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A NARRATIVE INQUIRY INTO THE EXPERIENCES OF THREE WOMEN IN THE 3D ANIMATION INDUSTRY: USING SELF-DETERMINATION THEORY TO UNDERSTAND SOCIO-CULTURAL INFLUENCES ON CONCEPTS OF SUCCESS AND MOTIVATION

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ABSTRACT

Concerned with the underrepresentation of women in the field of animation, I used a narrative inquiry approach in this qualitative study of three women to understand what motivated and/or influenced their pursuit of careers in the animation industry. Through the interpretative lens of Self-determination Theory (SDT), I analyzed in-depth multiple interviews conducted over a five-year period with three women in the midst of successful careers in the animation industry. They discussed their educational experiences and careers in the animation industry. Throughout the journey of this narrative inquiry, my own deep-seated beliefs and values were challenged regarding conditions in the animation industry for women.

The narratives from these three women about what motivated them to pursue and achieve successful careers in the animation industry included influences from early role models. All had attended schools that had flexible/experimental programs, which built their capacity for autonomy and competence. However, each had unique reasons for being drawn to animation careers, and how they learned animation. All three felt they had support from their spouse or their peers. They also perceived that they were trusted and needed within their profession.

It is my hope that this study will encourage further research by disabilities studies scholars, critical race theorists, and other researchers to provide different perspectives from their examinations of the socio-cultural contexts in the animation industry that have led to underrepresentation of women, people of color, and people experiencing disabilities. Art educators also need to develop interdisciplinary animation curricula that

facilitate autonomy, competence, and relatedness to not only generate individual motivation but also to model a supportive learning environment for transfer into the animation industry's work environments. The most significant implication is the need to improve working conditions and environments in the animation industry in order to support those who work there and enable them to have families and take medical leaves without jeopardizing their careers. As a male Taiwanese professor of animation with approximately one year of experience in the animation industry in the United States working at Pixar, conducting this research changed my own awareness of discriminatory practices toward women in the animation. These perspectives and related discussions conclude the study.

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PROLOGUE

Why Did I Do This Research?

Intrinsic motivation is integral to a study of three women with careers in the male-dominated 3D animation industry; yet, as a male animator conducting research on women animators, I had not examined my intrinsic motivations.

On November 18, 2009, I scheduled a presentation at a Gender and Technology Writing Group monthly meeting to share my current research with a diverse audience of professors and graduate students from art education, women's studies, and information science and technology. After my 10-minute presentation, I started a question-and-answer session. The audience's questions and concerns focused primarily on my theoretical framework and research methodology. I tried to answer their questions. Then, a seasoned scholar from the College of Information Science and Technology asked, "Why do you do this research?" I hesitated for a moment and could not answer the question right away. Then, I took a deep breath and tried to answer the question. I cannot fully remember my response but many attending the presentation remarked that my journey to an awareness of gender discrimination in the 3D animation industry should be included in the study. Therefore, I introduce this narrative inquiry into the journey of three women in the 3D animation industry with my own narrative inquiry on what compelled me, a Taiwanese man involved in the 3D animation industry, to engage in this research.

An Awareness of Personal Narrative

"Why am I doing this research?" I asked myself and turned on the audio recorder. "I don't know." I talked to myself. It was scary to me that my instant answer was, "I don't know." I stopped the recorder for a moment, without thinking too much. And then I returned to the question and kept recording. I think the motivation stemmed from my second year in the doctoral Art Education Program at Penn State. I took a course from the Women's Studies Program. I was inspired by the ideas of empowerment, construction of identity, social change, and feminist theory.

Issues of gender imbalance from a feminist perspective caught my attention and led me to focus on women's roles, conditions, and status in the 3D animation industry. I recalled my experiences as an animator in this industry, a graduate student in 3D animation classrooms, and work as a 3D animation teacher. In doing so, I discovered that a part of my life was missing. It was a lack of awareness of the power relationships within gender roles. But how did I come to lack this awareness? I had to ask myself many questions. Is it because my Asian (Chinese/Taiwanese) cultural heritage has taught me to be insensitive to issues of gender imbalance? Why was this not part of my education? Were these issues intentionally or unintentionally ignored by the educational system that was controlled by a particular dominant group in the society I lived? Or, is it because I, as a man, am within a privileged/benefit/dominant group in a patriarchal society, thus blinded from seeing gender imbalance in everyday life? So many questions came, one right after the other. When listening to my tape-recorded answers, I realized that I had to reflect upon questions and then find answers through this exploratory investigation. This

study was one way to answer these questions, determine why the 3D animation industry is built on patriarchal values, and provide insights that may increase public attention of this issue. It was a challenge for me as an Asian male researcher to understand the life experiences of the three women animators who participated in this study by sharing their experiences in the 3D animation industry in the United States.

This study is a political act as well as a practice of empowerment. Doing this research allowed me to challenge my own understandings and assumptions of motivation, power relationships, and identity. How could I possibly use an Asian man's perspective to create a narrative that could properly represent the three women animators who shared their experiences in the 3D animation industry? Through a narrative inquiry process, I hoped to be able to provide insights into three women animators' life experiences as well as my own changing perspectives that, hopefully, can evoke others' self-awareness of identity. My desire was to empower the women animators who participated in this study and those involved in the 3D animation industry.

Not only did this study seek to discover how the three women animators motivated themselves to pursue successful careers in the male-dominated 3D animation industry, by investigating their life experiences; it also attempted to uncover my deep-seated beliefs and values regarding the 3D animation industry and education. How has one's gender, as one part of our socio-cultural education, provided opportunities or challenged the 3D animation industry? Second, using findings from this study, 3D animation educators can create a gender-friendly learning environment that allows all students to understand differences in gendered experiences and support each other during the learning process.

This Is Where the Reflective Story Began

When I was in a master's degree program in 3D animation in the United States in 1996, I only had one or two women classmates in the computer lab. Because of the limited number of computers and time slots available in the computer labs, students usually had to reserve time slots to work on their 3D animation projects late at night. It was very common for people to eat, play computer games, joke with each other, run around, and even sleep in the computer lab throughout the night. During my graduate work at the computer lab, I never noticed gender issues because I did not see or hear anything directly related to them. Most of the male students tended to help women students when they had animation questions. However, I was not sensitive enough to see that the jokes told and comics drawn on the whiteboard might hold negative connotations toward women. This lack of awareness on my part may have been due to the time and stress in making 3D animation—we did not have sufficiently clear minds to see that the working conditions that seemed 'normal' in our computer lab may instead be redolent with overtones of sexual harassment.

Chapter 1

INTRODUCTION

Statement of the Problem

Why So Few Women Animators?

In observing attendees at the SIGGRAPH[1] conference since 2004, I have seen an increase in the number of women. Similarly, I also have noticed that more women have been enrolled in my 3D animation courses since 2000. However, as a formal technical director at Pixar Animation Studios in 1997, and as a frequent visitor to major studios such as Disney, Pixar, DreamWorks/PDI, and Rhythm & Hues since 2000, I have noticed that the number of women in these animation studios has not significantly increased in the past decade (2000–2010). These experiences raise the question: Why isn't the number of women animators in the 3D animation industry increasing in the same manner as the number in animation courses?

Nochlin's (1971) question posed in the 1970s, *Why have there been no great women artists?,* has been tackled by many (Chadwick, 1990; Chicago, 2007; Lippard, 1995; Parker & Pollock, 1981) with recognition that the definition of art and artists, opportunities for women, and a gender-biased art history were the predominant reasons. Twenty-five years later, Simensky (1996) in her article, "Women in the animation industry—Some thoughts," wrote that, "In the animation industry, a professional

[1] SIGGRAPH (Special Interest Group on Computer Graphics): This is the world's largest community for the digital media and interactive technologies. The conference attendees for the annual SIGGRAPH conference total about 15,000–25,000 people from all over the world.

association called Women in Animation formed in 1993, men in the business joked, 'Where's the Men in Animation group?,' to which the women replied, that's what we call 'The Animation Industry'" (para. 1). This statement illustrated the situation that women have encountered in the animation industry, which parallels what women artists observed thirty-five years earlier.

While women's roles and conditions in art, science, and education have gradually improved in the 21st century, the factors that have influenced the low numbers of women engaging in the production of 3D animation in the industry are still obscure. Women are still underrepresented in production roles in the 3D animation industry today. Thus, the purpose of this study was to gain insights into the motivations, and educational and career journeys of three women in the 3D animation industry.

Purpose of the Study

Through the stories of three experienced female animators in the 3D animation industry, I explored their motivation to pursue animation careers, difficulties and advantages they encountered, and their conceptions of success. Their stories provided insights into gender issues in the male-dominated 3D animation industry. In this narrative study, I used Self-determination Theory (SDT) to understand these women animators' concepts of success and perspectives on motivational moments during (a) their education experiences in pursuit of a career in 3D animation, and (b) their careers in the 3D animation industry. Ultimately, the interpretative lens of Self-determination Theory and a

narrative inquiry methodology revealed important gender-related information about the male-dominated 3D animation industry.

Research Questions

In order to contextually understand how the three women animators were motivated to pursue professional careers in the male-dominated 3D animation industry, I developed the following research questions. These questions focused the analysis in this study.

1. What educational experiences have inspired, encouraged, and/or dissuaded the three female animators in this study to pursue careers in animation?

2. What challenges and/or privileges did the three participants of this study encounter in their animation careers?

3. What were the socio-cultural influences in the 3D animation industry experienced by the three participants of this study that shaped their concepts of self-determination for a successful animation career?

Limitations of the Study

This study had important limitations that are both described here and acknowledged throughout the description of the narrative inquiries on the three women in the 3D animation industry who participated in this study. Below, I discuss concerns about sample size and the use of my perceptions, which are filtered through my experiences as

a male Taiwanese 3D animator, a college 3D animation teacher, and a researcher who has worked both in the 3D animation industry and in academia.

Sample Size

The sample size for this qualitative research project is relatively small. This study involved three woman participants with different levels of expertise and experiences who were working at different studios in the Los Angeles area. Each provided a unique perspective on her life in the 3D animation industry. Although the interview prompts can provide an opportunity for the three women animators to reflectively think about their life experiences and provide unique and deep insights through their stories, their individual experiences should not be generalized to represent those of all women in the 3D animation industry. Even so, what is revealed from these individual stories could provide insights for a large-scale quantitative survey on women's careers in this industry.

Using a purposeful sampling strategy, I selected research participants with more than 10 years or more of work experience in the 3D animation industry. Since computer technologies have changed dramatically in the past decade, their experiences may be very different from those encountered by women today as they pursue careers in the 3D animation industry. To build on this exploratory study, further studies are needed on female students' understanding of the 3D animation industry culture, their 3D animation-related learning experiences in school, and their motivation, or lack of motivation, in pursuing careers in the 3D animation industry.

Socio-cultural Barrier and Opportunities

As a man from Asia, my Taiwanese socio-cultural, political, and economic values and perspectives may render me blind to patriarchal practices and in fact lead me not to view them as problematic. On the other hand, my Taiwanese cultural lens may allow me to see or notice areas that may go unnoticed and/or are taken for granted by those immersed in their own culture. Furthermore, as a Taiwanese male animator who teaches college-level courses in 3D animation in both Taiwan and the United States, conducting research on women in the U.S. animation industry holds challenges relating to building trusting and empathetic relationships between female research participants and me.

While being male may limit female research participants' openness to discussing specific areas of their experience, two of the female animators participating in this research, with whom I had interviews and conversations back and forth through email for about six months, when doing follow-up interviews onsite assumed that I was a female before we met in person. Both interviewees thought that I was a woman because I was conducting research on women animators. When they learned that I was male, both were supportive of the study and willing to talk candidly about their experiences in the 3D animation industry. Their positive attitudes and support were important motivational factors that facilitated my sense of competence and relatedness and encouraged me to go further and complete this study. Therefore, this research study could challenge the cultural values and practices of individuals, and thereby begin to change patriarchal socialization in the education of animators.

Other Limitations

Early on, I mentioned the small number of participants in my study. Rather than study a representative case or a random sample, which are often not the richest in information (Flyvbjerg, 2006), I chose an adopted critical case selection to recruit the three research participants to achieve the greatest possible gathering of information on the animation field. All my research participants were from Hollywood's major studios and were from only one region of the U.S. (i.e., Los Angeles). Although each individual's experience was different, each individual narrative shared some similarities due to immersion in Hollywood culture.

In addition, the research participants' ethnicity, race, socioeconomic situation, and sexual orientation differences or similarities were not the focus of my analysis other than as they revealed intrinsic and extrinsic motivations in their stories about their education, careers, and life experiences as these interwove with their gender as women in an often-patriarchal Hollywood animation industry. I have seen few women in leadership positions at the various animation studios over the past decades; and until 2011 none had directed an animated feature film. The May 25, 2011, *Los Angeles Times* reported that Jennifer Yuh Nelson is the director of an animated feature film, *Kung Fu Panda 2*[2] and thus "the first woman to solely direct an animated feature from a major Hollywood studio" (Sperling, 2011, para. 3). Despite this long-overdue recognition that women can direct major animation feature films, the patriarchy of Hollywood animation culture has been invisible or unmarked for many reasons. One major reason concerns the fact that the

[2] This is a 3D computer-animated film and the sequel to the 2008 film *Kung Fu Panda*, produced by DreamWorks Animation in 2011 in the United States.

animation industry is composed primarily of men immersed within its patriarchal culture, who are thus unaware of the omission of women from leadership positions. Moreover, we are all shaped by the dominant ideology of a particular time and place.

Significance of the Study

Many researchers who have studied women and computer technology in Information Technology (IT) and Computer Science (CS) careers have found that gender equity in educational environments can motivate girls and women toward IT and CS careers (Brunner & Bennett, 1997; Fuller & Meiners, 2005; Klawe, 2002; Margolis & Fisher, 2002; Tapia & Kvasny, 2004; Teague, 2002; Todd, Mardis, & Wyatt, 2005; Trauth, Quesenberry, & Yeo, 2005). However, few studies on women in the field of 3D animation provide insightful suggestions on how to encourage and support girls or women in the pursuit of animation careers (Cooper, 2002; Simensky, 1996). The findings from this study provide insight into three women's experiences from their career stories of their journeys in a male-dominated 3D animation industry. Research that focuses on women specifically provides examples, even role models, for animation teachers to introduce to students. My hope is that the stories presented in this study will motivate female students to study 3D animation. Furthermore, as more women become successful in the animation industry, this will challenge male domination of the 3D animation industry.

Overview of Chapters

In this chapter, I presented an overview of the research and highlighted study questions and significance as these related to the field of 3D animation, and summarized the current research. The next chapter includes a review of the literature on Women in Computing and Animation, Narrative Inquiry, and Self-determination Theory, followed by a description of the study methodology in Chapter 3; data analysis on the three women animators' narratives in Chapter 4; and findings, conclusions, insights, and implications for further research in Chapter 5.

Chapter 2

REVIEW OF THE LITERATURE: WOMEN IN ANIMATION AND COMPUTING CAREERS, NARRATIVE INQUIRY, AND SELF-DETERMINATION THEORY

Very little literature has been devoted to women in animation; however, an extensive and contextual understanding of research on women in the fields of information technology (IT) and computer science (CS) provides parallels that allow a deeper understanding of stories shared with me concerning three women's motivations to pursue careers in 3D animation, and to understand their experiences as women animators in the male-dominated 3D animation industry. In order to focus the study to ensure depth of analysis, I turned to narrative inquiry as the dominant methodology and used the theoretical lens of self-determination.

In this chapter, I begin with a brief overview of studies on women in animation, computing, and information technology from historical and cultural perspectives. This review also provides a foundational understanding of gender issues in specific socio-cultural contexts. The review confirms the importance of understanding the issue of gender imbalance in the 3D animation industry. Next, I explore how narrative inquiry methodology can be a critical writing process in revealing processes of identity formation. Finally, I discuss Self-determination Theory and consider it as an interpretive lens through which to explore three women's motivations to pursue careers in the male-dominated 3D animation industry.

Women in Animation

While working on the topic of women in animation, I found it a challenge to identify relevant literature for this study. While there have been studies of women in computing, studies of female animators are relatively few to nonexistent, with even less said about the experiences of women in the 3D animation industry.

Through a preliminary literature review on issues relating to 3D computer graphics and animation, I found that most of the research focused on technique improvement for 3D computer graphics and technology (Giambruno, 1997; Kerlow, 2004; Pocock & Rosebush, 2001; Vince, 2000), or refinement of animation education (Ebert & Bailey, 2000; Flaxman, 2003; Orr & Nord, 2005). Though some studies relate to issues faced by women in animation, most are concerned with women's roles and representation of female characters in 3D animation (Bell, Haas, & Sells, 1995; Davis, 2006; Wasko, 2001). Comparatively little attention has been paid to the issue of women animators' gender role and experience in this field (Guedel, 2003; Sperling, 2011).

Guedel's (2003) and Quigley's (2005) writings are among the very few that concern discrimination of women in animation careers. In Guedel's (2003) autobiographical book, *Animatrix—a Female Animator: How Laughter Saved My Life*, she first provided a startling and accurate picture of her struggle through school, the free-spirited 1960s, and then recounted how she fought her way into animation only to find that women were not taken seriously. In this book, she also shared her stories about how she climbed the ladder and broke through "the glass ceiling" to reach an animator position as the first woman animator at Disney.

Taking a socio-cultural rather than an aesthetic approach, Quigley's (2005) book *Women Do Animate,* aims "to frame the histories of some individual women animators in a larger [women's] animation history" via a series of edited interviews with ten filmmakers (Quigley, 2005, p. 9). Through the record of the interviews, Quigley chronologically presented women animators' diverse practices, and particularly their creative process. Quigley's study involved both a reflection of how working opportunities and contexts have changed over the last 45 years in Australia, and also how the struggle to earn a living from making purely personal work remains problematic. Quigley emphasized a point made by more than one interviewee—that women's issues should be seen in a wider context as social issues in order to unfold a more encompassing understanding of women animators. Although Quigley's studies directly focus on women in the 2D animation industry or on individual animators rather than women in the 3D animation industry, it still provides an insightful perspective on issues relating to filmmakers' education and training, influences, techniques, and funding experiences, as well as their marginalization as both independent filmmakers and women artists.

Compared to 3D animation production, the equipment required for 2D animation is more affordable and accessible. A SGI[3] workstation for 3D animation cost more than $30,000 in 1995; software packages, such as *Wavefront*[4] or *Alias*[5] were the same price

[3] SGI, historically sometimes referred to as Silicon Graphics Computer Systems, was a manufacturer of high-performance computing solutions, including computer hardware and software, founded in 1981 by Jim Clark.

[4] Wavefront Technologies was a computer graphics company that developed and sold animation software used in Hollywood motion pictures and other industries. It was founded in 1984, in Santa Barbara, California, by Bill Kovacs, Larry Barels, and Mark Sylvester. They started the company to produce computer graphics for movies and television commercials, and to market their own software, as there were no off-the-shelf computer animation tools available at the time. In 1995, Wavefront Technologies was purchased by Silicon Graphics and merged with Alias Research to form Alias|Wavefront.

as the hardware. Not every individual animator can afford these sorts of expenses—one reason why few individual 3D animators were engaged in this technology.

In addition to Guedel's and Quigley's studies on women in animation, I found a *Women in Animation* website that provided insightful information on women in the 3D animation industry in the late 1990s. One participant, Kellie-Bea Cooper (formerly Kellie-Bea Rainey), stated that she believes that she has gained some benefits from being a woman in the animation industry. She gives credit to the organizations with which she has been involved. She also feels that women have a need to share, comfort, and support. This led her to launch the website, *Women in the Realm of Computer Visual Arts, Effects, and Animation*, for female animators. The site, which first appeared in 1997, provided an opportunity for these women to share their thoughts, experiences, and lives. "The groups I am involved in give these things to me as well as offer me the opportunity to give these things to others" (Rainey, 2007, para. 3). On this website, she offers brief interviews with more than 40 women whose careers are related to computer artists, producers, animators, or computer teachers and who have been working over the past four years (1997–2000). These women provided rich information about the situation and working conditions of women in the computer animation industry. These conditions include gender imbalance, gender bias, social expectations that limit women's potential as leaders in the animation industry, and discrimination regarding women's value and contributions.

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[5] Alias Systems Corporation (formerly Alias|Wavefront), headquartered in Toronto, Ontario, Canada, was a software company that produced high-end 3D graphics software. The company was formed in 1995 when Silicon Graphics bought Alias Research, which was founded in 1983, and Wavefront Technologies, founded in 1984, and then merged the two companies. It is now owned by Autodesk, the producers of AutoCAD and 3DS Max.

Gender Imbalance

As noted in many reports and by most interviewees on the *Women in Animation* website, there is a serious imbalance in the gender ratio in the animation industry. Crow (1997) recalled that only one-sixth of the DFX[6] supervisors at her company (Digital Domain[7]) are women. Gasaway (1997), a company owner and the only male to be interviewed, also admitted that in his animation studio there are 4 women animators and 22 men (Gasaway, 2007). Since there are few women in the industry, one has an easier time being recognized because "people notice and remember the women because they are rare" (Donath, 1999, para. 3).

The other aspect that requires attention is that although women have participated in the profession, they still have not occupied major positions. Compared to the number of men in animation, there have been a relatively small number of female animation artists, directors, and head writers for many years. A similarly small number of women have held positions of influence in the animation industry (Perras, 2008). Thus, there is not only an inconsistency in the nature of jobs but also the authority associated with these jobs. Men and women tend to gravitate toward different parts of the industry. "In the producing arena there are more women, while in the 3D animation world there are more men" (Phipps, 1999, para. 3). "I would guess between 60% and 80% of CG production managers are women" (Friedman, 1997, para. 2). And, "Where I work in the programming arena, there are not many women, but my department manager is a

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[6] DFX refers to digital visual effects. It also commonly calls Digital F/X or VFX.

[7] Digital Domain is a visual effects and animation company founded by film director James Cameron, Stan Winston and Scott Ross. It is based in Venice, Los Angeles, California. The company is known for creating state-of-the-art digital imagery for feature films, television advertising, interactive visual media and the video game industry.

woman" (Champagne, 1999, para. 1). Some believe that, in general, women grow up learning how to collaborate better than men do, which also helps women to obtain jobs in the male-dominated realms of computing or animation.

Gender Bias

While touching on the issue of gender discrimination in the animation industry, some interviewees shared instances of gender bias they confronted in their workplace. Rainey (1997) remembered coming across potential employers who "have offered me salary rates much lower than what they have given men with my same skills or lesser" (Rainey, 1997, para. 3). Part of the discrimination is due to the perception that women are less technical—"people often assume that the hard coding part of a project must have been done by a man" (Donath, 1999, para. 3). Phipps (1999) pointed out that the gender bias in stereotype programming still seems like a boy's game. She believed that discrimination stems from experiences in early education. For example, "in junior high school, when the girls were not encouraged on the 'math track' or the 'science track'" (Phipps, 1999, para. 3).

However, such discrimination can be found in any industry—many animators would rather take a positive attitude toward bias. "Sure there is discrimination ... The key is not to let it stop you" (Donath, 1999, para. 4). "I don't allow myself to think about it being harder to be a woman in this industry. It's an irrelevant factor in achieving my goals and dreams;" and "the key is to know it is there and show them how insignificant it is to you. Move on and keep on going" (Champagne, 1999, para. 6). Many women have

acknowledged the existence of gender bias and discrimination in the animation industry. However, the strategy of ignoring their discrimination, and trying to change themselves rather than the working conditions, will not resolve the problem of project-by-project hires favoring those who work overtime, especially for those who have or would like to have family life and care responsibilities.

Social Expectations

Schweppe (1999) mentioned in an interview that “most women [animators] don't have the option of having a full time person taking care of things at home” (para. 2). When it comes to juggling a career and a family, “it is not easy as a professional woman [animator] to find a househusband to stay home and take care of the house, children, cooking, etc. A lot of men take this service for granted” (Schweppe, 1999, para. 27). Phipps (1999) expressed her anxiety that “while I don't find it any harder being a women in my field at the moment, once I decide to get married and have children, the long hours and crazy lifestyle will have to be a thing of the past;” and “If it can ever be a ‘normal’ job, which I think is possible, it could work” (para. 5).

Women’s Unique Value and Contributions

Through a study of the conversations on the website, I learned how women find their unique value in this area by bringing a certain aesthetic and style to their work in the animation industry. For example, “I have heard many of my associates (male and female)

mentioning that a women's view would be essential to their project" (Rainey, 1997, para. 3). And, "there are far greater differences between any two given individuals than there are between men and women as a group" (McAndless, 1997, para. 5), and "as far as character animation is concerned, women often have a unique approach to acting and creating a character's performance" (Friedman, 1997, para. 6).

Recent reports indicate that more and more woman are entering animation, such that their number has been rising (Simensky, 1996). Therefore, looking to the future, most interviewee believed that there are great opportunities for women in the animation industry. Barcy (2000) felt encouraged, yet also believed that "women still need to attain more directorial type positions" (para. 5). Champagne (1998) even expected to have "the strong women climb the ladder further into the recognition of success - more and more women will walk the path laid before them by their sisters. She's doing it! I can do it too!" (para. 7).

Today, I am delighted to see more and more successful female animators find positions in their professional realm and a balance between job and family. Jennifer Yun Nelson, the director of *Kung Fu Panda 2*, is a successful example that should be taken into account. When she was asked if she had encountered any gender issues during her rise through the industry, she said:

> In my career, I have never run into a gender problem. I've been very fortunate to have so much support. A lot of the time people forget that I'm a woman. That's where we should be going. We should get to the point where it's not about a woman or a man; it's just a director. The industry has to become gender-invisible. I haven't experienced it so I wish I could

> understand the causes. A way to fix it would be to have more role models at the top so we can get to where it's less of a surprise that a woman is the director. We have a lot of female animators on the crew — it's not a 50-50 situation, but there are many.
>
> (Speakeasy, 2011, para. 9)

Jennifer Yun Nelson has become an influential role model who is inspiring more girls and women to pursue an animation career. However, her belief that the industry has to become *gender-invisible* seems problematic to me. As a Taiwanese male animator, the gender issues were invisible to me because I was immersed in a patriarchal society. Like Jennifer Yun Nelson, I never experienced or noticed gender discrimination. However, this does not mean that the gender problems do not exist. I became aware of the gender issues in my life and in the animation industry. My deep reflection helped me become an active agent in seeking social change. Therefore, it is very important for women role models in the animation industry to pay more attention and understand that the gender issues are complicated and should not become invisible. If female role models publicly acknowledge working conditions and other factors that lead to gender imbalance in the animation industry, they will raise public attention to this issue and gradually change Hollywood's animation culture. An important female role model, Nelson said to a college art class, "if you do what you love, the rest will follow" (quoted in Nelson, 2011, para. 4). However, this shifts the problems of how to overcome gender bias and poor working conditions onto the individual rather than the animation industry.

Women in Computing

Even though little research has been conducted on women's experiences working in the animation industry, a large body of research on women and gender equity in the fields of information technology (IT) and computer science (CS) provides useful insights that may be applied to this study of women in the 3D animation industry.

I have organized what follows into major themes that I found in my research on what affects women as they pursue careers in computer science and information technology. These themes are: early influences, attitude and behavior, self-confidence, working and learning environment, role models and mentorship, and socio-cultural influence.

Early Influences

According to transcripts from an interview with one of my research participants—EnergyK—conducted by WAMC[8] (2009) on the Internet, she became interested in cartoons and animation at a young age first through the influence of her older brother, who would "[read] comic books, and [was] into story telling and role playing games." However, her father's attitude toward computers was an important factor in "get[ting] into computers" and led her to become a 3D animator.

People's early experiences with computers influence their level of confidence and motivation in pursuing a career in IT and CS. With regard to gender in computer

[8] WAMC is a public radio network headquartered in Albany, New York.

technology, a great deal of the research indicates that early influences on girls' and boys' computer experiences are important factors in gender segregation in computer-related areas, including computer science, information technology, computer graphics, and computer animation (Jepson & Perl, 2002; Rendl, Broihier, & Fleetwood, 1989).

Parents' attitudes are crucial to children's feelings about themselves, particularly in children's early years. As such, parents' attitudes toward and experiences with computers play an important role in children's attitudes towards computer and technology. As Margolis and Fisher (2002) put it: "parents import their computer enthusiasm and skills to their children, and through early mastery acquired at home children gain a competence and confidence they carry with them into school" (p. 20).

In an early study of 525 middle-school students in basic programming courses, Linn (1985) found that with proper instructional techniques (pedagogy) that equally emphasized computing for both genders, female students performed as well as or better than male students. However, later studies have shown that many female students enter their first-year college computer courses with less experience than male students (Margolis & Fisher, 2002; Mounfield & Taylor, 1994; Parelius & Sackrowitz, 1996). Similar research also indicated no gender-related problems in learning computer technologies when both men and women were given equal opportunities to develop their experiences (Anderson, 1987; Rodger & Walker, 1996; Wilson, 2002). The individual differences remained, but the overall performance of male and female students indicated no significant difference.

Working and Learning Environment

Animation and Computing Environment: Mostly Men

Since 3D animation is produced via computers, the condition of learning about and working in 3D animation is similar to that for computing. Some research studies on male and female interactions in computer labs revealed two main factors that lead women to feel uncomfortable working with male coworkers in the same environment, i.e., male jokes about sex and methods of communication that make female employees feel uncomfortable or discriminated against (Margolis & Fisher, 2002; Sproull, Zubrow, & Kiesler, 1986; Tannen, 1995). This finding is reminiscent of my own past experiences in computer labs. These labs were messy and noisy spaces crowded by male students who played computer games, joked with and chased each other, and even slept in the computer lab throughout the night. The content of the graffiti on the whiteboard was sometimes pejorative toward women. These sorts of computer lab environments are unfriendly spaces for female students. More and more female students tend to work at home to avoid this awkward condition. Clearly, such environments might not support social networks and career opportunities for female students.

All-female Environment

Some research studies have found that female students show more confidence and perform better in math and science in all-female environments than a mixed-gender environment (Corston & Colman, 1996; Fuller & Meiners, 2005; Treu & Skinner, 2002).

Fuller and Meiners (2005), in their article, “Reflections: Empowering Women, Technology, and (Feminist) Institutional Changes,” also indicated that women learn better in a single-sex environment in science, math, engineering, and technology. However, similar studies on learning 3D animation are not available.

While research shows that boys are more dominant in teacher-directed talk in the classroom, the effect of an all-female learning environment can provide more opportunities for girls to develop leadership in public discourse. Once these skills are developed, research indicates that this confidence is transformed in mixed-gender situations (Corporation, 2008; Heise, 2004; Salomone, 2003).

Gender-inclusive Environment

In a study of gender equity in the computer science learning environment, Miliszewska, Barker, Henderson, and Sztendur (2006) found, in looking at two single-gender groups and two mixed-gender groups, that “although female students did not regard the under-representation of females in the course as a problem, they singled out their fellow female students as the vital source of both academic and personal help, thereby reiterating the need for female peers in the [Information and communication technology] course” (p. 107). A gender-inclusive environment is not only a space that involves relatively equal numbers of both genders, but importantly offers equal opportunities to access information and facilities as well as engage in course work and discourse. Their findings also suggest that the course curriculum design and collaborative

approach to group projects, which ensure that all students gain experience from one another, are important components in creating gender-inclusive classrooms.

Attitude and Behavior

The majority of studies have shown that those spending more time with computers have a more positive view of them (Loyd & Gressard, 1984; Margolis & Fisher, 2002; Shashaani, 1994). When studying students' attitudes and behaviors toward computers and technology in classrooms, researchers found that most preschool and elementary school students seemed to have positive attitudes toward computers and technology regardless of gender differences.

Research also reveals that it is not until later years that gender differences become evident. For example, many research studies have shown that boys tend to jump in and explore computers without guidance but girls tend to wait for the teachers' instruction. And most of the time boys tend to monopolize the conversation with instructors and silence girls (Bernhard, 1992; Huber & Scaglion, 1995). Similarly, some research has indicated that math and science teachers unintentionally spend more time with male students than female students (Huber & Scaglion, 1995), thereby encouraging male students to dominate math and science classes.

However, in a survey study of 210 undergraduate students in a computing course at Victoria University in Melbourne, Australia, Miliszewska, Barker, Henderson, and Sztendur (2006) found that a balance of having both genders as lecturers in an information and communications technology (ICT) course did not change or challenge

the curriculum in raising awareness of gender imbalance in the ICT field. The researchers reported that students of both genders expressed the same challenges and overall satisfaction with the course regardless of whether they were taught by a male or female instructor. Women are as much entrenched in a patriarchal history as men, and often find that their success in a career is furthered when they support patriarchal systemic knowledge and society.

Compounding issues of gender and race in these circumstances are the metaphors, analogy, language, and references used by teachers. Amburgy, Knight, and Keifer-Boyd (2004) discussed privileged cultural narratives in their article, “Schooled in silence,” where they noted that “one form of silence is an absence of voice, another form of silence lies in the unspoken assumptions on which dominant stories are based” (p. 82).

Moreover, in many situations, men tend to solve the problems encountered by women with computer technology, and do so without sharing knowledge and problem-solving techniques with women. They intentionally or unintentionally neglect the possibility that women may want to learn how to resolve computer problems by themselves. As such, women often do not have a chance to learn or face computer problems by themselves, which may affect their attitudes toward computers. These social practices usually frustrate girls’ future attitudes toward interest in and self-confidence with computer technology (Shashaani, 1993).

In order to fulfill the goal of education for democracy, educators need to pay attention to whose voice is not heard as well as what is not told/taught within the dominated groups and culture (Amburgy et al., 2004). This approach can empower teachers and students of both genders to critically examine their social, cultural, and

political identities. In doing so, students will be aware of how they are influenced by the dominant culture's conceptions about what girls/boys should or should not be.

Computer Gaming Experiences

Many researchers have indicated that computer games are usually children's first experience with computers; this influences their future interest in computer use (Gorriz & Medina, 2000; Mounfield & Taylor, 1994; Natale, 2002; Parelius & Sackrowitz, 1996; Scragg & Smith, 1998). While most boys and men prefer games that emphasize violence, sex, and competition, most girls and women tend to prefer games with networking features that allow them to play collaboratively with others (Lee, 2006; Ray, 2004). And, girls like to play more sophisticated games that include story-telling and role-play features, which allow them to create their own narratives through game play (Gillen, 1994; Taylor, 2003). As Gorriz and Medina (2000) noted, "creating software games of interest to girls has the potential to bring more girls into computing at early ages, thus increasing the numbers throughout the pipeline" (p. 43). Therefore, female students' computer gaming experiences at an early age are influenced tremendously by the contents of game design and gaming space (Kafai, 1996).

Furthermore, in studies of children's gaming behaviors, researchers have noted that boys are more aggressive while playing games. They shout and blaspheme which, according to McCormick's (1991) study, is offensive and intimidating to girls. As a result, boys' behaviors while playing computer games influence girls' interests in using computers at an early age.

A survey, the 2006 Essential Facts about the Computer and Video Game Industry by ESA[9] (2006) on the digital game industry and marketing, pointed out that in the marketplace, 62% of game players are male and 38% are female. Women aged 18 or older represent a significantly greater proportion of the game-playing population (30%) than boys aged 17 or younger (23%). In conducting the same survey four years later, ESA (2010) found a gradual increase in the number of women game players. The results indicated that women over 18 years of age are one of the industry's fastest-growing demographics. Furthermore, 40% of all players are women. This is 2% greater population growth than four years ago. Today, adult women represent a greater portion of the game-playing population (33%) than boys aged 17 or younger (20%). The result indicates an important factor in the future—growing numbers of female game players will gradually influence younger girls' attitudes toward computing through game-play.

Self-confidence

Self-confidence plays an important part in students' learning of computer technology. Studies have shown that self-confidence hinges on four different components: performance and accomplishments, observing and learning from others, freedom from anxiety concerning work and conduct in a particular field, and persuasion and support from others (Ambrose, Dunkle, Lazarus, Nair, & Harkus, 1997; Ambrose, Lazarus, & Nair, 1998; Teague, 2002).

[9] ESA: The Entertainment Software Association (ESA) is the U.S. association exclusively dedicated to serving the business and public affairs needs of companies that publish computer and video games for video game consoles, personal computers, and the Internet.

Shashani's (1997) study of college students' attitudes toward computing found that "female students reported higher anxiety along with a lower confidence with interest in computers when compared to the male students" (Shashani cited in Natale, 2002, p. 28). Lack of self-confidence is not necessarily related to lack of ability; however, it influences students' attitudes toward challenges that they may encounter in the future. In order to resolve such problems, many studies suggest that teachers and parents can encourage young girls and build their self-confidence through providing motivational learning environments, such as introducing female role models (Brunner & Bennett, 1997) in a classroom, or helping girls to form a study group (Burger, 2002; Margolis & Fisher, 2002).

Role Models and Mentorship

Research studies suggest that role models can facilitate and encourage girls and women to find computer technology appealing (Brunner & Bennett, 1997; Goulding & Cleeve, 1997; Klawe, 2002; Margolis & Fisher, 2002; Teague, 2002; Todd et al., 2005). However, there is a lack of female role models not only in computer science and information technology, but also in 3D animation.

Happily, things have been changing gradually. Today, female students have more opportunities to interact with experienced women in computing in many ways than they had in the past. Through personal networking or personal referrals, they can communicate with female role models in person, online, or through support group meetings, conference talks, and biographies (Bakken, 2005; Margolis & Fisher, 2002; McCarthy & Berger,

2008; Townsend, 1996). Moreover, research studies have revealed that young girls benefit from attending workshops where women teach them simple computing skills (Brunner & Bennett, 1997). This provides an opportunity to learn computing information and become familiar with female role models. And role model and mentorship opportunities can also apply to college-level computer classes.

Socio-cultural Influence

As Margolis and Fisher (2002) stated, “there is probably no way to know the direction of influence, but it is clear that multiple layers of gender socialization affect student’s attraction or detachment from toys and now the computer” (p. 29). Social affect and culture constrain how boys and girls perceive their gender identity and behave according to social expectations of boys or girls when encountering computers and technology.

Likewise, in a study on gender in the IT workforce, Trauth, Quesenberry, and Yeo (2008) found that the economy and culture are important factors that reveal a wide range of influences on women’s recruitment and retention in the IT field. These studies suggest that to understand the possible social factors impacting on girls’/women’s attitudes toward computer technology, and toward choosing careers in IT fields, it is important to consider social and cultural contexts at different stages of learning and decision making. Two major factors, media influence and male-oriented culture, are acknowledged below.

Media Influence

Although a growing number of women are using digital devices, women are still underrepresented in the field of computing (Margolis & Fisher, 2002; Trauth, Quesenberry, & Huang, 2008). Margolis and Fisher (2002) pointed out that "public image, media, and marketing of computers have been specifically focused on boys. The gender stereotypes associated with computing tend to pull boys in and push girls away" (p. 119).

The media has been influencing girls' impression of the culture of computing, engineering, and information technology. It has also influenced boys' thoughts about becoming a scientist or engineer, as boys are usually portrayed in magazines, TV programs, or movies as smart, intelligent, and brave enough to explore a new technology; on the contrary, girls are portrayed as passive, helpless, or not smart enough to deal with technology (Hoyles, 1988; Knupfer, 1998; Vekiri & Chronaki, 2008).

The stereotype of male and female attitudes toward computer and technology conveyed by the media has a tremendous influence on both males and females at an early age. And, gender stereotypes relating to computers seep into society and become embedded in gender roles that affect females' attitudes toward computers (Natale, 2002).

Male-dominated Culture

Many researchers of gender issues in computing indicate that the culture of computing is either male-oriented or male-dominated. As Teague (2002) asserted, "External factors include the popular perception of the male dominated computing

culture, its particularly masculine character and, often, a ‘geek’ image” (p. 109). The stereotype of computer professionals as geeks is a factor that keeps female students away from computers (Klawe, 2002; Teague, 2002). Moreover, this stereotype also deters girls from entering computer-related fields, such as CS and IT, or even the animation industry, due to the perception that computer-related programs require lots of knowledge and experiences in mathematics and science.

A major factor that influences women’s decision not to pursue a career in computer-related fields is the stereotype of long working hours in the computer lab—a lifestyle prevalent among all computer scientists. The stereotype of the computer science student is of a person who stays in front of a computer for long hours and lacks social skills. Women often believe that if they enter computing, they will inexorably lose that balance, and decide to avoid the field altogether instead (Copper, 2005).

The review of the literature on women in IT and CS identified factors that can potentially influence girls’ and women’s decision making about entering or withdrawing from IT careers. Although there are individual differences among people, the presence of stereotypes and hostile work environments for girls and women influence career decisions. The review suggests an important direction for an investigation of women in the animation industry as a parallel phenomenon in looking at issues of gender imbalance in the IT and CS workforces.

Narrative Inquiry

Narrative has been defined in various ways in different disciplines, based on different research approaches. According to Chatman (1978), narrative contains two parts: story and discourse. The story consists of “the chain of events (content) and the existents (characters, item of setting)” while discourse is the way “a certain content is communicated” (p. 19). Bal (1997) expanded on the definition and asserted that narrative is “a text in which an agent relates (‘tells’) a story in a particular medium, such as language, imagery, sound, buildings or a combination thereof” (p. 5). Thus, narrative is a corpus that should consist of “all narrative texts and only those texts which are narrative” (p. 3). Story is content itself, and a narrative is a way of constructing meaning through the presentation of stories. In other words, story is the content of the narrative expression, while discourse is the form of that expression.

Moreover, narrative has also been seen as a way to explore and interpret (Gale, Mitchell, Garand, & Wesner, 2003), since narratives comprise symbolic actions, words, and/or deeds that have sequence and meaning for those who live, create, or interpret them (Fisher, 1987). Furthermore, many researchers have claimed that narrative is also a form of communication that transforms information through storytelling into “data” that enable us to examine, reflect, and understand one’s experiences (Silverman, 2006). From this perspective, narrative is an agent/mediation for people to interact/respond/interpret the told story, and at the same time to reconstruct reality in their own words while giving meaning to their own life (Bailey, 1996).

According to Elliott (2005), there are “many different established narrative forms, sedimented at different depths, within a culture to which individuals can turn to make sense of their own experience and communicate that experience to others” (p. 129). Describing one’s life through narrative creates meanings for those who read the story, since in reading the stories they provide an understanding of self and bring cognition, emotion, and action together to give experience “cultural relevance” (Bruner, 1986, p. 69). However, it might not fit perfectly with individual experiences due to the process of making meaning, which includes many narratives of lived experiences. As such, narratives can be a way to construct meanings rather than truths.

Overview of Narrative Inquiry

Research interest in the analysis of stories has increased as researchers in many disciplines endeavor to see the world through the eyes of others (Riley & Hawe, 2004). The purposes of narrative inquiry vary in different disciplines such as psychology (Josselson & Lieblich, 2003; Polkinghorne, 1995), sociology (Bruner, 1991; Richardson, 1990), nursing (Barton, 2006), and cross-cultural studies (Phillion, 2002) and many others. For example, in social history and anthropology, “narrative refers to an entire life of story woven from threads of interviews, observations, and documents” (Riessman, 2008, p. 5). In psychology and sociology, “narrative encompasses long sections of talk—extended accounts of lives in context that develop over the course of single or multiple research interviews or therapeutic conversations” (Riessman, 2008, p. 6).

Narrative inquiry is a flexible qualitative research methodology that applies both descriptive and reflective language inquiry into human experiences. It has been used to explore various phenomena in the social sciences since the 1970s. Narrative inquiry methodology is a process of gathering people's experiences as data through their storytelling for the purposes of research. Many researchers have suggested that narrative inquiry methodology is a good approach to use when seeking an understanding of people's life experiences (Clandinin, 2006; Connelly & Clandinin, 2006; Duffy, 2007; Richardson, 1990).

As a type of qualitative methodology, narrative inquiry requires that the researcher study individual stories, and in particular those of the less powerful, underrepresented, or marginalized people such as *minority* groups in a society. The approach allows researcher to explore and learn from participants' lived experiences to challenge stereotypes (Lagerwey, Phillips, & Fuller, 2003).

The argument, according to Overcash (2003), is that a narrative consists of "a person telling their story [which] becomes part of the research decision making process in that they can decide how the story is told, what is included and how lengthy the interview" (p. 181). Therefore, narrative inquiry methodology allows researchers to engage with their own experiences in relation to the participants' life experiences conveyed through the stories they tell (McCance, McKenna, & Boore, 2008). In order to properly address issues and represent the findings from collected stories of respondents, researchers need to understand their roles, and throughout the inquiry focus analysis with a clear theoretical lens and in light of the purpose of the study.

Riessman (1993) stated that the purpose of the narrative interview is “to see how respondents in interviews impose order on the flow of experience to make sense of events and actions in their lives” (p. 2). Duffy (2007) also suggested that “the meanings that people give to their experience and that shape their lives are collected and organized into story form” (p. 2). As such, people’s story-telling/narratives provide opportunities to think and rethink about self and the world.

Since no single story is, in itself, a narrative inquiry, the focus of the analysis is on the most important situation/condition relevant to a study’s research questions. Most of the narrative analysis methods use an analytic inductive approach to see patterns in the data and review relevant literature to interpret patterns. Since the researcher’s values and experiences influence interpretations, these are revealed in journals as part of data collection and analysis (Arrington, 2005).

Researchers represent narrative data by using narrative analysis, which focuses not only on what is told but also on how events are constructed. Unlike scientific research and specifically methodologies that use preset categories of analyses and statistical probabilities to generalize findings, narrative inquiry analysis tends to carefully examine and interpret the under layer of meanings of human experiences by looking for the emerging themes through the process of writing and re-writing (Clandinin & Connelly, 2000; Riessman, 1993).

Richardson (2000) argued that *writing as inquiry* is an element of narrative inquiry that occurs as researchers collect data, analyze data, create meanings, and then represent stories from findings that identify specific themes and patterns from the context of society. The interpretative process helps a researcher to understand his/her

socio-cultural assumptions and reflect on which meanings are valuable and what matters. Since lives are understood as and shaped by narratives, it is appropriate to use the narrative inquiry methodology to explore human experiences. Therefore, through the writing and re-writing process of narrative inquiry, I deeply reflected on the narrative data from themes and patterns that emerged from an analysis of participants' lived experiences.

While the possible factors that influence these three women animators' decision-making about their animation careers may seem obvious, I found that the Self-determination Theory (SDT) was useful as an interpretative lens to analyze themes and patterns from their narratives. The next section presents the interpretative lens, the Self-determination Theory (SDT), used in analyzing story responses to interview prompts regarding the three women animators' educational experiences, animation careers, and notions of success..

Self-determination Theory

Self-determination is defined as a combination of skills, knowledge, and beliefs that enables a person to engage in goal-directed self-regulated behavior (Field, Martin, Miller, Ward, & Wehmeyer, 1998). It also "refers to the attitudes and abilities required to act as the primary causal agent in one's life and to make choices regarding one's actions free from undue external influence or interference" (Wehmeyer, 1992, p. 305). Therefore, a self-determined person can usually face problems, overcome challenges, and engage in a course of action through the use of positive thinking and effective skills under

supportive social and cultural conditions. SDT suggests that everyone has basic psychological needs for autonomy, competence, and relatedness that must be satisfied to act as causal agents in their own lives to experience a sense of well-being (Ryan & Deci, 2002). The three basic psychological needs are defined as follows: autonomy, competence, and relatedness.

Autonomy

Autonomy "refers to being the perceived origin or source of one's own behavior" (Ryan & Deci, 2002, p. 8). When individuals make decisions or take action without perceived or real external forces regarding their choice or behavior, they will be more willing and capable to use available resources to take action and pursue their goal. Based on Ryan and Deci's STD, Guay (2005) asserted that "the need for autonomy implies that individuals strive to experience choice in the initiation, maintenance, and regulation of human behavior" (p. 78). For example, most animators who pursue a career in animation are not doing so for the salary (although it is important); instead, they are working for their happiness and towards a dream. Although this is a labor-intensive career, it also involves fun and creativity. This sense of autonomy in pursuing a career that is not lucrative at the entry level is typically not an option for those who do not have the means and opportunity for education and frequent access to computers. Thus, one's socioeconomic class, among other life circumstances, impinges upon their autonomy.

Competence

Competence "refers to feeling effective in one's interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2002, p. 8). Based on Ryan and Deci's STD, Guay (2005) asserted that "the need for competence implies that individuals seek to be effective in their interactions with the environment … to experience perceptions of competence when performing an activity" (p. 78). Therefore, in order to achieve a sense of competence, individuals will choose moderately challenging tasks. For example, in the animation industry, most animators usually have different, innovative ideas about animating characters in order to realize impressive animation outcomes. To animate a perfect shot with style is always a big task; however, animators usually spend extra hours tackling the challenge. When they solve problems and achieve satisfied outcomes, they develop a sense of competence. Recognition by others, and criteria for what works well, are contextual factors that often maintain a hegemony of values, which in turn inhibit a sense of competence for those whose work is at adds with socio-cultural practices, perspectives, networks, and ideologies in the field.

Relatedness

Relatedness "refers to feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community" (Ryan & Deci, 2002, p. 8). Based on Ryan and Deci's STD, Guay (2005) asserted that "the need for relatedness implies that individuals seek positive

and significant relationships with others" (p. 78). When an individual and a community can provide sufficient acceptance, concern, and support, that individual can undergo various difficulties and challenges and then achieve psychological growth. Therefore, when society can provide or meet these basic psychological needs for individuals, they will be more likely to become motivated to develop goals and pursue them. For example, in the animation industry, people work in teams all the time. Different animators have different strengths to contribute to animation projects. Like character animation, one may specialize in facial animation, while another may focus on hair or gesture animation. When these animators have the same goal—to make a good movie as a team—they become related to each other. In supporting and learning from each other, animators get the sense of relatedness.

Self-determination Theory is based on the assumption that people have natural tendencies to grow psychologically, to overcome challenges, and to integrate their experiences. Ryan and Deci defined SDT as:

> … an approach to human motivation concerned with the development and functioning of personality within social contexts. … [T]he social context can either support or thwart the natural tendencies toward active engagement and psychological growth. Thus, it is the dialectic between the active organism and the social context that is the basis for SDT's predictions about behavior, experience, and development (Ryan & Deci, 2000a, para. 1).

A study of the relationship between self-determination and empowerment about disability led Sprague and Hayes (2000) to the belief that one has to deal with different kinds of social situations and embody different potential relationships with others. They emphasized that "the notion of relationships empowering self-determination needs to include social structural relationships" (Sprague & Hayes, 2000, p. 686), which also echoes Ryan and Deci's (2000b) assertion about the basic needs of SDT and specifically that *competence*, an interaction with social environment, plays an important role in motivation. Feelings of being socially connected with others, *relatedness*, in educational or social contexts influence the performance of self-determined behavior. And, *autonomy*, the need to experience degree of choice, motivates one's behaviors.

I sought to understand female animators' notions of self within the power roles and relationships they experienced in pursuing careers in the male-dominated 3D animation industry. SDT provided a useful theoretical frame for this study because it focused my investigation on the possible factors that influence these three women's construction of identity (awareness of self) and their decision-making in pursuing a career in a male-dominated industry.

Research that specifically focuses on women animators in the male-dominated 3D animation industry serves a pedagogical purpose that may shed light on potential areas for intervention that may serve to enhance women students' engagement in the learning of 3D animation and pursuit of a 3D animation career.

Motivation

Motivation is the inner power or energy that pushes one toward performing a certain action. It is about desire and ambition, and is one of the most important keys to success. Vallerand (2000) looked at motivation as a multidimensional concept that encompasses more than the dichotomy of intrinsic and extrinsic motivation. Both intrinsic motivation and extrinsic motivation are on a continuum ranging from a high to low level of determination.

The nature of motivation, according to Ryan and Deci (2000c), involves "energy, direction, persistence and equifinality—all aspects of activation and intention" (p. 69), and it is highly valued for the consequence of its influence. Numerous studies (Reeve, 2002; Wehmeyer, 2003) on students' behavior of learning have shown that students who feel desire and ambition toward a learning subject achieve better performance and outcomes because of their positive motivation. As such, motivation is usually strong when one has a clear vision and strong desire or goal.

According to Deci and Ryan's SDT, motivations are not only different in degree and "level of motivation" but in type, the "orientation of that motivation" (Ryan & Deci, 2000b, p. 54). Different types of motivations are situated along a self-determination continuum of relative autonomy, ranging from least self-determined to highly self-motivated, in the order of: external, introjected, identified and intrinsic (Guay, 2005; Wang & Liu, 2007). Based on the different reasons or goals that give rise to an action, Deci and Ryan (1985) proposed basic distinctions between *intrinsic motivation* and *extrinsic motivation*.

Intrinsic Motivation

Intrinsic motivation derives internally from doing something to get a sense of pleasure or satisfaction. According to Ryan and Deci (2000b), intrinsic motivation is defined as engaging in an activity for its inherent satisfaction rather than for some separable consequence. It also refers to "behaviors done in the absence of external impetus that are inherently interesting and enjoyable" (Niemiec & Ryan, 2009, p. 134) or "doing something for its own sake and not for external rewards" (Wang & Liu, 2007, p. 148). In an educational context, it is central to humans' inherent tendencies to learn and to develop (Flavell, 1999); therefore, intrinsically motivated learning can only occur when an individual feels free to make choices in the process, when an activity is challenging, and when the challenge can be overcome. When people are intrinsically motivated, they take action for the fun of the challenge entailed rather than external prods, pressures, or rewards. Therefore, the inherent tendency to search for novelty and challenges, to extend and exercise one's capacities, to explore, and to learn are central to intrinsic motivation (Ryan & Deci, 2000b).

The concept of intrinsic motivation was believed to be a critical reaction to two behavior theories, the operant theory (Skinner, 1953) and the learning theory (Hull, 1943), that were dominant in empirical psychology from the 1940s to the 1960s. Skinner's (1953) operant theory asserted that all behaviors are motivated by rewards. On the contrary, Hall's (1943) learning theory argued that all behaviors are motivated by physiological drives.

Intrinsic motivation not only exists within individuals but also exists in relation to individuals and activities. Some scholars have defined intrinsic motivation in terms of the task being interesting while others have defined it in terms of the satisfactions a person gains from intrinsically motivated task engagement (Ryan & Deci, 2000b). Therefore, intrinsic motivation depends on the interaction between different individual perceptions of self and different perceptions of the environment. Extrinsic reward can enhance or undermine intrinsic motivation. The majority of the research on the effects of environmental events on intrinsic motivation has focused on the issue of autonomy versus control. A meta-analysis of intrinsic and extrinsic motivational research by Deci, Koestner, and Ryan (1999) found that intrinsic motivation is negatively affected when tangible extrinsic motivation is attached to the behavior because the received extrinsic rewards are the factors that decrease individual's sense of autonomy and competence, the main drivers of intrinsic motivation. On the contrary, intrinsic motivation can also be enhanced by increasing an individual's perceptions of autonomy and competence (Deci, Koestner, & Ryan, 1999). Therefore, intrinsic motivation will occur only for activities that hold intrinsic interest, the appeal of novelty, challenge, or aesthetic value for an individual (Ryan & Deci, 2000b).

Extrinsic Motivation

Extrinsic motivation, in contrast with intrinsic motivation, most often refers to engaging in activities to achieve separable outcomes, rather than for their instrumental value (Ryan & Deci, 2000b). In other words, our desires to perform a task are controlled

by an outside source: the external rewards. For example, motivating factors are external rewards, which can include money, grades, feedback, synthesis with self, and goals. These rewards increase motivation and provide satisfaction and pleasure that the task itself may not provide.

Ryan and Deci's SDT specifies four types of extrinsic motivation that vary greatly in their degree of autonomy. They range and fall along a continuum anchored by controlled and autonomous regulation from low to high levels of autonomy as follows: *external regulation, introjected regulation, identified regulation,* and *integrated regulation* (Deci & Ryan, 2000; Ryan & Deci, 2000b).

External regulation, the least autonomous type of extrinsic motivation, refers to behaviors regulated through external means, such as rewards and constraint. Such behaviors are performed to satisfy an external demand or obtain rewards, and are poorly maintained when the controlling contingencies are withdrawn (Niemiec & Ryan, 2009; Ryan & Deci, 2000b). A second type of extrinsic motivation is introjected regulation. It refers to behaviors that are partially internalized by an individual but still relatively external to the self (Deci & Ryan, 2000). Internal regulation still exerts some control because people perform such actions in order to avoid feelings of guilt or anxiety or to attend to ego-enhancements or feel pride (Niemiec & Ryan, 2009; Ryan & Deci, 2000b). Proceeding toward greater autonomy, identified regulation refers to behaviors that are consciously performed by choice because an individual has accepted the action as personally important (Niemiec & Ryan, 2009; Ryan & Deci, 2000b). Finally, the most autonomous type of extrinsic motivation is integrated regulation. This refers to behaviors that are synthesized with other aspects of self. Through self-examination and bringing

new regulations into congruence with other values and needs, integration occurs when identified regulations have been fully assimilated into the self. As such, integrated forms of motivation share many qualities with intrinsic motivation (Niemiec & Ryan, 2009; Ryan & Deci, 2000b).

According to the reviewed literature on the studies of psychological and academic outcomes associated with autonomous self-regulation for learning, Niemiec and Ryan (2009) indicated that "internalization of extrinsic motivation is critical for effective psychological and academic functioning among students at all educational levels" (p. 138). They concluded that "internalization of extrinsic motivation is essential for students' self-initiation and maintained volition for educational activities that are not inherently interesting or enjoyable" (p. 138). Accordingly, in an educational context, it is important for teachers to understand how to facilitate internalization and create extrinsic motivational conditions that allow students to pursue their goals—this is a critical element of the educational agenda (Niemiec & Ryan, 2009).

This chapter presented a review of the literature that focused on four main areas: women in animation, women in computing, narrative inquiry, and Self-determination Theory. The reviewed literature on computing and animation provided relevant information on issues relating to women's attitudes and motivation of learning computer technologies from social and culture contexts that focused my analysis in Chapter 4. The review of Self-determination Theory connected the literature on prior studies of girls' and women's motivation to learn computer technology to a theoretical framework for intrinsic and extrinsic motivation as a theory of self-determination. My review of narrative inquiry provided a look at the various ways researchers have used this

qualitative research method to study human experiences. Using this review, I developed open-ended prompts to elicit stories from the three women animators and a research methodology described in Chapter 3 and enacted in Chapter 4.

Chapter 3

RESEARCH METHODOLOGY

The primary focus of this study was to explore and dissect three individual women's experiences in pursuing their careers in the 3D animation industry. In this chapter, I outline and describe specific methodological and research procedures employed in this study. I begin by introducing the research questions, selection of participants, data collection, and data analysis methods. Next, I discuss my narrative inquiry methodology and the theoretical framework on which I based the data analysis. I use narrative inquiry in the prologue and in the process of data gathering. The analysis is presented in Chapter 4.

Research Questions and Interview Prompts

In order to contextually understand the three women's motivations in pursuing professional careers in the 3D animation industry, I was guided by three research questions. I employed interview prompts to gather specific stories on their experiences.

Research Question One: What educational experiences have inspired, encouraged, and/or dissuaded the three female animators in this study to pursue careers in animation?

Interview Prompts:

- Why did you pursue a career in 3D animation? Please vividly describe to me an event in which you realized your interest in a career in computer animation.
- Please vividly describe to me two specific experiences in either your K-12, or college education: one that you found especially valuable, as well as another experience that you found especially a bad experience.

.

Research Question Two: What challenges and/or privileges did the three participants of this study encounter in their animation careers?

Interview Prompts:

- Please describe a specific moment in your transition out of college and into the 3D animation industry. Were you recruited? If so, describe that situation and your particular experience. If not, describe how you obtained your first job in the 3D animation industry.
- Please describe your career journey to this moment, beginning from your first job in the animation industry.

Research Question Three: What were the socio-cultural influences in the 3D animation industry experienced by the three participants of this study that shaped their concepts of self-determination for a successful animation career?

Interview Prompts:

- Please describe an experience that you perceive may have provided advantage or disadvantage because of your gender?

- Do you feel you are successful in your current career? How do you define success for yourself?

Selection of Research Participants

According to Patton (1990), the chain sampling method (also called the snowball method) is an ideal method to use when seeking to achieve a desired sample of people who can provide rich information for a study. A criterion sampling strategy (Creswell, 1998) involves selecting individuals who have met various criteria (e.g., having knowledge of the phenomenon being researched and the ability to verbalize their experiences of it). There are many different ways to determine a purposeful sample. In this study, I used a mixed purposeful sampling strategy that combined chain sampling strategies and a criterion sampling strategy to select research participants.

In the chain sampling, first, I searched for potential research participants through my connections to female college friends who work in the 3D animation industry, Internet searches, and direct referral by female animators. In criterion sampling, I then selected three research participants from the pool of six possibilities using three criteria: current employment as a female 3D animator, experience in the animation industry, and major studio experience.

Female 3D Animators. Animators in this research had to be female. This could include modelers, lighters, animators, and technical directors, depending on variations in job function used in 3D animation at different studios. While many types of careers support the animation industry, such as marketing, business management, and public

relationship, project manager, etc., I sought women who had either technical or artistic skills and were involved in the production pipe-line of creating animations. Women who worked in pre-production (concept art such as set design, character design, etc.) or post-production (video/audio editing) were not included as potential participants in this research.

Experienced Animators. All research participants had to have experiences in the production of 3D animation independently or collaboratively. Those with approximately 10 or more years of working experiences in the 3D animation industry would have had a chance to pursue possible advances in their career. Therefore, obstacles to and directions of advancement would shed light on what they perceived as successful careers in the 3D animation industry.

Major Studio Experience. Working for an award-winning animation studio is a good starting career for an animator—not only because of receiving credits from participation in notable animation projects, but also due to the possibility of meeting and learning from talented and experienced animators. The benefits and salary are typically better than offered in small studios. I selected women who worked for major 3D animation or visual effects studios in the Los Angeles area, such as Disney/Pixar, DreamWorks/PDI (Pacific Data Image), and R&H (Rhythm & Hues). These studios have more than twenty-five years of experience in creating award-winning 3D animated films and digital visual effects in both artistic and technical ways. And, these studios are in a position to influence the 3D animation industry.

The chain sampling strategy led to a possible sample of six women animators. Of these six women who were interviewed for a pilot study, all had different job titles such

as lighting effects supervisor, animator, technical director, modeling supervisor, or producer. Each of their positions represented different professional tracks in the field that might offer shared and unique stories of motivational factors and cultural conditions in the 3D animation industry.

Three of the six were excluded from the study because they were unable to participate in the follow-up interviews. Therefore, I included three woman animators in this study to provide their rich, in-depth, and diverse experience in 3D animation careers.

Researcher's Role in the Study

In this study, my role as researcher shifted from being an outsider who was conducting the research by listening and gathering interview data from research participants, to being an insider in interpreting their stories through my own experiences in light of my involvement throughout the interview process and as an experienced technical director in the 3D animation industry. At times, I am an outsider since my experiences are markedly different as a male in the 3D animation industry, and an insider as co-participant in interpreting the stories and analyzing the underlying narrative that the storytellers shared.

Data Collection

Semi-structured Interviews

The data collection primarily came from two resources: email exchanges and onsite interviews with each individual research participant. Following receiving approval from the Penn State Institutional Review Board (see Appendix A), I sent a research recruitment letter with questionnaires (see Appendix B) and the consent form (see Appendix C) to my research participants, and requested their responses by email. Since some of their answers in response to my questionnaires (see Appendix D) through email did not contain enough information to provide rich, thick description, I then arranged two follow-up onsite interviews during the SIGGRAPH conference at the Los Angeles Convention Center in August 2005 and August 2008 for my study.

Since five of the six woman animators worked in the Los Angeles area, I had opportunities to follow-up the semi-structured email interview responses with face-to-face, open-ended dialogue about their career plans, educational backgrounds, working experiences, and ideas about success as a woman animator with only four women in Los Angeles. In August 2005, I conducted two face-to-face interviews at the Los Angeles Convention Center: one was at the participant's animation studio; and another was at the participant's home. From the four possible participants, I excluded one from the full study because she was unable to participate in the follow-up interview. Besides, I found that three participants were a more manageable number for an in-depth analysis of their career stories.

In August 2008, two participants were able to join me in another follow-up interview during the SIGGRAPH conference in the Los Angeles area. Again, I interviewed one in her studio, and another in her home. Prior to starting the interview, I sent both an email with the interview questions I planned to ask them. The initial interview ranged from approximately 30 to 45 minutes, but the two participants were comfortable enough with my questions and provided information about their lives from past to future such that the interviews lasted somewhere between 60 to 80 minutes and provided in-depth data for further analysis.

It is important to note that the women participants in the study shared their *stories* through their individual narratives. As the researcher, I took the approach that the women told me stories of their experiences during our interviews. These stories became their narratives; their narratives are what appear with my interpretations in Chapter 4 of this dissertation.

Data Collection for Triangulation of Data Analysis

In conducting this research study, I collected data from multiple sources. The primary data were from the women's own words in response to the emailed interview prompts and in-person interviews. During the interview process, I used a digital audio recorder to collect participants' stories and I took field notes to supplement the interview. The other data also included study of press interviews and media reports about women in the animation industry, mission statements from organizations of women animators, and institutional structures (derived from an examination of production credits on animations

produced by an animation company). The primary tool used to collect these data was the Internet search. My narrative connecting my personal experiences as a technical director at an animation company, college animation teacher, and researcher, was another source of data that I used. Moreover, I investigated all data through the lens of Self-determination Theory (see Figure 3.1).

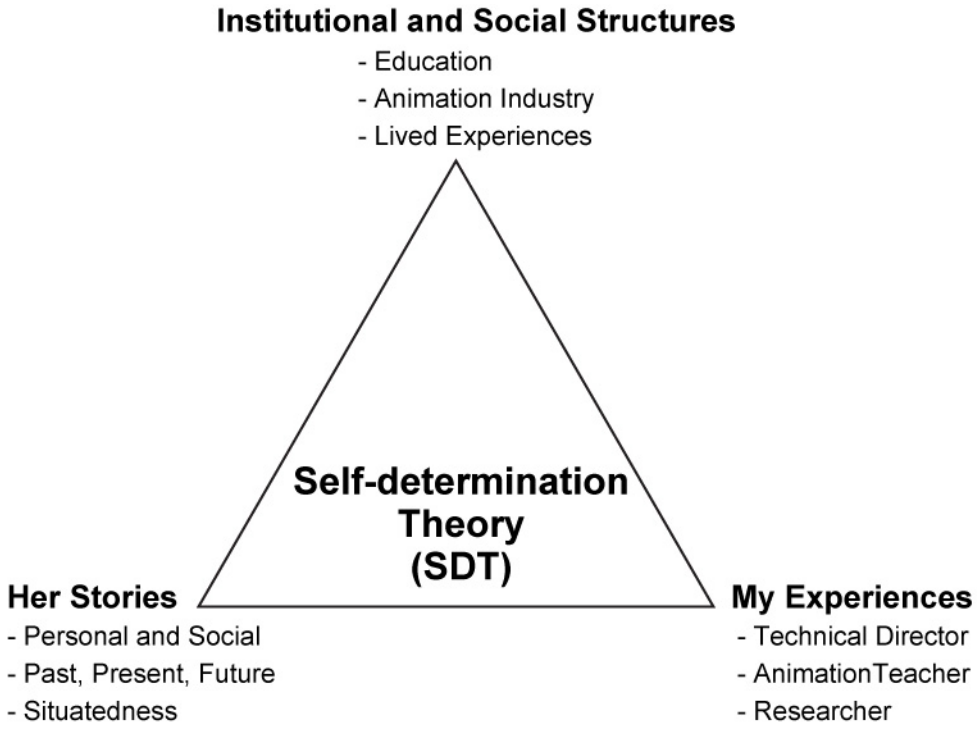

Figure 3.1. Data Triangulation

Data Analysis

Derived from a Deweyan view of experience of situation, continuity, and interaction, Clandinin and Connelly (2000) created a "metaphorical *three-dimensional narrative inquiry space*," which includes "personal and social," "past, present, and

future," and the notion of "place" as their framework to examine and understand qualitative data (p. 50). Therefore, I investigated and interpreted the research participants' stories with regard to their personal experiences, socio-cultural condition, and interaction with people at home, and in education and work environments within specific times and places.

I began by transcribing oral narratives from the interviews. I analyzed the transcripts using inductive narrative approach. Moreover, I transcribed all audio-recorded interviews verbatim, and I invited participants to review the transcript of their interview and comment on completeness and accuracy. Their agreement with the accuracy of transcripts and comments during the interview helped to substantiate the truthfulness of the qualitative data.

Also, I completed and compiled the transcriptions of the interviews using a word-processing program to create a linear text document. In this study, I investigated data within the following three categories—education experience, industry experience, and self-image of success—by using a triangulation approach to synthesize data from various sources through a lens of Self-determination Theory. The sense of autonomy, competence, and relatedness, the components of motivation, were the lenses I used to identify and code corresponding themes through reading, rereading, and reflecting on the three women's narratives. The inductive coding process allowed me to move forward and backward, inward and outward, to look for the emerging meanings of the narratives.

After repeated reading of the narrative transcripts, certain themes began to emerge; at the same time I compiled lists of the recurring themes. Then, I sorted common themes and categories to organize compared transcripts to locate themes that linked to the text.

Then, I copied excerpts from the original transcripts and pasted them into a new document, and used a color coding strategy to highlight and distinguish differences among themes and categories.

After I individually analyzed the transcripts for themes, I then found similarities and patterns by cross-referencing terms and phrases in all interview data. As such, I selected participants' comments to characterize themes and subthemes.

The three women working for three different animation studios with different expertise, different time-periods of work experiences, and different educational backgrounds generated rich, diverse, and context-bound data for this study. Using narrative inquiry to analyze qualitative data allowed me to "conceptualize the inquiry experience as a storied one on several levels" (Clandinin & Connelly, 2000, p. 71). As such, the three participants were living in and telling a life story. I, as the researcher, analyzed their life stories (see Chapter 4) through narrative analysis to address my three research questions. I carefully examined, categorized, and tabulated all data from a framework of self-determination as theorized by Ryan and Deci (2000a), and present the analysis in Chapter 4.

Narrative Inquiry Research Methodology

In this study, I adopted narrative inquiry as the methodology for data collection and analysis. Narrative inquiry is sometimes referred to as "narrative analysis" (Manning & Cullum-Swan, 1994) or "the narrative study of lives" (Josselson, 1996). It is also a form of qualitative research that captures personal stories of experiences as its data.

Narrative inquiry has been used in educational and social science research for more than two decades. As Riley and Hawe (2004) argued, story and narrative are interchangeably used but analytically different in that story is "where the primary data ends and [narrative is] where the analysis of that data begins" (p. 227). For example, one talks about her/his experiences through oral or written conversations during interviews with a researcher; the conversation represents how one understands oneself through reflection within the context of the social worlds they experienced.

In addition, narratives "reveal the meanings, conventions, dominant beliefs and values of the time and place in which a person live[s] and develop[s] an identity" (Duffy, 2007, p. 402). The meanings of their experiences, as told through their personal stories, therefore represent their understanding of their lives and social worlds that they wish to express to others.

According to Riley and Hawe (2004), narrative analysis: "(1) focuses more directly on the dynamic 'in process' nature of interpretation, and (2) begins from the stand point of [the] storyteller" (p. 229). They asserted that "integration of time and context in the construction of meaning is a distinctly narrative characteristic" (p. 229).

Tamboukou (2003) noted that "individuals use narrative form to remember, argue, justify, persuade, engage, entertain and even mislead an audience" (p. 59). Riley and Hawe (2004) also suggested that "narrative methods may give new and deeper insights into [the] complexity of practice contexts" (p. 226); and "narrative inquiry examines the way a story is told by considering the positioning of the actor/storyteller, the endpoints, the supporting cast, the sequencing and the tension created by the revelation of some events, in preference to others" (p. 227). The function of stories can "mislead audiences;"

however, they can also “mobilize others into action for progressive social change” (Riessman, 2008, p. 9). As such, narrative inquiry could be a unique method for this study in providing special insights into the complexity of these three women animators’ lives.

In order to interpret life stories through a narrative form, I systematically analyzed these stories and then wrote the analysis as critical reflection of the stories in a way that enlarged the personal as political, in that personal stories are situated in issues shared by others and of socio-political concern in relationship to the research questions.

Since narrative analysis focuses on the process of interpretation of collected stories, it was important for me as a narrative researcher to carefully examine the diverse stories collected from email responses and from audio-recorded vocal data, in order to understand how they thought through events and what they valued.

Later, I adopted self-determination as a theoretical frame to examine the socio-cultural influences on their psychological growth and decision-making at different times and places through revealed stories. Not only have I reflectively constructed meanings, but I also negotiated meanings between us through dialogues with the three women, over a period of two years. Therefore, the integration of time and context within the lens of Self-determination Theory to analyze data and to construct an analysis was central to this inquiry.

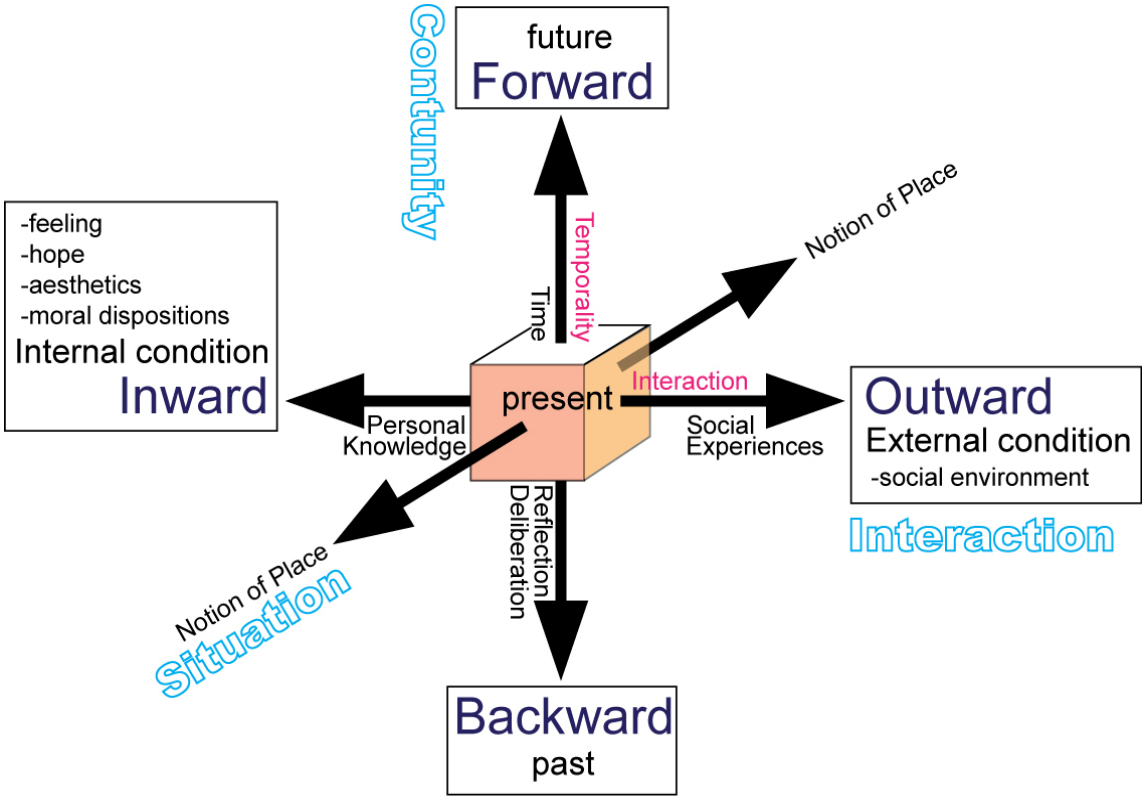

Figure 3.2. Three-dimensional Narrative Inquiry Space Diagram

Theoretical Framework

In this study, I used a theory of self-determination developed by Ryan and Deci (1985) to: (a) examine how the three women were motivated to make their decisions in choosing a professional career as female animators in the 3D animation industry, and (b) understand their concept of self-determination as it affected their success in an animation career.

Self-determination Theory

Self-determination Theory (SDT) is an approach in the study of human motivation and personality. Definitions of self-determination can be found in various literatures (Deci & Ryan, 1985; Field et al., 1998; Wehmeyer, 1992, 1996). The University of Illinois at Chicago National Research and Training Center's (2002) concept of self-determination is that a self-determined person has the free will and rights to "have full power over their own lives, regardless of presence of illness or disability" (p. 1). According to Ryan and Deci (Ryan & Deci, 2000a, 2000c), SDT is a macro-theory of motivation based on two essential assumptions:

> (a) human beings have a natural tendency toward growth and development, which can be either supported or hindered by identifiable environmental factors, and (b) human beings naturally tend toward integration of their own experiences into their understanding of the world. (Ryan & Deci, 2002, cited in Brockelman, 2009, p. 272)

SDT has been redefined by Ryan and Deci (2004) as a macro-theory that contains five mini-theories: (a) Cognitive evaluation theory, (b) Organismic integration theory, (c) Causality orientations theory, (d) Basic psychological needs theory, and (e) Goal contents theory. Each mini theory "not only varies in *level* of motivation (i.e., how much motivation?), but also in the *orientation* of that motivation (i.e., what type of motivation?)" (Ryan & Deci, 2000b, p. 54). A further assumption of SDT is that supportive and undermining environments can be identified by whether or not they meet

one's basic psychological needs for autonomy, competence, and relatedness. It is a way to understand human motivation and personality within social contexts (see Figure 3.3).

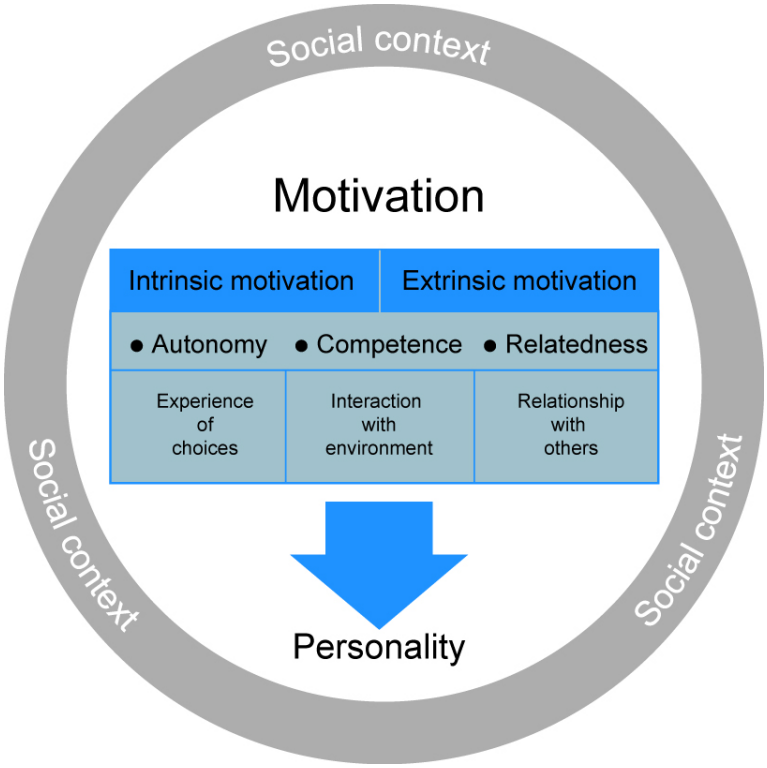

Figure 3.3. Theoretical Framework of SDT

In this study, I did not seek to investigate how these mini-theories affected the three women animators' concept of success and their decision-making when choosing an animation career, but instead wished to understand how and what kind of intrinsic and extrinsic motivation served as important factors influencing their psychological growth and decision-making in different social environments and at different times.

This chapter detailed the qualitative methodology—narrative inquiry—used in this study. Discussion included the process of using prompts to elicit stories, criteria of

sample inclusion, participant recruitment strategies, researcher's role, data collection, and use of SDT as a lens in examining the narrative data in the study.

Chapter 4

RESEARCH FINDINGS

This chapter offers a description of the data analysis and the findings from my research. Since narratives are constructions based on individual experiences and interpretations, I saw the participants' narratives not only as research data but further stories that need to be shared. Through the process of writing as inquiry, the interview texts were interwoven with my own experiences. And, I thought it was very important to include both the participants' narratives and my interpretations. Through the writing and re-writing process, aspects of experiences, themes, events, and hidden meanings were revealed through my narratives.

Interview with EnergyK

EnergyK (personal communication, August 4, 2005) said, "I have always been an animation lover." She has been involved in the animation industry for around eleven years (1994–2005) and she wears many hats—animator, art director, story-teller, production manager, teacher, and puppeteer. Most recently, she became a mother of two and a graduate student at Columbia University[10] in 2011.

I had two face-to-face interviews with EnergyK: the first was in 2005 and the second was in 2008. I knew EnergyK from her webpage on the Internet. We first met at

[10] Columbia University is an Ivy League university founded in 1754 in Manhattan, New York City. It is the oldest institution of higher learning in the state of New York.

the SIGGRAPH conference in Los Angeles in 2005; but before then, we emailed about arranging a face-to-face interview during SIGGRAPH. I called her when I arrived at the convention center and heard her enthusiastic voice. We scheduled an interview, later, at her home. I was touched by her sincerity and willingness to answer my interview questions.

The interview took place in the afternoon, on a sunny day. EnergyK led me to her living room and told me to find a comfortable place to sit for our interview. At the time, I did not know that EnergyK was pregnant and taking care of her two-year-old daughter.

When we met, she told me that she would have her second baby by the end of the year. I felt embarrassed—if I had known that before, I would not have bothered her under the circumstances. My assumption was that the pregnant circumstance is disabling because she might need more rest. I mentioned this to her. “Don’t worry about it,” she said. Then she asked me if I would like something to drink, and we found a place to begin our interview. I thought a pregnant woman might need more time to rest and would no longer participate in professional activities. It was obvious that I was wrong. A lack of knowledge about a pregnant woman’s capabilities and/or my socio-cultural image of a pregnant woman may have been factors in my stereotyping of her condition and situation.

It was a cozy, small living room. I looked around and saw sunlight passing through the window, casting a beautiful shadow on the wall which made the living room bright enough without turning on a light. I started the interview. I felt a little nervous because this was my first interview and it was with someone I had just met. She was very kind, telling me that she would slow down a bit in answering my questions. Our conversation began that way, but when aspects of the interview captured her interest, she

sped up and talked excitedly. I was impressed by her clear thoughts and animation. She was much like many of the animators I had met before who always seemed to have that quality/characteristic embodied in their real life.

I Was Kind of Boyish

When asking EnergyK about her early influence, she said, "what formulated me as a person is that my parents got divorced, and we were awarded custody to my father. So, I grew up with more men … and my older brother was my initial inspiration" (EnergyK, personal communication, August 14, 2008). She usually looked up to her older brother and would go with him to read comic books, tell stories, role-play games, and go to the annual comic book convention to be inspired by the great artists presenting there. EnergyK (personal communication, August 4, 2005) continued, "since I was the younger sister, it was monkey see, monkey do. I enjoyed being in his eyes energetic and fascinated with what he was doing." Her brother was her role model during her childhood. These early influences motivated her to become interested in the arts at a very young age. EnergyK illustrated her family's influence on her thinking and behavior as she was growing up.

> I am a very self-motivated person. I think a lot of it was because my parents got a divorce. ... [We have to] be responsible because nobody else is going to be responsible for us, and we could fail if we choose to. Not because my parents or my father would want us to fail … And, so I had to decide who to hang out with. Hang out with the people who actually succeeded … Just

> like an adult, anybody that inspires me, I want to hang out with them. Not for what they can do for me, but what I can be inspired by.
>
> (EnergyK, personal communication, August 14, 2008)

With regard to EnergyK's assertion in the above quote, this early memory from her childhood was a tremendous source of motivation as she developed ways to look at people and make decisions about her life. Her past beliefs may not be the same as those developed in the future, but they do reflect who she is today. She exhibited considerable self-confidence in proclaiming herself to be a self-motivated person. Her sense of self-motivation came from growing up in a single-parent family. She then reflected on her experiences in high school. She said:

> In high school I was kind of boyish. I was a very athletic person, so I played water polo, but I played on the men's team. That would turn off girls who had probably a more balanced family life. I had my father, my brother, and the whole boys' water polo team … I was kind of growing up around men. So, I didn't have that same stigma [like other girls do]. I had the opposite when I was growing up.
>
> (EnergyK, personal communication, August 14, 2008)

As described above, EnergyK felt natural hanging out with boys and was not concerned about gender differences. This may be because she was surrounded by male role models like her older brother and her father during her childhood. I was very interested in these comments because I had had similar experiences growing up without my father around in my life because he worked overseas, but in my case I had three younger sisters and my mom. Sometimes playing games and engaging in activities with

my sisters bored me, so I would turn instead to drawing, which allowed me to immerse myself in my own world. My early life with three sisters was my main motivation for studying art, design, and animation. I did not tell EnergyK about my childhood experiences growing up but noted this in my thoughts and nodded in agreement with her.

Then, EnergyK talked about how her father had influenced her decision to study computers. She said, "My father knew that [the] computer was the way of the future and he encouraged me to take some types of computer courses… I did not want to be a programmer, specifically" (EnergyK, personal communication, August 14, 2008). When she was in college, there were no computer animation classes, no animation programs at all, so she chose a department called "Education Technology" and began her journey towards animation.

I Didn't Have a Home of My Own So I Built My Own Existence

In the late 1980s, personal computers were just beginning to enter classrooms and homes, and very few people owned a computer at home. So, EnergyK took her father's words seriously and thought that the computer would be the wave of the future. She said:

> When I got into college, I was interested in doing theater arts. I was going to be a puppeteer, a hand puppeteer. That's what I was influenced by. Then, I wanted to be in the arts. … I actually petitioned to take as my undergraduate degree 'Education Technology,' which was like HyperCard and you know those types of things. But, it was a graduate degree, so I had

> to petition the dean to take graduate classes for my undergraduate [degree]. So I got in and I did very well. That's kind of nice.
>
> (EnergyK, personal communication, August 14, 2008)

Although the school could not offer computer animation courses at that time, EnergyK seemed very clear about what she wanted for her college education. She saw the problem and then found a way to create an alternative learning opportunity. She said, "I didn't really have a department because I had education technology, theater, and child development. So, I was split between things." She was satisfied with and proud of her accomplishments in getting a college education. This type of experience was what she wanted, so she set goals to make it happen. The challenge she faced in getting into an education technology graduate class was the goal that extrinsically motivated EnergyK to petition the dean for entry. The successful outcome filled her with a sense of autonomy and competence. This reflects SDT's notion of fulfillment of basic psychological needs from extrinsic motivation and internalizing the extrinsic to build intrinsic motivation that includes a sense of enjoyment.

The Best Thing Was Finding My Role Model at School

EnergyK's college experiences were not without difficulty. She shared examples of the best and worst:

> [in college] they had people [in] to talk, so you bring the exterior professionals into the campus, and they lecture [and do] inspirational speaking, and you can come and be inspired to go on your way, and you can

> ask questions. There was one day that I went to one of these [lectures]. It was from Disney Imagery.
>
> (EnergyK, personal communication, August 14, 2008)

EnergyK chose a specific event to illustrate the importance of inviting guest speakers from the animation industry in motivating her not only to explore animation, but to locate female role models. She described the situation at that moment when she attended a panel discussion.

> It just so happened that the panel was all men except for only one woman. This woman was a seamstress. That didn't matter to me. She still got to speak with all the men, doing a collaborative talk on some type of attraction at [the] theme park in Disneyland. She seemed very happy. And, they seemed very happy to help her ... At that time I was very motivated to do my own thing but I didn't have a lot of collaboration with many people. After the entire lecture was done, I walked up to her and asked her "Do you think it would be 'OK' if I keep in touch with you? Because someday I want to be in the industry but I don't know how." And, she said, "you can talk to me anytime you want."
>
> (EnergyK, personal communication, August 14, 2008)

EnergyK seemed to become aware of differences in gender roles in the animation industry while she was in college. Although there were many male animation experts on the panel, the one who attracted her was a woman seamstress. It seemed to me that, at that moment, EnergyK was aware of the woman speaker's social condition on the stage,

surrounded by male colleagues. In reflecting on the circumstance to students, EnergyK continued:

> … in the back of their minds, they feel like they're connected. And, that connection, which I called '*the silent mentor*,' keeps them going … I could've just as easily run up to a man but for some reason I ran up to this woman. And I just feel like, you know, I needed somebody to say "you can do it."
>
> (EnergyK, personal communication, August 14, 2008)

This might reflect EnergyK's personal need to find the female role models who had been missing from her life. It was obvious to me that the conditions of *self-awareness* and *personal importance* of the extrinsic motivation had helped her to get further support for her animation career. This type of extrinsic motivation, according to SDT, is highly internalized, enabling the individual to "proceed toward greater autonomy" (Niemiec & Ryan, 2009); further, these conditions share many qualities with intrinsic motivation and are integral to other aspects of the self. For EnergyK, her belief in her worth was reinforced by another's belief in her, and these meshed with her desire to become an animator.

My Entire Career Has Nothing to Do with Sex Appeal

In contrast to finding a female role model on the Disney Imagery panel, she shared negative college experiences with me. For example, one day EnergyK went to the dean of the 3D department for advice about studying animation. She illustrated:

> I went to the one dean at the 3D department, who happened to be a woman ... I asked her because I didn't have a woman role model in my life … She was older, attractive enough; of course she looked professional and powerful. I thought, well, if I needed a mother figure that was also a powerful woman, I would ask her. Unfortunately, she turned out to be one of the worst advisors ever. She said, "you need to look more like a woman, and look sexier"… I didn't understand exact[ly] what she's saying, but I was hoping it wasn't what I was hearing. And she said, "you need to wear skirts and then when you sit, you need to kind of lean forward to show a little bit of …" This drove me insane. … I didn't want to make her mad. So, I said, "Sorry, you're saying a little bit of sex appear will go along way?" She said, "because you're a woman, and you're around men, you going to have to work this way." You know what I did. I said, "thank you very much." ... and I did absolutely not like that.
>
> (EnergyK, personal communication, August 14, 2008)

I found this confusing because I thought that the representation of women's gender roles in the United States was more positive than in Taiwan because feminist movements were largely based in Western culture. My notion of democratic development, socio-cultural conditions, and women's rights was that the West was in a somewhat superior situation to the East. I knew that the situation might happen but I never thought that it would still happen in an institution of higher education. This gave me a great opportunity to examine my own stereotypical views about gender and cultural assumptions. EnergyK continued:

> My entire career has nothing to do with sex appeal. And I just thought nobody should give women or men the opinion that they should rely on something other than their actual strength to get somewhere. I just thought that it was the most grotesque thing that an administrator, a potential role model, could tell anybody something like that … but, you know, maybe that was a generation of how you might have to survive at that time. They did pave the way for us today, but I don't want to be that role model for the future of the [animation] industry.
>
> (EnergyK, personal communication, August 14, 2008)

EnergyK's critical reflection impressed me very much. Her experiences had drawn her attention to stereotypes about women in a patriarchal culture and male-dominated society. The external factor of motivation had made her aware of her self-image and inspired her to become a better female role model in the animation industry. Her reflective thinking also challenged my assumptions and encouraged me to rethink my own values and beliefs in the representation of my gender role and power relationship with others in a patriarchal society.

When I worked at an animation studio, I never paid attention to the relationship between power and sex appeal. I only saw people as professionals, regardless of their gender roles. The issue of sex appeal was invisible to me at that time. I might have been oblivious due to my educational background or my Taiwanese and Chinese heritage as an outsider working in an animation studio within U.S. patriarchal culture and society. With this in mind, I became more sensitive to gender issues at work and in my life.

What's the Right Way to Be a Woman?

For most people, the transition from high school to college is a major step. Different educational structures and socio-cultural environments offer students great opportunities to experience new ways of learning and experiencing their life. EnergyK said:

> … when I was in high school, I was an athlete. I didn't really think about the beautification issues or interests of women because I was always in the swimming pool. In retrospect, I was very good looking because I always wore a swimming suit. I had no like problem thinking that I was wearing a swimming suit and that's very attractive. But, you don't think that way because it's all about your athletic [abilities]. You were very focused and very kind of professional … I guess you don't get too involved in the social-stereotyping type of things; you don't get into too much trouble when your mind is idle. My mind wasn't very idle. I was much occupied … then I went into the college, I was trying to find what's the right way to do and be a woman.
>
> (EnergyK, personal communication, August 14, 2008)

EnergyK was a very self-motivated woman. She was very active and always focused on what she would like to do professionally. Until she entered college, she tended to look for a *right way* to balance her interests and her self-image as a woman. Her self-image seemed to have negotiated a sense of gender identity. She was aware of the

gender and sexual orientation perspectives applied to her by girls in high school. She said:

> When I was in high school [and] a little bit in college I was so focused on my athletics. Hanging out with the guys was more like my livelihood. It wasn't like a physical sexual thing, but a lot of women were intimidated by me and thought I was too aggressive … They thought I was bi-sexual, or homosexual. They thought I was promiscuous. I didn't think of myself as very feminine and very attractive until I got into college and realized that the social elements at high school were very immature in comparison to college … I have female role models in my life. So, I didn't think I was doing anything wrong. I just thought I don't want to waste my time doing this. I've got better things to do; there is nothing wrong with being feminine.
>
> (EnergyK, personal communication, August 14, 2008)

In order to focus on her athletic abilities in high school, EnergyK tended to ignore the social-stereotypical aspects of what girls should look like. The peer pressure from other girls could be a challenge that influenced her search for her own identity; however, motivations from her family, role models, and athlete teammates helped to provide a sense of autonomy, competence, and relatedness. This fulfillment of the basic psychological needs of SDT motivated EnergyK to keep up with the high standards inherent in self-fulfillment at different stages in her life. Extrinsic motivation could have made her an isolated or demoralized person; however, EnergyK internalized and

integrated the external factor into her sense of autonomy and competence, acting to increase her perception of intrinsic motivation.

My Career Path to the Animation Industry

"I knew that I liked animation but I was a puppeteer at heart," EnergyK said. She was intrinsically inspired by cartoons, comic books, and role-playing games. When she was in college, she did not receive a formal education in computer animation, but she still found a way to fill in this missing part of her education so that she could pursue an animation career. She said:

> Though I had no formal animation college training, and wish I had, I did get a lot of performance, video and editing experience. This gave me the core skills of an Artist's Director. Meaning, I had the eye for directing and the training as an Actor-storyteller. … [In college,] I also studied theater arts and family development, as my interests were in doing something for the educational market through the entertainment industry.
>
> (EnergyK, personal communication, August 4, 2005)

EnergyK briefly outlined how she got into the animation industry without a formal computer animation education in college. She created an alternative path of study in order to learn and gain experiences from theater, educational technology, and video-editing and became a passionate storyteller. Her goal to create something for the educational market through the entertainment industry was the extrinsic motivation that drove her to pursue a career in the 3D animation industry. About 15 years after

graduating from college, she met her goal. She established her own company as a producer to create short animated films, and she also found an education program through which to teach 3D animation to traditional Disney animators to smooth out the transition from using pencils to computer animation programs. Later, she became a director of the animation program at an art institute. From there, EnergyK inspired students to master animation tools and helped them to develop a career path toward the animation industry. Her different roles at different stages of her career journey fulfilled her need for autonomy, competence, and relatedness, and thus her personal well-being. According to SDT, the fulfillment of personal needs was the main reason she felt she'd been successful in her professional career.

EnergyK started with an important factor that helped her move toward her animation career. She described the situation:

> … I was an athlete and I hung out with athletes. We supported each other. And, I think that support externally from my family; I think everybody could use that kind of community. … I do think that life fulfillment is about building a community no matter how small.
>
> (EnergyK, personal communication, August 14, 2008)

Knowing how to increase an individual's learning capacity is important. It also was important to build up her community to have peer support. In her case, EnergyK's family is her initial support in her life. During her high school years, she found this community by joining a swim-polo team, where she developed a social network and, thereby, fulfilled SDT's basic psychological needs for autonomy, competence, and relatedness within specific "social contextual conditions" (Ryan & Deci, 2000b, p. 65).

After talking about an important experience in high school, EnergyK shared another important experience from college. In order to gain practical experience before pursuing a job in the animation industry, EnergyK took internships before graduation. She emphasized that:

> Internships were a key to learn how the real production world worked. While in college, I had an internship with the local television news station. Directly out of college, I also interned at a post-production studio in Hollywood, where they did computer digital visual effects for top movies. In both these internships, I got exposure to the production process and how team collaboration works … Internships is the best starting point and looks very impressive on your resume.
>
> (EnergyK, personal communication, August 4, 2005)

There is always a gap between schools and industry in 3D animation. EnergyK suggested an important key point: having internship experience can help students gain hands-on experiences in the real world before pursuing their jobs in the industry. I agreed with her because that was how I got my first job in the 3D animation industry. EnergyK decided to pursue a job in the industry before graduation, but she still did not have enough confidence to convince herself that she would be successful. She said, “before I graduated from college, I sent a bunch of resumes out … I said that I’ll do anything, be a secretary. I’ll do whatever is necessary.” Her concentration and open-mindedness during her job-hunt revealed a goal—the personal importance of getting a job—as the extrinsic motivation that drove EnergyK to create opportunities for herself in the animation industry. By applying for an internship, her self-determination acted as a source of

extrinsic motivation: as noted by Ryan and Deci, “choice and the opportunity for self-direction appear to enhance intrinsic motivation” (Ryan & Deci, 2000b, p. 59) and, thus, helped her attain a greater sense of autonomy. EnergyK continued:

> I don’t really knock [on] too many doors that close on me because I was a woman. There wasn’t a lot of opportunity just because I was a woman … For the most part in this industry, the only time the door closes is because the door of the studio closed, because there’s no work. And, I was one of many who got to do more.
>
> (EnergyK, personal communication, August 14, 2008)

EnergyK was very proud of being continuously employed in the unstable 3D animation industry. While some conflicts may have occurred in her various work situations, she was confident in her professional knowledge and skills. Here, the satisfaction of synthesis with self, and personal importance were the components of extrinsic motivation that fulfilled the sense of autonomy and competence that kept her at a high level of performance in the animation industry.

In addition to internships, EnergyK mentioned attending animation-related events and conferences to meet people, be inspired, and establish her social network. As EnergyK described it:

> I was invited to work in SIGGRAPH [conference]. When I went into SIGGRAPH I still didn’t find where I fit … SIGGRAPH was once a year so that [my] job was coming to an end. I need to find something I would like to do in the industry for the long term. So, I helped start this group called

> *Women in Animation.*[11] I was basically the new woman … [In Women in Animation at SIGGRAPH] there were twelve women who have been in the industry. Some of them were in the media aspect of it, some of them were studio owners, and for the most part they were just trying to support each other. They need more women in the industry. … I am more than happy to do anything this community needed because this is my community. I didn't care about [my] title at this time; I cared about making something happen. And, I got very good responses from that type of attitude, and I installed that attitude into my students … It's not about me; it's about us.
>
> (EnergyK, personal communication, August 14, 2008)

In hearing about EnergyK's experience at SIGGRAPH with women from the *Women in Animation* organization, it was clear that she enjoyed what she was doing, so much so in fact that intrinsic motivation had taken place. The engagement with a women's community, Women in Animation, reflected how the extrinsic motivational factor, awareness of an external demand, fulfilled her sense of competence. Her interaction with the social environment provided a sense of relatedness to people in the community and enabled her to build relationships with others. Her enthusiasm for what she was doing and where she was going professionally, and her willingness to share and help others, made her a successful role model to her students in a private art institute. Her attitudes and experiences became a force that served to drive her toward success.

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[11] Women in Animation is a professional, non-profit organization established in 1994 to foster the dignity, concerns and advancement of women who are involved in any and all aspects of the art and industry of animation.

I Have Been Successful in My Career

EnergyK proudly said, **"**I've been very successful even if the industry was up and down, I usually can keep fairly stable" (personal communication, August 14, 2008). She felt that her *personal growth*, the desire to learn and work collaboratively with other professionals on different tasks in the 3D animation industry, had been the most influential factor in her success. It had led her to a superior working status and industry recognition. EnergyK defined her career success according to three different approaches: *personal growth*, *work status*, and *industry recognition*.

Motivation for Personal Growth (from Hands-on Research)

Self-motivation kept EnergyK's animation skills in good shape even though she mainly does production management today. She said:

> The industry is one of art and technology, which each, by definition, is always redefining itself and in a constant state of growth. [To] keep up with these growth challenges, one needs to make time and effort to roll up their sleeves and do the research. I have found that if I can not find the time at my day job, which is now much more demanding and full of supervisory and managerial meetings, to get into the trenches of the hands-on work, I will create smaller independent film short productions (generally outside work) to collaborate on in order to sharpen my skills. … Although I truly love the complete freedom of learning and creating independently, it's very tough to make the time. I rarely, if ever, get the time for this learning luxury at work.

(EnergyK, personal communication, August 4, 2005)

EnergyK's personal growth in the 3D animation industry stemmed from research involved in creative production. Her definition of research at this point was to look for resources such as tools or software that could help her to get her job done. Creating 3D animation is a complicated working process. Animators must understand how to implement animation principles and utilize relevant application software, which are constantly changing. Thus, animators must be able to teach themselves. Their desire to communicate and ability to visualize an animation motivates their learning of ever-changing technologies. In order to effectively transform a good story through visual forms, animators need to research technologies and study animation and other new media art through creative and practical applications. Experiments with 3D animation software, new modes of storytelling, and drawing processes challenge the limits of technology and animation as a communicative art form.

EnergyK pointed out that animators need time and much hands-on practice to gain experience. Their production experiences are constructed through different approaches directed toward achieving better outcomes. The extrinsic motivation to be able to reach a goal, a better outcome, leads eventually to feelings of satisfaction in being able to meet external demands and to a sense of competence in doing a great job. In addition, fulfillment of a sense of relatedness requires collaborative work with other animators, with such interactions serving to improve animators' skills and offer valuable experiences in handling animation tools. As such, motivation to create an independent animation that would result in feelings of satisfaction indicated EnergyK's fulfillment of her "basic psychological need" (Ryan & Deci, 2000c), sense of autonomy, competence, and

relatedness of SDT. Other motivations included teaching, writing articles, and presenting. Accomplishment of these tasks leads to feelings of empowerment of both self and others by sharing knowledge with others. According to SDT, intrinsic motivation fulfills EnergyK's sense of inherent satisfaction from sharing, fulfillment of a sense of relatedness from extrinsic motivation, and ego-involvement from self and others. Her professional engagement in creative research and production has yielded industry recognition.

Work (Credit/Title) Status

EnergyK has produced many award-winning animations that have brought her many credits. She is a great communicator and team leader. As she said, she can always find the right person in the right place. Working with people with different specialties in making 3D animation projects has helped EnergyK to become a notable production manager and producer. She explained:

> In the entertainment business your credit/title is both how you are known for the craft you do and it also affects your pay scale. Climbing the ladder can be prestigious, but at some point there may not be a new title to climb to. At which point some challenge themselves by constantly perfecting their craft and become masters. Some challenge themselves by changing roles entirely and learning a new branch of the craft.
>
> (EnergyK, personal communication, August 4, 2005)

Here, satisfaction attained through working status and competence is an important component in motivation to succeed. Pursuing promotion not only secures financial status, but enables one to become a professional. Since not many people can be promoted due to the limited number of positions available in an animation studio, most may stay in the same position for many years until being laid off or electing to retire. Therefore, people in the industry often learn different tools at the same time to prepare for a change in their position/role on a team.

EnergyK was proud to have had many titles, such as animator, writer, producer …, etc. But she emphasized that her current favorite title was *mother*. What impressed me the most was that she usually had a positive attitude toward changes in her career because she is in control of those changes, including the choice to be a mother. She decided on the timing of this role as she fulfilled her other endeavors. EnergyK affirmed that being a full-time mother is her current priority. When talking about career, the usual thinking is that professional development occurs outside of family life. However, EnergyK claimed that her role as mother was a stage in her career; this assertion made me rethink my assumption that parenting is not a professional career. Her perspective also provided me a better understanding of different meanings of *career* in a patriarchal society. Women's role as mother might have become a public norm over the course of many years, yet women's roles have been gradually changing as is evident as more women take on more responsibility in different fields today.

Industry Recognition

EnergyK has received high recognition as an award-winning director, animation journalist, conference speaker, and writer. She has inspired many people to pursue careers in 3D animation while teaching 3D animation in school, giving lectures at conferences, and conducting media interviews. I was inspired by her life story about her career path into the 3D animation industry. She emphasized:

> This point is especially important … I like the idea of being a *silent mentor* for others to gain strength and encouragement from so they can tell themselves, "If she can do it so can I!"…With this, I honestly feel there are many, many successful women in this industry but most keep a low profile, meaning they keep out of the public eye.
>
> (EnergyK, personal communication, August 4, 2005)

I was curious to learn why she felt many successful women keep a low profile. She clearly does not. In talking with her, I gained greater insights into the many challenges faced by women as they seek to pursue careers in 3D animation. An understanding of these challenges is important to truly understanding the nature of the industry and all that women endure to become a part of it. In addition, self-motivation is the key: In feeling confident about her skills and experiences, EnergyK has been able to expose herself to the public and become an image of a successful woman in the animation industry. She described this situation as follows:

> … at the top industry conferences (GDC[12], SIGGRAPH, VES[13], etc.) the percentage of women presenters to men is extremely low. Why is this? Is it because it really is just a "Men's industry"? Well, luckily for us all, I know women are important co-workers in this industry, and that their numbers are growing, because of the longitudinal study I've done on the subject (http://women.animation.org/)[14]. I attend most of the major industry events each year and I see a lot of new, eager, and talented women attending. I can see it in their eyes that they are looking for inspiration, especially from other successful women.
>
> (EnergyK, personal communication, August 4, 2005)

EnergyK devoted herself to actively giving lectures at conferences, created a website that included more than 40 online interviews with women in the field of visual arts, effects, and animation, and founded her own animation studios to which she applied her considerable enthusiasm for and knowledge of the 3D animation industry. While I was not able to attend any of her lectures, I collected articles based on press interviews with her regarding her thoughts about how to move more students toward careers in 3D animation, why there are fewer women in the animation industry, and how to attain success in this industry. These are described in the literature review chapter.

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[12] GDC stands for Game Developer Conference, the largest annual conference of professional video game developer, focusing on learning, inspiration, and networking. It was first organized in 1988.

[13] VES stands for Visual Effects Society, the professional organization dedicated to advancing the arts, sciences, and applications of visual effects and representing the full breadth of visual effects practitioners in all areas of entertainment from film, television and commercials to music videos and games.

[14] Her study was supported by three-year (1997~2000) research grant which EnergyK received from the Women in Animation Association. The goal of this study is to create an online discussion platform for female animators to share their experiences in the animation industry.

Epilogue

After having children, EnergyK decided to spend more time with her family and so engaged in seeking ways to balance her professional career and personal life. She described her efforts as follows:

> I do have some women in the industry going back to the gender biases in the industry. A lot of women feel like they can't have children because [it's] either the career or kids. Not because they don't want kids, they decide that they can either have one or the other. They work so hard to get to a certain level in their career that I guess we're not going to have kids and you know that's [a] life decision … Like myself, [I] have decided to take time away. I am taking it completely away for a couple of years for my kids … Within their [kids] need, I will be there. They are the most important thing for me though. They are my community. That's not a woman's point of view, but that's my decision. My husband and I have talked about it. One of us is going to raise our children. We are not going to give them to a nanny or to some hired place we put money into … I love to be around my kids.
>
> (EnergyK, personal communication, August 14, 2008)

Although EnergyK had received much recognition for her many professional achievements, she did not think being a woman made her work difficult. However, when she decided to have her baby, she dramatically shifted her career from industry to her home: "Being a qualified mother is a professional job and it is part of my career." This was an important factor, the fulfillment of a sense of autonomy, which allowed EnergyK

to feel confident in her decision to be a mother. Furthermore, EnergyK did not view departure from her work in the industry as a loss; to the contrary, she thought nursing her baby and watching it grow up was an important decision which she had made without pressure of any sort, and thus served to fulfill the psychological need for competence according to SDT. In fact, social expectations in the animation industry challenge women to become mothers and full-time employees. In doing otherwise, she challenged social norms in her professional context. Furthermore, the shifting career path of being a mother had created for her a different sense of relatedness. It seemed the right time to shift her life from the industry to her family. EnergyK said:

> I don't want to work overtime, really anytime, 60–80 hours a week. I never wanted to do that again. I don't want to have to skip Christmas because the deadline has been pushed in two weeks and it ruined Christmas and New Year's. I'm not at that stage anymore. I've already put my time in and built my relationships. I am not interested in that challenge in my life. My challenge is to find what I really enjoy and be good at that.
>
> (EnergyK, personal communication, August 14, 2008)

A successful career includes satisfaction with living and working conditions, and self-confidence in every aspect of life. The definition of success depends on one's personal ideology about the value of life. People from different social and cultural backgrounds define success differently. A look at EnergyK's experiences enables us to understand that she has had successful careers as an animator and as a producer. Today, EnergyK has chosen to pursue her next career path, as a mother—one on which she believes she will be successful, too. Fulfillment of a sense of autonomy, competence, and

relatedness within motivation has enabled her to enjoy a successful career and personal well-being, as well.

Interview with RigC

RigC is a Rigger who had been working in the 3D animation industry for 25 years[15]. In person, she was a small and very generous woman. She was referred to me by a friend in the animation industry.

I first met RigC in August 2005 at the SIGGRAPH conference. Before going there, I sent her an email to set up an interview time with her while she worked in her company's exhibition booth. She told me to look for an Asian wearing a company T-shirt on the exhibition floor. I thought it would not be too difficult to find her.

As expected, I found her easily when I arrived at her company's booth. But, she looked surprised and confused, and said aloud, "you are a guy!" I was a little surprised by her reaction and kept silent for a second. "Yes, I am a man," I said. I asked myself, "Why did she express such surprise in seeing a man?" RigC seemed a bit embarrassed at her reaction. She explained that she could not tell my gender from my name on my e-mail; most importantly, she did not think that this type of gender-related study would be conducted by a man. I thought it was her, or perhaps most people's stereotypical thinking. We both laughed about her reaction. After RigC finished her work, she took me to her studio for our interview.

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[15] The Rigger is the person who creates animation control attributes for animators to articulate 3D models in the animation industry

During the SIGGRAPH conference, many of her colleagues were attending meetings there and they were not in the studio. RigC showed me around her studio first, and then I was led to a wide-open space with several couches to begin our conversation. It was a nice, quiet space for people to meet and talk. We began our face-to-face interview.

I Was Not Sure if I Could Make a Career Out of It

RigC did not have the type of formal computer animation education that would lead her toward a specific career goal in the animation industry. She said, ". . . in junior high school, I do remember I had a desire to do something in the entertainment industry but couldn't quite put my finger on it." Her self-awareness of her interest motivated her to go through the different challenges necessary to attain an animation career. As she described it:

> … I didn't want to be a director or screenwriter. I just had [an] inkling that there must be some other field in that industry I could do and do well … There weren't any computer graphics going on at all at this time in 1976, while I was in junior high school … when I was going to UCLA[16] as an undergraduate, I was studying graphic design.
>
> (RigC, personal communication, August 3, 2005)

RigC began by recalling junior high school memories. It was during this time that she began to gather knowledge about art and design, which were important foundations

[16] UCLA stands for University of California in Los Angeles.

for her later study in animation. Although she did not know how to attain a career in the animation industry then, she believed she could do it. Her self-confidence, sense of autonomy, and competence motivated her to pursue an animation career. RigC (personal communication, August 3, 2005) reflected, “I never thought I had a real talent at drawing … Animation was something that I thought would be fun to study, but I never seriously thought I could make a career out of it.” Rather than becoming frustrated about her inability to draw, RigC sought background knowledge on animation in order to break through into the [animated feature] film industry. To remedy her lack of animation knowledge, RigC went to college and studied film to gain competency. Her educational experiences were not all good, but her positive learning experiences motivated her to face challenges in her future career.

The Best Thing Happened at The Learning Center

While talking about her most influential learning experience, RigC suddenly became exciting and talkative. She described the *Learning Center*. She was selected to attend the Learning Center during her junior high school years. She believed that this was one of the most influential experiences she ever encountered. It was also the most memorable time of her younger years. This experience served as an external motivation that made her feel more connected with the teacher-student relationship, and the subjects of graphic design and multi-media. As RigC described it, it was:

> ... an experimental education program that promoted closer interaction with teachers, smaller classes and encouraged independent thinking by all

> students. Curriculum and studies could be driven by the student independent of any pre-determined classes set forth by the faculty. This was in junior high school.
>
> (RigC, personal communication, September 26, 2008)

At the learning center, students were allowed to express their opinions and decide which topics they wished to study, even if it went against conventional thinking, such as a study of the Vietnam War. Various issues and hidden facts that differed from official U.S. government communications were introduced and discussed in that class. Students were encouraged to make a claim from their perspectives. The discussions were more like those that would occur in a college setting, and classrooms were arranged in a non-traditional layout. Students were encouraged to explore their own interests and conduct research, which included career path exploration.

RigC remembered her experience in developing a multi-media presentation with limited resources that combined music with a graphic slide show to sell a product. This experience led her to decide to pursue a career that combined graphic elements with sound and animation. Her study experiences at The Learning Center gave her a feeling of autonomy about choosing a subject for study, the competence to complete a satisfying and satisfactory project, and relatedness with her classmates and teacher. Gaining autonomy, competence, and relatedness was an important motivational factor in pursuing a career in the animation industry.

I Didn't See Any Real Option

"Architecture was an interest I was going to pursue out of high school, but I opted for graphic design instead" (RigC, personal communication, September 26, 2008). After graduating from high school, RigC could not reflect on any specific ideas in college, but she knew that "it was going to be difficult to break into a male-dominated [animation] industry where jobs were scarce to begin with" (RigC, personal communication, August 3, 2005). She only knew that she wanted to study animation but she was hesitant and unsure whether she could break into the industry. RigC perspicaciously sensed the issue of gender imbalance in the animation industry. The male-dominated culture there did not discourage her; instead, she established a clear goal, a synthesis with herself, which motivated her to build a path toward an animation career.

When RigC earned a BA degree in graphic design, there were few job prospects after graduation. She decided to go back to school to study architecture and hoped she might have more job opportunities. While she did not feel that the architecture program was a strong program, "many of the principles in architecture I did learn to apply directly to building 3D models, which was useful early in my CG career and even today" (RigC, personal communication, August 3, 2005).

Although RigC mentioned being positively influenced by architecture, her learning experiences in the architecture program were not smooth. RigC mentioned negative situations she encountered there:

> In this [architecture] program, they threw about 30 students into one huge workspace with one teaching assistant, F. He went on to become a pretty

> well-know southern California architect … The problem with the program was, if the TA didn't like you, you were left on your own. No guidance, no instruction. It was a bit too free-wheeling. I, of course, was not one of F's chosen few, so he rarely spoke to me or gave me any input. I felt like he thought I was wasting his time. …it was such a bad situation; I ended up dropping out within 5 weeks.
>
> (RigC, personal communication, September 26, 2008)

RigC's experience in architecture was very discouraging. Her extrinsic motivation drove her into architecture, but it was not sufficient to sustain her intrinsic motivation to enjoy her course of study. Under these circumstances, RigC had developed a sense of autonomy in deciding to study architecture, which was intrinsically supported by her personal interest and also extrinsically supported by the synthesis of a goal; however, once in the architecture program she felt isolated and she was excluded from a sense of relatedness with the teacher (i.e., her teaching assistant F). These obstructed her sense of competence in her studies. It seemed that this teaching assistant's attitude toward RigC thwarted her sense of competence and relatedness. RigC explained that because she was one of the few girls perceived to ask too many questions, the teaching assistant viewed her as a troublemaker in his class. However, F did not attempt to create a participatory communication environment in which students could ask questions—a situation that prevented RigC from developing the extrinsic motivation needed to study the subject.

RigC autonomously decided to quit her study of architecture after five weeks. She then studied animation at a film school about six months later, which led to opportunities to learn about computer graphics and 3D animation. This was an exciting time since the

animation process was changing in these years, the 1990s. RigC's career path toward the animation industry was a long journey. She spent much time searching for programs of study and building up related knowledge for her animation education. According to RigC, "I thought that I could blend my education in graphic design and my interest in the budding computer graphics world to work on motion pictures" (RigC, personal communication, August 3, 2005). She began searching for a career that would allow her to work on special effects, which became especially popular after the success of *Star Wars*[17] and its sequels. RigC explained:

> At the time, model making and motion control camera work were the primary jobs available. And gaining experience in these areas was very limited. You couldn't take a course or get a degree. It was just "on the job" experience … So after the success of *Star Wars* and the sequels, and the advent of special effects in commercials, slowly the opportunities to get work started to expand. I was lucky to break in at this time. … For anyone who wants to break into animation, it takes a lot of hard work and perseverance … that hasn't really changed.
>
> (RigC, personal communication, August 3, 2005)

Although RigC did not have direct training in animation at school, her experience in learning architecture was discouraging. Finally she went to study animation at a film school and got an opportunity to learn film making, editing, movement, line of action, and live action. Her education and networks at the film school led to her first job as a

[17] Star Wars is an American epic space opera franchise conceived by George Lucas. The first film in the franchise was originally released in 1977, and then soon became a worldwide pop culture phenomenon.

camera operator for companies like RA&A[18] and NBC[19], then gradually to shift her career and become a character rigger for 3D animation at DD[20], Walt Disney Animation Studios[21], and DreamWorks Animation.[22] Her animation studies in film school eventually enabled her to engage in computer graphics. This began her career in the film industry and then in animation.

Sometimes I Do Not Feel Motivated

The animation industry is very "departmentalized" (RigC, personal communication, August 14, 2008), with people stuck doing one thing because "they want the best at that particular part of the production pipe-line … and they want you to be specialized" (RigC, personal communication, August 14, 2008). RigC's specialization is rigging, which involves setting up controls for characters so they can be animated. According to RigC, "… they needed people to cross over" (RigC, personal communication, August 14, 2008), which meant people needed to share ideas and different experiences. However, the animation studio did not work out well because "they stereotype people" (RigC, personal communication, August 14, 2008). She said, for example:

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[18] RA&A stands for Robert Abel and Associates established in the early 1980s. It was a pioneering production company specializing in TV commercials made with computer graphics.

[19] NBC stands for the National Broadcasting Company formed in 1926. It was the first major broadcast network in the United States

[20] DD stands for Digital Domain. It is a visual effects and animation company founded by film director James Cameron, Stan Winston and Scott Ross in 1993.

[21] Walt Disney Animation Studio was founded in 1923. It is an American animation studio and the subsidiary of The Walt Disney Company responsible for creating animated films.

[22] DreamWorks Animation SKG, Inc. was founded in 1994. It is an American animation studio which primarily produces a series of commercially successfully 3D animation films such as *Shrek* and *How to Train Your Dragon*.

> …[In a project review meeting] if someone asked for suggestion like ‘give us a story suggestion ... ,’ and for whatever reason whether you’ll [have] been really honest and say ‘you need to change this,’ and somebody in the upper-levels who didn’t like it, and [then] you are gone. So, people stop offering their comments and suggestions.
>
> (RigC, personal communication, August 14, 2008)

It became complex: “people are protecting what they know and who they know,” and some people “got burned out on the politics” (RigC, personal communication, August 14, 2008). She asked herself, ‘why am I staying in this?’; ‘I don’t have to stay in it,’ she answered instantly. “I am done with this. I am ready to get out” (RigC, personal communication, August 14, 2008). I was impressed by RigC’s reflection on her working experiences in this animation studio, which did not seem positive. I was curious to learn that RigC had thought about leaving her job and moving on to a new career. Something must have kept her motivated to work in those circumstances.

RigC sometimes felt disappointed about the state of the animation workforce, but cited values to the work, which included the benefits and income, and earning positive feedback from peers—these are the external factors of motivation. She elaborated:

> I am complaining, but it’s probably the best company that I’ve worked for, because the benefits are great, the environment, the office, the spaces they provide for you are great. But, I think sometimes the politics just wear you down … I would’ve liked to maybe have had one more leadership spot. But, you know, when you get older, it’s not as important anymore. I don’t know why that is.

(RigC, personal communication, August 14, 2008)

Her response sounded tense. On the one hand, RigC seemed very upset about the politics of the animation industry; on the other hand, other conditions such as having a comfortable office and salary seemed the best option available to her. Thus, her sense of autonomy diminished when opportunities in the workplace stagnated.

Throughout our several conversations, RigC seemed very motivated to accept the challenges of being a team leader; however, she could not sustain the politics involved in getting promoted. For that reason, she stayed in her position as a team leader and declined a promotion to a higher position because there would be more meetings, politics, and uncertainties. In her words:

> The other thing is that you can be up there [as a supervisor], but when they start doing lay-offs, they need more artists than supervisors [for the production]. They've plenty of people that they don't need up there. There's usually going to be one. I think that's why people in there [higher-position] are under more pressure, and that's why all the politicking happens because they want to remain in that level … I knew people who get up there, but they don't stay up there. And, what do they do? They're devastated, because [they fear that they will be fired or demoted].
>
> (RigC, personal communication, August 14, 2008)

When RigC felt that she could not be satisfied with the external reward of being promoted to a higher position, she lost the sense of competence that attended the recognition and prestige of being a team leader. The uncertainty and insecurity of taking a higher but more expendable position kept her from pursuing higher positions. She

explained: “I think I like what I’ve done. I’m glad that I did it. As I said before, my prior [goal] was changed and I am ready to move on. And, maybe have a nicer level of living” (RigC, personal communication, August 14, 2008). I was aware that she was seeking change at that moment, and then I asked her, “what would you do next?” She said, “it depends on what my husband is going to do” (RigC, personal communication, August 14, 2008). I was surprised to hear her answer and confused because she was an independent woman from my perspective. Her answer revealed that under these circumstances, she depended on her husband.

RigC had been working in the same animation studio for 13 years (1995–2008). The box office revenue generated from this studio’s animated films was not as high as it had been before. In the past three years (2005–2008) she had seen many people laid off from the studio. She sensed that they might close the entire 3D department within the next six months. I could feel her worry about the uncertainty of her career. Because of those feelings, RigC then shared what she might want to do if she left the animation studio. She said:

> I was looking at the health care industry. If I have to go to another area, there will be always hospital[s]. It would be a total change if I do that. Or, the other option, my husband and I are thinking of trying to do our own business … maybe it means my priorities would’ve changed. I think that’s it.
>
> (RigC, personal communication, August 14, 2008)

I was surprised to hear her thinking about working in a completely different field, and felt that she needed a strong motivation to make that sort of decision. Under these

circumstances, the uncertainty of her career in the animation industry had extrinsically motivated her to plan ahead for another career in order to achieve a sense of autonomy and competence.

For the Longest Time, I Was the Only One

RigC's long-time employment at her animation studio had led to her promotion to a rigger team leader in many 3D feature animations.[23] She had been aware of the gender imbalance in the animation industry since junior high school. When talking about her gender role and relationships with her colleagues, she was eager to share more stories. For example:

> I would say in our department, probably twelve, there are three of us. They called [us] the Character TD[24] department. What you do is that you are rigging controllers and deformers for characters, and that can include cloth … And, for the longest time, I was the only one [female rigger]. You know, years prior. It's a very low ratio for women … I think lots of women go into compositing and lighting … I don't like to say that it's less technical, but it's more artistic … What's really unusual is in this year [2008] we have our first female modeler.[25] In all the shows that I have been [in on] here, there were never female modelers. So, it's kind of interesting. I don't know if it [is] going to change now that schools or universities are expanding

[23] A 3D feature film refers to a three-dimensional computer animation
[24] TD stands for Technical Director.
[25] Modeler is the person who creates computer models like characters for animation.

> their CG[26] education. And, that could be why? Maybe that's why I am seeing a female modeler.
>
> (RigC, personal communication, August 14, 2008)

She believed that in the past decade, more female students had gotten into animation programs but the animation industry was still a "male-dominated industry" (RigC, personal communication, August 14, 2008). Even in software development, most software programmers are men. In all, her working experience in the industry had led her to reflect on gender imbalances in specific positions within the animation industry.

They Don't Want to Work Under a Woman

Although RigC had been promoted to team leader, she still had lots of challenges to overcome. RigC shared her experiences in being the only woman team leader in a group of men teammates. She elaborated:

> You have a lot of young guys in this business for whatever reason, egos? Whatever? They don't want to work under a woman. When they get to a level they can either pick or choose who they want to be a lead supervisor, they will pick a guy. They will pick a friend. And that [picking a friend] could be too false. It could be because they feel more comfortable, and if they get mad at you they feel [more] comfortable yelling at a man than yelling at a woman. Whatever? That's a professional viewpoint? I don't

[26] CG stands for Computer Graphics.

> know. By the time I was chosen to lead, I was actually recommended by a guy. He thought that I would be good.
>
> (RigC, personal communication, August 14, 2008)

Normally, when people make decisions about the people with whom they would prefer to work, they choose the one whose professional skills and personal relationships they know well. RigC's team leadership experience revealed that the animation industry was still very much "a boys club" (RigC, personal communication, August 3, 2005). Promotion, from her perspective, was not only a reward for her great performance but also an honor. In other words, she was being treated as a responsible person able to lead the team. RigC said:

> You have to be a 'people person' really, and to delegate. Just because you are the most technical TD doesn't mean that you are going to be a good supervisor.
>
> (RigC, personal communication, August 14, 2008)

In order to lead a team, RigC had to demonstrate that she had enough knowledge about and experience in her craft, had good communication skills, and could bring people together. For example, at the very beginning, her teammates might question her leadership and then raise questions and identify problems to challenge her. However, these challenges did not demotivate her or cause her to lose her confidence to lead a team. They became extrinsic motivational factors that were internalized and integrated to support her intrinsic motivation to fulfill the sense of autonomy in facing a problem, the sense of competence to resolve problems, and the sense of relatedness to develop leadership and relationships with her teammates. After she proved that she was capable of

helping her teammates overcome problems and questions professionally, she was accepted and her leadership was established.

When Women Start a Family, They Drop Out

In addition to gender bias in the workplace, there are other challenges for women in the animation industry. The most important issue concerns family expectations. Although RigC did not have children, she provided an example of how a woman friend encountered problems when she had children. She explained:

> …when she was working on this film, they had a lot of overtime you had to do, which means she was working also on Saturdays and working late on weekdays. She never got to see her daughter very much. And I think women may come in early before they have families. You know, maybe it would've worked it out, but then they start families they are not going to do this kind of work anymore.
>
> (RigC, personal communication, August 14, 2008)

The long working hours are an important issue for both women and men to consider as they decide whether or not to enter and stay in the animation industry because of the difficulty in sustaining stable relationships. It is common for couples to both work in the animation industry because they meet each other in the workplace, share similar interests, and understand working conditions.

During these interviews it became obvious that establishing a family and having children were important issues for both women and men to consider in their career in the

animation industry. It is difficult for a woman or man to balance parental and professional roles when having children. However, the social expectations ingrained in women and men frame a sense of autonomy, a sense of options and decision. In a patriarchal society, many women believe their only option is to quit their job if they're deciding to have children. Men rationalize that a woman can only breast-feed while not employed. Autonomy is confused with perceptions that when a woman has a baby, her priorities change, while a man whose wife has had a baby does not change his priorities. Does care of children preclude being both a good parent and a good professional? Might work conditions change to consider pregnancy and dependent caregiving normal aspects of being human, rather than regard non-pregnant or non-parent as part of the natural state of being human?

I Still Feel I've Been Very Successful in My Career

In the male-dominated animation industry, it is even more difficult for women to strive for a successful career. RigC felt that she had been successful because she "has achieved steady employment in a very unstable industry" (RigC, personal communication, August 3, 2005). The sense of fulfillment in achieving certain goals made her feel successful. She said that, "I sometimes feel it would also be very fulfilling to move into more of a supervisory role" (RigC, personal communication, August 3, 2005). Getting promoted is one kind of extrinsic motivation in that the reward of self-importance and synthesis of self develops a sense of competence and relatedness. RigC indicated her sense of competence and relatedness in the following: "I believe companies/productions

are confident that they can rely on me and my expertise to get the job done" (RigC, personal communication, August 3, 2005). Her confidence came from the studio's reliance on her ability and from feeling that she was trusted.

Epilogue

RigC was asked to leave her job just two weeks after our meeting during SIGGRAPH in 2008. She said that it was "not a total surprise, but somewhat unexpected" (personal conversation, September 6, 2008). When she was thinking about shifting her career from animation to the healthcare industry, she seemed not to be ready to make the transition to a new career. Therefore, she applied for another job at another well-known animation studio, and she was offered the job two months later.

RigC loved her new job and told me that "here is really like a dream place to work" (personal conversation, September 6, 2008) because the way people created their animation was more professional than had been the case at the studio where she had previously worked. The benefits and working conditions were both better than she had had previously. Finally, RigC had worked continually in the animation industry for approximately 25 years (1986–2011). Moreover, in successfully moving to a new job at another well-known animation studio, it is important that she continue to be a role model as a successful woman in the animation industry.

Interview with PerfectY

PerfectY is a 3D animator born in Japan who received her undergraduate degree and graduate education in the United States. She had been working in the animation industry for around 15 years (1995–2011).

I first learned about PerfectY from EnergyK's website, *Women in the Realm of Computer Visual Arts, Effects, and Animation*, for female animators, where PerfectY left an interview message in which she shared ideas and experiences as a woman animator in the animation industry. When I asked my friend in the animation industry to introduce me to experienced women animators for my study, PerfectY's name was one of the two provided to me. She was very supportive of my work since first learning of my study.

Our first interview occurred at the SIGGRAPH conference on August 3, 2005. Since she had only about thirty minutes to talk with me, we arranged to meet for our interview at the dining area of the SIGGRAPH convention center during lunch time. The dining area was crowded and noisy, but we could not have had a better choice for an interview location and lunch at that time. I did not know that PerfectY had a twenty-month-old daughter with her at SIGGRAPH. When we began our interview, PerfectY's husband came to pick up their daughter. I was sorry that the interview had caused the separation; in order to accommodate me, her daughter was getting one less hour with her mother. This offered a real-time example of women animators balancing professional and personal lives.

Dual-degree with Computer Science and Visual Art

When talking about her educational experiences in animation, PerfectY began with details about her college education, which she said had nothing to do with computer animation. She went to Columbia University in New York City. She was interested in computer graphics but could not find any specific major for that; therefore, she decided to take computer science and visual arts.

PerfectY received her BA degree in Visual Arts and Computer Science at Columbia University; she found that she was more interested in visual arts than computer science. After graduation, PerfectY could not find a job in the animation industry because no jobs were available in the mid-1980s. Like most college graduates, PerfectY sent out her resume to many places to find her first job. She only received one response, from Pixar,[27] which told her, "sorry, we don't have any positions open at this time" (PerfectY, personal communication, August 3, 2005).

PerfectY's college education in computer science and visual art did not prepare her well for direct entry into the animation industry. For one thing, she did not have a demo reel.[28] Also, the 3D animation industry was not as well developed as it is today. From 1985 to 1990, only a couple of animation studios existed, such as PDI,[29] Pixar, Blue Sky,[30] Rhythm and Hues,[31] for example, were doing computer animation and

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[27] Pixar Animation Studios was founded in 1986 and created the world's first computer animation feature film, *Toy Story*, in 1995.

[28] A demo reel is the motion picture or video equivalent of an artist's portfolio typically used as a tool to promote the artist's skill, talent, and experience in the entertainment industry such as animation, etc.

[29] PDI stands for Pacific Data Images Studios. It is a computer animation studio founded in 1980. Some of its award-winning animated features include Shrek and its sequels.

[30] Blue Sky Studios is a computer animation studio. It was founded in 1987. Some of its remarkable computer-animated features include *Ice Age* and its sequels.

[31] Rhythm and Hues Studios is a visual effects studio. It was founded in 1987. Some of its remarkable

visual effects for commercials. Thus, recruitment was primarily targeted toward those with knowledge of computer graphics programming and animation skills, rather than art skills, although artistic talents were always emphasized in recruiting statements.

No Reel, No Job

PerfectY said that "there was no job for me without a reel" (PerfectY, personal communication, August 3, 2005), which was the norm for the animation industry. People who wanted a job as an animator in the animation industry had to have created a demo reel that showcased their talent in animation.

To make a living after graduating from college, PerfectY worked as a programmer at the Wall Street branch of a Japanese company in New York. Later, she was relocated back to the company's headquarters in Tokyo, Japan. While working in Tokyo, PerfectY never gave up her dream of pursuing a career in the animation industry in the United States. She thought that she might find an animation job if she attended the annual SIGGRAPH conference in Las Vegas in 1991. During SIGGRAPH, PerfectY met a man who was working on the first *Toy Story* at Pixar. He talked about CalArts,[32] where he'd received his education. This information inspired PerfectY to study animation at CalArts. She said:

> I went to [CalArts] first at the time they started a computer animation program, but because they did not have [a] very good computer facility,

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visual effect and animated feature films are *Babe*, *X-man*, and *Happy Feet*.

[32] CalArts stands for California Institute of the Arts. It was founded by Walt Disney in the early 1960s. The Institute has established one of the best animation programs in the world.

> then I transferred to USC[33] to study film and computer animation. It was the first year of the computer animation department. This was about 12 years ago.
>
> (PerfectY, personal communication, August 3, 2005)

PerfectY talked about her preparation for a career in computer animation, building her knowledge and skills before seeking a job in the 3D animation industry. She had the financial means to study animation and gradually move forward to attain her goal. Her goal was to be an animator in Hollywood's animation industry. This goal indicated PerfectY's belief in her personal importance, the key factor in extrinsic motivation. Extrinsic motivation was facilitated through her autonomous income, which she could use to fund her education at private institutions of her choice. After attending the institute, she was able to create a convincing demo reel and be viewed as a qualified animator in the industry.

The Animation Industry Is a Tough Place to Survive

PerfectY's animation career was project-based, which made her feel insecure sometimes. As she described it:

> Animation is such an unstable job. You can have a job now, but once the project is over, even within the same company, you have to reapply, resubmit your reel, and get reevaluated, so you get pick[ed] up or not for the next project. …You never know when you won't have a job, so you have to

[33] USC stands for the University of South California. It is the oldest private research university founded in 1880.

> be financial[ly] independent as much as possible while you can still work. We always need to worry about that. Most of the contracts are project-based.
>
> (PerfectY, personal communication, August 3, 2005)

In order to maintain stable employment in the animation industry, PerfectY worked hard, got jobs done quickly, and followed high-quality standards set by others in the animation industry. This does not mean that people cannot do a good job in the hours paid for a project, but since overtime occurs all the time, this suggests that those who excel and are employed on the next project will likely have worked over the number of hours for which they were paid. Stress usually comes from "the executives [who] are encouraged to pressure us to work harder and longer" (PerfectY, personal communication, August 3, 2005). PerfectY often struggled with her overtime schedule at work. She engaged in the overtime practice because she thought it was the best way to ensure a better project review from her supervisor; she would have preferred to work within a 40-hour work week.

According to PerfectY, animators frequently sacrifice their personal life/family in order to outperform others who will compete with them for the same jobs on the next project. However, my personal experience as a Technical Director in the animation industry has shown me that engaging in an interesting task is an important motivating factor in intrinsic motivation. For example, when I enjoy working on an animation task, I always wish to work overtime to make my labors look better. Intrinsic motivation helps to facilitate my sense of autonomy in working overtime and my sense of competence in improving the quality of animation. The issue of long working hours is part of the

animation culture and a significant challenge for both women and men animators as they seek to balance their personal and professional lives, and especially so for women who have young children. In a patriarchal society, men with young children do not seem to feel the same sense of relatedness to their family and daily responsibility in caring for their children.

PerfectY next pointed to the politics and gender issues in the animation industry. She addressed them as follows:

> [Sometimes] the thing is, it is not necessarily performance. It depends on how much you made, also who you know. It's very political. I feel that especially [in] the promotion. If you know the right people, like the right supervisor, you get more [of a] chance to get promoted. I guess it would be harder for women if you are not in that group because men hang out with men. Especially, if you are a woman with a family, you don't have time to hang out with people.
>
> (PerfectY, personal communication, August 3, 2005)

The animation industry is very competitive. Since I did not work as an animator in the industry for very long, I did not experience political issues first-hand when seeking promotion. I did find that creating personal social networks is important in enabling people to share experiences and find support. A support group is an important factor in extrinsic motivation because it helps people to sense their relatedness. Since the animation industry is more "male-oriented," the socio-cultural condition for women as they seek to develop a career and receive promotion has been a greater challenge for them.

Since political and gender issues still exist in this particular workforce and the situation is not improving for women, PerfectY seemed to feel helpless. She said, “I believe it is a matter of time that before I would be replaced by someone younger, cheaper, more flexible, and willing to do anything” (PerfectY, personal communication, August 3, 2005). The political and gender issues in the animation industry seemed to be undermining PerfectY’s sense of self-determination. As a result, she could not fulfill her sense of autonomy and competence, which influence her confidence as an aging woman animator.

We Can’t Win Either Way

When we talked about how she balanced her family life and career, PerfectY recalled her pregnancy a few years ago. She said:

> When I became pregnant, I had to be bed-ridden for a long time due to complications. If I had come back two days later, I would have automatically lost my job. After I came back to work, I felt I had to start all over again and reprove myself. I didn’t get issued as-good [of] scenes to work on as other animators at my level. I felt like I had been set back in my professional career for taking a long maternity leave. One thing for sure, my absence from work set me back on my promotion/career move.
>
> (PerfectY, personal communication, August 3, 2005)

As a man without children, it is difficult for me to fully understand how challenge it is for a pregnant female animator to maintain her career in the industry. In

listening to PerfectY's story, I learned that if the workforce could not provide better service or policy for maternity leave, women will be discriminated against for bearing children. Because PerfectY's absence gave rise to worries about her future employment, the type of stress that is invisible to most men in the animation industry influences the perpetuation of a male-dominated workforce. This issue is a crucial factor in women's decision to develop and maintain a career in the animation industry.

PerfectY then described how she and her husband worked together to find a way to balance their job and family lives. She said:

> During the day, we hire a nanny to come to us to take care of our daughter from 9 [a.m.] to 7 [p.m.] from Monday through Friday. If we have to work over time, then, I would go in maybe at 5 [a.m.] in the morning, work till 6 [p.m.] and come home. My husband would go in at 9:30 [a.m.] and work as late as he needs to. While we are at work, we may work through lunch or take half an hour instead of one hour for lunch. Just [to] try to get things done as much as possible. If we have to go to work on Saturday, we take turns [taking care of our daughter].
>
> (PerfectY, personal communication, August 3, 2005)

The importance of this work/family life balance is revealed in large part by the efforts of two life partners who work together to keep employed so that both feel fulfilled in the relationship with each other and their child, and in contributions to their finances through work as animators. PerfectY described how she and her husband balanced their jobs and family life. Since they both work in the same animation studio, they have an

equal understanding of working conditions and status issues, giving them a better opportunity to work out their complicated schedule and find a balance.

According to PerfectY, “I’m fighting a constant battle with exhaustion on top of the normal stress caused by work and personal life” (PerfectY, personal communication, August 3, 2005). This stress and exhaustion may also have been experienced by her husband because they both share the same situation, working in the same studio. However, for PerfectY, as a woman, the impact was even greater than that on her husband. The social expectations of gender roles make it so that it “is not so easy for men to be a stay-at-home dad because it is not as socially accepted as stay-at-home mom[s]” (PerfectY, personal communication, August 3, 2005). As such, the creation of better working conditions, particularly for women with children, can be a very important motivational factor in helping women animators to maintain fulfilling personal and professional lives.

Like many new parents with a first child, the most important task is to stay employed and maintain an income while being part of the child’s everyday experiences. The anxiety of having time for both is dealt with by each parent in a variety of ways. Balance is sometimes achieved by hiring a nanny or having each parent take on either work or career and often family care. But, there seems to be another layer of concern for women. PerfectY explained:

> I think my husband cares about our daughter as much as I do. You know, my daughter is only 20 months old right now, and we hear that her personality is built in the first 5 years. This is the most important stage for her, and I want to be there as much as we can afford for her.

(PerfectY, personal communication, August 3, 2005)

Today, many women want to keep their career and have a family life in order to maintain their self-esteem. In PerfectY's case, they need the two incomes to pay their bills to keep a home and acceptable life style of middle class. However, doing so is often very difficult. For example, PerfectY knew that it was important to spend as much time as possible raising her little daughter. Due to her employment and the need for a second income, she must employ someone to come to their home to take care of her daughter. PerfectY provided an example of this difficult situation:

> A lot of time, my daughter would wake up in the middle of the night more than once because of her painful teething. She would challenge us with her needs, which sometimes make me doubt my ability to be a good mother. … It is natural for me as a woman to feel guilty about not spending more time with my daughter. It gets even harder when I don't get a nice scene to work on. Those are the times when I say to myself "why am I here working?" I feel working women sacrifice a lot to be at work and so do the stay-at-home women.

(PerfectY, personal communication, August 3, 2005)

PerfectY's motherhood reveals messages that I've never experienced as a man without a child. Her story provides a great opportunity for me to reflect on my role in a patriarchal society. For a long time, women have been expected to be stay-at-home mothers who take care of children after marriage, while men are expected to provide for their family by having a secure financial status. This is the kind of family condition that I experienced when growing up. These stereotypical role expectations are evident in visual

culture, and have influenced women's decisions about having a career and/or experiencing motherhood. A recent television commercial provides a good example. In this commercial, the mother, not the father or son, makes breakfast for the entire family. This situation may gradually change, but there is still a perception that it is natural to ask women to give up their careers, at least for a certain period of time, in the interest of their families. Caregiving by women often extends beyond small children to parental, spousal, sibling, and older children's care. Once children become young adults, women often begin to care for aging parents in a patriarchal society.

Because working on animation projects is what PerfectY loves to do, she is serious about every job assigned to her, whether they motivate her or not. She has found intrinsic motivation from the extrinsic motivational positive feedback from her co-workers. Her senses of autonomy, competence, and relatedness from her job have served to shape her self-image as a good animator. However, her desire for extrinsic recognition in the workplace and concerns about her involvement in her daughter's development has created a complicated situation that challenges her ability to be both a good mother and a good employee. Women who seek to maintain a balance between work and family lives experience more challenges in doing so than men, who often view women's "juggling" as the norm in a patriarchal society. Often, men have been socialized not to see this as problematic, since I've felt that way before. PerfectY said that, "[if necessary] I would just quit my job and devote myself to my family" (PerfectY, personal communication, August 3, 2005). Her story empowered me to feel that if I had to quit my job for my family, I would be able to discuss the issue with my wife and take responsibility for devoting myself to my family.

I Am Always in Search of Perfection

PerfectY did not tell me how she felt about being a successful woman animator, but did mention receiving recognition. She explained:

> … [to be recognized] as a great artist from your peers and the audience, the public, it is most satisfying when they enjoy your work, when you make them smile, laugh, cry, entertain, touch, and be inspired by your work. However, it is hard to feel satisfied with my own work because I am always striving to be better, searching for perfection.
>
> (PerfectY, personal communication, August 3, 2005)

Recognition from colleagues and audiences was the external motivational factor. The fulfillment that stems from attaining autonomy and competence are the drivers of extrinsic motivation that help PerfectY decide to work hard and seek perfection in all job and family tasks. With great outcomes from each task and positive feedback and recognition from co-workers, family, and the public has come a sense of relatedness. It seemed that her self-motivation did not cause her to feel successful at the time of our interviews; however, colleague recognition of her worth was an important external force that motivated her to do good work. PerfectY shared another thought about her idea of success. She explained:

> I get instant satisfaction/appreciation when I teach animation to students. Sometimes I am asked to do a lecture at schools, universities, or for visiting students. The students make me appreciate my job and where I am at [in] my career. It is great fun to be able to inspire them.

(PerfectY, personal communication, August 3, 2005)

The definition of success can differ from time to time in different situations and different socio-cultural conditions. PerfectY modestly said, “I guess success is to be able to balance career and personal life – finding happiness through all this is success to me” (PerfectY, personal communication, August 3, 2005). PerfectY still did not assert her definition of success but appeared to feel that in attaining a balance in career and family life, she had become successful. A sense of autonomy in deciding to stay in or leave the industry, a sense of competence in being able to complete task to her high standards and overcome challenges of too little time to do so, and a sense of relatedness to her family, co-workers, students, and recognition of her work by audiences of it, served to ensure her personal well-being—this was PerfectY’s idea of success.

Epilogue

PerfectY worked on animated feature films as an animator in the industry from 1995 to 2007. About two and one-half years after our meeting in 2005, PerfectY was laid off for six months. During that time she did freelance animation at home, which allowed her to have a flexible schedule, spend more time with her daughter, and maintain a network and currency in the animation industry. The unexpected life change was a challenge for PerfectY; however, the freelance work kept her in the animation industry. Later, she was hired back as a senior animator by the same animation studio. In 2011, PerfectY was promoted to animation supervisor.

Chapter 5

DISCUSSION AND CONCLUSION

This chapter contains a discussion of the findings for each research question. Next, after offering information on the implications of this study, suggestions and remaining questions for further research are described.

Discussion of Research Questions

After carefully reviewing the related literature, conducting a qualitative case study to collect relevant data from various sources, systemically analyzing the data, and examining the final results through an elaborate theoretical framework, I summarize the findings for each research question in order to draw conclusions from this study. The three research questions guiding my investigation are restated below:

1. What educational experiences have inspired, encouraged, and/or dissuaded the three female animators in this study to pursue careers in animation?

2. What challenges and/or privileges did the three participants of this study encounter in their animation careers?

3. What were the socio-cultural influences in the 3D animation industry experienced by the three participants of this study that shaped their concepts of self-determination for a successful animation career?

Response to Research Question One: Motivation

What educational experiences have inspired, encouraged, and/or dissuaded the three female animators in this study to pursue careers in animation?

While investigating participants' narrative data about their educational experiences, emerging themes revealed that motivational factors which inspired, encouraged, and/or dissuaded them as they considered a career in animation could be generalized into four dimensions: *family influence*, *alternative learning experiences*, *role models*, and *socio-cultural influences*. In many situations, these motivational factors overlap and are interwoven together. For example, role models can be found in one's family, such as parents, brothers, or sisters, and in formal educational environments, such as teachers or guest speakers, and in public areas such as the images of successful animators, particularly female animators. However, based on their individual educational experiences, each participant chose examples of different situations at different times and places as they shared their understanding of what motivated or demotivated their pursuit of a career in animation.

Family Influence

Not all of the participants mentioned their family influence; however, it was clear that motivation to pursue a career in a strong interest area stemmed from parents' and/or significant others' positive attitudes toward the participants' expressions of interest. EnergyK's brother was both a companion and an important role model during her

childhood. They shared the same interests in comics and art, which inspired her to develop her interest in and passion for animation.

Looking at her achievements to this point, EnergyK gave credit to her supportive father, who believed computers would be the way of the future and encouraged her to take related courses in college, motivating her to learn computer-related subjects such as education technology that became an important foundation in preparing her for her later career in the animation industry. Not all three research participants noted the influence of parents during their childhood; however, family members' influence on childhood can be the most influential factor in facilitating intrinsic motivation—that is, enabling children to fulfill their innate needs to experience enjoyment and interest in engaged tasks.

Alternative Learning Experience

The research participants had not originally considered animation as a career. In the late 1980s to early 1990s, there was no 3D animation industry and computer graphics was a new subject in some art institutions; thus, the three research participants could not have had access to a formal and fully developed curriculum in 3D animation. But, they all were self-reflective about their interests. As such, whatever was missing from their animation education facilitated their desire to seek opportunities that would allow them to garner training in and extend their knowledge of animation. They found agencies that allowed them to pursue their interests by taking visual art, film, computer graphics, or other related courses during their years in school. They also attended professional events such as the SIGGRAPH conference to meet people in the animation industry and build

connections with them to support their job-hunting and career-development in the animation field.

EnergyK, for example, went to a film and television department to learn about story-telling through film; RigC studied graphic design, film, and architecture to learn more about visual languages that would eventually lead her to work in camera control and 3D modeling; and PerfectY implemented her computer science and visual art background with later animation and film education to better handle timing control character motion and apply her artistic views to computer-animated characters' acting in her animation. The intention to build knowledge of animation through these alternative educational experiences is the motivational factor that helped all three research participants fulfill their desire to choose what they wished to study and gave them a sense of competence as they sought careers in the animation industry, enabling them to become successful in their respective chosen areas.

In addition to citing the influence of formal education, two of the research participants also mentioned inspirational learning experiences during their youth in school. RigC appreciated learning experiences during her teens in an experimental education program, the Learning Center, where students were encouraged to think independently and critically. Through closer interaction with teachers and classmates, RigC was allowed to express her opinions and explore interests. By exploring and researching the subjects about which she was interested, she was able to gain a clearer perception of her possible career paths. As importantly, she had an opportunity to develop autonomy and competence.

Role Models

Role models motivated all three research participants at different stages of their lives. EnergyK likened herself to a monkey, imitating her brother in reading and appreciating comic books and engaging in role-play during her youth. At that time, her brother was her role model. This role model led her to explore her interests and may have made up for the lack of a mother-figure in her single-parent family. EnergyK shared how she found her female role model, a seamstress at a Disney theme park, and how that person inspired her to bravely go on her way. The seamstress was giving a presentation at a panel discussion session at a conference—attending this particular conference turned out to be one of EnergyK's best experiences in school. Even though this female role model was not engaged in animation, her comments aroused EnergyK and extrinsically motivated her to be in the industry. PerfectY has never forgotten the animator from Pixar whom she met at SIGGRAPH while job hunting—this person encouraged her to study animation at CalArts.

Introducing role models, particularly female role models, inspires girls and women, helping them to build "self-confidence" (Brunner & Bennett, 1997), which is the extrinsic motivation that facilitates the gaining of a sense of competence in pursuing a career in the 3D animation industry.

Socio-cultural Influences

Women are socialized to be modest and avoid self-promotion in a patriarchal society. Since EnergyK grew up in a single-parent family, she realized she needed to

build her own existence, which led her to socialize with people who were actually successful. For example, in high school, EnergyK had a very good community with which to share, help, and rely on, which also made her feel supported. A community is one kind of social network. Many studies have found that creating personal social networks can help people to locate the types of support they need to enhance their learning and gain better outcomes from their courses of study (Cross & Parker, 2004; Margolis & Fisher, 2002; McCarthy & Berger, 2008). The extrinsic motivation from EnergyK's social network at high school facilitated her sense of competence to engage in tasks, and also fulfilled her sense of relatedness, allowing her to enjoy great relationships with others.

Refusing to accept the advice of her college dean, EnergyK was fully confident in her belief that her career has nothing to do with sex appeal. She believed that no one should relay on anything other than their developed strengths in the skills of a profession. This uncomfortable experience with the dean was the factor that enhanced her extrinsic motivation and did not set her back; instead, it served to strengthen her sense of autonomy which made her aware of her self-image and led her to become a better female role model in the animation industry.

The influence of sex appeal in the media and patriarchal culture is tremendous. It is important for parents and teachers to reveal these embedded messages from films, TV programs, commercials, and advertisements, and then to provide an opportunity for younger generations, both boys and girls, to practice critical thinking and understand the hidden meanings behind the images and scenes and create alternative images and strategies for achieving respect and a sense of worthiness. Such practices will help people

understand that there are other ways to pursue a goal that will provide long-term respect, success, and a sense of competence.

Response to Research Question Two: Relatedness

What challenges and/or privileges did the three participants of this study encounter in their animation careers?

Barely referring to the privileges afforded to them in their career, the three women research participants disclosed the tough challenges they encountered in their animation careers. The challenges are discussed from four perspectives: gender imbalance, competitive battlefield, gender bias, and family needs.

Gender Imbalance

While describing women in their working environment, all three research participants mentioned the situation of gender imbalance. They barely mentioned benefits gained as women, but did cite the disadvantages of being women in the workforce. EnergyK recalled that there were few women in higher positions in animation and computer-related fields participating in the SIGGRAPH conference when she volunteered to work there. Most of the women who attended SIGGRAPH were someone's wife or assistant. There were very few female speakers at this important computer graphics and animation conference, and thus few role models there and in the 1990s in this industry overall.

From my observations of SIGGRAPH over the past decade and reading reviews of relevant literature on women in animation, it is clear that more and more women and girls wish to engage in the pursuit of animation careers. However, from insights offered of RigC's and PerfectY's experiences in the 3D animation industry, the female-to-male ratio in animator/rigger positions is about 1:5, and sometimes even lower than that in their workforce. This evidence indicates that the 3D animation industry is still male-dominated and women are still underrepresented today.

RigC remembered how she struggled with anxiety when she decided to pursue an animation career, since "it was going to be difficult to break into a male-dominated industry" (RigC, personal communication, August 14, 2008). Moreover, women faced obstacles in being noticed for promotion because men noticed male workers and spent time with male colleagues and "it would be harder for women if you are not in that group" (PerfectY, personal communication, August 3, 2005).

Fortunately, since the early 2000s, more colleges have offered various 3D animation programs such as computer art, experimental animation, character animation, visual effects, etc., which have provided women and men with more opportunities to gain an education and the experiences needed to pursue an animation career. With these educational opportunities, more female animators will be able to take important positions in the 3D animation industries. As noted in the introduction to this study, there is, as of 2011, a female director for the first time of a 3D animation feature: DreamWorks's *Kung Fu Panda 2*. Women's increasingly influential roles in 3D animation will inspire more young girls/women to enter the field, and may gradually reshape the male-dominated culture. The gender imbalance that has made women animators' work/work lives more

difficult, in part because of the affect on their sense of relatedness, also has been a motivational factor to work even harder than their male colleagues to be acknowledged for quality job performance..

Competitive Battlefield

As PerfectY put it, “animation is such an unstable job,” and “a tough place to survive for both males and females” (PerfectY, personal communication, August 3, 2005). Most contracts are project-based, which means once the project is done, you need to find another job. You have to reapply and resubmit examples of recent work for re-evaluation in order to be selected for the next project, even in the same animation company. RigC used the term “factory” to describe the animation company to point out its mindset, where it wishes its employees “to [be] best at that particular part of the production pipe-line” (RigC, personal communication, August 14, 2008). Moreover, as an animator, one should be capable of overcoming the high pressures of the work environment and the inevitable overtime; most importantly, these people need to continue to be productive or risk being replaced by anyone who can do the job faster, better, or cheaper.

In addition to the unstable working status in the animation industry, office politics make the working environment a complicated battlefield. For example, PerfectY believed that “knowing the right people will make more chance[s] to get promoted or to stay in the team” (PerfectY, personal communication, August 3, 2005) and “the politics just wear you down” (RigC, personal communication, August 14, 2008). The issue of politics was mentioned by PerfectY and RigC, who noted the challenge this creates for all people in

the industry; however, there are fewer women than men, so the challenge is greater for women than for men. This challenge has become an extrinsic motivation that may set them back, but all of the participants in this study showed their ability to overcome competitive and political situations.

Gender Bias

It is undeniable that gender bias does exist in the animation industry. Her past experience had shown RigC that some men have problems being supervised by a woman; in fact, some do not wish to work under a woman. Some male animators think of themselves as having a male way of communicating and problem-solving, which they do not expect women to understand.

Furthermore, EnergyK also mentioned her working experience with a Korean studio. While she was in charge of working with the Korean team, in fact the Korean representative was always in contact with another man rather than talking to her directly because he viewed men as being more professional and worthy of respect. The one was usually a man on EnergyK's team.

Today, more women are gradually gaining leadership positions in the 3D animation industry as producers (EnergyK), animation supervisors (PerfectY), or rigging supervisors (RigC). With more women taking greater responsibility and exposing their professional images to the public in the animation industry, both women and men will have more opportunities to be inspired by interaction with female role models.

Gender bias may exist in different cultures and societies. In the 3D animation industry, gender bias may be a negative factor that particularly demotivates girls and women from pursuing successful animation careers because gender bias can diminish a sense of competence and relatedness.

Family Needs

The last but probably the most important factor influencing women's decisions to pursue animation careers is the family. In particular, having children is still viewed by a patriarchal society as more important for women than pursuing a career. Therefore, responsibility for/to family is an expectation socially nurtured in both men and women. This issue can be a critical motivational factor that impacts women's decisions to sustain or withdraw from their jobs in the animation industry.

Animation work is stressful; combining this work with family demands increases stress and tension exponentially. Female animators sometimes feel they have to make a choice between career and family. Many women worry about this situation since they have worked so hard to obtain a higher position or a better situation in their animation career; having children may slow down or reverse their career development. Often, women choose to leave the industry to care for their children. PerfectY sought to remain in her job while having children. While she was willing to sacrifice personal time to balance her career and family, she found doing so very tough and exhausting and eventually quit her job to work on a more flexible schedule as a freelancer. In opposition to PerfectY, who struggled between her animation career and family, EnergyK was

decided on her own to move completely away from the animation industry for a couple of years for her children because she thought that being a mother was also important to her. She wished to devote herself to her children during their childhood because the sense of relatedness to her children and family were her priority at that point in her life. EnergyK knew this decision might mean leaving the industry forever. The feeling of uncertainty about her future animation career led to extrinsic motivation to think about an alternative way to build up a business at home. Meanwhile, she decided to take an online master's program that would prepare her to be an animation teacher at a formal institution.

Accompanying the family issue is the financial issue. All three research participants mentioned that the pay scale was important for their family. As such, it created another factor that facilitated their extrinsic motivation to pursue external rewards needed to keep their job and feel secure. As such, they motivated themselves to work hard and keep their job in order to maintain a stable life.

Response to Research Question Three: Autonomy and Competence

What were the socio-cultural influences in the 3D animation industry experienced by the three participants of this study that shaped their concepts of self-determination for a successful animation career?

The effects of environmental and socio-cultural conditions in the 3D animation industry are an extrinsic motivational factor that may facilitate or diminish intrinsic motivation toward self-determination to self-regulate and thereby perform better. Deci (1980) argued that because people can make decisions about how to respond to situations,

they should be able to make conscious choices for their lives. Therefore, people's innate needs to have a sense of autonomy, competence, and relatedness are the foundation of self-determination.

In this study, I sought to understand how the three research participants fulfilled their need for self-determination through their definition of success. Since all three research participants have more than fifteen years of working experience in the animation industry, these working experiences are the most valuable components of this study in revealing the animation industry's socio-cultural influences on motivation to success.

The factors in socio-cultural influences are difficult to define and often complicated. This is especially true for the 3D animation industry. In reviewing the information from the interviews, interrelated issues of gender imbalance, competitive and unstable working conditions, politics, and gender bias impact motivation to pursue successful animation careers. With strong intrinsic motivation, which clearly interweaves with extrinsic motivational rewards of relatedness and sense of competence, people gain a sense of autonomy as they work to overcome challenges.

Extrinsic motivations such as earning equitable income and benefits and gaining recognition and trust from the industry as their male counterparts are internalized and integrated with intrinsic motivation. The most influential factors are extrinsic motivations, which were well-internalized and created positive impacts for the three women as they sought to overcome challenges, retain employment, and further develop their successful career in the unstable animation industry.

With different socio-cultural influences and life experiences, the three research participants gave distinct but interrelated definitions of success. EnergyK defined her

success as personal growth, work status, and recognition. Personal growth stems from support of basic personal psychological needs, autonomy, and competence, which facilitated EnergyK's self-determination to develop her professional skills (intrinsic motivation), as well as to engage her in the animation industry and fulfill her sense of relatedness (extrinsic motivation). Her satisfaction with her working status indicated her sense of competence. With great communication skills and capability, EnergyK has earned a reputation as a reliable person, generating positive feedback from supervisors and co-workers. This positive feedback fulfills EnergyK's sense of her competence, which, on the other hand, increases her intrinsic motivation to overcome challenges and complete all tasks. Thus, self-determination requires external positive feedback and public recognition. For EnergyK, earning the industry's recognition involves being able to create award-winning animations, give lectures to share her knowledge at conferences, and inspire youth at school. Therefore, receiving industry recognition is the reward, the extrinsic motivation, which is internalized to fulfill inherent needs for competence and relatedness that create a positive impact on her intrinsic motivation. This also influences EnergyK's sense of mission as a mentor, encouraging women to gain the strength and confidence needed to pursue a career in the animation industry.

Unlike EnergyK, who defined success from three areas (personal growth, work status, and recognitions); RigC specifically defined her success as achieving steady employment in a very unstable industry. More than just maintaining steady employment, RigC stressed two underlying motivational factors: to be promoted and to be trusted. The desire for promotion and trustworthiness is an external reward that translates into positive extrinsic motivations and is internalized as intrinsic motivation to fulfill RigC's

psychological needs for competence and relatedness. For a woman animator to earn trust from teammates is even more challenging in a gender-imbalanced workforce. As such, RigC has had to work even harder than her male co-workers to prove her ability in both her profession and leadership. In the meantime, growing competence from extrinsic motivation enables her to overcome challenges she continues to face as a woman in the unstable animation industry.

With the goal of pursuing perfection, PerfectY does not believe that she has been successful either in her job or as a mother. She was seeking a balance between her career and family, which seems impossible given a lack of childcare support and flexible hours. Making more family-friendly changes in the industry would facilitate feelings of autonomy and competence in women's working and personal lives. On the other hand, the desire to be recognized within industry circles also shows PerfectY's need to fulfill her sense of competence and relatedness.

Implications and Suggestions

It is an indisputable fact that women are still underrepresented in the field of animation. While there have been studies of women in computing, studies of female animators are relatively few to nonexistent, with even less said about the experiences, challenges, and accomplishments of women in the 3D animation industry. This lack of interest in such topics has in some ways allowed the animation industry to maintain a male-dominated environment, and led women to be more hesitant about moving forward in pursuit of animation careers.

Through the three female animators' stories, this inquiry took a socio-cultural perspective to reveal the educational experiences, challenges, and socio-cultural influences that shaped these animators' concepts of self-determination as they worked toward successful animation careers. Findings from this study not only provide insights but will hopefully increase public attention to this issue.

Study implications also suggest the worthiness of including researchers from different cultural backgrounds to contribute diverse outlooks to this issue—a broader array of such researchers would facilitate identification of the influences of socio-cultural contexts and individual identities of race, social-class, and gender as these acts to motivate women to pursue animator careers.

It would also be valuable to conduct a field study involving close observation of women animators' working conditions at their work sites to gain a deeper understanding of possible motivational factors that influence their decision-making in pursuing successful careers in the animation industry. Further research could include former female animators who quit their job, to explore difficulties and problems confronted within animation learning and working experiences. In all, this information would aid comprehension of changes needed in the animation workplace.

Study findings offer several significant insights for animation educators. First, they reveal how educational experiences could inspire, encourage, and/or otherwise lead women to extrinsic motivations to bravely pursue interests in the animation industry. Reviews of relevant literature reveal that a gender-inclusive environment is important and necessary to support female students' learning experiences toward CS, IT, and animation. A gender-inclusive environment is not only a space that involves relatively equal

numbers of both genders, but importantly offers equal opportunities to access information, role models, and facilities as well as engage in course work and discourse. To build a gender-balanced learning environment, Amburgy, Knight, and Keifer-Boyd (2004) suggested empowering both teachers and students of both genders to critically examine their social, culture, and political contexts. In doing so, students become aware of how they are influenced by the dominant culture's conceptions of what girls/boys should or should not be. Further research should be conducted by and for developers and female animators to gather perspectives on how to create gender-inclusive learning and work environments.

As these three women animators' stories of their careers in the animation industry unfolded, it became clear that such women may serve important roles as animator educators who not only motivate women to seek further careers in the 3D animation industry, but also guide female students to establish positive attitudes, develop self-confidence, build self-esteem, and gain communication skills needed to prepare women to face expected and unexpected circumstances in the animation industry. Once these skills have been developed, this confidence may be transformed to handle mixed-gender situations (Heise, 2004; Lehrer, 2000; Salomone, 2003).

Alternative learning experiences and skills gained before joining the 3D animation industry provided the three women animators with examples and pedagogical approaches that may be used by animation educators in developing an inter-disciplinary curriculum that will help all students gain the ability to proficiently integrate knowledge into art and technology and thereby better prepare them for careers in the animation industry.

Further, their stories in themselves act as a type of role model experience for female students considering a future in the animation industry. One further implication is peer support as an important motivation in influencing and delivering positive learning experiences for female students in IT, CS, and animation classes. Studies of female students' learning of computer technology also indicate that a social network is important for female students as they seek to improve their skills in computer technology. Female peers and teachers at school are typically their most supportive group because they are of the same gender. Therefore, animation educators may also seek to establish an all-female environment for small study groups, workshops, or seminars in order to facilitate supportive groups. These supportive groups and activities can usually contribute to girls' and women's well-being by offering opportunities to gather together and serve as role models. Such learning experiences will provide female students with equal opportunities to explore the realm of animation and build positive experiences that will carry them through to their later years (Margolis & Fisher, 2002). Thus, further research on how to effectively encourage female students to develop and pursue their interests in working in the animation industry by creating gender-inclusive learning environments and building female support communities will be important and necessary.

In addition, since the animation industry is a rapidly changing industry, it is necessary to conduct sustained research on women animators from a range of ages to identify different experiences women animators have encountered in the industry, as well as the progress of gender-friendly environment development in the 3D animation industry.

Furthermore, it is important for teachers and parents to learn about and understand how to facilitate self-determination in students and children as they begin to consider goals and seek to attain those goals. Parents' attitudes have the greatest impact on children at an early age; teachers are active and effective agents in encouraging students to pursue a career in the animation industry.

Finally, since the animation industry is still male-dominated, men in the animation industry need to perceive women as important co-workers, not only because they perform well professionally but also because they can provide valuable input into the industry's work and leadership. Male co-workers and administrators also need to understand the challenges that female co-workers may encounter, and provide a better socio-cultural working environment that ensures that women want to remain in this industry and contribute to it. This includes providing equal opportunities to prove their professional skills and show their leadership.

This research is nearly the first study of female animators' career experiences conducted by a male researcher/animator. Hopefully, from a male perspective, reflectively viewing the struggles, challenges, and opportunities encountered by these three women animators in the animation industry, I have offered an alternative view of female animators' experiences in the 3D animation industry.

In exploring female animators' stories and constantly reflecting on personal experiences, I, as the male researcher in this study, gained the greatest benefits from this research. These experiences will inform and empower my future teaching, thereby benefiting students. Learning of these women's experiences challenged by perspectives of women animators and opened my eyes to the situations and difficulties they continue

to face. I have also learned to be more concerned about and respectful of gender differences in learning animation in my classes. Finally, I will make greater efforts to inspire and encourage female students to pursue their interests and dreams on their way to animation-related employment.

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Appendix A

Institutional Review Board (IRB) Approval

From	"Gardner, Jackie" <jkg10@rtto.psu.edu>
To	wzc108@psu.edu, ktk2@psu.edu
Subject	Approval e-mail "Experiences and Insights of Women in Animation Careers to Encourage Female Students to Enter and Succeed in the Animation Industry" (IRB#20178)
Date	Fri, Jan 21, 2005 02:34 PM

Dear Wei-Chung Chang:

Your submitted application for the new human participant study titled, "Experiences and Insights of Women in Animation Careers to Encourage Female Students to Enter and Succeed in the Animation Industry" (IRB#20178) has been approved; therefore, you may begin your research.

The approval date is 01/21/05 and the expiration date is 01/02/06. You will receive an approval letter in the mail shortly.

Attached is your Informed Consent Form with the approval stamp and a revised recruitment letter (you will also receive a copy in the mail with your approval letter). Please ensure that this consent form is used to enroll new participants.

If you have any questions, please do not hesitate to contact me at jkg10@psu.edu.

Thank you,

Jackie
Jackie Gardner, M.S.
Office for Research Protections
The PennsylvaniaStateUniversity
212 Kern Graduate Building
University Park, PA16802
Phone: (814) 865-1775
Fax: (814) 863-8699
http://www.research.psu.edu/orp/

Appendix B

Recruitment Letter

From: Wei-Chung Chang
To: Ms.
Subject: Interviews with women in animation careers for doctoral research
Date:

Dear Ms.

I am currently a doctoral student at The Pennsylvania State University's Art Education program. I am seeking research participants in my study, "A narrative inquiry into the experience of three women in the 3D animation industry: Using Self-determination Theory to understand socio-cultural influence on concept of success and motivation" which focuses on gender issues and motivation in relation to the career seeking, satisfaction, and success in the field of 3D animation.

I have taught 3D animation in Taiwan for five years since 1997, when I left PIXAR as a Technical Director (TD) in modeling and lighting. Since 2003, I have taught 3D animation as a Teaching Assistant in the School of Visual Arts at The Pennsylvania State University. Being a TD, educator, and researcher, I have seen the gender imbalance in the 3D animation/game industry. Through in-depth interviews, I hope to discover motivational factors that have effected women's decisions to pursue and continue careers in the animation industry that specifically focuses on the production of 3D animations. To encourage female students to pursue animation careers, I hope use the findings from the interviews to recommend pedagogical approaches and curricular changes in higher education programs involving 3D animation courses. My interview will focus on three females who are considered successful in pursuing careers in the animation industry that involves the production of 3D animations.

I would like to interview you with a focus on three areas of inquiry:

1. What educational experiences have inspired, encouraged, and/or dissuaded the three female animators in this study to pursue careers in animation?

2. What challenges and/or privileges did the three participants of this study encounter in their animation careers?

3. What were the socio-cultural influences in the 3D animation industry experienced by the three participants of this study that shaped their concepts of self-determination for a successful animation career?

I look forward to hearing from you in the next couple of weeks regarding your willingness in participating in an interview. The attached consent form provides further information. If you are willing to participate, please sign the consent form, making selections concerning the form of the interview and confidentiality, and mail it to me at

Wei-Chung Chang
425 Waupelani Drive #526
State College, PA 16801

Thank you very much for your time and support.

Best Regard,

Wei-Chung Chang
Ph.D. Candidate, Art Education
The Pennsylvania State University
Tel: 814-861-2619
email: wzc108@psu.edu

Appendix C

Informed Consent Form

ORP USE ONLY:
The Pennsylvania State University
Office for Research Protections
IRB#20178
Approval Date: 01/21/05 JKG
Expiration Date: 01/02/06 JKG
Social Science Institutional Review Board

Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: Experiences and Insights of Women in Animation Careers to Encourage Female Students to Enter and Succeed in the Animation Industry

Principal Investigator: Wei-Chung Chang
425 Waupelani Drive #526
State College, PA 16801
Phone: 814-861-2619 • Email:wzc108@psu.edu

Advisor: Karen Keifer-Boyd, Ph.D.,
Associate professor
The Pennsylvania State University
210 Arts Cottage, University Park, PA 16802-2905
Phone: 814.863.7312 • Email: kk-b@psu.edu

1. **Purpose of the Study:** The purpose of the study is to discover through in-depth interviews, which factors have effected women's decisions to pursue and continue careers in the animation industry that specifically focuses on the production of three-dimensional animations. To encourage female students to pursue animation careers, I will use the findings from the interviews to recommend pedagogical approaches and curricular changes in higher education programs involving three-dimensional animation courses.

2. **Procedures to be followed:** I will send you an invitation letter along with the consent form and core questions via email. If you are interested in participating, please mail me a signed consent form. After receiving a signed consent form from you, I will sign it, make a copy, and mail the copied consent form back to you. Using an in-depth interview strategy, I will ask women in animation careers about factors that they feel have effected their decisions to pursue and continue careers in the animation industry. You will have the option to participate in a follow-up interview of 30 to 45 minutes to clarify points in the primary interview of four key question areas. Please indicate in this consent form if you are willing to have a follow-up interview.

3. **Discomforts and Risks:** There are no risks in participating in this research beyond those experienced in everyday life.

4. **Benefits:** The potential benefit to you, who have pursued a career in the animation industry, is to disseminate your insights to through publications and in course curriculum revision to help future female students to pursue animation careers. Society benefits by more exposing careers in animation to both genders.

5. **Duration/Time:** This consent form and letter begins our exchange. If you are willing to participate, I would like to conduct one interview session with you, by email, of approximately 30 minutes to one hour by phone, or face-to-face in your location depending on your chosen format. After this interview, I will ask if you are willing to have one follow-up interview to clarify the insights that you provide. The follow-up interview will be an email exchange, phone call, or face-to-face conversation of about 30-45 minutes.

Statement of Confidentiality: I will interview women in animation careers. I will use email, an audio tape recorder, and/or a video camcorder to film and record the interviews. I will state the date, time, and name of those who wish to be recognized for her views and accomplishments in future publications and presentations, or eliminate the use of names or any other identifying information. During the interviews, you may request that something is not included in a publication or ask that something is not taped. In using email, your confidentiality will be safe to the degree permitted by the technology used. Specifically, no guarantees can be made regarding the interception of data sent via the Internet by any third parties. I will transcribe recordings myself; however, Dr. Keifer-Boyd, as my dissertation advisor, will have access to some data in guiding me in analysis, although she will not store the data.

Audio tapes and video recordings will be stored in my locked home office cabinet. Coding, analysis of the data, and digital pictures will be stored on my home computer with password protection. I will destroy all original data (without identifying information) that results from this research in 25 years (January 1, 2030).

Please place your initials by any of the following that you provide your consent:

____ I agree to be interviewed via e-mail for the purpose of this research; the email will be deleted on January 1, 2030.

____ I agree to be interviewed via phone and audio recorded for the purpose of this research**; t**he audiotapes will be destroyed on January 1, 2030.

____ I agree to be interviewed face-to-face and audio recorded for the purpose of this research**;** the audiotapes be destroyed January 1, 2030.

____ I agree to be interviewed face-to-face and video recorded for the purpose of this research**;** the videotapes be destroyed January 1, 2030.

____ I give permission to use my name in publications as author of the insights and stories that I provide. Please list me as:_____

____ I do not give permission to use my name or any other identifiers when publishing or presenting the data.

____ I am willing to have a follow-up interview to clarify the insights that I provide.

____ I am not willing to have a follow-up interview.

____ I give permission for my recordings and digital pictures to be archived for use in future research projects in the area of art education. Tapes and digital pictures will be destroyed on January 1, 2030.

____ I do not give permission for my recordings or digital pictures to be archived for educational purposes. Tapes and digital pictures will be destroyed on January 1, 2030.

____ I give permission for my recordings and digital pictures to be archived for educational use in classrooms, conferences, and research publications. Tapes and digital pictures will be destroyed on January 1, 2030.

___ I do not give permission for my recordings or digital pictures to be archived for future research projects. The tapes will be destroyed on January 1, 2030.

6. **Right to Ask Questions:** Participants have the right to ask questions and have those questions answered. If you have questions about your rights as a research participant, contact Penn State's Office for Research Protections at (814) 865-1775.

7. **Compensation:** There is no compensation for participating in this study.

Voluntary Participation: Participation is voluntary. You can withdraw from the study at any time and you can decline to answer specific questions.

You must be 18 years of age or older to consent to take part in this research study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this signed and dated consent form for your records.

Participant Signature	Date
Person Obtaining Consent	Date

Appendix D

Interview Prompts

1. Why did you pursue a career in 3D animation? Please vividly describe to me an event in which you realized your interest in a career in computer animation.

2. Please vividly describe to me two specific experiences in either your K-12, or college education that you found especially valuable, as well as another experience that you found especially a bad experience.

3. Please describe a specific moment in your transition out of college and into the 3D animation industry. Were you recruited? If so, describe that situation and your particular experience. If not, describe how you got your first job in the 3D animation industry.

4. Please describe your career journey to this moment, beginning from your first job in the animation industry.

5. Please describe an experience that you perceive may have provided advantage or disadvantage because of your gender?

6. Do you feel you are successful in your current career? How do you define success for yourself?

Vita

Wei-Chung Chang

Education

Ph.D. in Art Education, The Pennsylvania State University, University Park, Pennsylvania, 2011.

M.A. in Visual Arts, William Paterson University, Wayne, New Jersey, 1997.

B.F.A. in Computer Graphics, Pratt Institute, Brooklyn, New York, 1995.

Professional Experience

Lecturer, National Taiwan University of Arts, New Taipei City, Taiwan, 1997－present.

Instructor, School of Visual Arts, The Pennsylvania State University, University Park, Pennsylvania, 2002-2005.

Director, Innovation Incubation Center, National Taiwan University of Arts, New Taipei City, Taiwan, 2000-2002.

Technical Director, Pixar Animation Studios, Richmond, California, 1997.

Conference Paper Presentations

Chang, W. (2007, March). Is Gender Inclusive Animation Education Possible?, National Art Education Association Conference in New York, New York, U.S.A.

Chang, W. & Hsiao, H. (2007, March). The Application of Digital Archive in Art Education, National Art Education Association Conference in New York, New York, U.S.A.

Chang, W. (2006, August). Design as narrative: Make thinking visible, Research poster presented at the SIGGRAPH 2006 Conference, Boston, Massachusetts, U.S.A.

Chang, W. (2006, March). Experiences and Insights of Women in Animation Careers. National Art Education Association Conference in Chicago, Illinois.

Chang, W. (2005, March). Design as Narrative, National Art Education Association Conference in Boston, Massachusetts.