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Finding the Research Possibilities of Computer Technologies in Art Education

Hyunil Jung

Korea National University of Education
hijung0524@knue.ac.kr

Abstract

The purpose of this study is to try finding the research possibilities of computer technology in art education and understand why computer technology has such a great impact on our contemporary education. The methodology of this study is based on the analysis of literature review. I have tried to find the importance articles in the journals of art education such as Studies in Art Education and Art Education published from the National Art Education Association, one of the most well-known organizations in the field of art education. To draw the purpose of this study, I found articles and categorized the information using key words such as aesthetic, feminist, gender issues, and interactivity. After analyzing, I have discussed about the research possibilities and important issues of computer technology in art education and then categorized the information found in each article into four different subheadings: 1) the visual effects of computer graphics in art education, 2) gender issues based on the computer technology, 3) interactive multimedia and social interactions among students, 4) research possibilities with computer technologies in art education. The findings are as follow. Firstly, there were many research possibilities of computer technologies in art education such as ways of criticizing the contemporary art world. Secondly, I found that computer technology has a great impact on art education because students are more eager to engage with computer technologies-based media activities and very familiar with new media either at home and school. Therefore, we, as educators, must address how the student will be systematically engaged with computer technologies in their educational environment and should determine what knowledge and skills prospective teachers bring to our teacher education programs and how and where they acquired this knowledge.

Keywords: Art education, Computer technology, Educational environments, Feminist aesthetic, gender issues, interactive multimedia, visual effects.

1. Introduction

In the past few years, the development of computer technology, the popularity of the Internet, and advanced interactive multimedia has changed almost all aspects of our lives. Apart from social and cultural changes, education has been affected by the increasing amounts of computer usage in the classrooms. In art education especially, computers have become the newest tools in the field of visual effects and are creating new educational environments requiring multiple curriculums. The prevalence of computer technology becomes part of the children's life. In education, computer technology, one of the visual effects, has become one of the most effective resources for teaching and learning. As a result of the increased emergence of computer

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Corresponding Author: hijung0524@knue.ac.kr

Tel: +82-43-230-3461, Fax: +82-43-233-1082

Dept. of Art Education, Korea National University of Education, Korea

technologies in many schools, many art educators are beginning to consider the significant value of technology in art education. The educators have found it necessary to integrate new technology into art because technology is already significantly affecting our education and will become an even more powerful teaching and learning tool in our personal and professional lives in the near future (Buffington, 2008; Freedman, 1997).

In my view, although many educators, students, and artists as researchers on the impact of computer technologies had written many theses or books, most of them may neglect to synthesize some important issues such as aesthetic theory, gender issue, and interactivity, one of the major features of multimedia applications. There, of course, are many articles and books related to each important issue, but the most of articles were not synthesized to each other. In this paper, I will highlight feminist aesthetic perspective as a central axis to connect the important issues in art education related to computer technology. The purpose of this paper, eventually, is to try finding the research possibilities of computer technology in art education related study literature and understand why computer technology has such a great impact on our contemporary education. To find the research possibilities and understand the importance of computer technology in art education, I have analyzed articles and then categorized the information found in each article into four different subheadings: 1) visual effects of computer graphics in art education, 2) gender issues based on the computer technology, 3) interactive multimedia and social interactions among students, 4) research possibilities with computer technologies in art education.

2. Review of the Literatures

I would like to review articles related art education and computer technologies to find an important issues such as a feminist aesthetic theory, gender issues, and interactivity. Through this review, I would like to give readers and art educators an idea of research possibilities within the circumstances of new computer technologies in education. The first article that I reviewed is "*The Application of Feminist Aesthetic Theory to Computer-Mediated Art*" researched by Dawn Mercedes in 2015. This article addressed some of the crucial issues and concerns about the advent of digital media. Specially, Mercedes focuses on feminist aesthetic theory as a framework for reevaluating aesthetic concepts and aesthetic criteria. In this paper, Mercedes also argues for the implication of a feminist aesthetic paradigm and present a new aesthetic paradigm for computer-mediated art. Mercedes believes that feminist aesthetic theory is the most appropriate philosophical and practical position to assume relative to art in general, and specifically to computer-mediated art because feminist aesthetic theory can play a crucial role in the formulation of a new aesthetic paradigm for computer-mediated art. Mercedes, therefore, argues that aesthetic issues related to computer-mediated art will need to be addressed, as computers become an integral part of the production process in the art classroom. In this article, Mercedes mentions gender issues as an important and influential consideration in how artists and viewers perceive, understand, and think about computer-mediated art.

In the second article titled as "*Computer Graphics, Artistic Production, and Social Processes*", published by Kerry Freedman and Anju Relan. This study consulted a case study of a class of university students who learned to use paint system software to investigate the process of computer graphics production in the class. The participants of this case study are 11 university students, eight of the 11 students were seniors, and 3 were juniors, nine females and two males, with ages ranging from 22 to 37 years, as they learned to use paint system software in an undergraduate computer graphics course. The study continued for the 10 weeks of the course. As a part of method, the researchers included structured interviews, journal/sketchbooks, questionnaires, unstructured observations, and photographic and tape-recorded records. At the beginning of the study, a multiple-choice and short-answer survey/questionnaire as a pilot study was used to obtain demographic and attitudinal information from the participants. According to the authors, the results indicated that: (a) there was a general shift during the learning process from a focus on production to ideation in the students' responses about their image development and learning processes; (b) students' images developed interactively in both production and ideation, indicating that the students controlled the computer and the computer influenced changes in their images; (c) social interactions among the students were important to their computer graphic

development and to their learning about aesthetic possibilities and decision-making (Freedman and Relan, 1992).

The third article, “*Gender and Technology in Hong Kong: A Study of Pupils' Attitudes toward Technology*”, by Kenneth Volk and Yip Wai Ming, researched nearly 3,500 Hong Kong secondary school students to examine whether there are differences in Hong Kong students' attitudes toward technology. Volk and Ming divided this study's instrument into three parts to collect data. The first section requested the student to provide a short description of what technology is. The second section contained questions seeking information required for demographic data analysis. Finally, the third section contained statements to assess students' attitudes toward technology. From a total of 3,481 usable surveys returned, out of 3,500 junior secondary school students, Volk and Ming concluded that the Hong Kong students' attitudes toward technology study of junior secondary students provides ample evidence that significant attitudinal differences exist between girls and boys. For example, “for the question about having taken Design & Technology or any technical subject in school, only 10.4 per cent of the girls responded in the affirmative, compared with 75.5 per cent of the boys” (Volk and Ming, 1999, p. 62). From the given data and students' gender analyzed, they conclude that boys had more positive attitudes than girls in almost all categories.

Finally, I reviewed the article, “*Keeping up with our students: The evolution of technology and standards in art education*” by Ryan Patton and Melanie Buffington address the standards of computer technologies in the visual art education and investigate how art education standards approach computer media as an educational and artmaking tool. In this article, Patton and Buffington suggests to examine how computer technologies might enhance our lives in thoughtful, positive and practical ways and also try to address how teacher education research might be broadened and strengthened by studying the use of technology as a research tool. To do so, Patton and Buffington raises two important questions: 1) how university art teacher preparation programs can develop their curriculums to better relate to well uses of computer technologies? (2) how can technology assist research into the national issues affecting art teacher education? This study also discusses the potential of computer technologies as instrument and research tools within art education. In other words, the resulting technology can be used as a means by which future teachers can be better trained and research conducted. Even though Patton and Buffington do not believe that the use of technology within art education should not be viewed as a panacea, the authors consider new technologies might enhance teachers' professional lives as well as the lives of their students.

3. Research Methodology

The methodology of this study is based on the analysis of literature review. I have tried to find the importance articles in the journals of art education such as *Studies in Art Education* and *Art Education* published from the National Art Education Association, one of the most well-known organizations in the field of art education. To find the research possibilities of computer technology in art education and understand why computer technology has such a great impact on the contemporary art education, I found articles and categorized the information using key words such as aesthetic, feminist, gender issues, and interactivity. After analyzing, I have discussed about the research possibilities and important issues of computer technology in art education.

4. Results: Four Important Issues in Art Education

4.1 Visual Effects of Computer Graphics in Art Education

To better understand how computer and software technologies might impact education and art education, it will be useful to know a history of computer graphics. Looking back through the history of computer graphics, the advent of computer graphics was driven by national defense interests in the U.S.A. Several early developments were supported by the federal government, through agencies like NASA, and the military, which sought to visualize and animate images of outer space. However, “artists soon realized the possibilities of

computer graphics for the purposes of art making and began to use it to create increasingly sophisticated images” (Freedman, 1997, p. 9). In addition to artists, teachers also are finding new ways for using computers in the art classroom as instructional tools, and discovering new ways of creating artistic works using computer graphics.

As I mentioned above, computer technologies have been so much important to in both artists and educators as well as viewers in art education. We, as educators, may already know that computers might be the enticing door that delivers students into a world of aesthetic possibility. There are, however, some questions: 1) how to criticize digitalized art works in the contemporary art world: 2) what kind of perspective do we need to rethink and reevaluate new arts. In the Mercedes’ article, the author provides us with a feminist aesthetic theory as a framework for reevaluating aesthetic concepts and criteria with regard to new technologies. Mercedes’ feministic perspective, especially, helped us to understand Freedman and Relan’s article related to computer-mediated art and opened our eyes to see potential for the future research. With feminist perspective, Mercedes addresses some of the crucial esthetic theory as framework for rethinking and reevaluating esthetic criteria. Mercedes also argues that modernist esthetic doctrine is inadequate for new arts, especially with regard to computer-mediated work. For instance, in the Freedman and Relan’s article, they asked to students following questions:

.....who the artist was or who “owned” the images. One student asked: are the computer images “truly me? I have a feeling that these works of art not only mine...the computer...is helping me work. The computer is doing a lot of performing which I am sharing with it.” Another student stated, “occasionally, you get a result that was unexpected, so are you responsible for the flood of ideas that you get, or computer?” When such questions and comments were made, the students were not simply focusing upon the collaborative relationship they had with the human software developers. Rather, they stated their questions and comments in ways that represented the machine as sharing in production and ideation. (Freedman and Relan, 1992, pp.98-109)

Upon the above questions and students’ responses, how can we, as art educators, understand students’ pieces of art? And how can we teach students digitalized works of art? I think the feminist esthetic theory is the most appropriate philosophical and practical position to assume relative to computer-mediated art. Not like Mercedes and Freedman and Relan, Patton and Buffington focused more on art teacher education and future research based on the use of technology. Volk and Ming report students’ attitudes toward new technologies including gender issues. Even though Patton and Buffington did not much mention the effects of computer graphics in art education, Patton and Buffington explains an inevitability of the computer technology into art teacher education. In the Volk and Ming’s article, they mainly discuss about gender issues.

4.2 Gender Issues based on the Computer Technology

From my perspective, gender issue is one of the most important research interests in K-12 technology classes across the world. According to Volk and Ming, Jan Raat and Marc de Vries in the Netherlands have begun this study of students’ attitudes toward technology in the middle of 1980. After their studies, a number of researchers have initiated similar studies in the United States, Europe, North America, and Africa, but not in Hong Kong and Asian region. With a lack of studies of gender issue in Hong Kong, Volk and Ming researched students’ attitudes toward technology with nearly 3,500 junior secondary school students.

Even though the authors well explored and analyzed the differences between girls and boys in six items which are: 1) interest in technology: 2) technology as an activity for both boys and girls: 3) perception of the difficulty of technology: 4) consequences of technology: 5) technology in the school curriculum: 6) ideas about pursuing a career, Volk and Ming neglected to address why the gender issues are important in education and art education related to technology courses and what the historical background of gender differences is. Fortunately, Mercedes provides the importance of gender issues, not defined by Volk and Ming through feminist esthetic perspective. The author explains that gender issues are very important when reconstructing and redefining aesthetic value because knowing and understanding that issue would help how artists and art students produce computer-mediated works, and how viewers respond to computer-mediated works of art.

About the gender differences, Mercedes explains two reasons through feminists’ perspective why the gender

differences might be raised in the technology education. According to the author, one reason is a system based on Patriarchy that takes a hierarchal form designed to exclude women and brings women are inferior to men. According to Mercedes(1998, p. 75), the other reason is a history of computer technology that is a following passage: “The development of computer-based art flows from the initial computer research endowed by the U.S military. Historically, men build computers for men to use in warfare and, as a result, the computer reflects a male view of reality that privileges masculine ways of knowing.”

4.3 Interactive Multimedia and Social Interactions

In Mercedes’ article, the author explains the true meaning of interactivity that is ultimately conversation between artists and students who work with new technologies and computer-mediated art works. In other words, Mercedes defines the meaning of interactivity that occurs between human beings and computer-mediated art works, so called the computer itself, through feminist aesthetic perspective. Many researchers have noted that students are motivated by the process of creating their own interactive multimedia application using multimedia authoring software (Jung, 2010; Radclyffe-Thomas, 2008; Stankiewicz, 2004). For instance, a research has shown that, when an educational technology properly is integrated into teaching at the point of instruction, multimedia applications can be a highly effective teaching and learning tool(Kim, 2018). Studies indicate that students retain approximately 20 percent of what they see; 30 percent of what they hear; and 50 percent of what they see and hear. When a student has a chance to hear, see, and interact with a learning environment, he or she can retain as much as 80 percent of the information (Shelly, Cashman, and Gunter, 2002). Why is the interactive multimedia a highly effective teaching and learning tool in our education? According to Mercedes and from my point of view, an important reason for students’ increased retention is that they become actively involved in the learning process instead of passive recipients of information and that teachers can provide students with a variety of learning styles in the classroom.

In many articles, the scholars raised some important questions related to interactive multimedia such as videodiscs, CD-ROMs, DVD-ROMs, and the Internet. One of the questions is that what kinds of collaborative projects using technology can pre-service teachers and teacher educators work together on? The other question is that what kinds of learning take place during these interactive multimedia classes? The scholars, however, mentioned the effectiveness of interactivity in education and raised above questions, however they did not much dealt with the interactive multimedia in their articles. With a feminist point of view, Mercedes tries to broaden the aesthetic realm of interactive multimedia that “allows artists to extend and expand aesthetic boundaries in a challenge to traditional aesthetic some of the hierarchies and dualisms of modernist aesthetic tradition that value one aesthetic over another, one trait over another” (Mercedes, 1998, P. 73). Mercedes also brings two crucial ways in which how interactivity functions aesthetically: (1) It helps to redefine our concept of "artist" by blurring traditional aesthetic boundaries and by repositioning the artist within the context of the community, and, (2) interactivity gives the viewer a way to actively engage the artwork in a more personal manner and allows for the self-directed construction of meaning relative and pertinent to the viewer's own lived experience (Mercedes, 1998, p. 73). In my view, this passage would help us to understand the questions, raised by Freedman and Relan, concerning “who the artist was or who owned the images” (Freedman and Relan, 1992). For instance, according to the authors, when the students interacted with computer, they accidentally and unexpectedly discover combinations of functions that resulted in unpredicted images. While Mercedes mainly discusses about the interactivity between human beings, artists or students, and computer-mediated art, Freedman and Relan focus more on social interactions among students, during interacting with computer graphic software programs. The authors say that students who are taking computer graphic classes felt comfortable doing what other students suggested because they could always go back to their original images if they did not like the results of the suggestions. As a result of the benefits of computer software program, many students, at some time during the study, saw on another student's screen things they have not done before(Jung, 2010). They asked how to do it and then used it in their own work (Freedman & Relan, 1992). Freedman and Relan argue that promoting group interaction when using computers in art education will support to aid students’ learning. While Freedman and Relan, Patton and Buffington, and Mercedes have an optimistic point of views to computer technologies in education, there are some pessimistic views which focus on the social aspects of those computer technologies, including a concern about students becoming isolated

and antisocial as a result of sitting in front of a screen. However, classroom research has demonstrated that students of various ages actually work best in groups when using computers in school (Rysavy & Sales, 1991). Art educators, therefore, need to take on the task of teaching not only by traditional methods but also by utilizing new technologies.

4.4 Research Possibilities of Computer Technology in Art Education

Computer technology in education and art education itself is a relatively new area of research and many scholars would suggest there is a need to develop a coherent framework within which an analysis of student learning of technology concepts and processes. Much of the literature related to new technologies in art education has rightly and separately emphasized gender issues, curriculum issues, implementation and teacher training. It is now time to pull all these together in order to place a greater emphasis on researching students' learning in technology education, including ways in which this learning can be enhanced (Jang, Nam, and Jung, 2016). With the elimination of old or masculine aesthetic boundaries, Mercedes recommended for three research questions that need to be addressed through feminist aesthetic perspective such as: (a) what type of curricula would best facilitate the implementation of new aesthetic paradigm? (b) how might computer-mediated works of art be discussed and critiqued in class? (c) how do we create an equitable classroom environment for our female students considering the gendered nature of computer technologies? In Mercedes' recommendations for future research, those are all interesting and important issues, however, I am specifically interested in the last question because an appropriate classroom environment is crucial for the development of student learning of technological concepts and processes. As I mentioned the effects of interactive multimedia before, learning is enhanced when students are involved in authentic activities, not passively, and where classroom approaches reflect technological practice. In my view, these potential research interests raised by Mercedes would help us to rethink, reevaluate, and restructure the way in which students learn and teachers teach technology-based art classes.

Even though many art educators are not agree with that the use of computer technology within education and art education should be viewed as a panacea, we need to examine how new technology might enhance our students' lives in thoughtful, positive and practical ways. We also should raise an importance of the use of technology as a research tool with the following questions: (1) how can technology enhance teaching and research within the preservice classroom? (2) how can technology assist research into the national issues affecting art teacher education? In the area and age of new technology, we should determine what knowledge and skills prospective teachers bring to our teacher education programs and how and where they acquired this knowledge.

5. Conclusion

We live in the computer age, and vital art necessarily reflects and interacts with dominant contemporary forces. While continuing to embrace traditional media, art teachers should carefully consider the merits of exploring the educational possibilities of the computer. If we use computer technologies such as software programs and communications and information technologies in education properly, these technologies can benefit education significantly. In addition, the proper use of visual effects could encourage children's interest and elevate children's learning. In conclusion, there is no end to the integration of computer technologies within education. Therefore, we, as current and future educators, must address how the student will be systematically engaged with computer technologies in their educational environment. Although I do not believe new computer technologies will be a solution that can replace the traditional ways to teach subject matter and solve all of our current and future educational problems, it is important to acknowledge the importance of new technologies in today's education system because many teachers need to use more technology to enhance and support teaching and allow children to use technology as a vehicle to learn knowledge and skills.

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