The Multimedia Interactive Theatre by Virtual Means Regarding Computational Intelligence in Space Design as HCI and Samples from Turkey

Pelin Yildiz

Abstract—The aim of this study is to emphasize the opportunities in space design under the aspect of HCI as performance areas. HCI is a multidisciplinary approach that could be identified in many different areas. The aesthetical reflections of HCI by virtual reality in space design are the high-tech solutions of the new innovations as computational facilities by artistic features. The method of this paper is to identify the subject in 3 main parts. In the first part a general approach and definition of interactivity on the basis of space design; in the second part the concept of multimedia interactive theater by some chosen samples from the world and interactive design aspects; in the third part the samples from Turkey will be identified by stage designing principles. In the results it could be declared that the multimedia database is the virtual approach of theatre stage designing regarding interactive means by computational facilities according to aesthetical aspects. HCI is mostly identified in theatre stages as computational intelligence under the affect of interactivity.

Keywords—Computational intelligence; interactive space; multimedia theatre; virtual reality.

I. INTRODUCTION

IN this paper the technical approaches of stage design in relation with the aesthetical principles and methods are being identified. The computational intelligence is integrated to theatre composition as a whole in many ways. This integration is the new advances in set designing by flexible quantities.

II. INTERACTIVE SPACE DESIGN REGARDING MULTIMEDIA

Multimedia interactive theatre is the high-tech approach of set design in relation with the concept computational intelligence. Computational intelligence is the supplier of all the technological advances in artistic disciplines as well as other fields [5].

While designing for interactive communication, it is important to think through scenarios for users who watch any performance alone as well as the dynamics of the interaction. The design task is to build an environment for a multi-user, networked play space for an online service.

There will be issues unique to a virtual environment that is not revealed by simply transferring observations from a physical space to a virtual one. The design ultimately needs to address the issues raised during the improvisation [9].

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The recent approaches in design are the explorations in computational facilities adapted to interior architecture by various ways. The architectural aspect of technological integration is the computational intelligence adapted to space in order to achieve the optimum quantities in contemporary methods. Interactivity is the most important medium in communication technologies. A visual communication method depends on visual perceptional requirements and contemporary approaches in order to maintain interactivity. Interactivity involves communication in a *dynamic* situation. Once a message is sent in interactive communication topologies, it is being integrated with the user and being transformed into another form. This dynamic relation is the basic point of interactivity also in the communication aspects of aesthetical disciplines concerning theaters.

Traditional user interface design begins with task analysis in which the designers anticipate all the tasks that a user will need to accomplish within a specific context. This is extremely useful when designing conventional, productivity-oriented software in which the tasks are based on a known process such as accounting, which in turn yields spreadsheet programs.

However, other techniques are required for designing interactive multimedia in which content influences the design, and more importantly, in which the goals include fun and entertainment. It is very difficult to design fun experiences based on task analysis. Therefore, we borrow a variety of techniques from improvisation and theatre games throughout the design process. We have found these to be most effective when trying to understand the needs of users in an unfamiliar context [9].

The new technologies of interactive communication are at a premature stage, needing inventive experimentation and creative content to remove its status as a forty year-old novelty act. Through imaginative effort in both technology and text, the craft of interactive entertainment can become an entirely new method.

The advent of digital media provides the essential ingredient for this growth, very much like technological developments such as the 19th century Phenatiskiscopes, Kinetiscopes, and Stroboscopes that allowed for motion pictures to be born over one-hundred years ago [13].

Theatre is an interactive multimedia composition. Here, the joint effects of action and text, sounds and lighting, stage and costume design produce a highly complex art form. But it has gone through some variations as all the other disciplines [5].

The development processes in contemporary theatre are in balance with the development of filming industries.
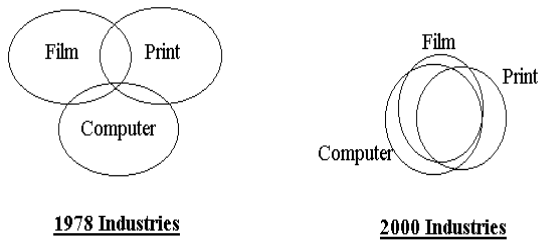

Fig. 1 The old and the current filming industries [10]

In this slide it is identified that the industries that were once independent bodies (print, film, and computer), have become integrated into a cohesive media network [10]. Therefore it should be identified that it is a necessity to look for efficient, alternative methods of communicating the multidimensional appeal of drama.

Encouraged by recent technological developments and growing student computer literacy, universities have launched research programs to represent drama in the new media. The challenging task ideally consists in integrating and mediating diversified kinds of knowledge: texts, movements, sounds, lights, and the even more intangible relationship between performers and spectators or listeners.

It is technically possible to produce a virtual theatre, using a variety of techniques: footage of real actors, scenes and buildings; animation, audio and architectural software; and digital rendering tools to control lighting effects. Locations, sets, and, to a certain extent, performers, can be simulated. Displayed online, results could be made accessible to a wide number of people at the same time.

While significant financial and technical resources will be needed to get started, student users might not have to invest in software to use a virtual theatre: a range of free VRML (Virtual Reality Modeling Language) browsers and decompressing software facilitate the streaming of even large 3-D animation files; transmission speed and storage space have significantly improved in recent years, and capacities will continue to increase dramatically [8].
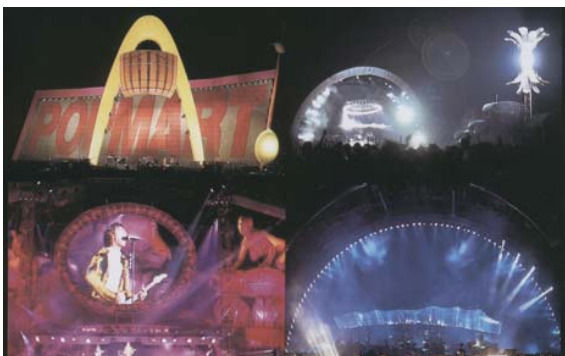

Fig. 2 The computational intelligence in stage designing is the variable and multidimensional usage of set as virtual reality under the affect of multimedia [1]. It could be realized that computational intelligence is the creator of multimedia in stage. So the visual perceptional quantities are flexible systems and organizations by virtual reality

Among the various projects attempting to transform the dramatic experience and create a virtual learning environment, the following trends might be identified:

-Heritage is a major theme for both theatre history research and museums and exhibitions. Virtual ancient theatres may be reconstructed in 3-D, fully colored and lit, and users may navigate within the site, using the mouse or certain keys.

• The creation of large databases of dramatic texts, complete with images, video and sound clips.

- Online tutorials on theatre and film.

- The creation of synthetic actors may have a certain set of skills, move in a virtual environment and interact with other characters. Virtual actors may be three-dimensional; it is also possible to dress them. Such avatars derive from either simple templates of humans provided by programs or from filming or scanning a real person and constructing from such data a virtual model [8].

- The creation of intelligent virtual environments with a sound and light profile. Theatre spaces which change according to the commands of the user not only represent an attractive tool for teaching drama but also appeal to professional stage designers and producers of commercial architecture and game software.

- The blending of actual and virtual performance. Student productions increasingly use a combination of different media, for instance, computer-generated backdrops versus real performers.

- The transmission of performances or 3-D spaces to remote audiences. From home or the university studio, viewers follow the action with a headset which suggests to them a 3-D space with performers. As an alternative, users may immerse themselves into a 3-D environment. Experiments are still very much work in progress.

III. THE MULTIMEDIA THEATRE & VIRTUAL REALITY

In this part the virtual reality according to multimedia concept and opportunities are being declared. The theatre space designing regarding multimedia is the definition of the imaginary expression by virtual means under the aspect of computational facilities and adaptations [5]. The computational intelligence is the systematic integration of disciplines by aesthetical values.

Fig. 3 The multimedia theatre in the formation of the reel appliance work

Fig. 4 The virtual theatre [12]

Fig. 5 The multimedia affection on stage designing is the multidimensional aspect of interior architecture [13]

The aspect of multimedia in space design is the creator of;
-the optimum usage of space,
-the virtual stage with the reel aspect,
-the practical and easier way of interior organization by technical equipment,
-the spatial appliances in set design supplied by computational intelligence as contemporary means.

IV. INTERACTIVE DESIGN ASPECTS

Multimedia tools no longer require a traditional editor who determines the shape of a text but a number of competent sub-editors responsible for images, sounds, web design and the like. Looking at virtual theatres today, we only begin to realize what immense efforts lay in such an undertaking. In the long run researchers will desire a full and fair appreciation of their web-based, computer-generated materials. The prestige gap between a printed book and a web resource will eventually disappear thanks to emerging multimedia standards [8].

Interactive multimedia environments may allow for both technical and creative roles beyond dimming the stage lights. For instance, as director, playwright or actor, the user may give instructions to other virtual agents who react to these commands.

It is referred to "tone and mood" rather than "look and feel" in order to expand our thinking about which components of the content and design affect the overall user experience. The tone and mood are set by the visual elements and screen layout, the visual style (photographic, water color, etc.), the use of sound to create a sense of ambiance or to provide user feedback, as well as the emotional experience desired.

Interaction design focuses on the physical ways that the user interacts with the computer. Some aspects of the physical interaction are determined by the context in which the user will use the software. This context then determines the actual input device. For desktop applications at home or work, the most conventional input devices are the mouse and the keyboard. In public information kiosks, however, touch screens are more common. And for interactive television, the remote control is the common input device [8].

The physical context and the choice of input device impact all other aspects of the design. For example, using a touch screen requires an increase in the size of on-screen elements as the active areas need to accommodate the size of a finger rather than the narrow tip of a cursor controlled by a mouse. Similarly, touch screen kiosks often do not have a keyboard available. In order to acquire alphanumeric data from the user, some sort of "on screen" keyboard needs to be provided.

Most conventional interaction design relies on users to initiate action in order to generate a response from the system. But in some scenarios, it may be appropriate to use interface agents which enable the system to take autonomous action on behalf of the user. Rather than rely on a lock-step pattern of interaction in which the user acts, the system responds, the user acts, the system responds, an autonomous interaction design allows the system to act concurrently with the user.

Data structures are defined to support the overall system architecture as well as to support specific aspects of the user experience. Many interactive multimedia applications keep track of the media assets through some type of database. One type of data structure is a data record with fields of information about each piece of media. For example, in We Make Memories each video story is indexed by speaker, year, topics, title, and running time. Then, an algorithm figures out which story to play based on an intersection of the time period on the timeline, the speaker, and the current topic. The algorithm also checks to see if the user has already heard the story, looks for another story about that topic from that speaker, and if it still cannot find a story that the user has not already heard the algorithm then moves on to the next most related topic.

The interactive prototype provides an opportunity to focus on specific aspects of the interaction design, the media and graphic treatment, and to evaluate the development tool that seems best suited to the particular product.

The interactive prototype is often used to raise additional funds for a project or to prove that the concept is strong enough to justify committing additional resources within a company. Therefore, the interactive prototype also needs to serve as a proof of concept that supports the information design, the interaction design, and the experiential design.

The robustness of the interactive prototype will depend on the schedule and the budget, but ideally, it should include the primary feature set and be stable enough to be user tested. Usually, the most frequently accessed screens and the key media elements are produced at the expected level of production value while "placeholder" artwork is used for the rest of the prototype. The first pass at the visual design is completed so that the meaning of the icons or other essential user interface elements can be evaluated during the user testing [9].

The introduction of an interactive structure into the domain of narrative is largely due to the influx of video games during the 1980s. The process of redefining narrative structures owes a great deal to the post baby-boom generation, which was raised in an environment where game entertainment offered an entirely new way of storytelling. The structure of the video game "story" is called the interrupted narrative, where "interruptions" occur during the story in the form of problems, discovery, tests, probing or examination. These interruptions are both controlled and responsive, thereby changing the next step on the narrative line according to the user's actions [8].
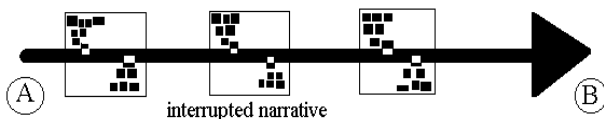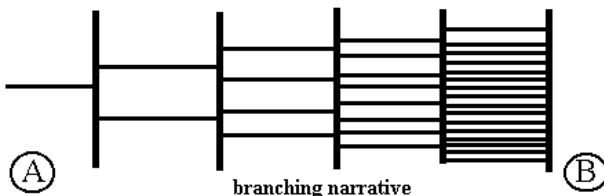

Fig. 6 Example of a figure caption [10]

Fig. 7 Example of a figure caption [10]

The various elements in the large squares represent possible user actions, while the smaller squares breaching the narrative line represent the action taken. Through the interrupted narrative, the user learns more about the story and characters through their own interaction. In the world of cinema, this concept of interruption was experimented by a variety of independent filmmakers [8].

The next step in the narrative evolution towards interactive film is a more complex rendition of the previous examples. The "branching narrative" extends the concept of the interrupted narrative, but builds different narrative paths once the linear structure is changed.

Finally, there is the object-oriented narrative, which is the most radical break in narrative structure. The object-oriented structure is highly responsive and introduces a certain degree

of entropy or chaos. Object-oriented structures in interactive entertainment are derived from design techniques used in computer programming. Object-oriented design is "a method in which a system is modeled as a collection of cooperating objects and individual objects are treated as instances of a class within a class hierarchy. Utilizing independent objects within a specified "hierarchy or environment, offers the advantages of a changeable and fluctuating story within a designed setting. Currently, this structure has only appeared on the Internet, but it is the direction of the interactive narrative media of the future.
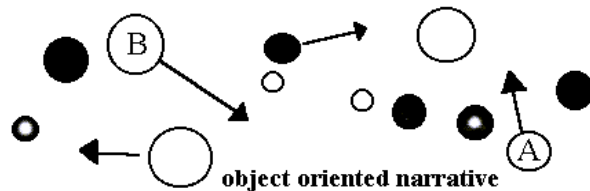

Fig. 8 Example of a figure caption [10]

The future of interactive communication theories and processes is not strictly object-oriented narrative or branching narrative or interruptive narrative, but a combination of all of these. The evolution of the interactive narrative form will result in a method of non-linear storytelling, similar to tribal forms of storytelling where the story could be expanded, altered, rearranged and visualized through dance and song [8]. Object-oriented structure is the current evolutionary stage of interactive narrative, and establishes that interactive cinema is moving towards a return to natural modes of storytelling, multi-tasking in the same way the human mind works in reality.

V. SAMPLES FROM TURKEY

The samples chosen for this case study are the stages of National Theatre plays selected from some auditoriums in Istanbul [11]. The basic point in these samples is the appliance of multimedia in set designing regarding virtual features.

Fig. 9 The stage design of *Don Kişot* in Taksim Auditorium [11]

Fig. 10 The Stage during the performance by virtual means

Fig. 14 The stage is variable accordingly to the reflections through the surfaces of the set by virtual atmosphere

Fig. 11 The actors also are adapted to the virtual feature of the play by costumes and the interactivity of the space is supplied by the integration of the reel and the virtual. This is the basic point of the computational intelligence in the space

Fig. 15 The variable backstage is the artifact of the performance concerning the systematical synchronization of time and space supplied by artificial intelligence [11]

Fig. 12 The photo of the Taksim Auditorium that the play *Don Kişot* has been performed [11]. (fig. 9,10,11)

Fig. 16 Another play in the same auditorium by no reel decoration but supplied by virtual artifacts

Fig. 13 The play with a multidimensional space approach again supplied by multimedia database

Fig. 17 The effects of lighting and multimedia activity is the resonance of a stage by reflected images rather than reel donations [11]

Fig. 18 The photo of the auditorium of *AKM Theatre* (Fig. 13, 14, 15 ,16 ,17)

As the samples analyzed are identified the above criteria are being reached as common properties:

-The aesthetical approach of multimedia by live performance activity,

-The virtual effects of stage supplied by multimedia with the lighting, acoustics, the reflected images on the screen, the synchronization of systems in set designing,

-The multidisciplinary artistic team work, etc.

The spatial expressions in the reel with virtual artifacts are the contemporary solutions to architectural aspects by variable explorations.

VI. RESULTS AND CONCLUSION

As the **results** of this case study, it is identified that;

-Set designing is a multidisciplinary team work with futuristic aspects and innovations adapted to space with artistic quantities.

-The synchronized disciplines are under the essence of multimedia so the designers with the expertise in stages should be aware of the facilities and innovations in technical developments and adapt the aesthetical and technical qualities together in balance with each other.

-The optimum quantities in space usage.

The **conclusions** indicate that;

-It should not be forgotten that if the ideal balance between the reel and the virtual has to be supplied in optimum quantities because the lack of the balance could end up with a synthetic image that is not realistic in fact could depress the aesthetical value of the space.

-The multimedia is a tool in many disciplines which is a numerical innovation of technical approaches of computational facilities. So the efficiency in space designing by multimedia database is the contemporary solutions of high tech innovations.

-Computational intelligence is a tool in the design concept so should be adapted to space in order to enlarge the capacity of the efficiency of the usage, therefore the designers should be aware of the facilities and renovations in technical developments and carefully adapt these to architectural database according to the computational hardware and maintenance.

-HCI under the basis of spatial organizations can open new directions for designers especially in performance areas in order to achieve the virtual reality in stage design. Multimedia is an important medium in HCI adapted to space designing. So designers should be aware of the facilities of computational intelligence in order to reach more efficient and creative spaces.

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