, he performs a variety of functions: the director, "creator of intermedial dispositives" (Gagneré and Plessiet 2018), a technician operating the program which generates the avatar and the set, and an intermediary between the actor, director, and avatar (particularly in *Masque et Avatar*). Cédric Plessiet specializes in Precalculated visual programming (in Real Time). Also he teaches at the Department of Art and Digital Imagery at Paris 8 University. He describes himself as a visual artist rather than a "tech engineer," a label erroneously ascribed to him and which he regards inadequate to his long-time research and artistic activities. Plessiet designs digital tools specifically for the stage, particularly those that enable the actor to work with an electronic image. He has also designed a few installations, and has experience in filmmaking (special effects and motion capture technology) and video games (work with avatars).

These two participants created the technological dispositive, cooperating in 2014 during the Idefi-CREATIC workshop and subsequently within the framework of a cluster workshop, from December 2015 onward. Their initial hypothesis was formulated in close connection with the technological dispositive used to create an avatar and interact with it: "Can we say that the avatar is guided by an IT engineer in the same way as the actor is guided by the director?" (Gagneré and Plessiet 2015: 9–35). Plessiet recollects this phase as follows:

> Georges Gagneré seemed to be fascinated by IT technology, but had no expertise in this domain. This somehow saved his image in my eyes. He did not regard me as a technician. Often theater directors say to us: "I am a director, and you are software engineer, so you should develop a tool for me." Hearing that I am immediately blocked. Georges said something else: "You have your own universe, which seems very interesting to me, and I have my own, so let's work together." I answered: "Okay, but first you should understand the principles operating in my universe." (Gagneré and Plessiet 2018)

The cooperation was possible through the openness of both the software engineer and the director, who wanted to talk, exchange experiences, and even get acquainted with some aspects of the partner's work. They are both confronted with the question of liveness and presence, pertinent not only in the theater but also, as Salz argues, in the digital humanities. Gagneré and Plessiet concentrated on the situation where an actor interacts with a computer animation, which led them to examine the degree of liveness of this animation (Gagneré and Plessiet 2015: 9–35). It becomes a partner for the actor, which raises the question: is it a mask or an electronic marionette – or perhaps a new form of acting?

Fig. 5: Masque et Avatar, Cluster Workshop, AkeNe.



A dispositive made up of Kinect and Oculus Rift, used in the first phase of the project, was part of the platform on which both artists had worked for three years.

Together they created a software library called AkeNe, containing a real-time engine for 3D video games, particularly *Ogre*, *Unity*, and *Unreal* (ibid: 13) (Fig. 5). This library allows you to program artificial intelligence for a video game in order to control virtual reality devices, such as Kinect and the Motion Capture dispositive. The library has a modular structure, which users can independently and quite efficiently expand, building interactive subsystems, just as Gagneré did. Moreover, in January 2015, in his Idefi-CREATIC atelier-lab, he offered the "From a registered gesture to a gesture of digital interactivity" postgraduate course, devoted to the functioning of avatars. Yet Gagneré needed a makeshift dispositive that would be easy to operate, so he could work on his own, without Plessiet's help. The latter prepared a small platform that required little expertise from the director. It was a dispositive which, in time, allowed him to gain some independence in manipulating the avatar or the virtual stage design (Gagneré and Plessiet 2018). For Gagneré, this was a significant moment in the process of getting acquainted with programming, which led to his becoming gradually more independent in working with the device:

> It is interesting that in the initial phase of our work in 2014 I managed to convince Cédric to build me a pedagogical platform for manipulating the avatar. I promised him that I would work on it without his help. This was the main reason for his saying yes. He just equipped me with the necessary technological elements, which I was supposed to be able to operate, without bothering him with questions and taking minimum responsibility for getting to know his language. I drew him closer to the theater and he built the first prototype. (ibid)

When they began the project in December 2015, Gagneré had already learned considerable IT skills.[12] The next important phase of the project was the "incarnation" of the avatar. It received a virtual body, based on recorded gestures of actor Victor Cuevas, a graduate of Paris 8 University. This phase was significant for the performers, who could hone their skills within the framework of a work in progress. Also, during the experiments and rehearsals, the digital artists, software engineers, actors, and the director could make sudden and unexpected discoveries. For example, Plessiet realized how the body of an actor differs from a virtual embodiment. The actor needs to be trained and stimulated to express; he or she also needs rest, unlike an avatar, which is only an algorithm manipulated

12 In April 2015, Gagneré made a study visit to Laboratoire d'Informatique Bordelais in France. By that time, Plessiet had created the first platform using Unity3D software. That year, in the summer and fall, Gagneré individually learned to operate Unreal software. He acquired the skills needed to assist Plessiet during the cluster workshop in December 2016 and to teach a Idefi-CREATIC.

by the programmer. It was at this crucial moment that Plessiet reached the following conclusion:

> What surprised me the most was the place of the body in the theater. In my line of work it is entirely different. For me the body is an avatar, a vehicle which I pilot, whereas for you it is an object of communication, an entirely different thing. I recall Victor [Cuevas], an actor participating in CREATIC in 2015, being constantly irritated, until we realized that we did not provide him with the means that he needed to express himself. For me it was a moment of shock and crisis. (ibid)

An actor creating a role needs time and material: a stage situation, dramatic tension, an outline of the character. Therefore, he or she needs the pieces to build the character. Victor Cuevas had none of these during this exercise with Gagneré and Plessiet. The presence of Giulia Filacanapa as the main director in the initial phase of the project proved invaluable, because she conducted exercises with the actors, using both the technological devices and the dell'arte masks. She devoted a great deal of attention to the details of the performers' work. With her involvement, Gagneré could focus primarily on steering the avatar, and from the CW≠3 cluster workshop in May 2016 onward, he no longer cooperated with the actors. He concentrated on manipulating the avatar and registering the actors' movement through Motion Capture. Later on, he only worked with computers and operated the digital devices. Because of this modification, in this project, particularly after the CW≠7 cluster workshop in October 2017, he could be called a "digital artist," a term often used in the digital humanities. Operating the dispositive, he served as an intermediary between the avatar, the actor, and the director. Sometimes, however, when speaking with the actors and other directors involved in the project, he took the role of a typical theater director.[13]

These shifts in the distribution of tasks in the final phase of the project turned out to be the right solution. Consecutive tasks became increasingly complex and demanded undivided attention. The directors were preoccupied by the work with the actors and preparing performances for public presentation. The programmers could only control the dispositive and design the details of the interaction between the actor and the avatar.

The work-in-progress format required that the technological system used and developed in the project be constantly updated, developed, and improved. For example, Kinect was integrated into the dispositive, but sometimes replaced by

13 In the second phase of the project, the function of the director was taken by Duccio Bellugi, Boris Dymy, Andy Lavender, and Giulia Filacanapa, who was involved in the project from its very outset.

motion capture technology, which turned out to be much more complex (it was included in the second phase of the project). The focal point was the avatar and its interaction with the actor in a real space. This work was divided into a few phases: the virtual embodiment of the avatar, generating the projected stage design, and setting the lighting in the acting space.

Gagneré and Plessiet formulated questions concerning this work method on two levels:

1. The level of Kinect:
   a) How can the programmer measure the actor's presence in real space?
   b) What is the quality of the programmer's perception of the actor's presence in this situation?

2. The level of Oculus Rift:
   a) What is felt by the audience immersed in an artificial space?
   b) How does the actor experience immersion when interacting with the avatar?

It should be stressed that the questions concerning Kinect were more pertinent to Gagneré's activities, because he used his previous theater experience in his work with the actors. Plessiet was more concerned with recording movement in real time (through motion-capture technology), and not with intermediary time, as is usually the case. He also emphasized that, before the start of the project in January 2014, the dispositive functioned flawlessly, and although the avatar was visually simple, the space it could "inhabit" already looked interesting: an austere interior with gray walls and windows overlooking a black abyss or an open space with blue sky and sandy ground.

Looking closely at how the project participants used Kinect and Oculus Rift, one cannot fail to notice the affinities between their work and the way design is conceived in digital humanities. The authors of the book *Digital_Humanities* define this method as "thinking-through-practice" and see it as essential to this domain. They define technological imagination on a cultural level and subject it to interpretation. They add:

> Digital Humanities is a production-based endeavor in which theoretical issues get tested in the design of implementation, and implementations are loci of theoretical reflection and elaboration. (Burdick et al. 2012: 13)

Significantly, the expression "thinking-through-practice" is crucial in artistic research, as *Masque et Avatar* might be defined. Suffice it to recall the term "reflection-in-action," suggested by Donal Schön as early as 1963 (Schön 1963). Equally

important was the concept of "action research," fundamental to the paradigm of artistic research, and defined in 1946 by Kurt Lewin (Lewin 1946). It should be stressed that both terms were used in artistic research in conjunction with a technological component or dispositive. *Masque et Avatar* combined an analysis of technological problems in theater, based on assumptions typical of artistic research, with the design and "thinking-through-practice" employed in the digital humanities. The lines between these two practices are becoming increasingly blurred. Perhaps in the future it will be possible to work out a coherent format for an interdisciplinary project, focused on a technological object as the common denominator for various fields of art and science.

Toward a DH Artist of Theater

Masque et Avatar, and particularly the cluster workshops, convincingly demonstrates numerous transfers of professional competences within an interdisciplinary team, which merges theatrical experiments with information technology on the one hand, and on the other, theory with practice. Gagneré and Plessiet oscillated between their professional skills and new specialist competences which they learned from each other. As a director, Gagneré acquired the rudiments of programming. Plessiet, a software engineer and visual artist, had a chance to work with the actors and try his hand at directing a live theater performance.

This transformation, typical of *Masque et Avatar* as well as many other contemporary collaborations between artists, engineers, and programmers, can be described by notions developed in the digital humanities and intermedial studies. Both Gagneré and Plessiet could be described as "creators of dispositives," "techs," or "digital artists." They could be treated as prototypical representatives of the digital humanities, not only because their project involved a technological dispositive which allowed them to experiment with new methods of acting and guiding the actors, but also because pairing their professional skills inspired them to develop new abilities and work formats. Plessiet exemplifies the tendency among contemporary visual artists to forge connections between art and technology by creating specialized software, optical devices, and innovative digital interfaces (Fourmentraux 2012: 19). Gagneré is a representative of theater artists who draw inspiration from novel technological apparatuses. As he stated:

> At some point together with Cédric we tried to grasp the moment of going beyond our competences. On the one hand, I realized what I cannot do and will never learn. On the other hand, I identified the skills which I could potentially acquire, to be able to understand some issues pertaining to IT engineering and enter Cédric's world. Our competences were mutually complementary, although in many respects I had

> to rely on his knowledge and skills. I started to work with digital tools, because I had no choice, although I did not become as skilled in digital technology as Adrien Mondot, who is a trained IT engineer. I think that a director or someone who works on a theater project with actors needs to acquire competences which only a few years ago started to be officially taught, particularly how to use digital tools. Therefore I started to work with codes and became a sort of 'power user,' without, however, knowing C++. (Gagneré and Plessiet 2018)

Gagneré admits that, as an artist, he had to depart from his research and theater work to learn new skills in an unfamiliar domain. He started to use his basic knowledge of programming in his art work. The exchange of competences leads to elision of borders between professions. As argued by Dominique Vinck, a sociologist active in the digital humanities, such collaborations make it obvious that it is necessary for artists to get to know the basics of IT technology to be able to operate digital systems (Vinck 2016: 10). Undoubtedly, Gagneré and Plessiet can be regarded as digital humanists who not only "create, process, theorize and/or evaluate digital tools and their potential," but also know how to use the code to carry out programming tasks (ibid).

Conclusions

Masque et Avatar is an example of innovative research in theater which goes beyond its framework by integrating information technology, video games, and technologies of visual imaging. Moreover, it connects theory and practice to test its initial hypotheses. The space created during cluster workshops created an opportunity to introduce innovative exercises, get to know the technical parameters of Kinect and Oculus Rift, interact with an avatar, and learn the basics of programming. The research I have described united theater and video games, showing that, perhaps, in the future, the actor will be able to perform alongside an avatar. This kind of research is still in its initial phase, and requires theater practitioners to put in a great deal of effort to learn information technology, programming the dispositive and adjusting it to the stage's requirements. As a result, the avatar will likely gain a wider range of expression, through gesture, movement, face, and voice.

Both Gagneré and Plessiet admitted that creating an effective dialogue in such a heterogeneous context is probably a Utopian task. They preferred to speak of gradual "transitions from one discipline to another" (Gagneré and Plessiet 2015: 15) to build bridges between various domains of knowledge and practice. As a result, the programmer becomes more than just an IT specialist, subservient to the demands of the director, who in turn is more than just an artist, presenting his concept in the obscure language of art. "Boundary crossing" is an interesting

methodological proposition which will most probably bring good results in other interdisciplinary projects. The cooperation between a director and a programmer can also be regarded as a continuation of the creative explorations of the New York group led by Rauschenberg and Klüver in 1966, and provides an excellent example of fruitful collaboration between an artist and an engineer.

Translated from Polish by Mateusz Borowski

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