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Teaching Interactive Media Design

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ABSTRACT: In todays, computer-centered society, designing interactive media has emerged as a new profession. Interactive design is often associated with spread of computers as a communication and interaction tool. However, interactive design has been a staple of artists and designers for many centuries. We present a historical perspective upon interactive design and point out the close relationship of this field with different fields of art and design. We argue that interactive media design is a distinct and evolving field and that it is imperative to teach it as such.

In this paper, we have adopted this perspective and detailed a new four-year undergraduate curriculum on interactive media design education. This curriculum stresses the various components of interactive media design and its close relationship with computer science.

Keywords: art and design, curriculum design, interactive media

1. INTRODUCTION

Interactive media design has emerged as a key component in the today's computer-centered world. Interactive media involve a fusion of sounds, images, and texts that enable users to interact with this integrated environment. Although interactive media is often conceived as a new field that has emerged after the computer revolution, we believe that it has long been present as a basic concept in art and design history. Therefore, it is essential to describe this area in its historical perspective before designing a program for interactive media design education.

In this paper, we describe the use of interactive media concepts through art and design history and attempt to define of this field and its relationships with other related disciplines. We argue that, although interactive media design has relationships with numerous fields such as film, photography, film, illustration, typography, music, architecture and computer science, it is a distinct field. Clement Mok makes the argument that multimedia is being formalized as a discipline (Mok 1996). There is on increasing demand for interactive media designers in almost all fields because there is hardly any field where the computer mediated environment has not penetrated. Our aim in designing our program in interactive media design is to meet this demand. We have based our curriculum model on our definition of interactive media in its historical perspective.

In implementing the interactive media design program, we have come across some problems. It is not easy to maintain a balance between distinct

disciplines such as computer science and art, or between interactive design and other arts. We have tried to design the curriculum to strike this balance and included courses that gradually expose the students to different fields in a studio system.

2. INTERACTIVE DESIGN BEFORE THE ADVENT OF COMPUTERS

Interactive design in the computer medium is a product of the last half of twentieth century. However, some argue that interactive design has been part of the human experience much longer (Shedroff 1999, p. 269). Packer defines interactivity as the ability of the user to manipulate and affect her experience of media directly, and to communicate with others through media (Packer 2001). Preece bases his definition of human computer interaction on the visibility and affordance concepts of Norman, who identifies these qualities as essential for good interaction with everyday objects (Norman 1999). Based on these definitions and analyses, if we accept interactive design as the design of a tool that will facilitate a mechanism or to access information through user action, we can find many historical examples:

Viewed from this perspective, the design of all mechanical tools which must be manipulated by humans, all means of communication systems starting with Indian smoke signals, and all dictionaries and encyclopedias on printed media can be accepted as works of interactive design. One of the earliest examples of 'interactive product', as we use the term today, was also on printed media: this was a 1950 French book which was printed on separate pages and could be read in varying order (Gasperini 1999, p. 300).

Many sources refer to architectural elements such as windows and doors as access elements, and hence, as works of interactive design (Preece 1996, p. 6). All these three-dimensional definitions are made in the framework of the solid user interface design (SUI) of electronic devices and are mostly evaluated as industrial design (Burke 1998, p. 98).

The interactive media design concept of the computer environment of our day has been known as 'an environment which uses the best possible combination of images and sounds for the given application, and whose design can manipulate according to the users' response' (Shedroff 1999, p. 282; Mok 1996, p. 48; Hartman 1995, p. 176; Manovich 2001, p. 55).

Throughout the history of art, interactive media design in two and three dimensions has evolved through many stages. As performance, interactive media can be considered to be as old as the shadow puppet theater. From the point of view of interactive media designer, the most interesting characteristic of shadow puppet theatre is the interaction between the spectator and the puppeteer. For example, in the *ombromanie* art, where the shadow figures are obtained by different juxtapositions of the hands, the puppeteer shares the same space with the spectators. Furthermore, the spectators can join in the play with their own shadow figures. In this way,

the spectators may participate in the performance, and intense interaction between the shadow figures and participants is realized. Traditional shadow puppet play is produced by the puppeteer moving the two-dimensional puppets behind a translucent screen, to the accompaniment of music and sound (And 1977). Here, there is a classical theatrical arrangement of spectators and the screen. However, the spectators regularly join in by jeering and cheering, and the puppeteer changes the course of the play in an improvised manner according to spectators' reactions.

Viewed from this perspective, all forms of puppet play, three dimensional hand- puppet, rod puppet and string puppet enable interactive participation in the form of improvisation.

Similarly, theatrical play is the first to factor active participation into the scenario. The play progresses according to spectator reactions. Theatre, which is as old as the history of humankind, is a kind of spatial interaction which seeks the right combination of sound, music, light and image within space. From that point of view, one of the important plays that incorporated active participation of spectators is 'Six characters in search of an author', written by Luigi Pirandello in 1922 (Gasperini 1999, p. 301).

Modern theatre, incorporating such possibilities as video recording, real-time images and laser technology, has become very rich in enabling interaction with the user.

If we put aside interactive TV, which enables the choice of viewpoint in watching a game to the spectator, the only art form in history that does not allow interaction is film (OpenTV 1999). Early projection technologies like *Phenakistoscope* and *Stroboscope* actually had an interactive structure (Parkinson 1995, p. 8). In that structure, the spectator, although

Figure 1. The lead actors in Turkish Shadow Puppet Play: Karagöz ve Hacivat (Folge 1924).

unable to interfere with the story, could decide to start or to end the presentation and slow down or speed up the pace.

However, the classical film techniques of our day do not allow interaction since the audiovisual material is flattened out to two dimensions. Some film makers have experimented to enable interaction by association. The most remarkable example of this type of interaction can be observed in the trilogy 'Three Colors: White, Blue, Red', by Kyzystof Kiesloswki (Kiesloswki 1993a, b, 1994). The well-known Polish director has added the identical scenes of an old woman trying to deposit a bottle into a recycling bin into all three films independent of the scenario. In 'White' and in 'Blue', the woman succeeds in getting the bottle to the opening of the recycling bin but the bottle gets stuck there. In the third film, 'Red', the leading actress helps the old woman get it inside. The spectators who watch the three films sequentially make up a fourth film by noticing similarities and complementary elements.

There are similar scenes throughout the triology. Both the flashbacks within the films and the meeting of all the primary characters in the final scenes of 'Red' reinforce the interactivity by association in the minds of the spectators (Figure 2).

Upon examining interactive design throughout history in different fields of art, we can view the interactive media of today as an extension to the computer medium; an extension which will develop in two dimensions or

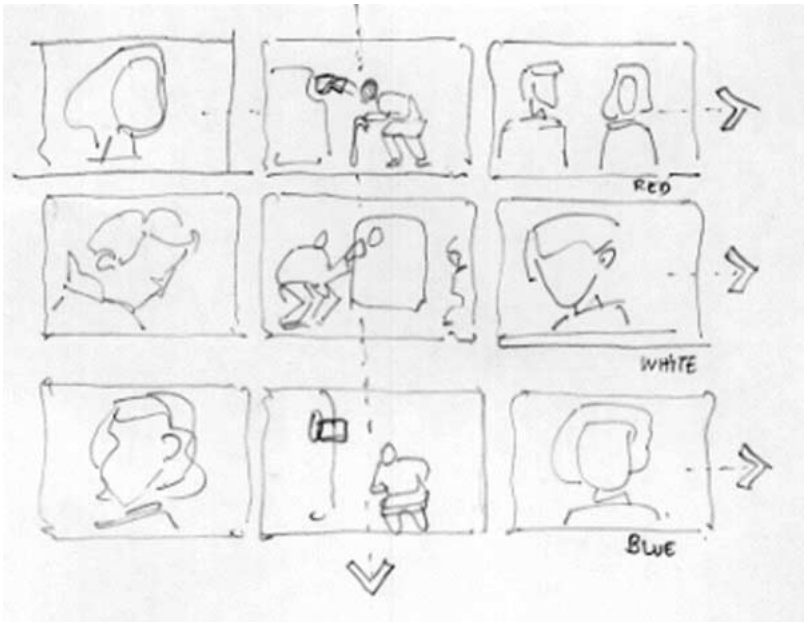


Figure 2. Scenes from the triology 'Three Colors: White, Blue, Red'. The identical scenes of an old woman trying to deposit a bottle into a recycling bin create 'interactivity by association'.

three dimensions, but essentially the same concept that has been tried in different fields of art.

3. THE NEED FOR INTERACTIVE MEDIA DESIGNERS

One of the important features of interactive media design is its non-linear structure. However, apart from this non-linear stucture, these designs are essentially visual and auditory compositions like all other works of art and design.

As a result, an interactive media design contains elements of different fields of art: photography since there is an image; illustrative arts since there is an element of visual communication; music since there is an auditory component; typography since it is an element of written communication (Shedroff 1999, p. 268).

Due to the motion component, interactive design has to incorporate lightning, stage design, choreography, and camera control.

Fundamental architectural concepts are essential to stage an interactive design in a physical medium or to create interactive designs in space. In that context, fundamentals of ergonomy and spatial assembly are needed.

Interactive media design is also similar to industrial product design. In industrial design, the actions performed by the user on the industrial product are considered within the framework of a 'solid user interface'. This framework is essentially very similar to the graphics user interface design of interactive media except the three dimensional versus two dimensional form.

In addition to, and yet, in contrast to all these disciplines, the interactive media designer must have an understanding of how the computer system works, how it is programmed and how the computer graphics operations are performed. Although most actions are performed using authoring tools without any real programming, the need for program development can arise for advanced interaction applications. Even if actual program coding is not involved, it is essential that the designer understands this process. As essential as it is for the painter to understand the chemistry of the paint, so must the designer understand the basics of programming.

When all these similarities are considered, is it really necessary to define a new specialization area for the interactive media designer? Is it not possible for the film maker, photographer, graphics designer, industrial designer, or even the computer programmer to specialize in this area? Can these specialists come together to produce an interactive media design?

At first, this seems possible. Many of these fields are related; Film and photography, animation and typography (Bellantoni 1999), photography and image processing, film and architecture (Penz 1997), dance-choreography and film. Furthermore, a team of specialists of the types listed above must cooperate in a team effort to produce large-scale interactive media productions. However, when the developing desktop technologies are considered, it seems more appropriate that the interactive media designer

first acquires the fundamentals of different media and then specializes in one of the aforementioned areas at the graduate level. When the interactive design task is small-scale such as a web site design for a company, or the preparation of a multimedia presentation, a specialist in interactive design who is equipped with both technical and aesthetic knowledge is best suited for the job. In larger scale designs, such as a professional computer game design, a team of specialists in different fields may cooperate; the interactive media designer must then coordinate the effort.

Viewed from this perspective, interactive media design is the intersection of 14 different areas of specialization from literature to engineering, from video production to advertising and from marketing to public relations (Mok 1996, p. 41). It is not film, photography, or graphics design; nor is it a specialization area of industrial design, computer science, or architecture. It is an area which integrates all the knowledge and experience in those mentioned fields to create designs in 2D or 3D.

4. FUNDAMENTAL PROBLEMS IN IMPLEMENTING AN INTERACTIVE MEDIA DESIGN PROGRAM

As outlined above, the interactive media designer, in addition to acquiring the fundamentals of interface design, must also be equipped with knowledge drawn from such fields as photography, film, illustration, typography, music and computer science.

This was our starting point in designing the curriculum of the interactive media design program at Yildiz Technical University, Istanbul. However, in doing this, we were faced with four problems: admission criteria, the balance between hand skills and computer skills, the balance between art and computer education, and the balance between interactive design education and other art education.

4.1. *Admission criteria*

Our department selects students based on two types of tests. The first is a multiple-choice test evaluating visual perception, logic and geometry skills. The second is a drawing test based on the visualization of a message. In the drawing test, students are asked to create a composition using only visual, non-text elements to convey a message. Evaluation is based on the creative skills rather than the drawing skills of examinees. The main problem here is selecting the candidates with both creative potential and drawing skills from among creative candidates who lack drawing skills and candidates who draw well but have limited creative potential.

4.2. *The balance between hand skills and computer skills*

Although interactive media design is performed solely in the computer medium, an issue for debate is whether creativity is enhanced in mixed hand/

computer medium instruction or only in computer medium instruction. Although we have only two years of experience in interactive media design education and do not have enough data to reach a conclusion, we have tried three methods: We asked the students to visualize a theme using hand drawing only, mixed hand/computer drawing and computer graphics only. Upon examining students' work, it is observed that the creativity of students is not affected by the medium of creation and is developed on the basis of individual experience and method. However, the development of both computer and hand skills enhances the creativity of students in experiencing and perception. The use of both media in a balanced way seems to be a fundamental issue in developing creativity.

4.3. *The balance between art and computer education*

As we have argued above, familiarity with the medium of design enhances creativity. Since the medium of interactive design is the computer, the student must learn the basics of computers: algorithms, programs, how programs work.

It must be kept in mind that the aim is not to educate computer programmers. Computer scientists and engineers will often work as a team with interactive designers. However, the worlds of science and engineering and that of art and design are two alien cultures. Even when these two cultures come together as in interactive media design, they do not speak the same language. Our aim is to have our students venture into the alien culture, to learn the vocabulary, to get familiar with program development patterns, and to get an understanding of what is easy to achieve by programming and carry out small program development tasks when needed.

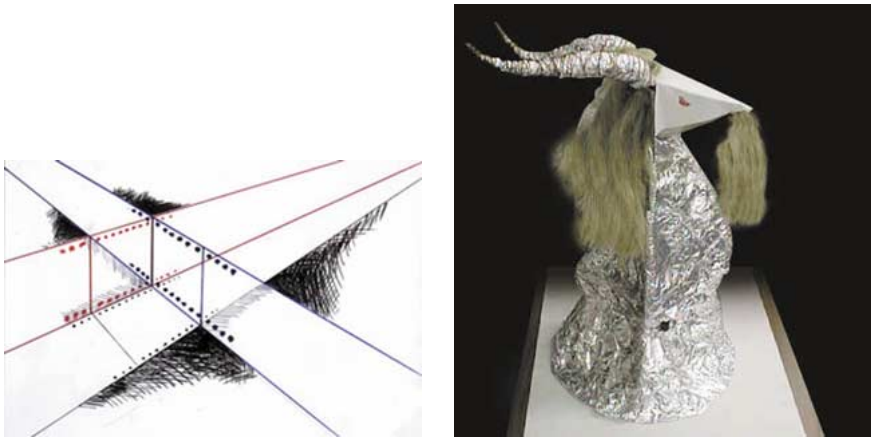


Figure 3. YTU Interactive Design Program Basic Design course projects: Left: A work conceptualizing the assembly in the triology 'Three Colors: White, Blue, Red' by Kieslowski. Right: A three dimensional installation representing the sign Aries.

On the other hand, an intensive programming education may prevent the acquisition of the fundamentals of art and may cause the student to become a multimedia engineer rather than an interactive media designer. Therefore, the balance between art and computer education must be carefully controlled.

4.4. *The balance between interactive design education and other art education*

It was argued above that the interactive media designer needs to know the fundamentals of photography, film, drawing, illustration, typography, music and computer programming. When it is considered that these fields all have undergraduate programs in which the fundamentals of each are taught in the course of four years, it becomes clear that all these cannot be taught in a single program. A fundamental question is whether students should learn a little of each or whether they should choose a specialization and acquire more in-depth knowledge in the chosen field.

5. INTERACTIVE MEDIA DESIGN PROGRAM CURRICULUM

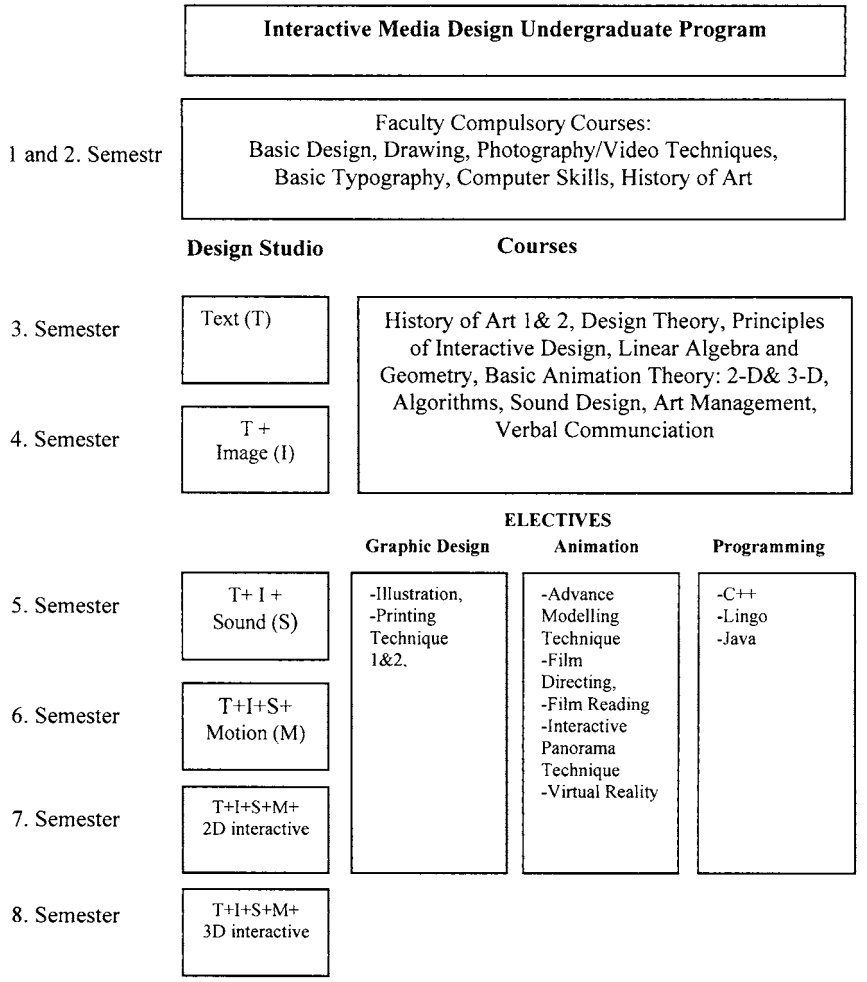
Considering both the definition of the field and its inter-relationships with other fields as given above and the fundamental problems described above, the Interactive Media Design Program which we offer is based totally on a studio system and upon courses that support that system. The students build the following skills gradually throughout the four years by producing five major works of design.

1. Text (T)
2. T + image (I)
3. T + I + motion (M) + sound (S)
4. T + I + M + S + 2-D interaction (2Di)
5. T + I + M + S + 2Di + 3-D interaction (3Di)

In the first project, the student works on a wallpaper design based only on text. This way, he applies the knowledge gained in the typography class. In the second project, students add images to their compositions. In the third, students add to the experience gained in the first two projects their knowledge of motion and sound to prepare a business presentation. In the seventh semester, students are ready to apply their knowledge of interactive design principles. In the fourth project, they design an interactive design product such as CD title, web site, interactive TV screen, or mobile phone screen. And finally, in the fifth project, the students design a physical interactive space. These five works of design, carried on sequentially, by incorporating new components, culminate in a design that combines all the elements of interactive media design.

For each work of art, courses that teach the fundamentals of the newly added concept have been included in the curriculum (Table I).

TABLE I
Interactive Media Design Program Curriculum



In the freshman year, students take common core courses within the School of Art and Design. That way, they get an overview of the fundamentals in other art programs and get to mingle and form synergies with students from other art and design programs. In the sophomore year, the students also take Linear Algebra and Geometry courses. These courses are aimed to equip our students with the three dimensional conceptualization abilities required of the designer. The mathematics courses, together with the programming courses, also let them develop a common platform of communication with computer scientists and engineers. Interactive media

design courses also start in the sophomore year and continue in the next three years.

Students can further specialize in subjects of their choice by taking more advanced electives. Electives are grouped into three specializations: Graphical design, animation, and programming. According to their field of specialization, students can choose careers as animator, sound editors, director of photography, graphic designer and programmer. Students who show promise in their subject of specialization will be encouraged to continue into graduate studies in the appropriate field.

CONCLUSION

The field of interactive media design is evolving with the recent developments in computer technology. The YTU Interactive media design undergraduate program is designed to keep in pace with this evolution. The curriculum is based on interactive design theory and the fundamentals in seven different fields that complement it: photography, film, drawing, illustration, typography, music and computer programming. The current alternative to our program is for the students to specialize in one of these seven fields and then go on to graduate study in interactive design. We believe that our strategy presents a better approach. Students who specialize in interactive media design can then go on to continue graduate studies in one of those seven fields. We believe that students who go through a multidisciplinary program such as ours can naturally participate in teamwork efforts required in big multimedia productions.

Since we have not had any graduates from the program, we cannot evaluate its performance. To evaluate our program effectively, we have to wait at least five years, until our graduates go on to graduate study or graduate and produce designs in industry. Our future evaluations will help us refine the curriculum of our program.

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