

Defining Interactive Multimedia Design Education: Expanding the Boundaries

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Abstract

The future of interactive multimedia design education depends upon the disintegration of discipline-based boundaries within the higher education system. Disciplines outside of computer science and computer art contribute significantly to the understanding of the cultural and social implications of the medium. A cross-disciplinary approach enables students to explore new ideas that inform their understanding of the implications of multimedia production on the individual and society. The evolution of communication design has reinforced the need for an understanding of human behavior and representation. Because functionality no longer takes precedence over appearance in WWW and CD-ROM design, students must have a strong understanding of the principles of art and design as well as programming. The boundary between content provider, visual designer, and software designer is blurring therefore reinforcing the need to explore the relationship between art, psychology, computer science, popular culture, software engineering, and the social sciences in a meaningful way and integrate these connections into the curriculum. Only then will higher education begin offering interactive multimedia design education that will enable students to influence the direction computer graphics and interactive techniques in new and profound ways. **Keywords:** curriculum, interactive multimedia design, cross-disciplinary.

1. Introduction

In the past decade, academic institutions have found themselves inadequately prepared to cope with the rapid changes brought about by the cultural appeal of computer graphics and interactive multimedia. Ten years ago, who would have thought that URLs would be printed on cereal boxes, and teenagers would prefer online chat sessions to TV? A life enriched by video games, special effects in film, and the World Wide Web often entices students to seek out academic institutions that are able to prepare them to become interactive communication designers and/or technicians. To provide a well-rounded education in interactive multimedia design, discipline-based degrees should be rethought and

new multi-discipline fields developed. This idea transcends the common practice of cross-disciplinary curriculum requirements and focuses on the development of hybrid courses and initiation of academic de-categorization. The development of a new interdisciplinary structure could enable flexible adaptation thus encompass the changing needs of students entering the interactive multimedia design field.

2. Collapsing the Structure

We are currently immersed in the technological and ideological transformation of global cultures. Not only is information on virtually any topic available to anyone with access to a networked computer, but the hierarchical structure controlling information production and publication is collapsing. In a world where scholarly texts and student productions co-exist side-by-side, we find that our expectations of and experiences with information acquisition have changed. According to Margot Lovejoy, "In the Internet, we have the commingling within a vast global community of international resources of both high and low cultural appeal. Some see the screen as a linguistic leveling device which flattens and devalues language. Others see a rich evolution of language occurring on the Web, not as it evolves in novels but as an experience of communication beyond the usual hierarchies of mediated publishing." [1] Not surprisingly, students often rely on the Web for information and we have seen URLs replace print references in their research papers. They realize the value of easy access to this cornucopia of diverse information and want to be involved in the production of information as well a consumer of it.

3. Revisiting the Past

Along with the collapse of the information production hierarchical structure, the method and means of conveying information have begun to take divergent paths. Whereas we see a resurgence of the dependence upon visual communication, the means of communication has evolved in a direction that defies the foundation upon which communication was founded. The earliest tangible examples of communication were often found on cave walls in the

form of depictive images. In these ancient cultures information was exchanged directly by means of visual, auditory and gesture-based reciprocation. This interactive interchange was confined to the physical locale. Over the years, cultures have become less and less dependent on images and have relied on the abstraction of symbols such as text to convey thought. With the advent of the book, information became tied to a tangible material that enabled the dissemination of ideas to a wider audience. Books became permanent records of knowledge and were often considered the authority. Cultures developed elaborate campaigns to mature text-based literacy, while de-emphasizing the visual image. Interaction, inherent in pre-text based information exchange, was severed, leaving the receiver of information alone without recourse. In "Being On Line: Net Subjectivity", Doctress Neutopia states "There is something dead about the word. After it is written, like a photograph, it is there as a reflection of past thought, there to remind us of a moment in time when the inspiration possessed the writer"[2]. The transient nature of the World Wide Web suggests there is no authority and information is constantly in flux and very much alive. Knowledge becomes a process of exploration and evolution, not a product.

4. Crossing the Boundaries

The re-emergence of an emphasis on visual, interactive exchange of information in the late 20th century generates the need to expand our interpretation of what it means to communicate. The Internet has become a fertile ground for experimental forms of social exchange. The enabling of immediate reciprocation that transcends geographic space challenges the formative structure of exchange yet broadens the appeal. Abraham, Meehan, and Samuel, in the book "The Future Ain't What it Used to Be", stated "Online culture is, more than anything else, about satisfying our fundamental needs for dialogue, discourse, and debate"[3]. In the past, personal interaction within local communities nourished the culture. Today the interchange within on-line culture supplements and often surpasses local exchange enabling not only dialogue and debate but also cross-cultural transmutation of ideas. Understanding the visual image plays an important role as students begin to understand cultural differences and explore new modes of exchange.

5. Education's Responsibility

With the responsibility of preparing today's youth to function effectively within a cross cultural, interactive, visual environment, educators have an obligation to address the concerns of the changing

state of information consumption and production. In many countries, we are seeing new academic programs emerge and existing structures expand to emphasize the production of visual information using computer graphics. The technical aspects involved in the production of images and interaction using computer technology typically consume academic attention. Little, if any, time is devoted to how these images are transforming our culture. The essence of interaction and information design is overlooked in favor of the technical means of production. We teach programming which focus on software development and art classes where students design Web pages, but where do we teach courses that integrate the mathematical, artistic, and cultural aspects of new media and communication design? A cross-disciplinary approach to interactive multimedia design education will enable students to produce works that not only stimulate our senses, but also challenge us intellectually.

6. The More We Know, the More We Can Say

Whether we design interfaces that empower or entertain, we are attempting to create screens that convey information to the user. Visual communication, whether employed in scientific visualization or in art, is often more successful when knowledge of human perception is applied. Developing an understanding of the structure and function of an image will enhance the student's ability to communicate the essence of a concept effectively. One of the strengths of computer graphics is its ability to render obscure and abstracted data. It is able to do so only through detailed analysis of the data that makes up the image. Knowledge is power. As stated in the classic computer science proverb, *garbage in – garbage out*, the quality of the input heavily influences the quality of the output. Students with a deeper and broader base of knowledge are able to produce more sophisticated and engaging interactive computer graphic products.

7. Communicating Ideas

In the Computer Art curriculum at Bowling Green State University students were given a JavaScript assignment to develop WWW pages that investigated the concept of time as it relates to human perception (see Figure 1). The idea was discussed as a class, thus generating initial approaches to the subject. Sub-topics were identified and students selected which theme they wanted to research further (see Figure 2). Students were given time to search the Internet, go to the library, find images, and think about a specific approach they wanted to take with the project. The following

week, the students met with a small group of other students that selected a similar theme and each student described the specific idea they wanted to convey visually and interactively in their JavaScript project. Often, the topic involved abstract content such as Mat Brandeberry's JavaScript project that explored the idea of duplicity, doldrums, and decisions (see Figure 3). Rudolph Arnheim in "Art and Visual Perception" states that "The relationship between intellectual knowledge and visual representation is frequently misunderstood. Some theorists talk as though an abstract concept could be directly rendered in a picture; others deny that theoretical knowledge can do anything but disturb a pictorial conception" [4]. Students grappled with the idea of visually communicating these abstract ideas within an interactive environment. They also considered how interaction could effectively enhance the concept they were trying to convey. The technical aspect of how to develop an interactive exploration of their idea using JavaScript was not highlighted until the research was well underway and the idea was solidified.

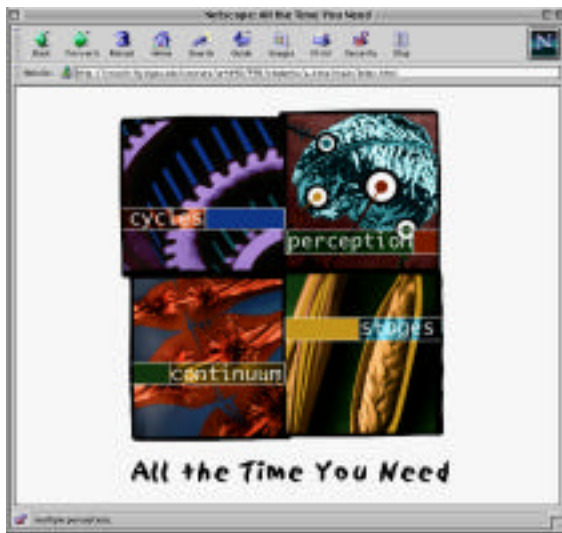


Figure 1. This is the start of the JavaScript Project.

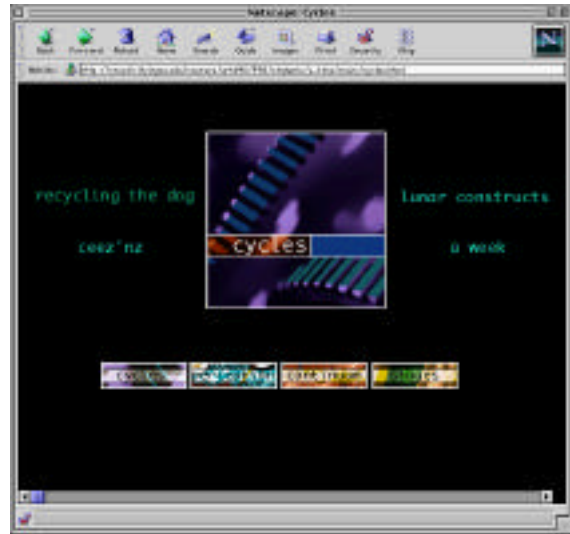


Figure 2. The topic was subdivided into themes.

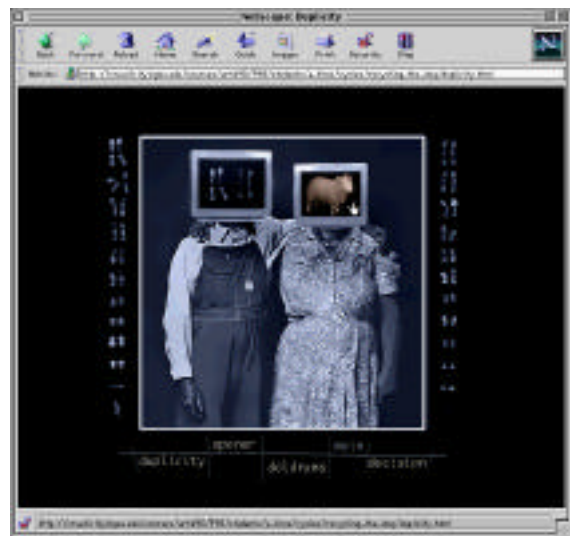


Figure 3. This approach explored the concept of duplicity, doldrums, and decisions.

8. Interface Design - Human Factors

As the students moved from idea to digital image production to interface development, issues related to human factors and effective visual layout arose. According to Brenda Laurel, "The working definition the interface has settled down to a relatively simple one - how humans and computers interact - but it avoids the central issue of what this all means in terms of reality and representation" [5]. Students needed to decide whether an exploratory or intuitive interface would be more effective in communicating their idea. They also discussed how the experience they were providing for the viewer translated into meaning. If a student decided to explore the concept of time, technology, and

intimidation, an interface designed to confuse and belittle the user would communicate more than any collection of images. Yet, if the student wished to empower the user, an interface that translated technology into human terms would result in a more relevant experience. The design of the interaction, interface, and visual communication should be seamlessly interwoven into the expression of the idea. Interdisciplinary educational experiences prepare students to make meaningful connections between disparate fields of study.

9. Interaction Production Education, or Technology is Never Enough

One of the obstacles that prevent the development of an integrated interactive multimedia design curriculum is that it does not fit nicely into any currently defined field. In an essay entitled, "The Design of Interaction", Terry Winograd states, "Although computers are at the center of interaction design, it is not a subfield of computer science... As well as being distinct from engineering, interaction design does not fit into any of the existing design fields. If software were something that the computer user just looked at, rather than operated, traditional visual design would be at the center of software design. If spaces were actually physical, rather than virtual, then traditional product and architectural design would suffice"[6]. Often we see academic programs such as Computer Art, Computer Science, Information Technology, and Public Communication offering classes in interactive multimedia, each with its own unique approach to the subject. Since interface and interaction design relies heavily on technical proficiency, artistic talent, and an understanding of human behavior, all aspects of the field are rarely explored in any depth in any single discipline. Nicholas Negroponte believes, that "...we are moving away from a hard-line mode of teaching, which has catered primarily to compulsive serialist children, toward one that is more porous and draws no clear lines between art and science or right brain and left" [7]. At the university level, this method of teaching is slow in developing. Occasionally computer art professors teach basic programming and the mathematical terminology necessary to understand 3D modeling, but it is rare to find courses in computer science or information technology that also focus on the principles of art and design. It is even more rare to find interactive multimedia courses that address issues of human perception, behavioral science, global studies, and popular culture.

10. Technical Proficiency

Within the Computer Art classroom, the students learning JavaScript to convey their ideas in relationship to time were forced to rely on a small subset of the programming language with very little knowledge of the concept of object-oriented programming. Because time was devoted to critique of the artwork and interface design as well as discussion, very little time was left to investigate the language. Without prerequisite knowledge of programming languages, the art students were stumped by concepts as fundamental as variables. Ten different JavaScript examples were presented and thoroughly discussed. These examples were made available to the students via the Internet. Needless to say, very few student projects code that significantly differed from the example code distributed. Did they understand the code? Yes, to a very limited extent. Did they understand the potential of the language and how to manipulate it to solve unique problems? No. As a beginning level assignment, the project was successful in revealing the artistic potential using computer graphics, interface design, interaction, and JavaScript, but to fully understand the medium, more programming experiences would be necessary. The students also were not given the opportunity to study the impact their work had on the global viewer nor how it fit into popular culture.

11. A New Generation

After completing the project, the three student volunteers developed the interface that linked the individual projects together under one unified structure. The project was published on the WWW. Although this was a student project, it was available for the world to peruse. For many students, this was the first time they had published a work of art. It is important to note that the average university student has a very different relationship to technology than their professors. Most of the students in the Computer Art course were between the age of 19 and 21. On the average, they were 5 years old when the microcomputer became widely available. Most had grown up with computers in their home. They do not remember a time when video games were not popular. Fax machines, photocopiers, and answering machines have always existed according to their recollection. They were in middle school when the World Wide Web hit the mainstream. Email, chat rooms, and URLs are as much a part of their lives as TV was a part of ours. The immediacy of real-time interaction with remote parties via the Internet is not new to this generation; it is an integral part of their life. Yet, communication that transcends cultural boundaries still has its novel appeal. As educators

we need to be aware that as consumers of information on the Internet, our students are often quite adept. Yet as producers of information, they are often very inexperienced.

12. Global Communication

Although publishing interactive information that reaches a global audience is exciting for the student, the lack of physicality, and the cross-cultural implications should be addressed in the curriculum. Creating interactive work that accepts or monitors responses from global visitors enables the student to begin to understand how the work reads in a cross-cultural virtual world. Oftentimes a student's vision of the world is based on their personal experiences. Lectures, books, and TV may present alternative views, but reality still exists within individual empiricism. Using the Internet to initiate communication and solicit responses to student interactive multimedia works, enable the student to begin to understand the implications and interpretations of their work. The World Wide Web enables the student to build pages and publish their work. By also including feedback forms on the page, the work not only becomes public but also is subject to global critique. A narrow, uninformed view of a topic or a design that does not compliment the content will quickly have its weaknesses revealed by the global community. It is often the case that critiques come from many different cultures and from people with various professional interests. Within a single discipline based course, this global feedback enables the student to integrate ideas that transcend geographic and discipline-based boundaries.

13. New Solutions

Within the academic community we are searching for a home for Internet-based interactive multimedia within existing departments and schools. Yet the very nature of the medium is cross-disciplinary. To be successful, an educational experience in interactive multimedia should span across academic boundaries and possibly include sub-topics within computer science, computer graphics or computer art, traditional art, information science, social science, psychology, business, and philosophy. Students also need to be more aware of the global economy and cultural similarities and differences. Currently, in most universities, students must select a major in one of the above areas and hope to take courses in the other areas. Contemporary solutions to providing a well-rounded experience in interactive multimedia have often fallen into four categories: new programs, experimental courses, advising, and prerequisite courses. Academic institutions are often reluctant to establish new programs therefore faculty initiatives

are essential to the educational success of students focusing in this area. Creative solutions come from the realization that new media has changed the way we, as a culture, process information. Broadening our own experiences to encompass new multi-disciplinary approaches to our own understanding of the issues will inevitably translate into attainable solutions.

14. The Team Teaching Dilemma

One of the answers to the problem is to provide team-taught cross-disciplinary courses that integrate design, programming, and human factors as well as information from other supporting fields. For numerous reasons, this solution is often unattainable. Although many universities pay lip service to the benefits of interdiscipline studies and team-teaching, faculty are often discouraged by the lack of support in terms of course load reductions, salary compensation, and access to information and facilities. Faculty eager to cross boundaries often find themselves without the support of the university and unable to initiate new course development without compensation and approval. Supportive departments often find that budgetary structures are not flexible enough to compensate two professors fully when together they teach only one course. Also, it is common that team taught courses require more preparation because of the ongoing negotiation involved between professors. Despite these obstacles, faculty occasionally sacrifice summers and adequate pay to develop experimental courses and integrate new cross-disciplinary content into their interactive multimedia courses. These heroic efforts have not gone unnoticed. The introduction of multi-disciplinary study, complimented by multiple viewpoints, increases the students understanding of the medium in which they work.

15. New Approaches

Although team teaching enhances the educational experience of both the student and the faculty, the discipline-based boundaries within the university still prevail. Art and Computer Science departments operate independent of one another and proudly educate students by delivering the content they know best. Courses that do not fit the idealistic vision of what art or computer science should be are often short lived or never approved. Many universities have developed departments or programs that attempt to merge the various interests involved in communication technology education. With titles such as Multimedia Technology, Information Science Technology, and Visual Communication Technology one would think that an aspiring interactive multimedia producer would be able to

obtain a well rounded education in the field. This is sometimes true, yet not always. These new disciplines also tend to become exclusive rather than inclusive and course content follows a prescribed direction that may or may not include the multifaceted field of interactive multimedia development. Imagine the possibility of developing a department that employed art and design faculty, computer scientists, popular culture researchers, architects, social science faculty and experts from other supporting fields. The goal would be to make connections between the various disciplines and tie it all together using computer graphics and interactive multimedia development as the catalyst. This cross-disciplinary approach to education would pose challenges as the various fields seek out common ground and merge interests. The rewards would reveal themselves not only in the educational outcomes of the students but also in the intellectual growth of the faculty as they broaden their experiences and modify their single discipline approach to education. In an actively evolving curriculum such as this, it is likely that the students would not only be the recipient of ideas but also engage in the process of creating the connections between disciplines.

16. Conclusion

As more and more students enter academic institutions with the desire to work with interactive multimedia, the demand for a cross-disciplinary approach will increase. The preparation necessary to enter the field will necessitate new disciplines or possibly a destruction of the academic walls that prevent students from focusing in a multidisciplinary direction. There will be more demand for a team teaching approach and a broad-based curriculum. Students have been, and will continue to challenge existing degree requirements to accommodate their desire to integrate computer science, art and other supporting areas. The development of a diverse educational approach promises to reveal exciting new opportunities not only for students but also for faculty and the institutions themselves. The knowledge and experience that comes from multiple viewpoints and various fields of study will challenge the students to become independent and critical thinkers. Students involved in a fully integrated cross-disciplinary interactive multimedia design educational experience will gain the understanding and power to take interactive multimedia to new exciting directions. This new generation of communication engineers and artists will inevitably alter the course of this important medium thus forcing academic institutions to again re-assess and refine their approach to providing interactive multimedia education.

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