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Virtual stage sets in live performing arts (from the spectator to the spect-actor)

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ABSTRACT

This paper studies the added value of VR to the art of stage setting through examples and experiments. It will also analyze the link between the audience and digital sets (VR, AR), from an aesthetic point of view as well as a practical one. It is important for us to succeed in creating a theatrical set which favors the spectator's presence for him to become a live performing spectator, and thus have a stronger link with the setting in the short as well as long run.

Categories and Subject Descriptors

J.5 [ARTS AND HUMANITIES]

General Terms

Design, Experimentation.

Keywords

Virtual stage setting, (VR, AR), live performing Art, presence.

1. INTRODUCTION

Science and digital technologies are extending our frontiers in terms of knowledge, while art is inviting us to reflect on these new experiences. The goal of our research is to create a theatrical virtual set with which the audience will be able to interact. The contextual review leads us to identify the useful elements for our project « **Aider Alice** ». This work- which is currently in progress- will try to offer interesting thoughts about the presence, the loose of physicality and the future of digital stages. We will thus start with a presentation of the digital technologies inputs in the theater, with for example: holography, computer graphics, the augmented reality, computer generated images and so on. We can notice that the art of stage setting is going through a great evolution towards these technologies, as every artistic domain is, and that this change implies a redefining of the link between virtual system and users (such as actors, managers, stage directors and the audience).

Then, we will study the relationship between spectator and virtual set and all of these put all together will allow us to identify this work's problematic and hypothesis. Among the digital technologies the theater can benefit from, we are particularly interested in the VR, for it implies the audience in the theatrical setting. We will after that show this technology's passivities which are very limited in **t**heir positive use in the theater. Then, we will adapt the expression "spect-actor" which is the interaction between spectators and the virtual set in which the spectator becomes a creator by taking advantage of the new artistic and interactive installations. Finally, we will show our experiment and will conclude by imagining and asking questions about the script of the future, the stage design and what surprises we could come across.

2. THE DIGITAL TECHNOLOGIES CONTRIBUTION TO LIVE PERFORMANC

In order to identify the beneficial elements for our work, and in order to highlight a problematic, we will present some landmarks in the History of digital technologies in the theater, as well as three examples of recent performances using those technologies, such as holography, computer graphics, the increased reality, computer generated images and so on.

Let's start with ("L'oeuvre d'art du future") "The Artwork of the Future" written by Richard Wagner in 1849, which is considered as a forerunner in the sense that he had imagined in this essay, a fusion of different arts using the opera as a medium and in this way he somehow foresaw the virtual and immersive reality[1-2]. On the other hand, Dan Graham's video installation of the "Opposing Mirrors and Video Monitors on Time Dela" presents the beginning of interactivity in the seventies. This work promotes the spectator not only as a perceiving subject, but even more as a person in a network of relationships [2]. Then, Jeffery Shaw took advantage of the emergence of multimedia and net art to present a new interactive installation for his virtual city "Legible City" in 1989 [1]. As a matter of fact, the idea for the landscape in VR was first experimented in 1994 through Mark REANEY's production of "The Adding Machine," by Elmer RICE in which the stage director had highlighted a tragic existing text "the VR can not only be used as a performance itself, but also as a new scenographic support at the staging's service" [1].

In this work we will show three concrete examples of some remarkable concepts in the staging world in the last six years. The first example is that of Miku which is a singing, digital avatar created by Crypton Future Media (fig.1). The 3-D projection of

Miku pranced around several stadium stages as part of a concert tour, where the capacity crowds waved their glow sticks and sang along 2009" [4].

Figure 1: Miku the singing, digital avatar. © SEGA http://miku.sega.jp/. © Crypton Future Media, Inc. © SONY Music Lable. [4].

The second is the interactive transmission process which is known as "Musion Live Stage telepresence" (fig. 2). Three Christie Roadster HD18K DLP projectors were used for the first-ever transmission of live, interactive 3D holograms from London and Montreal to Orlando, Florida in 2009 [5].

Figure 2: 3D holograms from London and Montreal to Orlando, Florida. © Christie Digital. [5]

The third example is the kinematics show by Adrien. M, the stage director, keeps on exploring how the relation to the object can be a source of emotion by exploding the limits of virtual juggling. During this show, the stage is composed of a thousand digital forms and embraces the two performers'bodies, thanks to a software created by Adrien Mondo himself [6].

3.   PROPLEMATIC AND HYPOTHESIS

After considering the different examples of digital technologies applied to the theater, we can say that those technologies have tried to integrate the audience to their systems. However, in the live performing art, they remained trapped in the actors' sacred space. These last quotations being reinforced thanks to our bibliographical research, lead us to this problematic:

How is it possible today to broaden the audience's presence in the theatrical set?

The hypothesis I would formulate is: we can apply the VR to broaden the relationship between spectator and theatrical setting.

4.   WHY SHOULD CHOOSE THE VR TO BROADEN THE RELATIONSHIP BETWEEN SPECTATOR AND THEATRICAL SETTING?

4.1. What do we call a presence?

We will first try to find an intermediate definition of the word "presence", since defining this notion in a precise way is very difficult. According to Bouvier, 2009, the presence is the authentic feeling of existing in a world other than the physical world in which our body can be found[7]. Here we have an intense definition and therefore a more complete one: existence is not just a physical state of being as "being here" could suggest. In the notion of existence we have the physical state as well as the psychological state of the user. As a matter of fact, the feeling of presence occurs for a user through different instinctive answers: physiological answers, emotional and behavioral answers [8]. Furthermore, the fact that this feeling is not continual throughout the experience [9][10] makes it a difficult notion to measure.

4.2. Reasons for choosing the VR

Among the digital technologies theatrical sets can benefit from, we are interested in VR to increase the presence of the spectator thanks to the multiple possibilities it offers, and also because numerous are the speeches discourses which threaten the theater to be cut out of its time if it does not start integrating the new technologies in other ways than just projecting images, a technique so often used in their stage nowadays [11] [12]. "The diversity of this work starts from the use of virtual sets for real actors and goes up to the total immersion of the audience in a virtual world where they are actors" De Loor [13].

Then, according to Plassard; the term "virtual theater" is "the manifestation of a desire to see materialized on the theatrical stages these electronic pretenses that we can come across in real life" [12]. Then, Jacquemin signifies that the virtual sets are used to evoke impossible places, absurd, therefore, the interactivity that is also useful in this type of virtual sets can provide the users with the possibility to design, modify, move or destroy elements of the set in order to increase the illusion of the characters' presences in the stage set [14]. As a matter of fact, Mark Reany says that The art of the theater has many similarities with the phenomenon of virtual reality, a theatrical performance and a VR experience are both time based, existing only for the time the human participants are engaged with them, 'Both rely on the creation of fictive universe designed to entertain, inform, and enlighten" [3]. In the same sense, the VR can be represented, in a schematic way, thanks to three key intertwined concepts according to Burdeaet Coiffet, 1993(fig. 3): The three I's triangle (Immersion-Interaction-Imagination) [15].
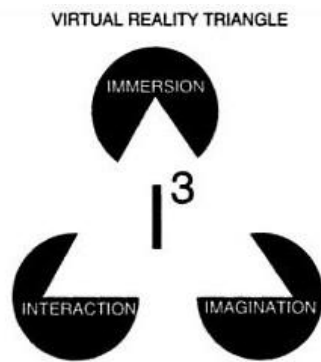
VIRTUAL REALITY TRIANGLE

Figure 3: the three I's of virtual reality, immersion-interaction-imagination adapted from Burdea in 1993. © 2003 by John Wiley & Sons Inc. All rights reserved [15].

4.3. The first productions which experimented the VR in stage setting

The first experiments on the use of these technologies in the theater were in the beginning of the nineties and started with the joint effort of some research centers [14].

Then, as we previously mentioned the first production which tested the idea of virtual reality scenery was the staging of Elmer Rice's "The Adding Machine,". This production of THE ADDING MACHINE attempted to demonstrate the ways in which virtual reality technology can be used to illuminate an existing dramatic text"[3].

The second experimental VR production was Arther Kopit's Wings. The goal of this experiment was to advance the technology and techniques discovered during production of The Adding Machine but enhance the sense of immersion for the audience. While looking through Emily's mind's eye, the audience shared its perceptions of the world around her, the I-glasses Enabling Reany to present virtual-worlds, computer generated objects and video images directly before the eyes of an audience [3].

4.4. The technical/aesthetic constraints

Although VR has been the object of much research in the last twenty years, it is still today limited because of technical and aesthetic constraints. These make it hard for this new technology to be integrated in the theatrical domain.

On the one hand, the first experiments in this field were joined with the development of immersive equipment of the increased reality such as the CAVETM. This equipment was not by nature meant for live performances because of the smallness of the audience and because it requires a constant monitoring of their positions. Some experiments on virtuality in theaters made use of individual immersive devices (virtual reality helmets), but these devices' are costly and their intrusion limited their use [14].

Besides, even if the spectators are provided with the virtual reality headsets (as it was the case for the 1996 *Wings* by Arthur Kopit) they find themselves isolated. They watch the show together; the same way a film audience does [12]. That is why immersion in a virtual world is viewed by most postmodernism theorists as a passive subjection to the authority of the world-designer, a subjection exemplified by the entrapment of tourists in the self-

enclosed virtual realities of theme parks or vacation resorts [16].

On the other hand, even if the specificities of the new technologies highlight numerous realizations that called for some moments of the audience's effective participation or for the audience's enrollment in the scenic or choreographic action, especially in the second half of the 20th century, it nonetheless remains that the direct, continual and almost hallucinatory experiment in a space in which it is possible to physically act, erases the necessary distance of the masterpiece's perception [12]. "Maintaining the illusion, the emotional context and the presence of virtual elements is the challenge of current artists" [13].

5. The interactivity as counter balancing the immersion passivity

In order to broaden the relationship between spectator and theatrical setting, we suggested that the VR possibilities such as imagination, immersion and interaction [15] were a likely solution to achieve this mission. As a matter of fact, our bibliographical research showed that the immersion passivities had limited the use of this technology in live performances, so far as to bring some researchers to think of the theater as not able to use these digital technologies: "a sanctuary [resilient] space to the evolution brought by the digital era" [16], this gap led Plassard to conclude that "to remain in the theatrical art domain, the integration of the virtual reality has to occur on stage, not in the audience" [12]. And that is what we notice in some recent virtual shows, such as the kinematics by Adrien for example in which two performers: Adrien Mondot and Sachie Noro, shift from duo to solo, interacting on stage with projected graphical materials (fig. 4). He thus left a door open as long as this technology is used on stage [6].

Figure 4: « Cinématique » by Adrien Mondot, 2010[6].
©AdrienMondot

Other researchers such as Rayan, sees that the spectator is always invited to interpret: "we can compare the Internet video games user's situation to that of the theater spectator" [17]. The spectator as well as the user, whatever the psychophysical force of his fascination for the show he is given, whatever the illocutionary effect of what is played on stage or on screen, keeps at all times, the freedom of recreating, reorienting or re-appropriating the performance in real time [16].

The interaction is therefore, the receiver's intrusion in the performance process in real time: "this intrusion counter balances the immersion passivity" [17-18]. Furthermore, Jean-Pierre Balpe explains that the interactivity is the presence and not only the participation, even if in every interactivity, there is a certain degree of participation. "Participation is an attitude when facing a work, whereas interactivity is a presence in the work" [19].

6. FROM SPECTATORS TO SPECT-ACTORS IN AN INTERACTIVE SET

After considering Balp's quote, we can say that we are on the right path to characterize our approach in which a spectator will be spectator as well as actor, thus spect-actor. This expression (spect-actor) was coined in the first multimedia art productions in the nineties, with the appearance of many interactive installations in which the spectator becomes a creator-actor of the work, in the plastic arts domain as well as the video or audio domain [1].

This led us to ask ourselves, today, in which type of performances do we find the spect-actor? What are the interactive installations used? And how can the interactive set favor the spectator's presence?

Live performances can give us some examples which adapt to the artistic interactive installations to involve the spectator.

An interactive projection organized in Munich in 2010 to reveal the Kinect, the new Microsoft X-Box artistic launch, involved people in a projection of computer generated images [20]. This new machine inspired a great diversity of live performances such as the architectural video game experience. These video game classics became in 2012 an unforgettable experience, using monumental proportions and playing with the body [21]. Two technologies are used: the Kinect to detect the player movements and the video mapping which adapts the game depending on the details of the building. In this way, the ball can bounce on real architectural elements, making this a great as well as a fun experience.

The second example: the Vodaphone, on the 15th and 16th of December Vodafone organized the first interactive mapping projections. Passers-by were able to experiment with a unique interactive experience, which was projected onto one of the most emblematic buildings of Madrid in Plaza de España. With their hands, they were able to use a Samsung Galaxy tab to control these projections. This spectacular mapping projection was themed around the galaxy for added effect [22].

The third example is the Contrex advertisement: some women on bikes turn on a giant neon strip-tease This time, Contrex turned to light Paris' halls of residence, and real strip teasers in flames appeared at the windows of the building [23]. All this presented in a fun and relaxed way with this strip tease and these women burning calories (fig. 5).

Figure 5: Contrex AD, 2012. [23] © contrexFR.

This experience makes us think of the first experiences in this domain and more precisely of that of Jeffrey Shaw "Legible City" in 1989 (fig. 6), in which a video projector is used to project computer generated images on a small screen at the front of a bike, the bike's handlebars and pedals allowing the spectator to interactively control their trip's speed and direction [1]. In these two examples, the physical effort produced is essential to the interaction with a video projector.

Figure 6: Jeffrey Shaw, Legible City 1989[1].
http://www.jeffrey-shaw.net/images/083_001.jpg

6. Experimentation

Our project « Aider Alice » consists in representing a theatrical adaptation of an existing tale to highlight on the one hand the VR/AR input to the text and on the other hand to estimate the relevance of its use in realizing a night interactive show (video interactive mapping) on Laval's castle's walls. The VR being based on the creation of a fictional universe to entertain people [3], we are led to search through the fun and grotesque tales to concretize our adaptation (fig 7). The goal of this choice is to use the spectator's imagination thanks to a virtual set which will be projected on the castle's walls. That is why we came to choose the tale of Alice in Wonderland in which nothing is ordinary and everything is crazy, and the virtual set can create impossible, absurd places [14].
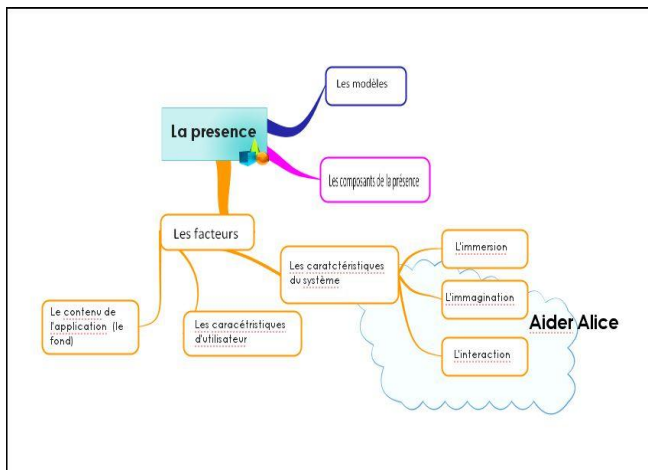
Figure 7: the context of our project "Aider Alice"

In the same way as the first productions using this technology in theater by Mark Reany, we adapt a well known text to facilitate the comprehension in the progress. However, this time the interaction will be possible between the spect-actors and the projected landscape. Then, we will try to transfer Alice's feeling to the spect-actor, especially during the zooming period.

'The content is the narrative and…. as it is contained in a visual technology, we are suggesting that it is primarily a visual-narrative. A visual narrative can simply be described as pictures that tell a story'. [24] In our case, we talk about an interactive setting of a visual narrative for an outside theatrical device. We therefore talk about double difficulties (dramatic and technical).

6.1 The dramatic and technical difficulties

6.1.1 Dramatically
Dramatically speaking, on the one hand, balancing the content exploration by the user and the content's capacity to bear this exploration and excite the interaction in a given moment without breaking a sense of flowing throughout the experience. On the other hand, how could a text from 1856 adapt to the new digital technologies of 2013? About the spect-actors, what will they be able to change in the setting elements, and how this will change the progress of the show especially when the interactivity presents itself as a possibility to improvise [17]?

6.1.2 Technically
On the other hand, technically speaking, it is important to understand how the content's elements as well as the spect-actors will work together. And when will the spect-actors react? And how?

To measure the degree of the spect-actors' holding back, we prepared a quiz for them to answer at the end of the performance. We also scheduled a rehearsal of the performance for each group of participants (3 spect-actors) two times; the first rehearsal took place without the possibility to interact, and the second with the interactive device to then compare the results.

In association with the Master 1 engineer team of Laval's "Virtuel et de l'Innovation", we first prepared a script of the interactive tale, then we created a model of the stage to get an idea of the space and our ideas' relevance.

6.2. Anticipated use of software and technologies to carry out the project
For our project, we will present an artistic installation which will count three types of Kinect interfaces installed at 50 meters from the castle's walls, in front of which the spect-actors will be able to take place (the spectators that will act during the performance). These Kinects will be installed in shielded boxes to protect them from theft and from bad weather (test if one Kinect functions well behind a shielded window). The simulator's development will be materialized thanks to a 3DSMAX and on "Unity" with the "Metaio" plugging for the augmented reality.

The animation will last for about five minutes and will tell a story adapted from tales. The animation's demonstrator will first be realized in increased reality on a screen placed in front of the castle. If it becomes a success, the city could hire an employee who would be in charge of projecting the images on the castle's wall instead of a screen.

7. CONCLUSION AND PERSPECTIVE
To conclude, we can say that virtual and/or augmented reality (VR/AR) is now part of the daily used technologies by millions of people. As a conclusion, we can say that the questions asked in our research lead to an important debate with some scenographic, architectural, dramatic and technical facets.

We want to warn people that the theatrical performances vitality using these types of technologies will soon substitute the cinematographic empire. First, because the cinema is becoming more and more accessible at home thanks to giant TV screens. And because of the lack of time between the moment the movie is projected in the cinema and its release on DVD, not to mention pirating. So, if there is a great deal of research dealing with the integration of the cinema in theaters, the successive attempts to create 3D movies in the cinema nonetheless underline the desire to approach reality. Will the cinema model really come to the theater model? When it comes to the actors, will the avatars completely replace the actors' role in the theater as it happened for the Japanese singer Miku? Will there be a stage in which the plays will take place in the air or in the water? The debate is very strong between the classical theater supporters and the modernity defenders.

Finally, this article's importance is the attempt to find a virtual theatrical setting model which can provide the spectators in 2013 with what they want and need and respects the theatrical performances measures. As a matter of fact, the answers to this conclusion's questions will be the topic of another research perspective.

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