

4-27-2010

# A Comparison of Peer Evaluation: The Evaluation App versus DeviantArt

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For the degree of Master of Science

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A COMPARISON OF PEER EVALUATION: THE EVALUATION APP VERSUS  
DEVIANART

A Thesis

Submitted to the Faculty

of

Purdue University

by

Brian Michael McCreight

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science

May 2010

Purdue University

West Lafayette, Indiana

I dedicate this thesis to my family and friends for their loving support. The academic road is not easy, but your emotional support guided me through every path presented.

## ACKNOWLEDGMENTS

My gratefulness to everyone who had a part in this thesis extends far beyond these written acknowledgements.

First, I would like to extend my gratitude to Dr. La Verne Abe Harris. As my graduate chair, professor, mentor, and friend, Dr. Harris has gone out of her way to help make all of this happen. From her words of wisdom to the late night emails, Dr. Harris' support has been extremely helpful in all aspects. I would like to accredit many of my accomplishments to Dr. Harris.

To my committee, I would like to thank each one of you for your hard work and inspiration. To Dr. Jamie L. Mohler, as a professor and committee member, thanks for your hard work and time spent on thesis formatting. To Professor Ronald J. Glotzbach, thanks for sharing your knowledge of new and emerging technology both inside the classroom and out. To Dr. William R. Watson, thanks for jumping on board late in the process and adding your expertise on technology and educational into the pool of knowledge.

To Professor Kellen R. Maicher, thanks for the long hours and support to begin and develop this thesis into what it is today. The beginning stages were rough at times, but with your support, we were able to pave over the patches.

I would also like to extend warm thanks to the people of the Computer Graphics Technology Department. From the faculty members that I have interacted with in both the classrooms and the hallways to the Administrative Assistants who make sure all my forms are filled out correctly.

To my family, friends, and fellow peers of the Knoy Hall Graduate lab, thanks for the additional support on this long, but adventurous academic journey.

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## ABSTRACT

McCreight, Brian M. M.S., Purdue University, May, 2010. A Comparison of Peer Evaluation: The Evaluation App versus DeviantArt. Major Professor: La Verne Abe Harris.

Using a causal comparative analysis approach, this study examines the use of a specifically designed peer evaluation Rich Internet Application (RIA) – The “Evaluation App” -- versus its Web application counterparts. Traditional peer evaluation Web applications are often overloaded with redundant and unnecessary features for reviewing and critiquing projects related to interactive media and applied computer graphics. With a decrease in interactivity, feature overload, and less targeted functionality, these kinds of Web applications tend to be less engaging for peer evaluation operations. This study attempts to examine the efficiency and practicality of RIAs used for the purpose of digital media critiques and evaluation.

According to Driver and Rogowski (2007), RIAs offer a “seamless user experience” (p. 2). Peer evaluation combined with the functional benefits of RIAs offer students a potentially seamless user experience in an accessible desktop mechanism.

Building on previous research in the areas of educational and interactive media, this thesis details an experimental study that compares a RIA specifically designed for use in educational peer evaluation with current digital technologies traditionally used to support the critiquing process.

## CHAPTER 1. INTRODUCTION

This chapter serves to provide a brief introduction into the background and overview of this thesis. This chapter offers an overview of this investigation and introduces the reader to the scope, problem statement, significance of the research, and research question(s) followed by the assumptions, limitations, and delimitations of the research. This evolves into the project overview and organization of this thesis preparing the reader for chapter 2; the review of literature.

### 1.1. Background

Since Macromedia marketed the term “Rich Internet Application (RIA)” in 2002 (Adobe Systems, Inc, 2009), the term has been widely used in the Web 2.0 era. Bridging the gap between the Internet and the desktop has turned out to be a long and complicated process, and by most standards is far from completion. The Web used to be a simple medium essentially comprised of basic graphics and text, but now integrates much richer and more advanced technology.

There are countless applications that are available to Web users for peer evaluation that include critiquing, commenting, rating, etc. All of these applications exist within the Web browser and suffer from various inflationary design problems such as bloat or feature creep. For example, students having problems learning a complicated Web-based program might have difficulties getting quality feedback on an assignment or project. This is problematic because obtaining quality educational feedback with some degree of efficiency is essential to project design and development.

### 1.2. Problem Statement

Traditional peer evaluation web applications such as DeviantArt, Flickr, and PhotoBucket tend to be unusable and un-engaging because of an overload of features and functionality (*Data based on a preliminary background pilot study conducted in October 2009*).

### 1.3. Significance

When conducted properly, critiques and peer evaluations offer significant educational advantages that are well established in the literature. However, when the tools used to facilitate these activities are unusable or unengaging, the effectiveness of the peer evaluation process is greatly diminished. A preliminary examination of peer evaluation systems currently available on the Web suggests that most of these applications suffer from several inherent problems such as bloat and feature creep. These problems significantly contribute to reducing **usability and user satisfaction** in interactive applications. Therefore, it is likely they do so within the context of peer evaluation Web applications. The effects of these problems are significant because applications are much less effective than they should be; thus hindering the educational benefits they would normally provide. Since peer evaluation can be a very effective education tool, it is logical to identify those aspects of web-based tools that hinder this process, and to create alternatives that may work more effectively.

### 1.4. Solution

To address the usability and engagement problems in the current crop of peer evaluation applications, the solution outlined in this thesis identifies those aspects of current systems that are problematic and test those applications against alternative solutions that address them. In this case, the author conducted a study to test a representative sample of peer evaluation

applications, identify the inherent problems, and then re-assess on application (DeviantArt) in comparison to an alternative mechanism (The “Evaluation App”).

#### 1.5. Research Question

Will a dedicated peer evaluation RIA (The “Evaluation App”) offer a more useful, usable, and engaging user experience than traditional Web-based applications (“DeviantArt”)?

#### 1.6. Assumptions

The assumptions for this study will include:

1. The tested mechanisms will function the same for each participant.
2. The goals and functions will be the same across applications.
3. The participants will remain anonymous during the study.

#### 1.7. Limitations

The limitations for this study will include:

1. The Adobe® Flex Builder® 3 platform will be used to develop for the Adobe Integrated Runtime® (AIR). Other technologies are available and will be compared in the literature, but will not be assessed during this study.
2. The study will take place during the dates/times listed in the methodology.
3. The participants will be novices of the “Evaluation App” prior to testing.
4. A stratified random sample (strata) will be used (Computer Graphics Technology [CGT 256] students) rather than a simple random sample (SRS).

### 1.8. Delimitations

The delimitations for this study will include:

1. Comprehensive learning will not be assessed.
2. Effects of student performance based on peer evaluation feedback will not be assessed.
3. Content of the peer evaluation application will not be assessed.
4. Although this application is not limited to Computer Graphics Technology (CGT) students, CGT students will be the only subjects tested during this study.
5. Educational environments will not be assessed.

### 1.9. Technical Terminology

Web 2.0: “The mechanism to refer to the next generation Web. Rather than just a static repository for data, the Web has become a platform for applications and the enabler for on-line participation, collaboration, harnessing collective intelligence and more. The key concepts are participation and dynamic interaction” (Gibson, 2007).

Rich Internet Applications (RIA): “Internet enabled applications that offer a rich, engaging experience that improves user satisfaction and increases productivity” (Adobe Systems Incorporated, 2009).

Adobe® Integrated Runtime (AIR®): “Adobe® AIR® is a runtime that lets developers use proven Web technologies to build rich Internet applications that run outside the browser on multiple operating systems” (Adobe Systems Incorporated, 2009).

Human Computer Interaction (HCI): “Human-Computer Interaction is a discipline concerned with the design, evaluation and implementation of interactive



computing systems for human use and with the study of major phenomena surrounding them” (Hewett, Baecker, Card, Carey, Gasen, Mantei, Perlman, Strong & Verplank, 2008a).

Human-Centered Design (HCD): “Advocates that a more promising and enduring approach is to model users’ natural behavior to begin with so that interfaces can be designed that are more intuitive, easier to learn, and freer of performance errors” (Oviatt, 2006).

Adobe® Flex Builder® 3: “A highly productive, free open source framework for building and maintaining expressive web applications that deploy consistently on all major browsers, desktops, and operating systems” (Adobe Systems Incorporated, 2009).

Computer Graphics Technology (CGT): Specialized degree program in the College of Technology at Purdue University (College of Technology – Purdue University, 2009).

Usability: “The extent to which a site can be used by a specified group of users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (Whitehead, 2000).

#### 1.10. Summary

This chapter presented a brief introduction of the background and research dedicated to this thesis. The scope, problem statement, significance of the problem, research question, assumptions, limitations, and delimitations of the project are addressed in this thesis. This chapter also discusses relevant background information to prepare the reader for chapter 2 of the thesis. Chapter 2 of the thesis includes the literature review for this study.

## CHAPTER 2. LITERATURE REVIEW

The following literature review incorporates preliminary research in examining the use of peer evaluation rich Internet applications (RIA's) versus traditional applications. Topics covered in this section include Web 2.0, Human Computer Interaction (HCI) and cognitive engagement, human-centered design, peer evaluation, effective rating systems, and addressing usability principles and guidelines for designing and developing interactive content.

### 2.1. Web 2.0 Technologies

With new advances in technology, Web 2.0 applications continue to evolve and develop. Companies are continually becoming more aware of these technologies and are beginning to evaluate their various advantages and disadvantages. Facebook, Google, and AOL are just a few of the companies that are beginning to recognize the importance of implementing Web 2.0 services. To cater to a larger audience, these businesses are now commonly offering traditional Web applications in tandem with alternative Web 2.0 desktop applications that provide highly interactive, but more simplistic functionality. These programs are not meant to necessarily replace the existing browser-based applications, but rather serve to supplement them by providing simple functionality, ease of use, increased accessibility, and richer user experiences. To that end, RIAs are being used more frequently as a means to offer these Web 2.0 features.

According to Cooper (2007), Web 2.0 is becoming the new and improved multimedia standard for Internet use. Cooper discusses how the high levels of

interactivity associated with Web 2.0 applications can reach a broader range of target audiences.

### 2.1.1. Rich Internet Applications (RIAs)

In RIA design, the user is intended to be the center of focus in creating effective interfaces and efficient functionality. According to Driver and Rogowski (2007), RIAs offer a variety of benefits to both the user and the developers involved creating the application. RIAs offer a “seamless user experience” (p. 2) where large amounts of data are integrated from multiple sources into a streamlined, easily accessible interface. This has the effect of increasing user efficiency and lowering cognitive load.

RIAs also have the ability to “access to enterprise app data and functionality via alternative interfaces” (p. 5). Mashup, a term coined in the early years of the 21<sup>st</sup> century, is used to describe a RIAs ability to combine multiple data sources into one. This paradigm has been known to reduce clutter and cognitive load while bringing in the data into a centralized location. Other benefits indirectly related to such systems include improved business workflow and matching the content supplied with the user’s roles from a business standpoint (Driver & Rogowski, 2007).

In short, Web 2.0 technologies can offer a range of features that are potentially beneficial to all applications, including peer evaluation programs. This includes one of the latest technologies from Adobe Systems known as the Adobe Integrated Runtime (or simply AIR.) Touted to provide seamless user experiences, aesthetically pleasing interfaces, and individualized experiences; Adobe AIR is one of the newest players in the RIA development game.

#### 2.1.1.1. Adobe AIR

Rich Tretola (2008), author of *Beginning Adobe AIR*, defines Adobe AIR as “a cross-operating system runtime that allows developers to build and deploy

rich Internet applications to the desktop using their existing skill sets” (p. 35). Tretola discusses AIR as having the ability to allow developers to create RIAs using pre-existing Web-programming technologies including, but not limited to ActionScript 3.0, XML, xHTML, CSS, JavaScript, and etc..

Adobe AIR has been chosen as the runtime for the experimental development because of its increased functionality, broader target audiences and increased accessibility, ability to interact with existing Web technologies, and market penetration.

### 2.1.2. Human Computer Interaction (HCI)

With Web 2.0, and other RIA technologies like Adobe AIR available, the question becomes whether or not they do in fact motivate, attract, and engage users and exactly how they achieve these goals.

Wang and Gearhart (2006) discuss enhanced interactivity as a key factor with such applications, and focus mainly on education as the primary application area. They describe interactivity as the “interaction between the learner and the instructional source” (p. 97). When developing and designing RIAs for educational purposes, interaction between the user and the application becomes a major concern that needs to be addressed.

There are specific aspects of interactivity that contribute to the success of any software or Web-based program, including educational applications. These aspects include attention, content relevance, cognitive engagement, and supportive context. When designing RIAs, these characteristics can be enhanced by focusing on interactivity, engagement, and the intuitive nature of the interface itself.

First and foremost, a program must first grab the users attention. Attention can be established by an effective use of graphics, fonts, and color among other things. Interactive content can also establish attention. Of course, designers and developers must be sure not to overuse any of these elements.

As previously stated, content relevance is another important aspect of interactivity. This state can exist in conceptual and procedural levels during the interactive experience. This level is important in gaining motivation and interest in the user when dealing with interactivity (Wang & Gearhart, 2006). Gaining motivation and interest in a particular subject matter correlates with cognitive engagement, which may be defined as the level that a system can engage a user mentally. According to Blumenfeld, Kempler, and Krajcik (2006), there are four principles of cognitive engagement and motivation: (1) value, (2) competence, (3) relatedness, and (4) autonomy.

Value may be defined by the amount of interest the user has in the context area. Blumenfeld et al. (2006) state that value can be increased by linking the context area to the students in some way, the incorporation of more interesting and creative topics, and application of practically can be introduced.

Competency is defined as the degree of user ability to successfully complete a given task. In the context of interaction design, a user is more likely to be engaged in a particular subject if they are reasonably competent with the tasks needed to access the application content.

Relatedness may be defined as the degree of association between the user's interests and the context area of an application. In this condition, the user has a higher chance of cognitive engagement if the student can personally relate to the subject matter.

Autonomy is freedom of the user to complete a task with the given information. Giving the student more responsibility in activity and project development has been shown to potentially increase interest and engagement (Blumenfeld, Kempler, & Krajcik, 2006).

The four levels of cognitive engagement and motivation as discussed by Blumenfeld et al. (2006) relate to RIA development. Increasing cognitive engagement and user motivation allows an application to be more interesting and could potentially lead to more activity with an application by a given user. RIA's can increase this activity by designing them in such a way as to increase value to

the user and to increase ease of use in order to provide a feeling of competency. By focusing on graphical user interface (GUI) aspects that relate to the user and their experiences (and by providing well-designed tasks and functionality) users may be provided with a greater sense of autonomy.

### 2.1.3. Human Factors

Human factors are directly related to HCI design and theory. By highlighting several points of relevant human factors issues available in the research literature, the author discusses cognitive load theory in relation to interface design. As has always been the case, the amount of information conveyed through an interface directly affects the interaction with the user. By using the inherent nature of RIAs as a means to reduce cognitive load, the users of a peer evaluation application created with such technology should be much more likely to focus on the goal of critiquing work rather than interpreting a complex interface.

#### 2.1.3.1. Cognitive Load Theory

Oviatt (2006) defined cognitive load as “the mental resources a person has available for solving problems or completing tasks at a given time” (p. 873). In increasing human performance when interacting with an interface, Oviatt (2006) discusses certain principles that should be incorporated into the design. These design principles have the ultimate goal of reducing cognitive load. These principles include: designing the application based on a users previous behavior, designing based on previously established patterns, reducing application errors by reducing input, decreasing cognitive activity, designing for establish work practice’s, reducing cognitive load by using familiar interface elements (symbols, metaphors, etc.), not distracting the user with clutter, and designing with less interruptions (pop ups, unnecessary steps, etc.) (Oviatt, 2006).

By designing a targeted, simplified RIA that implements these design standards, cognitive load and functionality overload can be decreased; thereby increasing usability and engagement.

#### 2.1.3.2. Human-Centered Design

According to Oviatt (2006), human-centered design is an approach that many Web 2.0 interactive designers adhere to when creating their projects. This approach focuses on specifically taking user needs and perspectives into account when designing a program. As such, several concepts of human factors and ergonomics are taken into consideration. Human-centered design has been shown to be a particularly effective approach in designing educational applications at various levels.

Some research suggests that users can adapt to an interface as they become a more 'frequent' user that utilizes the software or application on a regular basis. In human centered design, interfaces ideally become more "intuitive, easier to learn, and freer of performance errors" (p. 871). In the end, users should gain the ability to attend, learn, and perform effectively without deterring the user away from valuable content (Oviatt, 2006).

By focusing on human-centered design a targeted set of goals, tasks, and functions can be developed that is ideally suited for a particular user persona. An RIA with simplistic functionality targeted for a particular demographic could increase the engagement, usability, and user experience with the peer evaluation mechanism.

### 2.2. Usability of Web 2.0

After considering the previous topics of RIAs, Web 2.0 technologies, Web-based instruction, and interface design patterns, one final area must be considered. The usability of educational applications is an important component that must be considered when designing a peer evaluation RIA. The following

discussion helps tie interface usability into the design of an effective and usable educational application.

Battleson, Booth, and Weintrop (2001) state that usability testing for the Web incorporates the following: “(1) the goal is to improve the usability of the interface; (2) testers represent real users; (3) testers perform real tasks; (4) user behavior and commentary are observed and recorded; and (5) data are analyzed to recognize problems and suggest solutions” (p. 189).

### 2.2.1. Usability Principles

Powell (2000) and Whitehead (2006) both define usability resulting in a user achieving goals with effectiveness, efficiency, and satisfaction. Whitehead (2000) also describes Web usability as “user and task dependant.” As a user interface designer, the main goal is to develop an interface that is not only designed for the user, but is developed with effectiveness, efficiency, and user satisfaction in mind. The user of the application should be able to complete a given task effectively with the given functionality in an efficient manner.

In *Designing Web Usability: The Practice of Simplicity* by Jakob Nielsen (1999), Nielsen defines usability with five guidelines. They include learnability, rememberability, efficiency, reliability, and user satisfaction. In summarizing Nielsen’s article, an application designed to meet usability guidelines should be learnable by new users, should be easy to pick up again for previous users, should have minimal tasks to increase efficiency, should be error free with high reliability, and should give an overall positive user satisfaction when the user accomplishes a task (Nielsen, 1999). McLaughlin and Skinner (2000) also define guidelines for usability. In addition to Nielsen’s guidelines, McLaughlin and Skinner add confidence and ease of use to Web usability. The user must feel confidence in their ability to complete a task and there must be high ease of use with an intuitive interface.



Nielson, McLaughlin, and Skinner are credible and established sources of expertise in the field of Web usability. The research highlighted in thesis was identified to serve as a means for integrating established Web standards and usability principles into the design of Rich Internet Applications. Because they have similar functionality, RIAs have similar UI's except for some of the fundamental constraints of browser-based applications. The literature highlights useful and credible guidelines for determining and establishing usable interfaces, and will be used when designing the RIA.

Hu and Chang (2006) define usability differently than the ISO 9241-11 usability definition, but do establish significant similarities in the process. In their article, Hu and Chang define Web site usability with the following terms in mind; use, use feature, designed context of use, effectiveness, efficiency, and satisfaction of a use.

An RIA designed to be effective, efficient, and capable of providing a positive user satisfaction are important factors. Good usability practice is a concept that can easily be implemented with traditional Web development, but with increased interactivity, higher engagement, and a larger accessibility rate through desktop development, RIAs and usability provide that Web 2.0 experience.

For implementation, Hu and Chang (2006) state that Web applications must have a real tasks performed by the user. The phrase "real task" implies that there should be a purpose for the application. The "use feature" concept states that the task must be significant in use. Designed context of use is defined as a use feature that clarifies how the task is carried out, by whom, and in what environment does the task exist. Effectiveness, efficiency, and satisfaction of use are defined in Nielson's definition of usability. Effectiveness is described by Hu and Chang as the accuracy and completeness of the tasks given in the application.

Effectiveness is defined as:

$$\text{Effectiveness } (E_{\text{fec}}) = 50\% \text{ Completeness } (C_{\text{gt+}}) + 50\% \text{ Accuracy } (A_{\text{gt}}) \quad (\text{Eq 2.1})$$

Efficiency is defined as:

$$\text{Efficiency} = (\text{Time Expended} - \text{Wasted Time}) / \text{Time Expended} \quad (\text{Eq 2.2})$$

In other words, the efficiency by which a user can complete a given task translates to a higher measure of usability. The last usability principle cited (satisfaction of use), describes how content a user is while interacting with the application and completing the given task.

According to Hu and Chang (2006), for a web site to be considered truly usable it must incorporate all of these usability principles. This allows users to complete tasks that the application was designed to do effectively, efficiently, and with a positive user experience. Integrating Jakob Nielsen's usability principles with Hu and Chang's and implementing them into the design of a RIA should produce a highly interactive application with increased usability.

As taken from the literature, the different aspects of usability can be applied to creating a usable RIA incorporated with Web usability principles. Determining both good Web usability practice in addition to discovering where issues with a particular application may lie help the GUI designer create a usable interface and assessment instruments for determining usable interfaces.

Designing a desktop RIA with simplified functionality for the user is a start, but of course, any Web application should incorporate usability principles and good practice. To increase the success of a desktop RIA, the application must be effective, efficient, free of errors, and have positive user satisfaction. All of these factors will add to a positive RIA experience.

### 2.3. Peer Evaluation

Peer evaluation is essential to the performance of students enrolled in CGT. Peer evaluation from students along with faculty evaluation provides feedback on project design and development. Evaluation can exist as a preliminary measure before the revision stage of the design process.

McGourty, Dominick, and Reilly (1998) research the effects of peer evaluation and review during the assessment process. The authors state that peer evaluation helps reinforce significant objectives in the learning process. This is an important element in the Department of Computer Graphics Technology at Purdue University due to the applied nature of the field and the fact that evaluation of projects can reinforce principles and theories taught in the lecture. These principles can be implemented throughout the application design and development process. The authors also posit that peer evaluation presented in a formal evaluation process can enhance the significance and necessity of peer evaluation. With this in mind, peer evaluation can provide improvement through feedback and can redefine project goals and objectives accordingly. This suggests that the receipt of high quality and efficient feedback is essential and important to CGT students, and allows them to improve their work based on that feedback (McGourty, Dominick, & Reilly, 1998)

McGourty, Dominick, and Reilly (1998) suggest that behavior-oriented peer evaluation can be very beneficial. This type of evaluation is very similar to the online peer evaluation. Online evaluation allows the users to focus on the quality of the work rather than the creator of the work. According to the authors, behavior-oriented peer evaluation is based on the “observation of specific behaviors rather than subjective overall impressions.” With behavior-oriented peer evaluation, the students can process the evaluation more efficiently. By focusing peer evaluation on the behavior-oriented evaluation, students can receive less subject feedback with quicker dissemination.

The body of work in the literature suggests that a RIA specifically designed for peer evaluation may lead to increased frequency of the evaluation

process among students, thus enhance the quality of their work during the overarching learning experience. The ultimate goal of this directed project is not create a desktop RIA that will directly enhance the student performance. Rather, the purpose of this project will be to design a peer evaluation RIA using established usability and design principles and compare that program to web-based alternatives. This comparison will focus on the usability and engagement of the two sets of applications in an effort to establish a user preference. Should the RIA be more usable and engaging (as is expected) it is intended that students will be more likely to engage in the peer evaluation process that has been established to provide significant educational benefits.

#### 2.4. Feedback Systems

In developing the feedback component of the peer evaluation application, research in rating systems is crucial for determining the criteria for an effective rating system. The following research on rating systems helps accomplish this goal.

##### 2.4.1. Web Rating Scales

In *Designing Parameters of Rating Scales for Web Sites* by van Schaik and Ling (2007), the effectiveness of rating scales were discussed as part of a Web study. Two types of rating scales were discussed as part of the response format portion of their study: (1) Likert scales and (2) visual analogues scales. Likert Scales use a discrete number of values that the evaluator can choose when utilizing the scale. Five-, seven-, and nine-point Likert scales are common among rating systems. When rating based on criteria on a five-point Likert scale, the evaluator can rate based on seven values. Van Schaik and Ling (2007) use the statement “I felt disoriented” and allowed the evaluator to rate a “one” for never, a seven for always, and a two to six for everything in between. Other Likert scales may use descriptive titles for each value in between. An analogue

scale has a continuous number of responses that the evaluator may enter in their evaluation. An interactive slider can be used as the scale. Therefore, if tested using the same statement as above, “I felt disoriented”, then the user would move the slider all the way to the right for always, all the way to the left for never, and anywhere in between with a continuous number of responses for other in between inputs (van Schaik & Ling, 2007).

Van Schaik and Ling (2003) compared the advantages and disadvantages of both scales, Likert versus visual analogue scale, in the table below.

Table 2.1.  
*Reported Advantages and Disadvantages of Likert and Visual Analogue Scale Response Formats (van Schaik & Ling, 2003a).*

	Likert	Visual analogue scale
Advantages	Relatively easy to learn because all possible responses are presented.	Effect of individual interpretation of Likert graduations avoided.
	Relevant changes in scores more easily interpreted by researchers.	Better match between subjective state and response through very large response range.
Disadvantages	Poorer match between subjective state and response because of restricted range of responses.	Difficulty in (learning to) use because of lack of indication of intermediate points (only end-points are displayed).
	Variability due to individual interpretation of Likert graduations.	Extra work required to convert analogue responses into numeric scores after data collection.

This is often assumed, but is not consistent with the research cited in Nunnally and Bernstein (1994) on the effect of increase the number of scale

steps on the reliability of scales, where scales become more reliable with an increasing number of scales steps, but the with rapidly diminishing returns; in particular, after 11 steps, reliability increases very little.

In researching Likert and visual analogue scales, van Schaik and Ling (2003) present research in comparing the two scales for Web rating systems. Schiak and Link discuss advantages and disadvantages of implementing both rating systems. The Likert scale offers a better solution for data gathering and analysis in the future with defined values. However, the analogue rating system offers a continuous range of values for the evaluator to choose from, but it could be troublesome because there is only a description of the value for the lowest and highest point, not for the in between values.

Along with types of rating systems, van Schaik and Ling (2003) also discuss interactive mechanisms used for Web ratings systems. In the study, the authors compare radio buttons versus drop down menus in response selection. The authors state that the use of radio buttons allows the user to easily click on response desired. If a drop down menu is implemented, the user has to click before the responses are visible (van Schaik & Link, 2007). From a usability point of view, the radio buttons could increase ease of use and therefore have a correlation with increase in usability.

Van Schaik and Ling (2007) relate rating systems to HCI in their research. In relation to HCI, Gillan and Cooke (1995) Likert scales are more common than analogues ones, but it is also stated that there is a lack of support for this concept in the research. Even though these researchers studied rating scales as a form of evaluation and questionnaires, this research provides a solid basis for determining effective implementation of rating scales in RIAs for this directed project. The purpose of this directed project is to compare RIA peer evaluation systems versus traditional applications, but improvements to rating systems of justification of a rating system being used adds to the body of knowledge.

## 2.5. Summary of Review of Literature

The topics covered in this literature review cover the relevant areas of RIA design, HCI, human-centered design, peer evaluation concepts, and applying effective usability standards to GUI's. This review along with additional research will hopefully allow the author and future designers/developers to apply this knowledge in building effective RIAs for peer evaluation.

### CHAPTER 3. FRAMEWORK AND METHODOLOGY

This experimental study focuses on the evaluation of desktop rich Internet applications with targeted peer evaluation functionality versus browser-confined Web applications designed with a more general set of functions. This evaluation will examine if an RIA with a more interactive and simplified media experience is more effective, efficient, and presents a higher user satisfaction opposed to a traditional Web application.

The RIA developed for this study -- *The "Evaluation App"* -- was compared against a traditional Web application (DeviantArt) with peer evaluation functionality. A usability index was used for a basis of the formative evaluation. According to Keevil, (1998), usability index is "A measure, expressed as a percent, of how closely the features of a Web site match generally accepted usability guidelines" (p. 4). For this study, the usability guidelines from the literature will be taken and applied to the RIAs presented in the findings. Keevil's definition was taken out of the context for websites and applied to RIAs of the Web.

The mixed methodology of this study acquires both quantitative and qualitative data. The quantitative data, which helps measure usability, using the criteria of effectiveness, efficiency, and error rate (both navigational and application errors), was acquired through an observational study. The post-assessment evaluates user satisfaction, specifically user motivation and user experience through the use of a Likert scale. The qualitative data was obtained by collecting written answers to open-ended questions about the user's experience when interacting with both RIAs and Web browser applications.



Through this formative evaluation, the usability and user satisfaction between both types of applications through a comparative analysis was examined.

### 3.1. Application

The RIA created solely by the researcher for this project (titled the “Evaluation App”), was developed with MXML and ActionScript 3.0 on the educational version of the Adobe Flex Builder 3 platform. PHP (PHP Hypertext Preprocessor) and XML (Extensible Markup Language) were used for the databases and connection to and from the server. The RIA was designed to function outside the Web browser using the Adobe AIR technology. As much as possible, the “Evaluation App” was designed according to proven and usability principles previously established for Web and software interfaces.

Potential application users include students, faculty, or persons outside of the university level with interest in a featured field. However, the “Evaluation App” was tested with Computer Graphics Technology (CGT) 256 students, but was built as a flexible application that could potentially be used outside the Computer Graphics Technology Department.

The “Evaluation App” is capable of displaying a broad variety of categories including photography, digital art, sketching art, print media advertising, web design/development, 3D modeling/animation, multimedia, BIM graphics, and virtual product integration. The users are able to upload projects at various stages of development so that they may receive feedback throughout development. Users are able to specify which categories they wish to upload, add project descriptions, and allow their projects to be critiqued. However, for the tested prototype the photography section was the only fully functional section. Faculty members can also use the application to rate students. Users are able to sort the various projects based on category, highest rated, most recent, artist, and by all. The overall rating system will determine the project’s popularity among all projects currently available on the system.

The “Evaluation App” is designed with interactivity and simplified functionality in mind. The RIA adopts features from existing Web applications and amplifies them by making those features more usable and interactive.

The following figures are an array of screenshots of the “Evaluation App” during usability testing. Figure 3.1 is the login screen that appears after the AIR application loads. Users must first create appropriate credentials before logging into the secure environment. The users may create credentials by clicking on the “Create Credentials” button on the login screen. Once the users enter their name, desired username and password, and email address, then they may log in instantly. The user data is stored in an XML (extensible markup language) database on a Purdue server. The AIR application interacts with the XML data through the use of PHP (PHP Hypertext Preprocessor), a server-side Web programming language.



*Figure 3.1 Login Screen.*

After logging in, the user is directed to Figure 3.2, the main screen. The main screen consists of 9 categories relevant to the CGT undergraduate specializations. Each category has a corresponding number that shows how many projects exist in the database for the specific category. To select a category, the user simply clicks on the desired category. If the user wishes to upload a project or view account settings (account information, manage uploads, or manage usage), the user may navigate the desired icons at the top of the screen. The user may also logout of the application using the “Logout” button located in the upper right corner of the menu on every page. The application displays a system information bar at the bottom of the screen. Username, login time, and connectivity are shown. If the application loses connection to the databases at any time, the connectivity bar will turn red, informing the user that internet connectivity has been lost.

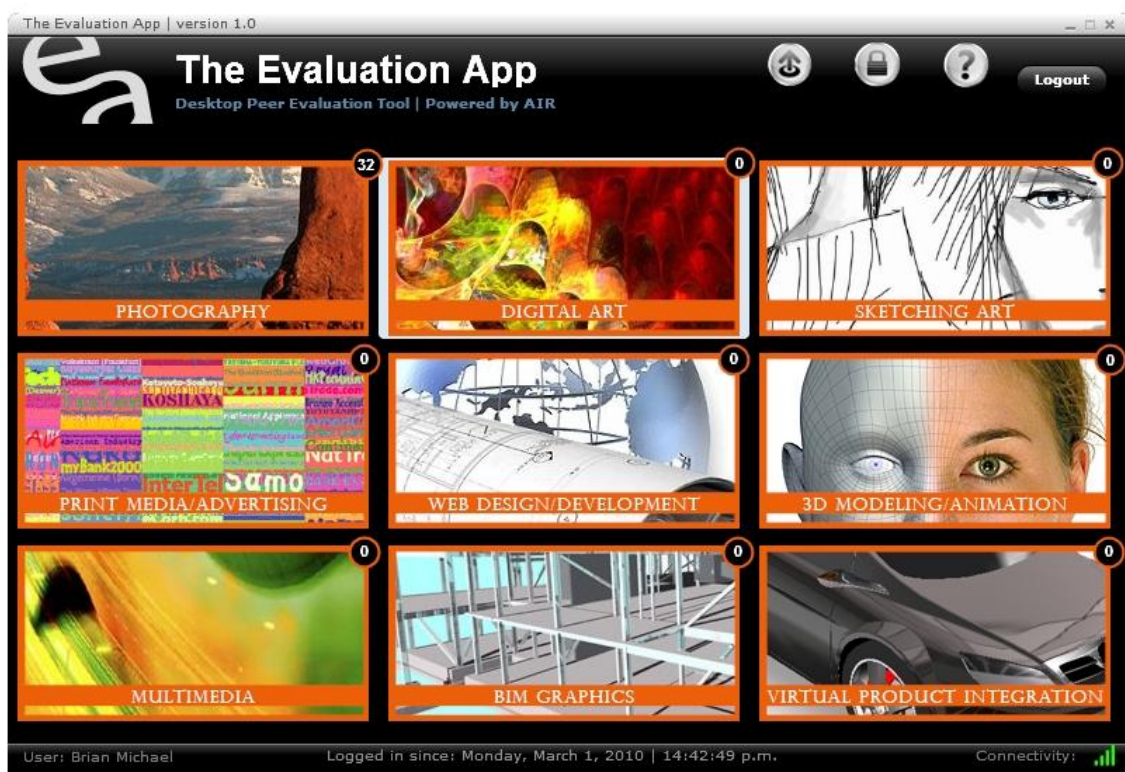
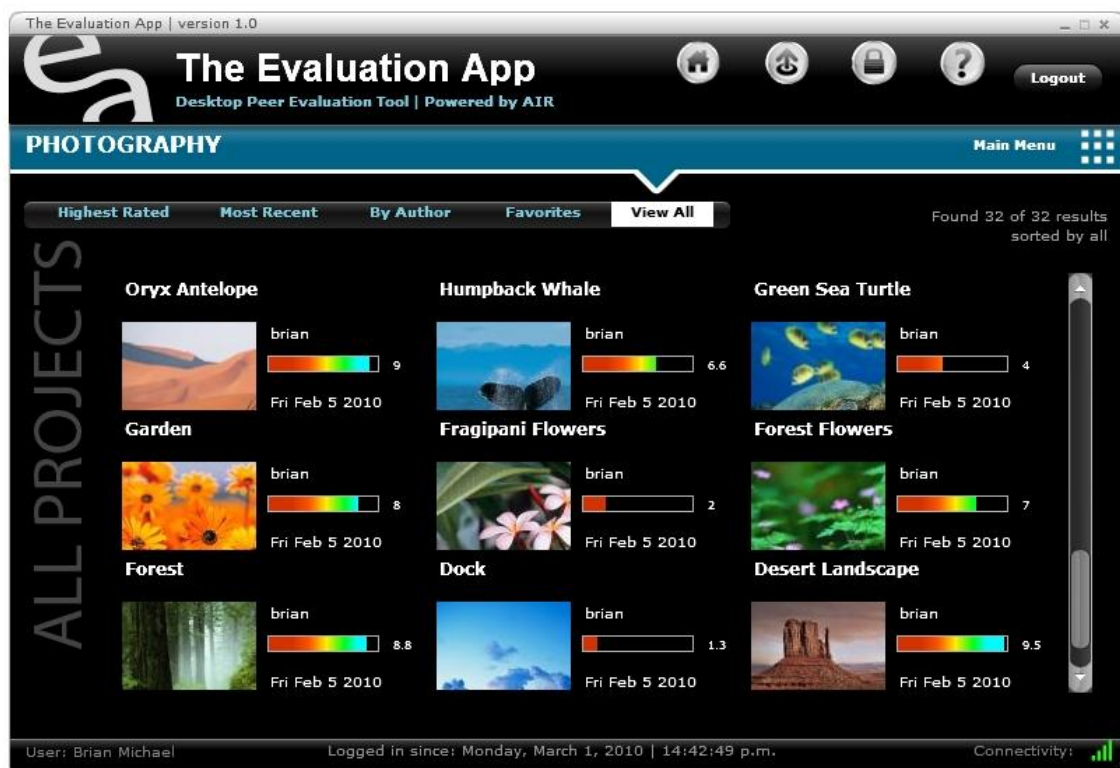


Figure 3.2 Main Screen.

Once the user clicks on a category from the mains screen, the application will navigate to the galleries (Figure 3.3). By default, the “View All” gallery appears first. Using the mouse, the user may select the following galleries; View All, Favorites, By Author, Most Recent, and Highest Rated.

The View All gallery pulls all projects from the database associated with the selected category. The Favorites gallery pulls projects that are placed on the favorite list by the user. Any project can be placed on the favorite list at any time. The Most Recent gallery pulls the nine most recently uploaded projects. The Highest Rated gallery pulls any project that is rated between 8 and 10 (10 being the highest rating a project may have).



*Figure 3.3 Main Gallery.*

Figure 3.4 shows the “By Author” gallery. This gallery allows the user to search by author using an XML search function. The search input auto populates based on the users search to help eliminate search errors (e.g. the user can type

“br” and any user that begins with “br” such as brian, brad, and Brandon will appear in a drop down box). Once a user searches for a username, the application will popular projects by that specific author. A profile tab will also appear detailing information about the user. This tab can be minimized at any time.

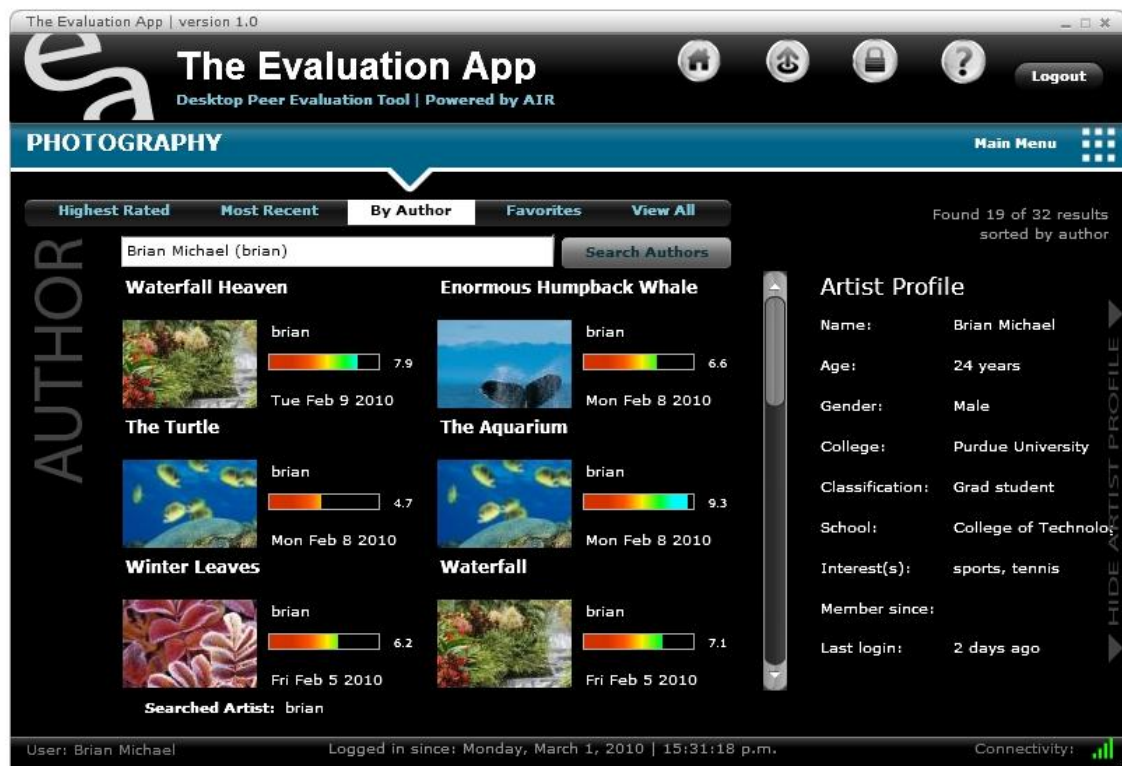


Figure 3.4 Search by Author.

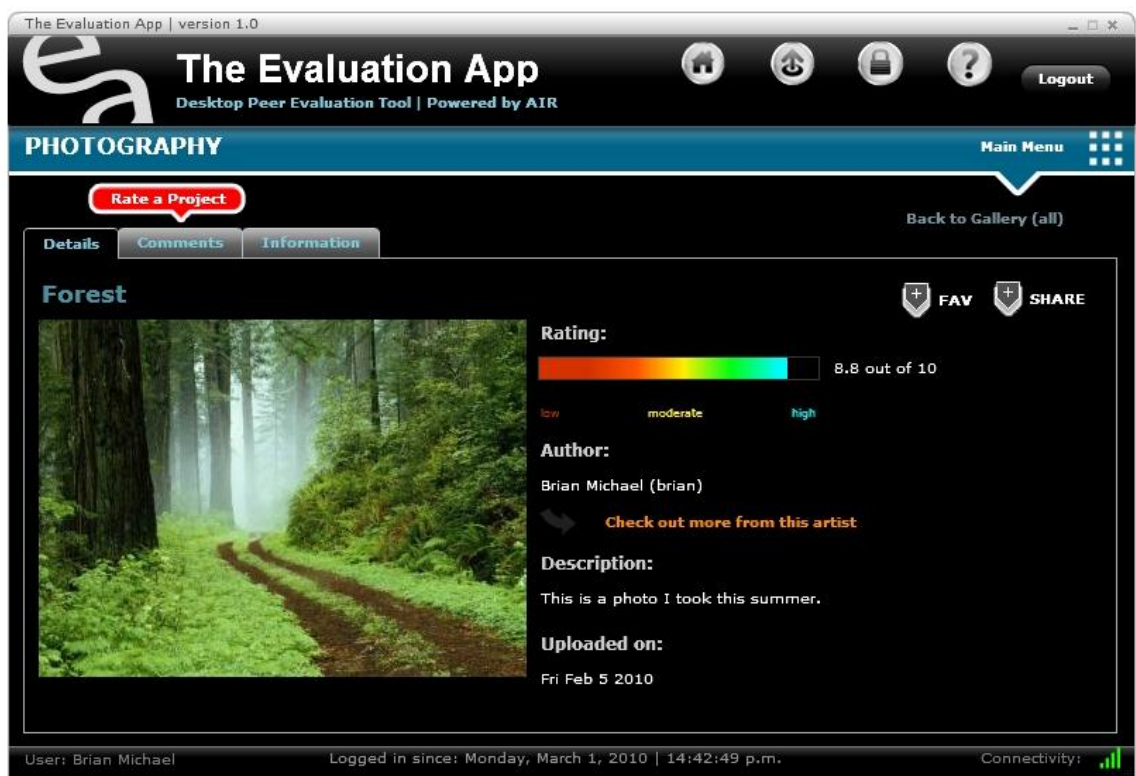
The thumbnail projects can be clicked on to display a larger image of the project as well as more information. The Project View Screen (Figure 3.5) is designed as a tabbed navigation.

The first tab (details) displays a larger snapshot of the projects, the rating, author, description, and upload date. The rating (both on the thumbnails and larger details page) displays the rating as a gradient scale. The scale is as follows; red to red-orange is low, yellow is moderate, and green to teal is high. The scale is based on a point rating. The points received for project determines



the colors given. The rating is calculated based on a simple average of all of the ratings.

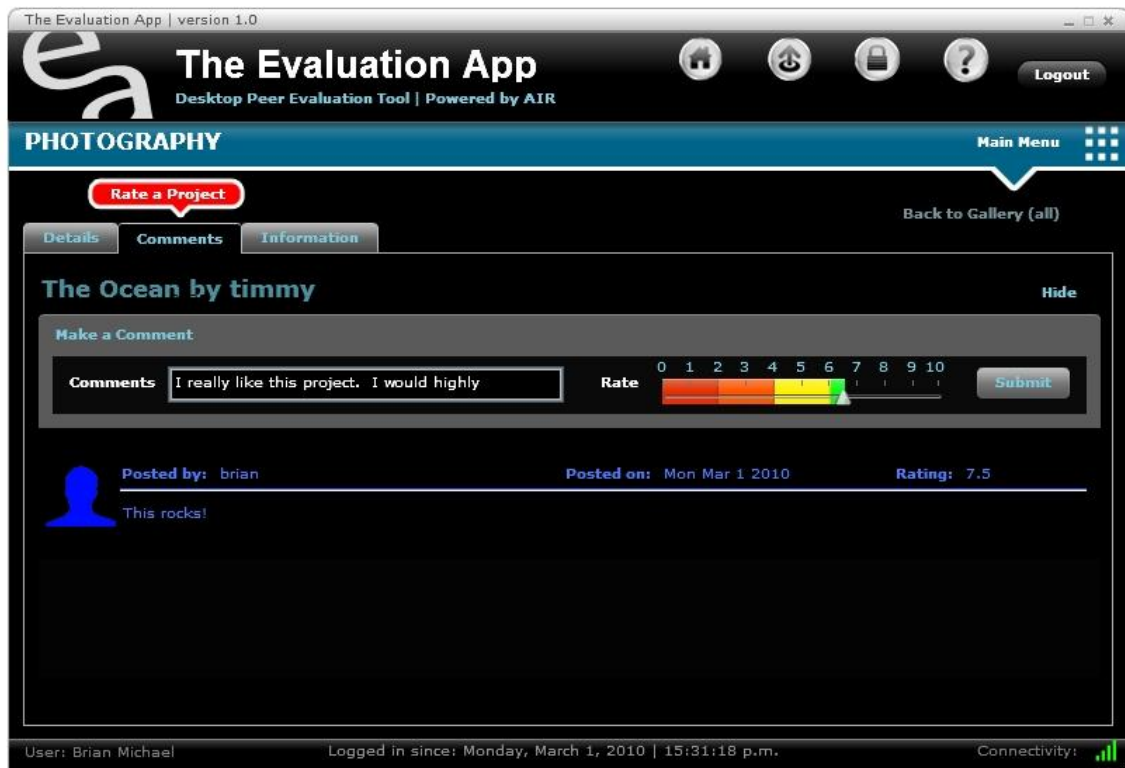
The details page allows the user to favorite a project using the “FAV” button. Clicking on the “FAV” button simply adds each project to the favorite list for quick viewing in the future. The “SHARE” button allows the user to share a project with popular social media applications such as Facebook, Twitter, and LinkedIn. By clicking the “SHARE” button, the application will navigate the user to a Website where they can login and add the project to their profile. Within the details page, there is also a button located near the artist’s name that allows the user to click and view all projects by this author.



*Figure 3.5 Project View Screen.*

Figure 3.6, the comments tab, allows users to comment and rate on the projects of peers. Comments can be made by placing a comment in the comments input box. Rating is down by moving the slider to the right to assign

the appropriate rating to the project. The rating scale is color coordinating to match the gradient rating associated with each project. Other comments are also displayed on this page. The application locks the author of the project from commenting and rating in this section. This prevents ballot stuffing from the author.



*Figure 3.6 Commenting Screen.*

The third tab, Project Information tab (Figure 3.7), displays data graphs about each project. The number of project views and comments are displayed in one graph. The monthly average for ratings is displayed in another graph. The monthly averages for ratings is mock data since the application is only tested over a course of three weeks.

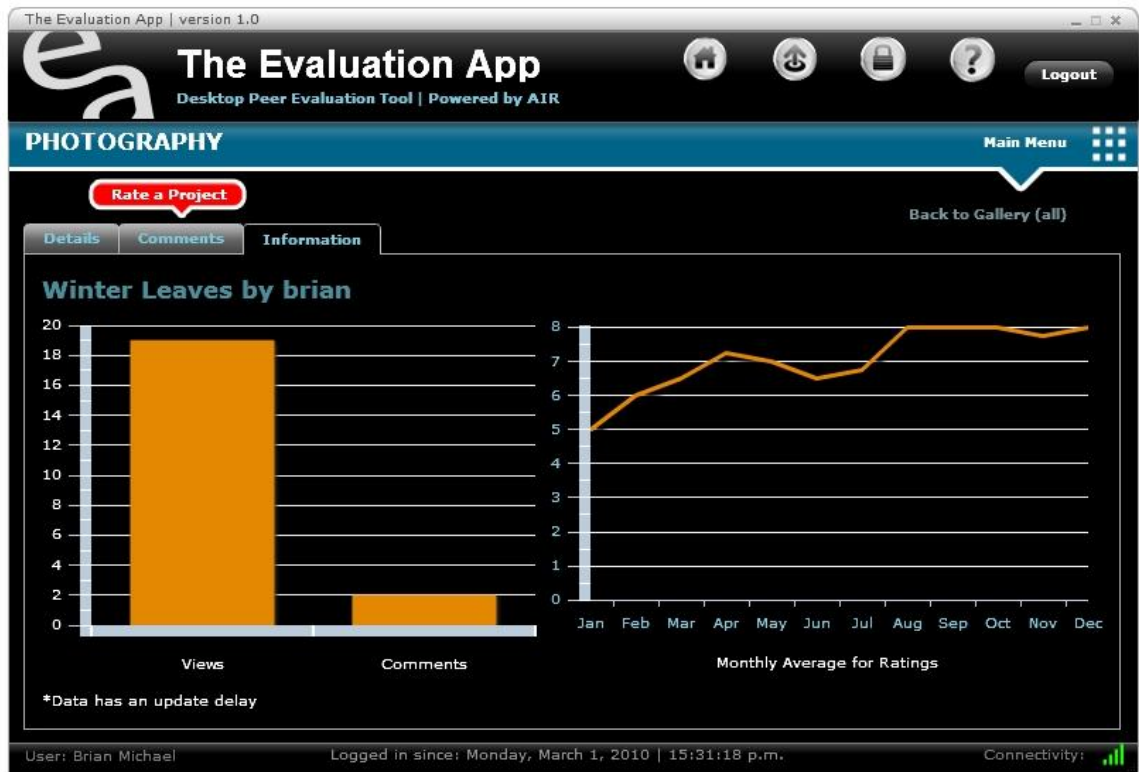


Figure 3.7 Project Information Screen.

Figures 3.8-3.11 are sections of the application located in the account settings section of “The Evaluation App”. These sections allow users to monitor information and settings, upload projects, and track projects/rating.

Figure 3.8, the Project Upload page allows users to upload a project into the database. The users can select the title, category, and description of the step 1 screen. The “Evaluation App” will display an error line if a project title is already taken. Once the user clicks the “Upload” button, the user will be guided to step 2. During step 2, the user can browse their computer to upload an image that will act as the screen shot of their project. The user will receive confirmation once the upload is complete. The uploaded project will display immediately for other users.



The Evaluation App | version 1.0

**The Evaluation App**  
Desktop Peer Evaluation Tool | Powered by AIR

ACCOUNT SETTINGS

Manage Account | Manage Usage | Manage Uploads | **Upload a Project**

**Step 1**

Name \* Brian Michael

User \* brian

Date \* Mon Mar 1 2010

Category \* Photography

Title \*

Description \*

**Step 2**

User: Brian Michael | Logged in since: Monday, March 1, 2010 | 14:42:49 p.m. | Connectivity:

*Figure 3.8 Project Upload Screen.*

Figure 3.9 displays the screen where users can manage their own uploads. The user's uploads are generated in a table format displaying the thumbnail image, title, date, description, rating, and category. The user logged in can also remove images in this section, view comments, and also reply to other comments. This section allows the user to easily manage their uploads and review comments/ratings without searching for their projects in the main galleries.

The screen in Figure 3.10 is the Manage Usage screen. This section allows users to manage both their login usage and upload usage. The data chart displays information for 2009 and 2010 in relation to the user's application activity.

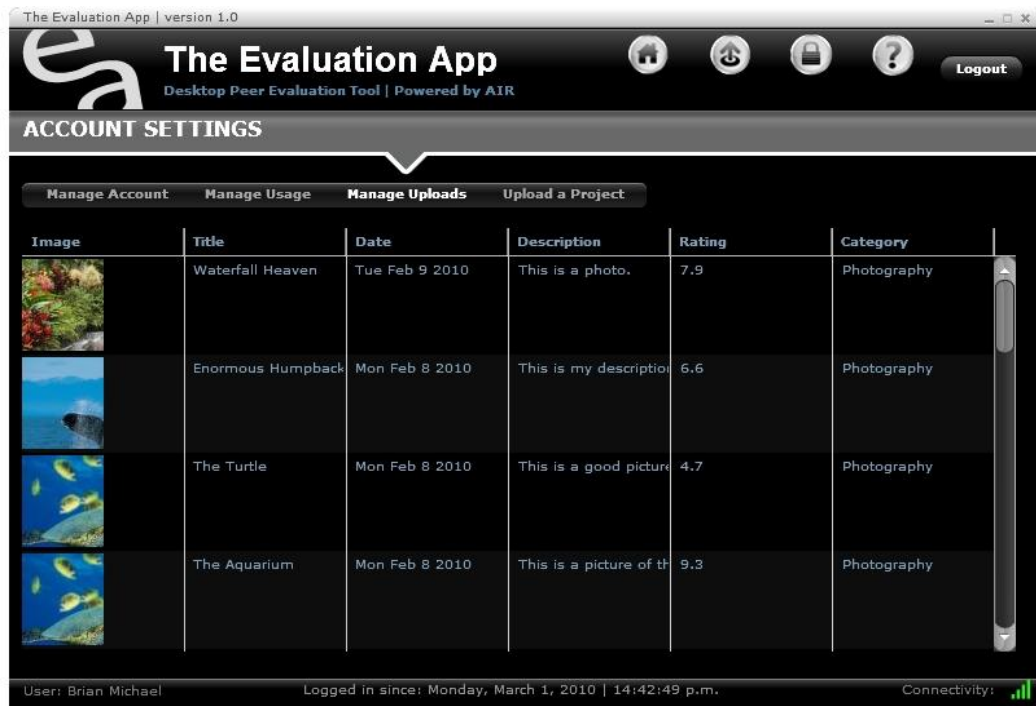


Figure 3.9 Manage Uploads.

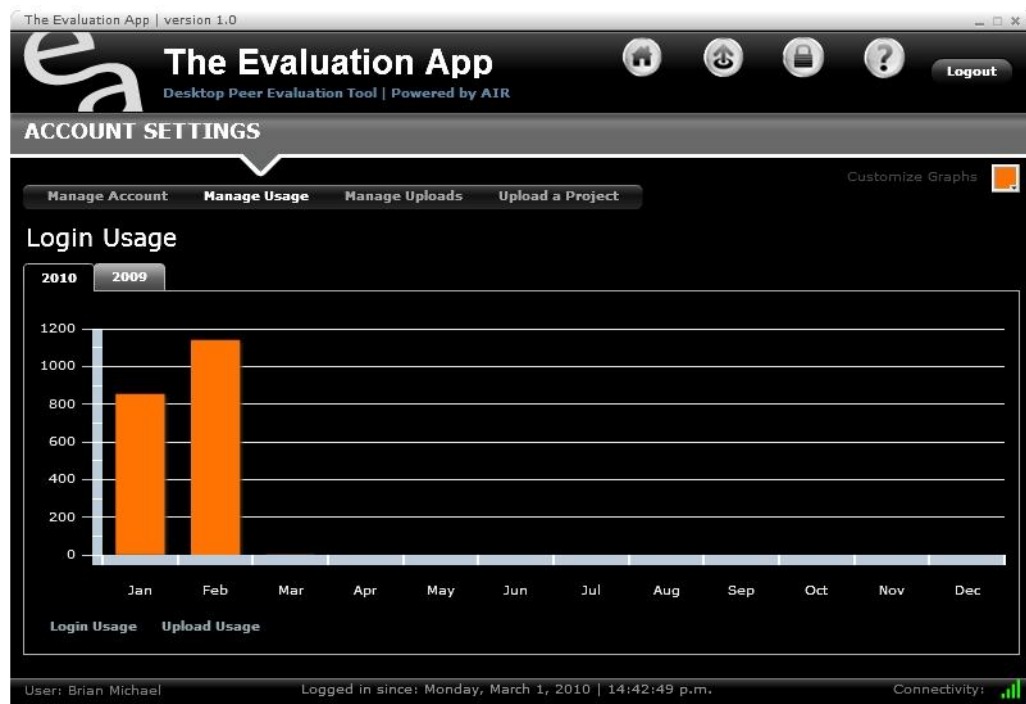


Figure 3.10 Manage Usage.

Figure 3.11, the Account Settings page, manages the user's account information. Users can edit their information by clicking the "Change Credentials" button. The user can view all credentials as well as edit their profile. Users can enter information for birthday, gender, college, classification, school, and interests. The user can also select which avatar (blue and pink) they would like to have displayed while commenting on projects. This section is password protected. Users cannot make changes without confirming their password.

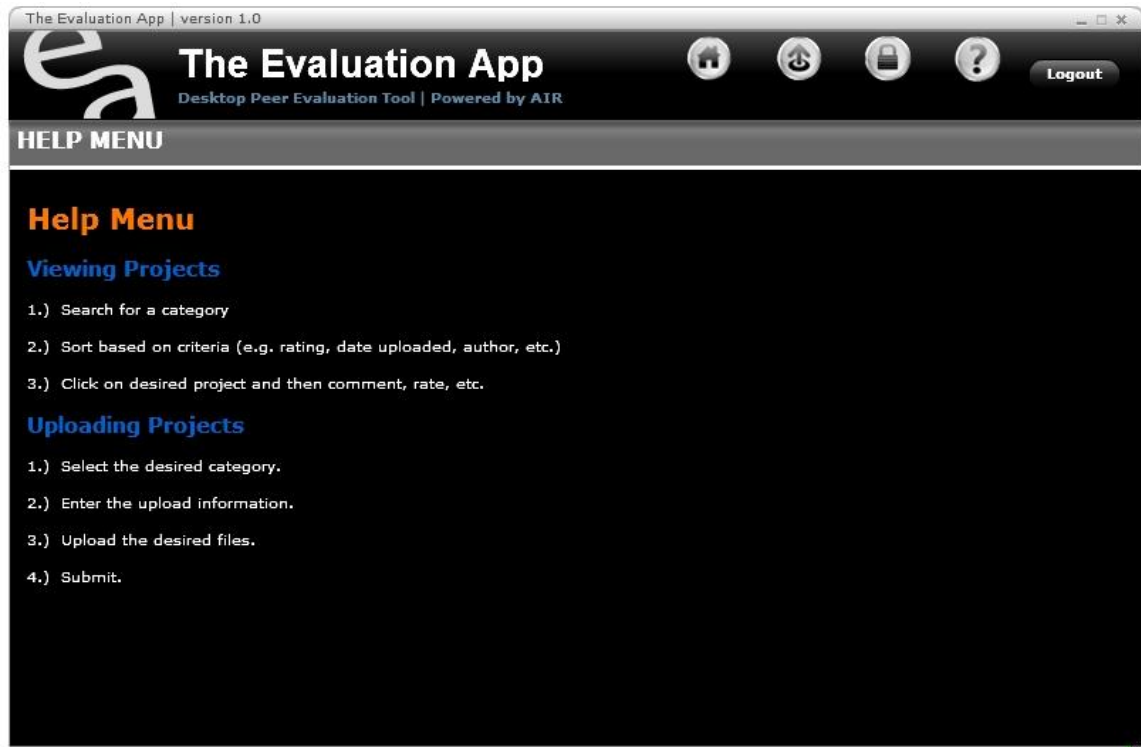
The screenshot shows the 'The Evaluation App' interface. At the top, there's a header with the app name and version (1.0). Below this is a navigation bar with 'ACCOUNT SETTINGS' highlighted. Underneath, there are four tabs: 'Manage Account', 'Manage Usage', 'Manage Uploads', and 'Upload a Project'. The 'Manage Account' tab is active, showing a 'Change Credentials' link. The main content area is divided into three sections: 'Basic Information', 'Profile Information', and 'Avatar'. The 'Basic Information' section includes fields for Name, Username, Password, Email, Privacy (Receive Emails), and Share Uploads. The 'Profile Information' section includes fields for Age, Gender, College, Classification, School, Interest(s), Member since, and Last login. The 'Avatar' section shows a selected blue avatar.

Basic Information		Profile Information		Avatar
Name	Brian Michael	Age:	24 years	Selected Avatar 
Username	brian	Gender:	Male	
Password	*****	College:	Purdue University	
Email	bmcraig@purdue	Classification:	Grad student	
Privacy	Receive Emails: true	School:	College of Technology	
	Share Uploads: true	Interest(s):	sports, tennis	
		Member since:		
		Last login:	2 days ago	

User: Brian Michael      Logged in since: Monday, March 1, 2010 | 14:42:49 p.m.      Connectivity:

*Figure 3.11 Manage Account.*

Figure 3.12 displays help information about the "Evaluation App." Information for viewing projects and upload projects are displayed. Simple step-by-step directions allow the users to easily search for guidance.



*Figure 3.12 Help Screen.*

### 3.2. Compared Applications

DeviantArt was used for the casual comparative analysis in this study. DeviantArt was chosen because this application is used by many CGT students (according to the previous pilot study: See section 3.3.1). This application is a free application that has uploading/viewing capabilities where users can upload projects and have them critiqued by others. DeviantArt is recognized as a traditional browser-based program (Figure 3.13).

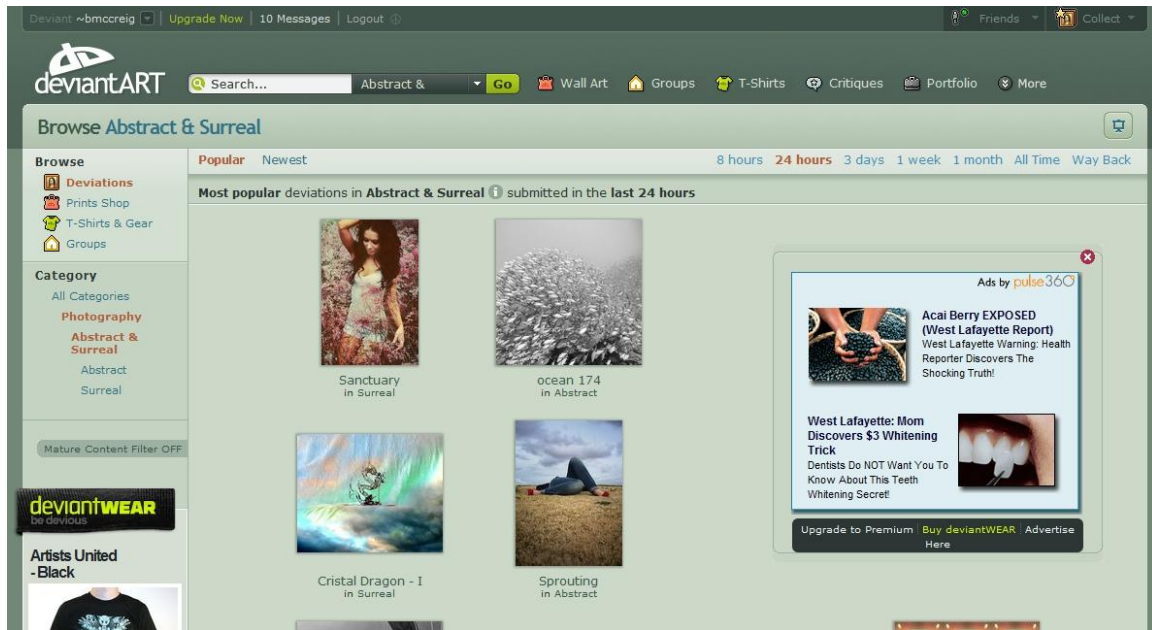


Figure 3.13 Main Gallery (DeviantArt).

DeviantArt ([www.deviantart.com](http://www.deviantart.com)) is a peer evaluation application with that generally possesses more functionality than Flickr. Users of DeviantArt are allowed to upload, share, and organize their projects. DeviantArt has a broad range of categories in which users can classify their projects. DeviantArt also has increased organization features that include portfolio capabilities. This allows the user to organize their projects together in a portfolio for easy viewing. DeviantArt also gives to capabilities of setting your projects for just viewing or listing them as reviewable. If you choose not to set your project as reviewable, then the viewers can comment and just give feedback on your project. If you do set the project to reviewable, then users can rate and evaluate your project through commenting.

DeviantArt is free to join, although premium versions are offered for a monthly charge. DeviantArt was chosen because this application is Web-based and offers similar features to the “Evaluation App.” Therefore, not only will DeviantArt be compared to the “Evaluation App”, but the adaptive functionality of both types of applications will also be compared.

Figure 3.14 displays the commenting/rating page for DeviantArt. This page displays a larger snapshot of the project, comments, ratings (emoticons), project details (size, resolution, etc.), and project information (number of comments, downloads, favorites, etc.). The user can also share the project with social media websites such as Facebook, Twitter, and LinkedIn.

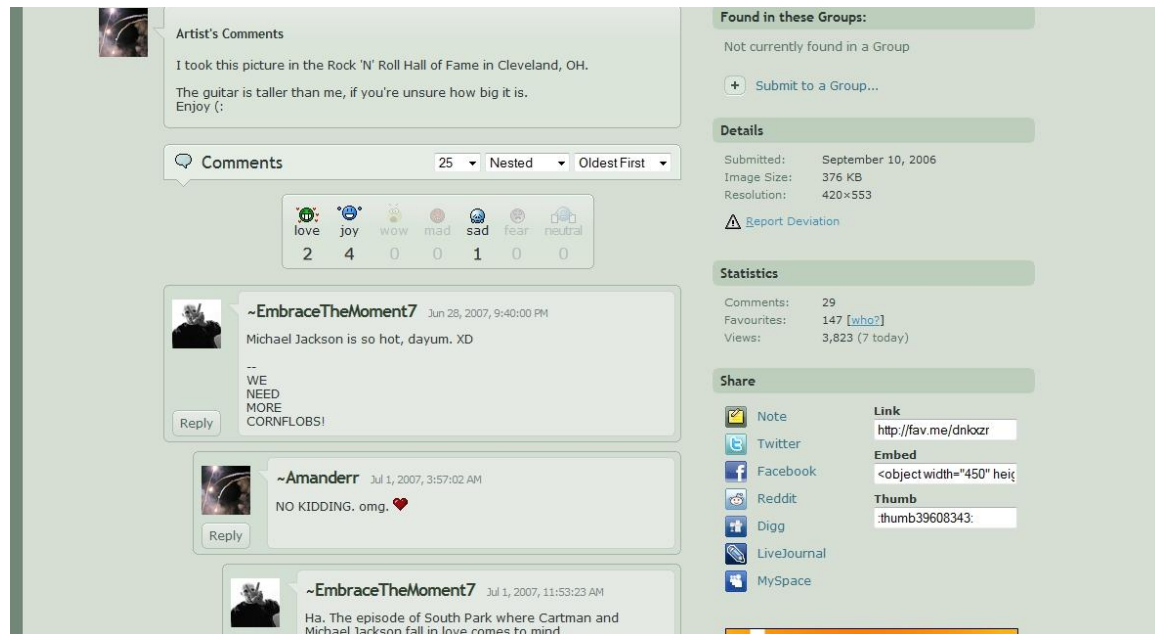


Figure 3.14 Comment/Critique Screen (DeviantArt).

### 3.3. Methodology Design

This study was conducted and assessed using a mixed methodology approach. Both quantitative and qualitative research methods were administered as a testing approach to gather data on rich Internet applications versus browser-confined Web applications. A causal comparative approach was used to compare identical data sets of the following: (1) a rich Internet application (the "Evaluation App"), and (2) a Web browser applications (DeviantArt). This study compares the applications to determine which type of application is more usable to the user and provides a higher user satisfaction.

The methodology design includes an online preliminary usability survey, observed usability study, and an online post usability survey. The preliminary usability survey (Appendix D) consisted of demographic questions, as well as levels of experience.

The usability study (Appendix F and G) consisted of participants completing a specific list of tasks for a traditional Web evaluation application (DeviantArt) and the same set of tasks for the customized rich Internet application (the “Evaluation App”). The treatment order was randomized. Participants for the testing were CGT 256 students. The researcher observed the participants and documented on three criteria: (1) efficiency, (2) effectiveness, and (3) navigational/application error rate. Efficiency was measured through time performance. How long did it take to complete the task? Effectiveness was measured through the ability to successfully complete a task. Error rate was measured through number of errors. How many application errors were experienced while interacting and did the user successfully complete the task? Navigational attempts were also measured for each task. The goal was to have 80% of participants complete the tasks correctly in the time allotted.

The post usability survey (Appendix E) is a user satisfaction survey using a 5-point Likert scale. It measured and clarified the following: (1) ease of use, (2) user experience, and (3) user motivation. User experience measures and clarifies participant perceptions of: (1) visual presentation, (2) organization of interface, (3) usefulness of application, and (4) confidence to complete a task effectively and efficiency with increased engagement. During the post usability survey, participants were also asked which features they liked, disliked, and would like to change in regards to the “Evaluation App.”

### 3.3.1. Preliminary Background Survey Results

A preliminary background survey (Appendix C) was conducted fall semester 2009. It included a series of questions to determine if there was a need

for the “Evaluation App.” The preliminary study survey was distributed via Qualtrics survey system offered through the Information Technology at Purdue (ITaP) department. Preliminary information was gathered prior to the design and development of the RIA. Participants in the pilot study consisted of 100 volunteers in the Department of Computer Graphics Technology (CGT), who were examined on their knowledge of RIAs and Adobe AIR. A major benefit of the preliminary study was that it addressed whether the sampled audience would like to see an application much like the “Evaluation App”, and if so what features would they like to see. Of the 100 responses, the results of the pilot study indicated the following: (1) 52% have previously uploaded a project to the Web to be viewed/analyzed/critiques by others, (2) DeviantArt, PhotoBucket, and Flickr were the top Web applications for peer evaluation, (3) 93% said that they would use an AIR desktop application to peer evaluate if it was available, (4) commenting, critiquing, and portfolio management were the top three features ranked by the participants, and (5) an effective/efficient feedback system was ranked the highest among desired goals for an AIR desktop peer evaluation application.

### 3.4. Hypothesis

$H_{01}$ : A desktop RIA (the “Evaluation App”) for peer evaluation with targeted functionality and simplicity will have no effect on usability and/or user satisfaction versus a traditional Web application (“DeviantArt”).

$H_{A1}$ : A desktop RIA (the “Evaluation App”) for peer evaluation with targeted functionality and simplicity will have a significant effect on usability and/or user satisfaction versus a traditional Web application (“DeviantArt”).



### 3.5. Methods

The rich Internet application and browser-confined Web application of this study are the independent variables. The performance of these applications was not impacted by other variables aside from independent confounding variables that occur based on pure chance. The ability to complete a task when interacting with each application, time taken to complete each task, and user satisfaction level represent the dependent variables in this study. Each of these measurements depend on the user interaction, effectiveness, efficiency, and error rate (usability guidelines) of each application. These three measurements are crucial to the testing and analysis of the usability and user experience of the rich Internet application versus the Web applications. Other confounding variables (ex: human factors, environmental factors, technological issues, etc.) may be present from the outside environment that can impact the results.

### 3.6. Data Collection and Analysis

The data was collected through both the observed study and the Qualtrics survey system. A paired T-test was used to compare the interaction of the user with the “Evaluation App” versus their interaction with one of the traditional Web applications. The paired T-test compared data pairs for the difference in time performance. The averages for application error rate, navigational attempts, completion success rate, and time were also recorded. Qualitative results, user satisfaction (user experience, ease of use, and user motivation), were recorded during the post survey.

The paired T-test was used to determine the p-value and level of significance of the p-value. This will either reject or retain (support) the null hypothesis. If the null hypothesis rejected, then the alternative hypothesis is accepted.

Qualitative data collected during the study was used to clarify user perception and satisfaction. It was not analyzed.

## CHAPTER 4. PRESENTATION OF DATA

Chapter 4 serves as the presentation of data. In this chapter, the participants are introduced and the data for each phase of testing is presented. Preliminary survey data (demographics and background information), application engagement data (times, interaction, success rate, and errors), and post survey data (ease of use, user experience, and user motivation) are presented in this chapter. This chapter also compares and contrasts the user's interaction with each application. Table 4.1 discusses the usability testing schedule for the "Evaluation App" versus DeviantArt.

Table 4.1.  
*Spring 2010 Usability Testing Schedule.*

Date	Type	Dissemination	Location
10/2009	Preliminary Background Survey	Electronic Survey	Online
2/24/2010	Preliminary Usability Survey	Electronic Survey	Online
2/24/2010	Usability Testing	Observed	KNOY 340
3/3/2010	Usability Testing	Observed	KNOY 340
3/10/2010	Usability Testing	Observed	KNOY 340
2/24/2010 – 3/1/2010*	Post Usability Survey	Electronic Survey	Online

\*post survey was conducted immediately following observed usability testing.

This study was conducted with 37 participants available through CGT 256: Human Computer Interface Design and Theory. Since two participants incorrectly completed their surveys, their data was disregarded and 35 participants were used for data analysis. The participants completed a short 5-10 minute preliminary survey before beginning the observed study. During the observed

study, the participants completed 10 tasks while interacting with the “Evaluation App” and completed eight tasks while interacting with DeviantArt. After completing the observed study (15-20 minutes), the participants were asked to complete a 5-10 minute post survey that examined their experience with both applications. In addition, a preliminary background survey was administered online in October 2009. This study examined 100 participants who are different and not linked in any way to the 35 participants used in this usability study. This data was discussed in the methodology section of chapter 3.

#### 4.1. Preliminary Usability Survey

The preliminary survey was distributed online through Purdue Qualtrics. The survey examined participant demographic information (gender, school, college, classification, and internet usage) as well as peer evaluation and technological background (Adobe AIR knowledge/experience and DeviantArt experience/usage).

##### 4.1.1. Participant’s Demographic and Background Information

The preliminary survey examined 35 participants. Thirty-seven students began the survey, but the data of two participants (CGT256-03-25 and CGT256-03-37) were discarded because of invalid data response. The following sections describe each participant based on their preliminary survey entry. Alphanumeric identifications were assigned randomly for each laboratory section: CGT256-02-XX for Section 02 and CGT256-03-XX for Section 03. The alphanumeric ID’s are linked to each user for each phase of testing, but is not linked as an identifier to the participant’s name and/or contact information.

#### 4.1.1.1. Participant 1

Participant 1 (CGT256-02-01) was a sophomore male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, social networking, and other (passing time). Prior to taking the survey, he has not heard of Adobe AIR. He reported that he uses DeviantArt once or twice a year (past year) to browse.

#### 4.1.1.2. Participant 2

Participant 2 (CGT256-02-02) was a sophomore female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, she has not heard of Adobe AIR. She reported that she had never used DeviantArt prior to participating in the study.

#### 4.1.1.3. Participant 3

Participant 3 (CGT256-02-03) was a senior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, she has not heard of Adobe AIR. She reported that she had never used DeviantArt prior to participating in the study.

#### 4.1.1.4. Participant 4

Participant 4 (CGT256-02-04) was a sophomore male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet

for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he uses DeviantArt once a month to upload projects, view projects, and critique projects.

#### 4.1.1.5. Participant 5

Participant5 (CGT256-02-05) was a junior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, buying/selling, and other (talking to my friends). Prior to taking the survey, she has not heard of Adobe AIR. She reported that she had never used DeviantArt prior to participating in the study.

#### 4.1.1.6. Participant 6

Participant 6 (CGT256-02-06) was a junior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, she has heard of Adobe AIR, but reported that she had not downloaded an AIR application. She reported that he uses DeviantArt, but it has been at least a year. She uses DeviantArt to view and upload projects.

#### 4.1.1.7. Participant 7

Participant 7 (CGT256-02-07) was a junior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR and has downloaded Pandora AIR and a

Twitter Client (AIR apps). He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.8. Participant 8

Participant 8 (CGT256-02-08) was a sophomore female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for social networking and buying/selling. Prior to taking the survey, she has heard of Adobe AIR, but reported that she had not downloaded an AIR application. She reported that she uses DeviantArt more than once a week to upload projects, view projects, critique projects, and other (groups, forums, leaving comments, and sharing skins).

#### 4.1.1.9. Participant 9

Participant 9 (CGT256-02-09) was a senior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, social networking, buying/selling, and other (web development). Prior to taking the survey, she has heard of Adobe AIR and has downloaded the CGT Cogent Calculator (AIR apps). She reported that she had never used DeviantArt prior to participating in the study.

#### 4.1.1.10. Participant 10

Participant 10 (CGT256-02-10) was a sophomore male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but has never downloaded an

application. He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.11. Participant 11

Participant 11 (CGT256-02-11) was a senior male specializing in Virtual Product Integration (VPI) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, and buying/selling. Prior to taking the survey, he has not heard of Adobe AIR. He reported that he uses DeviantArt more once a month view projects and critique projects.

#### 4.1.1.12. Participant 12

Participant 2 (CGT256-02-12) was a junior male within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, he has not heard of Adobe AIR. He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.13. Participant 13

Participant 13 (CGT256-02-13) was a junior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, and social networking. Prior to taking the survey, he has heard of Adobe AIR and has downloaded the Cogent Calculator and Pandora (AIR apps). He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.14. Participant 14

Participant 14 (CGT256-02-14) was a sophomore female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for research and social networking. Prior to taking the survey, she has not heard of Adobe AIR. She reported that she had never used DeviantArt prior to participating in the study.

#### 4.1.1.15. Participant 15

Participant 15 (CGT256-02-15) was a senior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, she has not heard of Adobe AIR. She reported had never used DeviantArt prior to participating in the study.

#### 4.1.1.16. Participant 16

Participant 16 (CGT256-02-16) was a junior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he uses DeviantArt once a month to view projects and for inspiration.

#### 4.1.1.17. Participant 17

Participant 17 (CGT256-02-17) was a senior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics



Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he uses DeviantArt once a year to view projects.

#### 4.1.1.18. Participant 18

Participant 18 (CGT256-02-18) was a sophomore male specializing in Animation within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, buying/selling and other (entertainment). Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he uses DeviantArt more once a month to view projects.

#### 4.1.1.19. Participant 19

Participant 19 (CGT256-02-19) was a senior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he uses DeviantArt once a year to view projects.

#### 4.1.1.20. Participant 20

Participant 20 (CGT256-02-20) was a senior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet

for surfing, research, gaming, social networking, buying/selling, and other (watching, reading, etc.). Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he uses DeviantArt randomly when necessary to view projects, browse randomly, getting wallpapers, and etc.

#### 4.1.1.21. Participant 21

Participant 21 (CGT256-02-21) was a senior male specializing in General Technology within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, he has not heard of Adobe AIR. He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.22. Participant 26

Participant 26 (CGT256-03-26) was a junior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he doesn't use DeviantArt.

#### 4.1.1.23. Participant 27

Participant 27 (CGT256-03-27) was a junior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not

downloaded an AIR application. He reported that he uses DeviantArt more than once a week to upload and view projects.

#### 4.1.1.24. Participant 28

Participant 28 (CGT256-03-28) was a senior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he had not heard of Adobe AIR. He reported that he uses DeviantArt, but it has been at least a year. He uses DeviantArt to upload projects.

#### 4.1.1.25. Participant 29

Participant 29 (CGT256-03-29) was a senior male specializing in Animation within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.26. Participant 30

Participant 30 (CGT256-03-30) was a senior male specializing in Interactive Multimedia Development within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing and research. Prior to taking the survey, he has heard of Adobe AIR and has downloaded AIR applications, but did not report which applications he had downloaded. He reported that he had never used DeviantArt prior to participating in the study.

#### 4.1.1.27. Participant 31

Participant 31 (CGT256-03-31) was a senior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, social networking, buying/selling, and other (finding information). Prior to taking the survey, he had not heard of Adobe AIR. He reported that he uses DeviantArt once a month to view projects.

#### 4.1.1.28. Participant 32

Participant 32 (CGT256-03-32) was a junior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing and buying/selling. Prior to taking the survey, she has not heard of Adobe AIR. She reported that he uses DeviantArt once a month to view projects.

#### 4.1.1.29. Participant 33

Participant 33 (CGT256-03-33) was a junior male within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing and research. Prior to taking the survey, he has not heard of Adobe AIR. He reported that he had never used DeviantArt prior to participating in the study

#### 4.1.1.30. Participant 34

Participant 34 (CGT256-03-34) was a junior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to

taking the survey, she has heard of Adobe AIR, but reported that she had not downloaded an AIR application. She reported that she uses DeviantArt more than once a week to upload and view projects.

#### 4.1.1.31. Participant 35

Participant 35 (CGT256-03-35) was a junior female specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. She mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, she had not heard of Adobe AIR. She reported that he uses DeviantArt once a week to upload and view projects.

#### 4.1.1.32. Participant 36

Participant 36 (CGT256-03-36) was a senior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, he had not heard of Adobe AIR. He reported that he uses DeviantArt once a month to view projects.

#### 4.1.1.33. Participant 38

Participant 38 (CGT256-03-38) was a junior male specializing in Interactive Multimedia Development (IMD) within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, social networking, and buying/selling. Prior to taking the survey, he had not heard of Adobe AIR. He reported that he had never used DeviantArt prior to participating in the study

#### 4.1.1.34. Participant 39

Participant 39 (CGT256-03-39) was a junior male within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, and buying/selling. Prior to taking the survey, he has heard of Adobe AIR, but reported that he had not downloaded an AIR application. He reported that she uses DeviantArt once a year to view projects.

#### 4.1.1.35. Participant 40

Participant 40 (CGT256-03-40) was a senior male specializing in General Technology within the Computer Graphics Technology (CGT) department at Purdue University. He mainly uses the Internet for surfing, research, gaming, social networking, buying/selling, and other (blogging). Prior to taking the survey, he had not heard of Adobe AIR. He reported that he uses DeviantArt once a year to view projects.

*\*Alphanumerics not assigned: CGT256-02-22, CGT256-02-23, CGT256-02-24*

*\*Discarded Data: CGT256-03-25, CGT256-03-37*

### 4.1.2. Group Analysis

The following sections analyze the participants as a group comparison. Compared data for demographics, technological background, and peer evaluation background are presented. Percentages as well as counts are reported.

#### 4.1.2.1. Demographics

The participants were examined for their demographic information during the preliminary survey phase. Of the 35 participants, 69% (24) were male while

31% (11) were female. A majority of the participants, 77% (27) focused in interactive multimedia development (IMD). Other focus areas included general technology (9%), animated (6%), undecided (6%), and virtual product integration (VPI) (3%). Eighty percent were either junior or senior status, while the remaining 20% were sophomores in the College of Technology at Purdue University. While asked what you used the Internet for, the data was reported as follows; surfing (94%), research (94%), gaming (54%), social networking (86%), and buying/selling (86%).

#### 4.1.2.2. Technology Background

The participants were examined for their technological and peer evaluation background during the preliminary survey phase. The following data reports the group responses for each of the questions. The participants were asked “have you ever heard of Adobe® AIR™ before you entered this survey?” Table 4.2 presents the data spread (counts and percentages).

Table 4.2.  
*AIR Knowledge.*

Answer	Response	%
Yes	18	51%
No	17	49%
Total	35	100%

By examining the data, the spread was fairly even with 51% (18) of the total participants aware of AIR technology where the other 49% (17) are not aware of AIR technology. This shows that before using the “Evaluation App”, developed for the Adobe Integrated Runtime (AIR), 51% of the participants never used or even heard of the technology. Table 4.3 shows data for the following

question: Have you ever downloaded or used an Adobe® AIR™ application? (If answered yes, please list which Adobe AIR application(s)).

Table 4.3.  
*AIR Downloads.*

Answer	Response	%
Yes	4	11%
No	31	89%
Total	35	100%

Of the 35 participants, only 11% (4) have downloaded an Adobe AIR application prior to the study. This shows that prior to the usability study, a significant proportion of the participants had limited knowledge and experience with Adobe AIR. Previous AIR downloads by the 4% include the following: CGT Cogent Calculator, Pandora, and Twitter.

Participant experience with DeviantArt was examined in the preliminary survey. The data gives the test administrator background information and prior experience with DeviantArt for each participant. Table 4.4 shows if each participant used DeviantArt before the usability study was conducted. The participants were asked “Have you ever used DeviantArt before?”

Table 4.4.  
*DeviantArt Experience.*

Answer	Response	%
Yes	18	51%
No	17	49%
Total	35	100%



The data was fairly equal across the spread. Of the 35 participants, 51% (18) used DeviantArt prior to the usability study with the remaining 49% (17) answering “no” to the survey question. The data confirms that prior to the study, about half the participants had experience with DeviantArt, while the other half did not. Of the participants who have used DeviantArt before, an additional question about DeviantArt usage was asked. Table 4.5 displays the frequency usage for DeviantArt users. The higher frequencies include 22% using DeviantArt once a month and 13% using the Web application once a year. Other frequencies include more than once a week (9%), once a week (3%), it’s been at least a year (6%), and other (6%). Other listings included “once or twice in the past year” and “randomly when necessary”.

Table 4.5.  
*DeviantArt Usage.*

Answer	Response	%
More than once a week	3	9%
Once a week	1	3%
Once a month	7	22%
Once a year	4	13%
It’s been at least a year	2	6%
N/A – I don’t use these types of applications	13	41%
Other	2	6%
Total	35	100%

The previous users of DeviantArt reported their primary purpose for using DeviantArt. Data on DeviantArt usage was recorded to determine the sample audience’s primary purpose for using a Web based peer evaluation application. This data could help better the design and development of the “Evaluation App.”

Table 4.6 displays the data for the following question: What is your primary purpose for using DeviantArt?

Table 4.6.  
*DeviantArt Usage/Purpose.*

Answer	Response	%
Upload projects	8	24%
View projects	18	53%
Critique projects	3	9%
Other	4	12%
I don't use these types of applications	14	41%
Total	34	100%

Of the 34 (one participant failed to answer) participants, 53% (18) use DeviantArt to view projects and 24% (8) use DeviantArt to upload projects. Other frequencies include critiquing projects (9%), other (12%), and 41% reported not using these types of applications. Notice that the percentages are of the total participants, not just the DeviantArt users. Other responses included “just to browse”, “inspiration”, “random browsing”, “getting wallpapers”, “groups”, “forums”, “leaving comments”, and “sharing skins”.

The preliminary survey results helped retain background, technological, and peer evaluation information on the participants. This data helps understand the participant's background as well as better the “Evaluation App” as a peer evaluation tool.

#### 4.2. Usability Study

The observed study contained the same 35 students that participated in the preliminary survey. Each student was observed individually by the test administrator. A Hewlett Packard Pavilion dv6000 notebook PC was used as the testing machine. The specs of the computer include; Windows Vista Home Premium 32 Bit operating system, Intel Core 2 Duo CPU, T8100 @ 2.10GHz processor, and 3GB RAM. An optical mouse was optional if preferred over the track pad.

Prior to the study, the participant was asked to register a free DeviantArt account. Once, the observed study began, each student was asked to interact with the “Evaluation App” as well as DeviantArt. The participants performed similar tasks for each application. The tasks for both applications were conducted in the photography sections of each application. While actively engaging with each task, the administrator recorded the start time, end time, completion (yes or no), navigational attempts, application errors, and additional notes observed. The observed study was not conducted as a think-aloud study, but verbal comments were noted to help the administrators examine the user’s experience.

##### 4.2.1. Observed Tasks

Table 4.7 describes the following tasks administered to each of the participants. Tasks 2-10 were given to and observed for each of the participants for both applications. Task 1 (Install application) and Task 2 (Register username) were both administered to users of the “Evaluation App” only. The reasoning for this was to examine average times for installation and user registration. Task 1 was not administered on DeviantArt since it is a Web based application. Task 2 was not administered to save time during the usability study since DeviantArt registration requires email confirmation.

The participants' engagement was limited by time for tasks 3-10. The time constraints were enforced to keep the usability test from being lengthy and to set an efficiency curve for the participants. The time constraints included the following: Task 3 (1 minute), Task 4 (2 minutes), Task 5 (2 minutes), Task 6 (2 minutes), Task 7 (1minute), Task 8 (1 minute), Task 9 (2 minutes), and Task 10 (2 minutes). If the time limit was reached and the participant was already engaged in completing the given task in a successful manner, then the participant was allowed to finish and the time was recorded. If the time limit was reached and it was clear that the participant had not completed the task successfully, then the time was recorded and the task was marked incomplete.

Table 4.7.

*Observed Task List.*

Number	Task List	Application
#1	Install application	Evaluation App
#2	Register username	Evaluation App
#3	Logging in	Evaluation App/DeviantArt
#4	Upload a project	Evaluation App/DeviantArt
#5	Search for uploaded projects	Evaluation App/DeviantArt
#6	Search for a project by author	Evaluation App/DeviantArt
#7	Favorite list a project	Evaluation App/DeviantArt
#8	Rate/comment on a project	Evaluation App/DeviantArt
#9	Search for a favorite listed project	Evaluation App/DeviantArt
#10	Search highest rated projects	Evaluation App/DeviantArt

The usability study was observed to collect data for application efficiency, effectiveness (success rate), navigational errors, and application errors. For every participant, each task was read to the participant in full. If the participant was confused or did not understand the task completely, then the task was read again. Once the task was fully understood, the time began and the user was allowed to interact with the application. The time was stopped if any one of the following four actions was conducted; task was completed, an answer for the task was given (if required for task), if the participant said "done", or if the time limit for the give task had been reached. A "yes" or "no" was then recorded if the

participant successfully completed a task. Tallies for navigational attempts were recorded. If the participant clicked in a section that was not related in any way to the task, then a tally was recorded. A navigational attempt was also tallied if the application faulted causing the participant to restart or navigate away to complete the task. Major application errors were also recorded. A major application error is defined as an error in the application that causes the participant to unsuccessfully complete a task or restart the task completely (E.g. loading error, blank screen, undefined error, etc.). Minor errors were noted and recorded, but if the error did not prevent the participant from completing a task successfully, then that type of error was not held against the participant. The observed task forms are located in Appendix F and G.

The following sections introduce each observed task during the usability study. The tables show the following for each task: Total subjects (N), mean time ( $\bar{x}$ ), variance ( $\sigma^2$ ), standard deviation ( $\sigma$ ), completion success rate, and navigational attempts. For compared tasks, tasks 3-10, a paired T-test was conducted that produces a T-value, Confidence Interval (CI), and a P-value. Discussion of the data follows each tabled data set. For each of the compared tasks (3-10), the null hypothesis for task efficiency is  $H_0: \mu = 0$  that states that there is no significant difference in the difference of times for each application. The alternative is  $H_a: \mu > 0$  that states that the task times for DeviantArt is significantly higher than the times of the “Evaluation App.”

#### 4.2.1.1. Task 1

Task 1 had each participant install the “Evaluation App.” Total times (seconds) and attempts were recorded for each search. Table 4.8 shows the data for application installation.

Table 4.8.  
*Task 1 Statistics.*

Observed Task: Install Application	
Sample Statistics	Values
Total Subjects (N)	35
Mean Time ( $\bar{x}$ )	29.34 s
Variance ( $\sigma^2$ )	256.53
Standard Deviation ( $\sigma$ )	16.02
Completion	35
Completion %	100%
Attempts	1

Of the 35 participants that installed the “Evaluation App”, the average install time was 28.77 seconds. The shortest installation time was 18 seconds and the longest installation time was 85 seconds. The standard deviation of the 35 installs was 16.02. All 35 participants were able to successfully install the application with an average of one attempt per user.

#### 4.2.1.2. Task 2

Table 4.9.  
*Task 2 Statistics.*

Observed Task: Register Username	
Sample Statistics	Values
Total Subjects (N)	35
Mean Time ( $\bar{x}$ )	28.86 s
Variance ( $\sigma^2$ )	673.48
Standard Deviation ( $\sigma$ )	25.95
Completion	35
Completion %	100%
Attempts	(1.14) $\approx$ 1

Task 2 had each participant register appropriate credentials for the “Evaluation App.” The time limit for this task was 1 minute. The participants were told to register a username and password that is very generic to this application

only. Total times (seconds) and attempts were recorded for each search. Table 4.9 shows the data for application registration.

Of the 35 participants that registered credentials for the “Evaluation App”, the average registration time was 28.86 seconds. The shortest installation time was 10 seconds and the longest installation time was 146 seconds. The standard deviation of the 35 installs was 25.95. All 35 participants were able to successfully register credentials for the application with an average of approximately one attempt per user. A couple of users were recorded for multiple attempts. Reasons included registration error and participants entering credential information into the login screen instead of the registration screen.

#### 4.2.1.3. Task 3

Table 4.10.

*Task 3 Statistics.*

Observed Task: Logging In		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	35	35
Mean Time ( $\bar{x}$ )	6.49 s	10.83 s
Variance ( $\sigma^2$ )	334.52	46.24
Standard Deviation ( $\sigma$ )	18.29	6.80
Completion	35	35
Completion %	100%	100%
Navigation Attempts	(1.06) $\approx$ 1	1
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	<b>0.107</b>	
T-Value	1.27	

Task 3 had each participant login to the “Evaluation App” with the previously created username and password. The time limit for this task was 1

minute. Total times (seconds) and attempts were recorded for each search. Table 4.10 shows the data for application login.

Of the 35 participants that logged into the “Evaluation App”, the average login time was 6.49 seconds. The standard deviation of the 35 participants was 18.29. All 35 participants were able to successfully register credentials for the application with an average of approximately one attempt per user.

Of the 35 participants that logged into DeviantArt, the average login time was 10.83 seconds. The standard deviation of the 35 logins was 6.8. All 35 participants were able to successfully register credentials for the application with an average of approximately one attempt per user.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.107. With this P-value, the null hypothesis was retained. There is not a significant difference in the time (seconds) for logging in with the “Evaluation App” versus DeviantArt.

#### 4.2.1.4. Task 4

Task 4 had each participant upload a photography project to the “Evaluation App.” The time limit for this task was 2 minutes. The user was allowed to upload any photo located on the testing computer. A title and description given was up to the user. Total times (seconds) and attempts were recorded for each search. Table 4.11 shows the data for project upload.



Table 4.11.  
Task 4 Statistic.

Observed Task: Upload a Project		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	35	35
Mean Time ( $\bar{x}$ )	40.74 s	100.66 s
Variance ( $\sigma^2$ )	394.42	1085.70
Standard Deviation ( $\sigma$ )	19.86	32.95
Completion	33	28
Completion %	94%	80%
Navigation Attempts	(1.21) $\approx$ 1	(1.82) $\approx$ 2
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	$\leq 0.001$	
T-Value	9.84	

Of the 35 participants that uploaded a project with the “Evaluation App”, the average login time was 40.74 seconds. The standard deviation of the 35 participants was 19.86. Of the 35 participants, 33 were able to successfully upload a project with the application with an average of approximately one attempt per user. Reasons for not completing the task successfully included not completing the task in the given time limit (2 minutes) and the inability to locate the correct page for uploading projects.

Of the 35 participants that uploaded a project with DeviantArt, the average login time was 100.66 seconds. The standard deviation of the 35 participants was 32.95. Of the 35 participants, 28 were able to successfully upload a project with the application with an average of approximately two attempts per user. Reasons for not completing the task successfully included not completing the task in the given time limit (2 minutes) and the inability to locate the correct page for uploading projects.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.001. With this P-value, the null hypothesis was rejected and the alternative hypothesis is accepted. In support of the “Evaluation App”, there is a significant difference in the time (seconds) for uploading a project with the “Evaluation App” versus DeviantArt.

Additional observations for both applications were noted during the observed study. For the “Evaluation App”, many students were confused by the setup of the upload. The upload process had the participant’s complete step 1 (title, description, category) before completing step 2 (photo upload). This reversed method confused participants. Many participants were not 100% confident in completing this task based on observation. Also, the name and username of the user didn’t populate correctly for a few user’s which stalled a few participants. As for DeviantArt, several participants were unable to locate the upload section. Also, a few participants attempted to upload multiple times because they didn’t fill out a few input boxes. If this occurred, an alert box appeared and forced the user to go back and enter in data before uploading picture. This event added to the task time.

#### 4.2.1.5. Task 5

Task 5 had each participant search for a gallery of their upload projects on “Evaluation App.” The time limit for this task was 2 minute. The participant was to find the gallery of projects that they had uploaded. Once they found the project, they were to click on the project and report the number of comments. Total times (seconds) and attempts were recorded for each search. Table 4.12 shows the data for project search.

Table 4.12.  
Task 5 Statistics.

Observed Task: Search your Uploaded Projects		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	28	28
Mean Time ( $\bar{x}$ )	22.25 s	32.82 s
Variance ( $\sigma^2$ )	132.48	673.92
Standard Deviation ( $\sigma$ )	11.51	25.96
Completion	18	26
Completion %	64%	93%
Navigation Attempts	(1.35) $\approx$ 1	(1.42) $\approx$ 1
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	<b>0.025</b>	
T-Value	2.06	

Since seven of the participants could not complete task 4 for one or both of the applications, only 28 participants could attempt task 5. Of the 28 participants that searched for uploaded projects with the “Evaluation App,” the average login time was 22.25 seconds. The standard deviation of the 28 participants was 11.51. Of the 28 participants, 18 were able to successfully search for uploaded projects with the application with an average of approximately one attempt per user. Reasons for not completing the task successfully included not completing the task in the given time limit (2 minutes) and the inability to locate the correct page for uploaded projects.

Of the 28 participants that searched for uploaded a projects with DeviantArt, the average login time was 32.82 seconds. The standard deviation of the 28 participants was 25.96. Of the 28 participants, 26 were able to successfully upload a project with the application with an average of approximately one attempt per user. Reasons for not completing the task

successfully included not completing the task in the given time limit (2 minutes) and the inability to locate the correct page for uploading projects.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.025. With this P-value, the null hypothesis was rejected and the alternative hypothesis is accepted. In support of the “Evaluation App”, there is a significant difference in the time (seconds) for searching for uploaded projects with the “Evaluation App” versus DeviantArt. However, only 64% of the participants were able to complete the given task successfully with the “Evaluation App” versus a 93% success rate with DeviantArt.

Additional observations for both applications were noted during the observed study. For the “Evaluation App”, a few participants went to the main gallery and clicked on their project in the “Recent Uploads” section. This event was recorded as an unsuccessful task. As for DeviantArt, some users were recorded with multiple attempts in finding the account section.

#### 4.2.1.6. Task 6

Task 6 had each participant search for a project by author on the “Evaluation App.” The time limit for this task was 2 minute. The user was told the title and author of a project. To eliminate miscommunication, the participant was allowed to see the spelling of the title and author. Total times (seconds) and attempts were recorded for each search. Table 4.13 shows the data for project search.

Table 4.13.  
Task 6 Statistics.

Observed Task: Searching for a Project by Author		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	35	35
Mean Time ( $\bar{x}$ )	45.23 s	63.17 s
Variance ( $\sigma^2$ )	699.60	997.30
Standard Deviation ( $\sigma$ )	26.45	31.58
Completion	33	31
Completion %	94%	89%
Navigation Attempts	(1.21) $\approx$ 1	(1.82) $\approx$ 2
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	<b>0.012</b>	
T-Value	2.36	

Of the 35 participants that searched for uploaded projects with the “Evaluation App”, the average search time was 45.23 seconds. The standard deviation of the 35 participants was 25.45. Of the 35 participants, 33 were able to successfully search for a project with the application with an average of approximately one attempt per user. Reasons for not completing the task successfully included not completing the task in the given time limit (2 minutes) and the inability to locate the correct page for uploaded projects. Some participants were not able to complete the task because they searched incorrectly.

Of the 35 participants that searched for uploaded a projects with DeviantArt, the average search time was 63.17 seconds. The standard deviation of the 35 participants was 31.58. Of the 35 participants, 31 were able to successfully search for a project with the application with an average of approximately two attempts per user. Reasons for not completing the task successfully included not completing the task in the given time limit (2 minutes)

and the inability to locate the correct page for uploading projects. Some participants were not able to complete the task because they searched incorrectly.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.012. With this P-value, the null hypothesis was rejected and the alternative hypothesis is accepted. In support of the “Evaluation App”, there is a significant difference in the time (seconds) for searching for a project with the “Evaluation App” versus DeviantArt.

Additional observations for both applications were noted during the observed study. For the “Evaluation App”, some participants didn’t complete the task during the first attempt because of an incorrect search query. As for DeviantArt, many participants were not able to locate the proper project after the search. Some participants would search for the author, which queried no response. Other participants were looking for an author associate with the project title, but the author was not clear on the thumbnails page.

#### 4.2.1.7. Task 7

Task 7 had each participant favorite list the photography project found in task 6 on “Evaluation App.” The time limit for this task was 1 minute. If the user could not complete task 6, then task 7 was marked null for this participant. Total times (seconds) and attempts were recorded for the task. Table 4.14 shows the data for favorite listing a project.

Table 4.14.  
Task 7 Statistics.

Observed Task: Favorite List a Project		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	30	30
Mean Time ( $\bar{x}$ )	3.73 s	17.10 s
Variance ( $\sigma^2$ )	17.81	1930.72
Standard Deviation ( $\sigma$ )	4.22	43.94
Completion	30	30
Completion %	100%	100%
Navigation Attempts	1	1
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	<b>0.055</b>	
T-Value	1.65	

Since five of the participants could not complete task 6 for one or both of the applications, only 30 participants could attempt task 7. Of the 30 participants that favorite listed a project with the “Evaluation App,” the average time was 3.73 seconds. The standard deviation of the 30 participants was 4.22. Of the 30 participants, 30 were able to successfully favorite list a project with the application with an average of approximately one attempt per user.

Of the 30 participants that favorite listed a project with DeviantArt, the average time was 17.10 seconds. The standard deviation of the 30 participants was 43.94. Of the 30 participants, 30 were able to successfully upload a project with the application with an average of approximately one attempt per user.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-

test reported as 0.055. With this P-value, the null hypothesis was not rejected. There is not a significant difference in the time (seconds) for favorite listing a project with the “Evaluation App” versus DeviantArt. However, the average time spent on completing the task with the “Evaluation App” was much lower than DeviantArt participants supporting the efficiency of task 7 with the “Evaluation App.”

Additional observations for both applications were noted during the observed study. For the “Evaluation App”, a majority of the students were able to complete the task successfully without a problem (based on observation). As for DeviantArt, a majority of the participants were able to complete the task successfully, but some had to scroll from top to bottom and back to top to find the “favourite” button.

#### 4.2.1.8. Task 8

Table 4.15.

*Task 8 Statistics.*

Observed Task: Rate/Comment a Project		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	30	30
Mean Time ( $\bar{x}$ )	17.10 s	25.03 s
Variance ( $\sigma^2$ )	51.12	103.02
Standard Deviation ( $\sigma$ )	7.15	10.15
Completion	30	29
Completion %	100%	97%
Navigation Attempts	(1.03) $\approx$ 1	(1.03) $\approx$ 1
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	<b><math>\leq 0.001</math></b>	
T-Value	3.93	



Task 8 had each participant rate/comment on the photography project found in task 6 on “Evaluation App.” The time limit for this task was 1 minute. If the user could not complete task 6, then task 7 was marked null for this participant. Total times (seconds) and attempts were recorded for the task. Table 4.15 shows the data for rating/commenting on a project.

Since five of the participants could not complete task 6 for one or both of the applications, only 30 participants could attempt task 8. Of the 30 participants that rated/commented on a project with the “Evaluation App,” the average time was 17.10 seconds. The standard deviation of the 30 participants was 7.15. Of the 30 participants, 30 were able to successfully favorite list a project with the application with an average of approximately one attempt per user.

Of the 30 participants who rated/commented on a project with DeviantArt, the average time was 25.03 seconds. The standard deviation of the 30 participants was 10.15. Of the 30 participants, 29 were able to successfully upload a project with the application with an average of approximately two attempts per user.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.001. With this P-value, the null hypothesis was rejected and the alternative hypothesis is accepted. In support of the “Evaluation App,” there is a significant difference in the time (seconds) for rating/commenting on a project with the “Evaluation App” versus DeviantArt.

Additional observations for both applications were noted during the observed study. For the “Evaluation App,” 100% of the students were able to successfully complete the task. However, minor errors like the failure to pull an avatar image took place for all participants that completed the task. As for DeviantArt, 97% of the students were able to complete the task successfully.

4.2.1.9. Task 9

Table 4.16.

*Task 9 Statistics.*

Observed Task: Search for a Favorite Listed Project		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	30	30
Mean Time ( $\bar{x}$ )	35.57 s	22.50 s
Variance ( $\sigma^2$ )	333.43	291.73
Standard Deviation ( $\sigma$ )	18.26	17.08
Completion	25	27
Completion %	83%	90%
Navigation Attempts	(1.92) $\approx$ 2	(1.17) $\approx$ 1
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	<b>0.990</b>	
T-Value	-2.44	

Task 9 had each participant search for a favorite listed photography project (the project from task 6) on “Evaluation App.” The time limit for this task was 2 minutes. If the user could not complete task 6, then task 7 was marked null for this participant. Total times (seconds) and attempts were recorded for the task. Table 4.16 shows the data for searching for a favorite listed project.

Since five of the participants could not complete task 6 for one or both of the applications, only 30 participants could attempt task 9. Of the 30 participants that searched for a favorite listed project with the “Evaluation App,” the average time was 35.57 seconds. The standard deviation of the 30 participants was 18.26. Of the 30 participants, 25 were able to successfully search for a favorite listed project with the application with an average of approximately two attempts per user.

Of the 30 participants who searched for a favorite listed a project with DeviantArt, the average time was 22.50 seconds. The standard deviation of the

30 participants was 17.08. Of the 30 participants, 27 were able to successfully upload a project with the application with an average of approximately one attempt per user.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.990. With this P-value, the null hypothesis was not rejected. In support of DeviantArt, there is a significant difference in the time (seconds) for searching for a favorite listed project.

Additional observations for both applications were noted during the observed study. For the “Evaluation App”, many students were confused by the location of the user’s “Favorites” list. A majority of the students navigated to the account settings page first before navigating to the main gallery. This was recorded as a navigational attempt. Seventeen percent of the participants were not able to locate the “Favorites” page within the time limit. As for DeviantArt, multiple attempts were registered for each participant.

#### 4.2.1.10. Task 10

Task 10 had each participant search for the highest rated project on “Evaluation App.” The time limit for this task was 2 minutes. The participant was told to find the highest rated project in the photography section. Once the user found the project, the user was told to report the rating. Total times (seconds) and attempts were recorded for the task. Table 4.17 shows the data for searching for the highest rated project.

Table 4.17.  
Task 10 Statistics.

Observed Task: Search Highest Rated Projects		
Task Statistics		
	The Evaluation App	DeviantArt
Total Subjects (N)	35	35
Mean Time ( $\bar{x}$ )	10.80 s	38.74 s
Variance ( $\sigma^2$ )	41.86	955.43
Standard Deviation ( $\sigma$ )	6.47	30.91
Completion	34	28
Completion %	97%	80%
Navigation Attempts	1	(1.4) $\approx$ 1
Paired T-Test		
	Comparison	
Confidence Interval (CI)	95% (0.95)	
P-Value	$\leq 0.001$	
T-Value	5.65	

Of the 35 participants that searched for the highest rated project with the “Evaluation App,” the average time was 10.80 seconds. The standard deviation of the 35 participants was 6.47. Of the 35 participants, 34 were able to successfully search for the highest rated project with the application with an average of approximately one attempt per user.

Of the 35 participants who searched for the highest rated project with DeviantArt, the average time was 38.74 seconds. The standard deviation of the 35 participants was 30.91. Of the 35 participants, 28 were able to successfully search for the highest rated project with the application with an average of approximately one attempt per user.

A paired T-test was conducted for the difference in the times for each participant. The null hypothesis for the paired T-test was reported as  $H_0: \mu = 0$  where the alternative hypothesis was reported as  $H_a: \mu > 0$ . A 95% confidence interval was used with an alpha of 0.05. The P-value for the one-sided paired T-test reported as 0.001. With this P-value, the null hypothesis was rejected and

the alternative hypothesis is accepted. In support of the “Evaluation App,” there is a significant difference in the time (seconds) for searching for the highest rated project with the “Evaluation App” versus DeviantArt. With only an 80% success rate while interacting with DeviantArt, the “Evaluation App” is supported further.

Additional observations for both applications were noted during the observed study. For both applications, a majority of the students were able to complete the task successfully. As for DeviantArt, a few participants located the most popular project in all the categories instead of just photography. This was marked as an unsuccessful completion.

#### 4.2.2. Application Errors

During the observed usability study, application errors were monitored and recorded. There are two types of application errors that were monitored, minor and major errors. A major error is defined as an error in the application that either prevents a user from completing a task successfully or forces the participant to hit the back button or take a different route to complete the task. Major errors were recorded and presented in Table 4.18.

A minor application error is defined as an error in the application that does not prevent the user from completing the task successfully, but should be addressed and fixed. Minor errors were monitored and tallied, but not reported as a major error. Minor errors in DeviantArt included inconsistent search results from a search query. Minor errors in the “Evaluation App” included avatar images failing to load, user name failing to populate on upload screen, and loading animation on login screen. Major and minor errors for the “Evaluation App” were evaluated for improvement.

Table 4.18.  
*Major Application Errors.*

Application	Error Description	Task	Participant
The “Evaluation App	Application failed to log in-user had to try again	3	CGT256-03-30
	User didn’t enter in a title correctly-user wasn’t alerted and project was not uploaded correctly	4	CGT256-03-32
	XML Database didn’t load correctly for the user comments	6	CGT256-02-08
	Incorrect gallery loaded	6	CGT256-03-34
	Search input box didn’t appear correctly	6	CGT256-03-26
DeviantArt	Application froze. User had to restart application	10	CGT256-03-27

#### 4.2.3. Discussion of Data

For application efficiency, the average times per task on the “Evaluation App” was lower on seven out of eight of the comparison tasks versus DeviantArt. The results of five out of eight of the tasks (4, 5, 6, 8, and 10) support the “Evaluation App” with a 95% Confidence Limit. However, task 5 contained only a 64% completion rate for the “Evaluation App.” This shows significance in efficiency, but not in effectiveness. The “Evaluation App” has a significant difference in time with a P-value lower than 0.05. This data helps support that the “Evaluation App” is more efficient per tasks. The two major tasks, uploading and rating/commenting, respectively recorded as 59.92 seconds and 7.93 seconds quicker on average. Searching for the highest ranked project with the “Evaluation App” recorded 37.77 seconds faster on average per task than DeviantArt. This

data supports the use of the “Evaluation App” for uploading, rating/commenting, and viewing projects for a more efficient experience. Searching for a favorite listed project (task 8) failed to reject the null hypothesis. The location of the “Favorites” list was confusing for some users. This error can be fixed for future versions.

As for eight of 10 of the tasks, the success rate for the “Evaluation App” ranked fairly high. Of the 10 tasks, eight tasks recorded a 91% success rate or better. The other two tasks, searching for uploaded projects (task 5) and searching for favorite listed project (task 9), received an 80% success rate or lower. These values correlate with the observed times per task. As for DeviantArt, only one of the eight tasks, logging in (task 3), recorded higher than a 91% success rate. The other seven of eight tasks ranked 88% or lower. This data helps support the effectiveness of the “Evaluation App” in the ability to complete a task successfully.

#### 4.3. Post Usability Survey

Each participant completed an online post survey immediately following the observed usability study. The post survey examined participant ease of use, user experience, user motivation, as well as application preference. Open-ended questions on likes and dislikes of the “Evaluation App” were recorded and reported.

##### 4.3.1. The Evaluation App Qualitative

Three series of Likert scales were presented during the post survey. The first series asked each user about the ease of use for the “Evaluation App.” The second series asked each user about their user experience with the “Evaluation App.” The third series asked each user about their motivation while interacting with the “Evaluation App.” Following the three series of Likert questions, the participants were asked questions about their likes and dislikes with the features

of the “Evaluation App” while interacting with the application. This subjective data will help improve the “Evaluation App” as a classroom peer evaluation application.

#### 4.3.1.1. Ease of Use

Table 4.19.

*Ease of Use Likert Distribution for the “Evaluation App”.*

Question	VD	D	N	S	VS	Total
Installing an application	0	0	3	11	21	35
Registering a username	0	1	2	12	20	35
Logging in	1	0	0	11	23	35
Uploading a project	0	0	7	18	9	34
Searching for your gallery of uploaded projects	0	4	6	17	8	35
Searching for a project by author	3	3	3	12	14	35
Adding a project to favorite list	0	0	2	10	23	35
Rating/Commenting on a project	0	0	4	12	19	35
Searching for a project on favorite list	4	5	4	13	9	35
Searching for highest rated projects	1	4	2	11	17	35

VD = very dissatisfied; D = dissatisfied; N = neutral; S = satisfied; VS = very satisfied;

Each user was asked to rate the ease of use for the “Evaluation App”.

Table 4.19 describes the Likert distribution for the user’s response. The users were asked to rank the ease of use for each task as either very dissatisfied, dissatisfied, neutral, satisfied, or very satisfied.

During interaction with the “Evaluation App”, installing an application (task 1) ranked high with 91% of the participants stating they were either satisfied or very satisfied with completing the task (S-11 and VS-21). Registering a username (task 2) ranked high as well with 91% of the participants stating they were either satisfied or very satisfied with completing the task (S-12 and VS-20).



Logging in (task 3) ranked high with 97% of the participants stating they were either satisfied or very satisfied with completing the task (S-11 and VS-23). Seventy-nine percent of the participants stated they were either satisfied or very satisfied with completing the task of uploading a project (task 5) (S-18 and VS-9). Twenty-one percent ranked uploading a project as neutral (N-7). Searching for a gallery of uploaded projects (task 5) ranked with 71% of the participants stating they were either satisfied or very satisfied with completing the task (S-17 and VS-8). Eleven percent (D-4) of the participants reported being dissatisfied with task 5 and 17% (N-6) reported being neutral with task 5. Searching for a project by author (task 6) was reported by 74% of the participants that they were either satisfied or very satisfied with completing the task (S-12 and VS-14). The other 26% spread from very dissatisfied to neutral (VD-3, D-3, and N-3). Favorite listing a project (task 7) ranked high with 94% of the participants, stating they were either satisfied or very satisfied with completing the task (S-10 and VS-23). Rating/Commenting on a project (task 8) ranked high with 89% of the participants stating they were either satisfied or very satisfied with completing the task (S-12 and VS-19). Searching for a project on favorite list (task 9) was reported by 63% of the participants that they were either satisfied or very satisfied with completing the task (S-13 and VS-9). The other 37% spread from very dissatisfied to neutral (VD-4, D-5, and N-4). Searching for the highest rated project (task 10) was reported by 80% of the participants that they were either satisfied or very satisfied with completing the task (S-11 and VS-17).

#### 4.3.1.2. User Experience

Each user was asked to rate their user experience while engaging with the “Evaluation App.” Table 4.20 describes the Likert distribution for the user’s response.

Table 4.20.  
*User Experience Likert Distribution for the “Evaluation App”.*

Question	VD	D	N	S	VS	Total
Visual presentation of interface	0	1	3	18	13	35
Organization of interface	0	3	18	16	8	35
Usefulness of application	1	1	12	15	6	35
Confidence to complete a given task effectively and more efficiently with increased application engagement	0	2	4	16	13	35

VD = very dissatisfied; D = dissatisfied; N = neutral; S = satisfied; VS = very satisfied;

The visual presentation of interface was ranked high with 89% of the participants stating they were either satisfied or very satisfied with completing the task (S-18 and VS-13). The organization of interface was ranked with 63% of the participants stating they were either satisfied or very satisfied with completing the task (S-16 and VS-8) and 51% stating they were neutral (N-18) with the organization. The usefulness of application was ranked with 60% of the participants stating they were either satisfied or very satisfied with completing the task (S-15 and VS-6) and 51% stating they were neutral (N-12) with the usefulness. The user’s confidence level was ranked high with 83% of the participants stating they were either satisfied or very satisfied with completing the task (S-16 and VS-13).

#### 4.3.1.3. User Motivation

Each user was asked to rate their user motivation while interacting with the “Evaluation App”. Table 21 describes the Likert distribution for the user’s response.

Table 4.21.  
*User Motivation Likert Distribution for the “Evaluation App”.*

Question	VU	U	N	M	VM	Total
When I first opened the application, I was _____ to continue to use the application.	0	4	12	14	5	35
After completing the first task, I was _____ to continue to use the application.	0	2	6	23	4	35
After completing the study, I was _____ to use the application again.	3	2	10	14	6	35

VU = very unmotivated; U = unmotivated; N = neutral; M = motivated; VM = very motivated;

In regards to user motivation, the participant was asked “When I first opened the application, I was \_\_\_\_\_ to continue to use the application.” In response to this question, 54% said they were either motivated or very motivated to continue (M-14 and VM-5). 34% stated they were neutral in response to this question (N-12). When asked “After completing the first task, I was \_\_\_\_\_ to continue to use the application”, 77% reported they were either motivated or very motivated to continue (M-23 and VM-4). When asked “After completing the study, I was \_\_\_\_\_ to use the application again”, 57% reported that they were either motivated or unmotivated to continue (M-14 and VM-6). 29% stated they were neutral in response to the question (N-10).

#### 4.3.2. Deviant Art Qualitative

Three series of Likert scales were presented during the post survey. The first series asked each user about the ease of use for DeviantArt. The second series asked each user about their user experience with DeviantArt. The third series asked each user about their motivation while interacting with DeviantArt.

#### 4.3.2.1. Ease of Use

Each user was asked to rate the ease of use with DeviantArt. Table 4.22 describes the Likert distribution for the user's response.

Table 4.22.  
*Ease of Use Likert Distribution for DeviantArt.*

Question	VD	D	N	S	VS	Total
Registering a username	0	0	11	16	8	35
Logging in	0	0	4	17	14	35
Uploading a project	5	4	5	15	6	35
Searching for your gallery of uploaded projects	2	4	6	13	10	35
Searching for a project by author	2	14	8	8	3	35
Adding a project to favorite list	0	2	4	15	14	35
Rating/Commenting on a project	0	3	7	11	14	35
Searching for a project on favorite list	0	5	9	15	6	35
Searching for highest rated projects	0	4	8	18	5	35

VD = very dissatisfied; D = dissatisfied; N = neutral; S = satisfied; VS = very satisfied;

Regarding interaction with DeviantArt, installing an application (task 1) was not administered because DeviantArt is Web based. Registering a username (task 2) ranked with 69% of the participants stating they were either satisfied or very satisfied with completing the task (S-16 and VS-8). The other 31% ranked task 2 as neutral. Logging in (task 3) ranked high with 89% of the participants stating they were either satisfied or very satisfied with completing the task (S-17 and VS-14). Uploading a project (task 5) ranked with 61% of the participants stating they were either satisfied or very satisfied with completing the task (S-15 and VS-6). Searching for a gallery of uploaded projects (task 5) ranked with 66% of the participants stating they were either satisfied or very satisfied with completing the task (S-13 and VS-10). Searching for a project by author (task 6)

was reported by 40% of the participants that they were dissatisfied with completing the task (D-14). Favorite listing a project (task 7) ranked high with 83% of the participants stating they were either satisfied or very satisfied with completing the task (S-15 and VS-14). Rating/Commenting on a project (task 8) reported that 71% of the participants stating they were either satisfied or very satisfied with completing the task (S-11 and VS-14). Searching for a project on favorite list (task 9) was reported by 43% of the participants that they were satisfied with completing the task (S-18). 26% rated this task as neutral (N-9). Searching for the highest rated project (task 10) was reported by 66% of the participants that they were either satisfied or very satisfied with completing the task (S-18 and VS-5).

#### 4.3.2.2. User Experience

Table 4.23.

*User Experience Likert Distribution for DeviantArt.*

Question	VD	D	N	S	VS	Total
Visual presentation of interface	0	3	10	16	6	35
Organization of interface	1	8	14	10	2	35
Usefulness of application	0	3	8	19	5	35
Confidence to complete a given task effectively and more efficiently with increased application engagement	1	6	8	15	5	35

VD = very dissatisfied; D = dissatisfied; N = neutral; S = satisfied; VS = very satisfied;

Each user was asked to rate their user experience while interacting with the DeviantArt. Table 4.23 describes the Likert distribution for the user's response.

The visual presentation of interface was ranked with 63% of the participants stating they were either satisfied or very satisfied with completing the task (S-16 and VS-6). Twenty-nine percent ranked this user experience rating as neutral. The organization of interface was ranked by 40% of the participants that

they were neutral with the organization of the interface (N-14) and only 29% stating they were satisfied (S-10) with the organization. The usefulness of application was ranked by 69% of the participants that they were either satisfied or very satisfied with completing the task (S-19 and VS-5). The user's confidence level was ranked by 57% of the participants that they were either satisfied or very satisfied with completing the task (S-15 and VS-5). Forty percent rated their confidence level as either dissatisfied or neutral (D-6 and N-8).

#### 4.3.2.3. User Motivation

Each user was asked to rate their user motivation while interacting with DeviantArt. Table 4.24 describes the Likert distribution for the user's response.

Table 4.24.

*User Motivation Likert Distribution for DeviantArt.*

Question	VU	U	N	M	VM	Total
When I first opened the application, I was _____ to continue to use the application.	0	2	12	20	1	35
After completing the first task, I was _____ to continue to use the application.	0	6	11	17	1	35
After completing the study, I was _____ to use the application again.	1	10	11	12	1	35

VU = very unmotivated; D = unmotivated; N = neutral; M = motivated; VM = very motivated;

In regards to user motivation, the participant was asked "When I first opened the application, I was \_\_\_\_\_ to continue to use the application." In response to this question, 60% said they were either motivated or very motivated to continue (M-10 and VM-1). Thirty-four percent stated they were neutral in response to this question (N-12). When asked "After completing the first task, I was \_\_\_\_\_ to continue to use the application", 51% reported they were either

motivated or very motivated to continue (M-17 and VM-1). When asked “After completing the study, I was \_\_\_\_\_ to use the application again”, 37% reported that they were either motivated or unmotivated to continue (M-12 and VM-1). 31% stated they were neutral in response to the question (N-11) and 29% stated they were unmotivated to continue (U-10).

#### 4.3.3. Qualitative Comparison of Applications (Open Ended)

The last section of the post survey asked each user which application they prefer plus a series of open-ended questions about their experience with the “Evaluation App”. Select data was chosen to be reported subjectively from participants in chapter 4. The participants responses offer both good and bad feedback for the “Evaluation App. The open-ended qualitative data helps support the quantitative data retrieved during the observed study. The data also helps the designers and developers maintain and better the users’ experience with a peer evaluation application.

##### 4.3.3.1. Peer Evaluation Comparison

Table 4.25.  
*Application Preference.*

Application	Response	%
DeviantArt	12	34%
The “Evaluation App”	21	60%
No Preference	2	6%
Total	35	100%

Each user was asked the following question: “Which application would you be more likely to use?” Table 4.25 presents the data spread from the 35 participants.

Of the 35 participants, 60% of them prefer to use the “Evaluation App” where 34% prefer DeviantArt and 6% have no preference. This data helps support the further development and usage of the “Evaluation App.” The following section follows up on the data with user responses.

#### 4.3.3.1.1. User Responses

Participant 1 (CGT256-02-01) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*I liked both, but DeviantArt was a little more graphically inviting to me.*

Participant 2 (CGT256-02-02) stated that she would prefer to use the “Evaluation App.” She followed up with the following statement:

*DeviantArt was way to hard to navigate.*

Participant 3 (CGT256-02-03) stated that she would prefer to use the “Evaluation App.” She followed up with the following statement:

*The DeviantArt App Interface was very unorganized in my opinion*

Participant 4 (CGT256-02-04) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*I think that DeviantArt is simply more established in that it can get my work out to a greater audience at this time, which is the point. That isn't to say that it is necessarily the best application, however.*

Participant 5 (CGT256-02-05) stated that she would prefer to use DeviantArt. She followed up with the following statement:

*I'm used to dA, since I do use it already. so to me it's easier to use.*

Participant 6 (CGT256-02-06) stated that she would prefer to use the “Evaluation App.” She followed up with the following statement:



*Except for a few minor things that I didn't like, it was overall easier to deal with.*

Participant 7 (CGT256-02-07) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*I prefer the convenience of a local application, but I need it to be connected to an online service.*

Participant 8 (CGT256-02-08) stated that she would prefer to use the "Evaluation App." She followed up with the following statement:

*There's a lot more clutter on Deviant Art.*

Participant 9 (CGT256-02-09) stated that she would prefer to use the "Evaluation App." She followed up with the following statement:

*I would be more likely to use the Evaluation App because it would be Purdue affiliated.*

Participant 10 (CGT256-02-10) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*Was much more simplistic and easy to get used to compared to DeviantArt*

Participant 11 (CGT256-02-11) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*Evaluation App is easier than DeviantArt to use.*

Participant 12 (CGT256-02-12) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*I really like the interface and organization of DeviantArt.*

Participant 13 (CGT256-02-13) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*DeviantArt was a lot harder to use seeing as I had never used it before*

Participant 14 (CGT256-02-14) stated that she would prefer to use the “Evaluation App.” She followed up with the following statement:

*The Evaluation App was more user friendly than DeviantArt.*

Participant 15 (CGT256-02-15) stated that she would prefer to use the “Evaluation App.” She followed up with the following statement:

*It was overall easier to use*

Participant 16 (CGT256-02-16) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*The Evaluation app was less confusing and looked better*

Participant 17 (CGT256-02-17) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*I have used Deviant Art before, therefore there is no learning curve.*

Participant 18 (CGT256-02-18) stated that he would prefer to use DeivantArt. He followed up with the following statement:

*I have used it before and it is more familiar to me.*

Participant 19 (CGT256-02-19) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*"Evaluation App" was much more easy to use. I did not have to think very much when using it.*

Participant 20 (CGT256-02-20) stated that he had no preference as to which application he would prefer to use. He followed up with the following statement:

*Both application have their good points. DeviantArt is purely web based, but Eva App seem to have more interesting features.*

Participant 21 (CGT256-03-21) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*Easier to use with more success and less confusion. Simpler terminology as well*

Participant 26 (CGT256-03-26) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*I liked the evaluation app better because of the fact that I thought it was easier to navigate around in. I thought that the main screen with the images used to display the categories were very informative. I also liked the fact that the options didn't seem hidden like some are (I felt) in deviant art.*

Participant 27 (CGT256-03-27) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*I thought the evaluation app was very straight forward and the interface was simple and put more focus on the artwork being displayed.*

Participant 28 (CGT256-03-28) stated that he would prefer to DeviantArt. He followed up with the following statement:

*DeviantArt uses more standard navigation and structural elements/functions which make it easier to use, at least with little familiarity with the software. The Evaluation App seemed to be missing (or hiding) important functions, like a search bar.*

Participant 29 (CGT256-03-29) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*The organization of DeviantArt was sometimes questionable and sometimes would show different results from the same search.*

Participant 30 (CGT256-03-30) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*The evaluation app was too much of a pain to figure out.*

Participant 31 (CGT256-03-31) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*It has more users and more content. Also, it's a web-application, which I prefer.*

Participant 32 (CGT256-03-32) stated that she had no preference as to which application she would prefer to use.

*I froze and couldn't continue looking.*

Participant 33 (CGT256-03-33) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*Because it was the most user friendly*

Participant 34 (CGT256-03-34) stated that she would prefer to use DeviantArt. She followed up with the following statement:

*Mere habitual usage and familiarity*

Participant 35 (CGT256-03-35) stated that she would prefer to use DeviantArt. She followed up with the following statement:

*I have used it for years and am accustomed with the interface.*

Participant 36 (CGT256-03-36) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*deviantart has strange wordings for things*

Participant 38 (CGT256-03-38) stated that he would prefer to use the "Evaluation App." He followed up with the following statement:

*I felt it was a lot easier to navigate around*

Participant 39 (CGT256-03-39) stated that he would prefer to use DeviantArt. He followed up with the following statement:

*I feel that I would use the Deviant Art app more because it is web based freeing up space on my computer and because it is already a popular site for image posting, sharing, etc. so there is a greater volume of work there.*

Participant 40 (CGT256-03-40) stated that he would prefer to use the “Evaluation App.” He followed up with the following statement:

*the interface was simple, easier to locate things*

#### 4.3.3.2. Features of The “Evaluation App”

During the post usability survey, each user was asked which features they liked most, features they liked least, and features they would like to see changed. Select responses are presented in Table 4.26. The data in the following table help better the further development of the “Evaluation App.” The data is reported as-is directly from the online survey, therefore, misspellings and grammatical errors may be present.

Table 4.26 portrays select responses from participants. Other likes for the “Evaluation App” include interface organization, ease of install, the navigation, ease of use, photo rating, simplicity, loading time, and labeling of artists and titles.

Other dislikes for the “Evaluation App” included organization of menus, lack of essential features, Aesthetics, color scheme, menu size, and search box.

Features that participants would like to see changed include search feature, button labels (nonexistent), fluid application option, location of favorite list, and breadcrumbs.

Table 4.26.  
*User Responses for features on the "Evaluation App."*

Participant	Questions	Response
Participant 9	Most liked feature	The layout in general is more user friendly.
	Least liked feature	There wasn't a favorites icon near the top menu to easily view your favorites list.
	Feature to change	Create a favorites button in the top menu.
Participant 10	Most liked feature	Simplistic, easy to use interface.
	Least liked feature	searching for a project seemed a bit slow
	Feature to change	Probably putting text under the buttons, the upload button wasn't clear when i first saw it, small text under it would have helped
Participant 13	Most liked feature	The fact that it was a desktop application
	Least liked feature	Searching for stuff
	Feature to change	Make it easier to view your own projects
Participant 27	Most liked feature	The ease of use
	Least liked feature	I liked everything I used
	Feature to change	I wouldn't change anything
Participant 29	Most liked feature	It's very organized.
	Least liked feature	The icons didn't have a text description under them which was a minor inconvenience with learning how to use it.
	Feature to change	Add small text descriptions to the icons: ex. "upload"
Participant 38	Most liked feature	everything was really easy to use
	Least liked feature	how small the size was
	Feature to change	make it a bigger application

This type of qualitative data helps improve the “Evaluation App.” The features liked by many participants help maintain the quality of the peer evaluation RIA. The dislikes and suggestions for improvements help improve the application tremendously. For many participants, this data correlates with the participants experience and data during the observed study. For example, many of the participants couldn’t find the “Favorites” list or search box and suggested that these features should be adjusted to better suit the user. These changes can be implemented in the next version of the application.

#### 4.3.3.3. The Future of the “Evaluation App”

At the end of the post survey, they students were asked the following question: “Would you like to see this application used in a classroom setting for acquiring project feedback?” This question was set up to help evaluate the need of a peer evaluation AIR application in a classroom setting. Table 4.27 presents the data.

Table 4.27.  
*Peer Evaluation Application in the Classroom.*

Application	Response	%
Yes	16	46%
Maybe	14	40%
No	5	14%
Total	35	100%

Based on the 35 participants in the post survey, 86% of the students reported “yes” or “maybe” to using the “Evaluation App” in a classroom setting for acquiring project feedback. This data helps support the need for the “Evaluation App” or other RIA peer evaluation applications in a classroom setting within the CGT department. The following section reports user responses for follow-up of

Table 4.27. The user's responses help bring subjective feedback to the attention of the designer and developer of the "Evaluation App."

#### 4.3.3.3.1. User Responses

Participant 1 (CGT256-02-01) stated that he would maybe like to see the "Evaluation App" used in a classroom setting for acquired project feedback. He followed up with the following statement:

*It could be useful for getting information back to students quick and effectively. Plus, you could have the ability to check out other projects to see what they did good or bad.*

Participant 4 (CGT256-02-04) stated that he would maybe like to see the "Evaluation App" used in a classroom setting for acquired project feedback. He followed up with the following statement:

*This would be a great application for a small class-room environment. It will need more robust features, however, to foster a larger community.*

Participant 5 (CGT256-02-05) stated that she would maybe like to see the "Evaluation App" used in a classroom setting for acquired project feedback. She followed up with the following statement:

*i hadn't thought of that, it would need some way to differ between things for this class and things for that class (and maybe who's in what class). that would be interesting though.*

Participant 6 (CGT256-02-06) stated that she would maybe like to see the "Evaluation App" used in a classroom setting for acquired project feedback. She followed up with the following statement:

*Wouldn't bother me either way*

Participant 7 (CGT256-02-07) stated that he would maybe like to see the "Evaluation App" used in a classroom setting for acquired project feedback. He followed up with the following statement:

*I don't know if I would need this application.*



Participant 16 (CGT256-02-16) stated that HE would like to see the “Evaluation App” used in a classroom setting for acquired project feedback. HE followed up with the following statement:

*that would be great*

Participant 17 (CGT256-02-17) stated that he would maybe like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*If the upload is more user friendly*

Participant 18 (CGT256-02-18) stated that he would maybe like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*no preference*

Participant 20 (CGT256-02-20) stated that he would like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*It would be a nice application with some improvements.*

Participant 26 (CGT256-03-26) stated that he would like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*I think that this could be useful when trying to see what other people have made, as well as getting feedback for your projects.*

Participant 27 (CGT256-03-27) stated that he would like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*I think it would be perfect for peer reviews*

Participant 28 (CGT256-03-28) stated that he would maybe like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*If some of these problems were addressed.*

Participant 38 (CGT256-03-38) stated that he would maybe like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*It could be very useful*

Participant 39 (CGT256-03-39) stated that he would maybe like to see the “Evaluation App” used in a classroom setting for acquired project feedback. He followed up with the following statement:

*It depends on how it is applied - in some ways it would be good (get feedback from professors/students) but also there are already so many different applications used by different classes (blackboard, katalyst, perisco, every math class seems to use a different online submission, the same is true for physics, etc.) sometimes it seems that it is all too much and that the college should strive to become more uniform instead even more varied. I am not saying that variety is in itself a bad thing only that it is making the process of submission itself a complex ordeal.*

#### 4.3.4. Summary

This chapter addressed the presentation of data for each testing phase (preliminary usability survey, observed usability testing, and post usability survey) of this thesis. Each phase of testing was introduced along with the data results followed by a discussion of data.

The preliminary survey retained demographic information, technological background, and peer evaluation background. This data allowed the administrators to understand the background of the 35 participants.

The observed usability study allowed the “Evaluation App” to be compared to DeviantArt, a traditional Web based peer evaluation application. A series of

tasks allowed participants to interact with the popular features of both applications. Efficiency, effectiveness, and error rate were monitored during this phase.

The post survey, the last phase of testing, gained qualitative data through Likert scales and open-ended responses. This data helps better the “Evaluation App” through feedback from users of both applications.

## CHAPTER 5. DISCUSSION

This chapter concludes on the data and discusses the outcome. The sections of this chapter include a brief overview, discussion of the data/outcome, future work, and future recommendations for the “Evaluation App.” These sections will be followed by a brief conclusion of the work.

### 5.1. Peer Evaluation Discussion

Based on the various phases of testing, the “Evaluation App” is well supported for efficiency, effectiveness, ease of use, user experience, and user motivation. With low P-values for time differences on seven out of eight compared tasks, the “Evaluation App” yields a significantly difference in efficiency over DeviantArt. With a higher success rate (over 91%) on nine out of 10 tasks, the “Evaluation App” supports an effective completion rate. It is noted that 77% (27) of the participants focus in the Interactive Multimedia Development (IMD) specialization of the Computer Graphics Technology Department. For future studies, a more diverse sample population is recommended.

The Likert scale data for ease of use and user experience ranked fairly well in support of using the “Evaluation App” for peer evaluation. For the eight compared tasks, the ease of use for the “Evaluation App” scored higher for each task versus DeviantArt. As for motivation, the “Evaluation App” accrued low levels of motivation before the users opened the application, but the levels increased as the user progressed through the 10 tasks. This may account for the emerging technology and newness of the “Evaluation App” versus an established peer evaluation application like DeviantArt.

The qualitative data from the post survey presents subjective feedback that helps support the quantitative data as well as suggests room for improvement. The need for a peer evaluation RIA such as the “Evaluation App” is well supported by data by this sample population, but recommendations for further testing is suggested.

## 5.2. Future Work

Supported by the usability study, the “Evaluation App” has potential in a classroom setting for acquiring project feedback through peer evaluation. However, the “Evaluation App” is still in the design and testing stages. The observed study helped bring out features that could be rearranged, added, and/or eliminated to increase the efficiency. Navigational and application errors were also tallied to help improve and maintain the application functionality of the “Evaluation App.”

From the observed study data, improvements can be made to the “Evaluation App” to help better the peer evaluation RIA. Effects of efficiency, effectiveness, and error rate can be improved based on the study. Suggested improvements include the following:

*Search bar functionality and placement:* Advanced search bar functionality is suggested for further improvements. Based on a heuristic evaluation and on participant responses, a search function capable of searching for titles and upload dates rather than just authors. It was mentioned in the post survey that the search bar was hard to find and seemed hidden. Participant CGT256-03-28 reported “The Evaluation App seemed to be missing (or hiding) important functions, like a search bar.”

*Favorite list placement:* Based on the completion percentage for finding the participants favorite list on the “Evaluation App,” a suggested improvement is to

move the location of the favorite list. Based solely on observation, several participants went to the accounts page first. The accounts page would be a good solution destination for the favorite list.

*Uploading process:* According to the post survey, a couple of participants noted that the upload process seemed backwards. It was suggested to keep the process normal. Participant CGT256-02-17 mentioned, "Uploading images required some thinking." For future improvements, the upload process will be reversed to conform to the normal.

*Addition of menu button labels:* Based on the post survey, some of the participants' mentioned that the menu buttons should contain labels underneath. CGT 256-03-29 said "The icons didn't have a text description under them which was a minor inconvenience with learning how to use it." This improvement will hopefully make the menu buttons more clear.

*Expansion of the Technology:* With the new release of AIR 2.0 beta and the Flex 4 SDK, future versions of The "Evaluation App" can utilize the aspects of these emerging technologies. A few recommendations include native application interaction and local database access. With AIR 2.0, developers have the capability of interacting with the desktop and have the ability to connect to local XML database files.

Once improvements are made (within reasonable time), the "Evaluation App" will be open to suggestions and implementations by the Computer Graphics Technology Department at Purdue University.

### 5.3. Future Recommendations

Upon conclusion of this study, the researchers present future recommendations. These recommendations are presented to researchers of

RIAs, Adobe AIR, and peer evaluation. The data and supporting elements of this thesis are presented to help build more effective and efficient peer evaluation mechanisms for students. Recommendations for the future are as follows:

*Further Research:* Further research in areas of RIA, peer evaluation, and Adobe AIR is recommended before future implementation. Being an emerging technology, Adobe AIR needs further research for its true capacity.

*Further Heuristic Evaluation:* Heuristic evaluation will help alert designers and developers of usability issues before usability testing. This will help better the application and narrow errors and usability issues before distributed for usability testing.

*Further Usability Testing.* After improvements are made based on this study, future testing is highly suggested. Future usability testing with a larger sample population would yield more data to evaluation efficiency, effectiveness, error rate, and overall usability and user experience.

*Semester-Long Study:* Semester-long implementation is ideal to test the “Evaluation App” in an educational setting. The suggested study would implement the “Evaluation App” in a classroom for an entire semester where students and instructors would utilize the application for peer evaluation. This sample population would be compared against students who gain traditional feedback from their professors only. This study would hopefully present data on the educational effects of peer evaluation from an RIA versus traditional methods.

*Classroom Implementation:* Once testing and evaluation has commenced, classroom implementation is ideal for the “Evaluation App.” Implementation

would allow students to use this application at their own expense and receive/give quality feedback with the click of a button.

*Further Analysis:* Qualitative analysis of data is recommended for future studies. Since this study was conducted on an AIR application with a smaller user/project load versus DeviantArt, it is recommended to analyze and account for the fact that The “Evaluation App” has smaller push/pull processes to and from the database.

#### 5.4. Summary

This chapter revisited the outcomes of the study that are beneficial to the future of peer evaluation and RIAs. Along with conclusions of the study, chapter 5 presented future recommendations for the “Evaluation App.” These recommendations will help improve and better implement a peer evaluation RIA in the classrooms of the College of Technology. Information within this thesis is presented to other researchers on the supporting facts of peer evaluation applications built with Adobe AIR.



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## APPENDICES

## Appendix A. Institutional Review Board Study Approval



HUMAN RESEARCH PROTECTION PROGRAM  
INSTITUTIONAL REVIEW BOARDS

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**To:** LAVERNE HARRIS  
KNOY

**From:** RICHARD MATTES, Chair  
Social Science IRB

**Date:** 02/10/2010

**Committee Action:** **Exemption Granted**

**IRB Action Date:** 02/10/2010

**IRB Protocol #:** 1001008888

**Study Title:** A Comparision of Peer Evaluation: The Evaluation App Versus DeviantArt

The Institutional Review Board (IRB) has reviewed the above-referenced protocol and has determined that it qualifies for exemption pursuant to Federal regulations 45 CFR 46.101(b) exempt category(1) .

If you wish to revise or amend the protocol, please submit a revision request to the IRB for consideration. Please contact our office if you have any questions.

We wish you good luck with your work. Please retain copy of this letter for your records.

## Appendix B. Usability Study Script

### THESIS USABILITY STUDY

Study Timeline: February 25<sup>th</sup> – March 10<sup>th</sup>

Hi, My name is Brian McCreight and I am a final semester graduate student in the College of Technology. I am conducting a study entitled “A Comparison of Peer Evaluation: The Evaluation App versus DeviantArt.” I need CGT students for my study and I have decided to use CGT 256. The study will last for 3 weeks and will only be conducted during the designated CGT 256 lab time. Total time for each student will be between 20 and 25 minutes.

The study will consist of three parts:

1. A preliminary assessment consisting of demographic and background information.
  - a. URL: [HTTP://PURDUE.QUALTRICS.COM/SE?SID=SV\\_6YSCLGMP3EQOQE4&SVID=PROD](http://PURDUE.QUALTRICS.COM/SE?SID=SV_6YSCLGMP3EQOQE4&SVID=PROD)
2. A task assessment asking the subjects to run through a series of tasks for both a traditional Web application (DeviantArt) and a rich Internet application (The Evaluation App). Each participant will be observed during the study.
3. A post assessment consisting of questions about the users experience with both applications
  - a. URL: [HTTP://PURDUE.QUALTRICS.COM/SE?SID=SV\\_0RFRPHKXRDPTES8&SVID=PROD](http://PURDUE.QUALTRICS.COM/SE?SID=SV_0RFRPHKXRDPTES8&SVID=PROD)

Disclaimer:

1. If you do not wish to participate in the study, there is an alternative activity that you may participate in. See Dr. Harris for details.
2. Each student will receive an alphanumeric key to link the 3 parts together after completing the study. At no time will your assessments be linked to identifiers. In other words, the assessment will be anonymous.
3. The assessment is scheduled to take a total of 20-25 minutes.
4. The students will receive a participation grade for completing the above usability test. If you do not wish to participate in the study, you may complete an alternative writing assignment for equal participation.

Thank you for your time.

### ALPHANUMERIC ID#: CGT256-XX-XX

Note: please keep this alphanumeric key throughout the study. Your key will be kept anonymous and will not link to your name at anytime.

## Appendix C. Preliminary Background Survey

*\*Delivered as online survey via Purdue Qualtrics*

### **Preliminary Background Survey**

#### **Background Information:**

The Adobe® AIR™ runtime is an extension of the Flash platform that allows developers to create software applications with ActionScript that reside on the end-users computer. Since applications built for Adobe® AIR™ do not require a web browser, they provide a uniquely rich interactive experience with dynamic content on your desktop. In short, AIR applications are written with ActionScript 3.0 on the Adobe® Flash™ platform.

The Evaluation App: (Working Title of AIR application): The Evaluation App (proposed application) is an AIR application that allows students and faculty members to critique partial works and finished projects. Students will be able to upload projects/snapshots of projects in various stages of development. Students and faculty will be able to sort and view projects from various different categories. Users of the application will also be able to comment and rate the projects. The main purpose of this application is to provide feedback on projects from other students and faculty and to provide students with a resource gallery of various projects.

The purpose of this questionnaire is to identify a) whether or not such an application would be useful and b) determine the most critical goals, features, and functions of the application. By answering the questions below, you will help achieve these goals.



*\*Delivered as online survey via Purdue Qualtrics*

**Background Information:**

1. Specialty area within CGT:
  - ☐ Construction Graphics
  - ☐ Interactive Multimedia
  - ☐ Virtual Product Information (VPI)
  - ☐ Animation
  - ☐ Undecided
  - ☐ General
  
2. What is your classification
  - ☐ Freshman
  - ☐ Sophomore
  - ☐ Junior
  - ☐ Senior
  - ☐ Graduate Student
  
3. What do you use the internet for?
  - ☐ Surfing
  - ☐ Research
  - ☐ Gaming
  - ☐ Social networking
  - ☐ Buying/Selling
  - ☐ Other

*\*Delivered as online survey via Purdue Qualtrics*

**Pre-Assessment (General Questions)**

4. Have you ever heard of Adobe® AIR™ before you entered this survey?
- ☐ Yes
- ☐ No
5. Have you ever downloaded or used an Adobe® AIR™ application?
- ☐ Yes
- ☐ No
6. If answered yes to the previous question, please list which ones. (If answer no, please leave blank.)
- 
7. Have you ever uploaded a project via web to be viewed/analyzed/critiqued by others?  
Examples: DeviantArt, Photobucket.com, Flickr, spaceclaiming.com, etc.)
- ☐ Yes
- ☐ No
8. If answered yes to the previous question, how regularly do you perform the above activity?
- ☐ Once a week
- ☐ Once a month
- ☐ Once a year
- ☐ It's been at least a year
9. If answered yes to the previous question, which ones have you used?
- 
10. Do you use project uploading web applications to comment/rate other projects?
- ☐ Yes
- ☐ No
- ☐ I don't use these applications

*\*Delivered as online survey via Purdue Qualtrics*

11. If there were an Adobe® AIR™ application that allowed students to quickly view and evaluate other students projects, would you use it?

☐ Yes

☐ No

12. If answered yes to the previous question, would you use it to \_\_\_\_\_?

☐ View projects

☐ Upload projects

☐ Both

☐ I would not be interested in this type of applicaiton

13. If there were rating/commenting capabilities, would you use them?

☐ Yes

☐ No

☐ I would not be interested in this type of applicaiton

14. What types of projects would you like to see displayed? (Check all that apply)

☐ Web Applications

☐ Photography

☐ Building Information Modeling

☐ 3D Models

☐ Video Compilations

☐ 3D Animations

☐ Print/Layout Designs

☐ Raster/Digital Art

☐ Virtual Product Models

☐ Game Development

☐ Other

*\*Delivered as online survey via Purdue Qualtrics*

Pre-Assessment (Goals, Tasks, Features) Ranking:

15. Please rate your goals for the application: (please place highest ranked feature first-click and drag to rank)

- ☐ Simplicity: A simple application with limited functions, but easy to use.
- ☐ Effective/Efficient Feedback System: A feedback system geared toward benefiting a user on their projects through quick and effective feedback.
- ☐ Positive User Experience: An application that is easy to use and provides a positive user experience.
- ☐ Branded Experience: An application that offers a branded experience not only in CGT, but is modular outside of the department.
- ☐ Leverage Technology: An application that has increased functionality through utilizing the technology of Flash, ActionScript, and AIR.

16. Please rate the following based on the features you wish to have included on the AIR application: (please place highest ranked feature first -click and drag to rank)

- ☐ Commenting
- ☐ Critiquing
- ☐ Search Options
- ☐ Customizable Rating
- ☐ Popularity Sorting
- ☐ Group Management
- ☐ Movie Conversion
- ☐ Project Sharing
- ☐ Online Forums
- ☐ Unlimited Uploads
- ☐ Portfolio Management
- ☐ Freelance Section
- ☐ Privacy Settings

*\*Delivered as online survey via Purdue Qualtrics*

**\*Question #15 Descriptions:**

Commenting: The ability to comment on others projects (similar to blogging).

Critiquing: The ability to critique others works through feedback. With this function, the user who uploaded the project will have the option to allow/not allow this feature.

Search Options: The ability to search for other members, groups, projects, etc.

Customizable Rating: The ability for the user who uploads to create their own questions/criteria to be rated. Ex: The user can chose to have a photography rated from 1-10 on lighting effects.

Popularity Sorting: The ability to sort based on most popular rated projects.

Group Management: The ability to set up groups where only invited members can upload their projects into that particular groups.

Movie Conversion: The ability for the server to dynamically convert movie files to smaller, compatible files automatically upon upload.

Project Sharing: The ability to share projects with social networks like Facebook, Twitter, MySpace, LinkedIn, etc. with the click of a button.

Online Forums: The ability to post questions, answers, comments, etc. on similar topics to other members of the application.

Chatting: The ability to chat instantly with other online members through the application.

Unlimited Uploads: The ability to upload as many projects as you would like at any given time.

Portfolio Management: The ability to post an entire portfolio to be critiqued/evaluated all at one time.

Freelance Section: The ability to post freelancing jobs for others to search.

Privacy Section: The ability to allow/block certain users from viewing your uploads.

## Appendix D. Preliminary Usability Survey

*\*Delivered as online survey via Purdue Qualtrics*

### **Preliminary Usability Survey**

#### **Background Information:**

Welcome to the preliminary assessment survey. This portion of the survey is to be completed before you begin the experimental assessment and post assessment survey. This portion should take less than 5 minutes.

You may stop at any time and at that point your survey and data will be destroyed and will not be linked to identifiers.

*\*Delivered as online survey via Purdue Qualtrics*

**Background and Demographic Information:**

1. Enter your alphanumeric ID#:

2. Gender:

☐ Male

☐ Female

3. Specialty area within CGT:

☐ Construction Graphics

☐ Interactive Multimedia

☐ Virtual Product Information (VPI)

☐ Animation

☐ Undecided

☐ Construction Graphics

4. What is your classification

☐ Freshman

☐ Sophomore

☐ Junior

☐ Senior

5. What do you use the internet for?

☐ Surfing

☐ Research

☐ Gaming

☐ Social networking

☐ Buying/Selling

☐ Other

*\*Delivered as online survey via Purdue Qualtrics*

6. Have you ever heard of Adobe® AIR™ before you entered this survey?

☐ Yes

☐ No

7. Have you ever downloaded or used an Adobe® AIR™ application? (If answered yes, please list which Adobe AIR application(s))

☐ Yes

☐ No

8. Have you every used DeviantArt before?

☐ Yes

☐ No

9. If answered yes to the previous question, how regularly do you use DeviantArt?

☐ More than once a week

☐ Once a week

☐ Once a month

☐ Once a year

☐ It's been at least a year

☐ N/A - I don't use these

☐ Other

10. What is your primary purpose for using DeviantArt?

☐ Upload Projects

☐ View Projects

☐ Critique Projects

☐ Other

☐ I don't use these types of applications



## Appendix E. Post Usability Survey

*\*Delivered as online survey via Purdue Qualtrics*

### **Post Usability Survey**

#### **Background Information:**

Welcome to the post usability survey. This portion of the survey is to be completed directly after the observed usability study.

You may stop at any time and at that point your survey and data will be destroyed and will not be linked to identifiers.

*\*Delivered as online survey via Purdue Qualtrics*

Enter your alphanumeric ID#:

Answer the following questions after interacting with the "Evaluation App"

Rate the ease of use for the following tasks (The Evaluation App):

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Installing application	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Registering a username	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Logging in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uploading a project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for your gallery of upload projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for a project by author	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adding a project to favorite list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rating/Commenting a project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for a project on favorite list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for the highest rated projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*\*Delivered as online survey via Purdue Qualtrics*

Rate your user experience: (The Evaluation App)

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Visual presentation of interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organization of interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usefulness of Application	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to complete a given task effectively and more efficiency with increased application engagement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rate your user motivation: (The Evaluation App)

Answer the following questions by completing the sentence with the response that best fits your engagement.

	Very Unmotivated	Unmotivated	Neutral	Motivated	Very Motivated
When I first opened the application, I was _____ to continue to use the application.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After completing the first task, I was _____ to continue to use the application.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After completing the study, I was _____ to use the application again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*\*Delivered as online survey via Purdue Qualtrics*

Answer the following questions after interacting with "DeviantArt"

Rate the ease of use for the following tasks (DeviantArt):

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Registering a username	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Logging in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uploading a project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for your gallery of upload projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for a project by author	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adding a project to favorite list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rating/Commenting a project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for a project on favorite list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Searching for the highest rated projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*\*Delivered as online survey via Purdue Qualtrics*

Rate your user experience: (DeviantArt)

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Visual presentation of interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organization of interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usefulness of Application	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to complete a given task effectively and more efficiency with increased application engagement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rate your user motivation: (DeviantArt)

Answer the following questions by completing the sentence with the response that best fits your engagement.

	Very Unmotivated	Unmotivated	Neutral	Motivated	Very Motivated
When I first opened the application, I was _____ to continue to use the application.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After completing the first task, I was _____ to continue to use the application.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After completing the study, I was _____ to use the application again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*\*Delivered as online survey via Purdue Qualtrics*

Answer the following questions about both applications in comparison.

Which application would you be more likely to use?

- ☐ DeviantArt
- ☐ The "Evaluation App"
- ☐ No Preference

Please explain your answer from the question above?

The feature I like least about the "Evaluation App" is:

The one thing I would change about the "Evaluation App" is:

Would you like to see this application used in a classroom setting for acquiring project feedback?

☐ Yes

☐ Maybe

☐ No

## Appendix F. Observed Task List (the “Evaluation App”)

<b>AlphaNumeric ID:</b>	CGT256-_____		
<b>Test Date:</b>	____/____/2010	<b>Test Time</b>	
<b>Test Location:</b>	KNOY 340 Lab		
<b>Test Application:</b>	The Evaluation App		

**Administrator:** Brian Michael McCreight (Graduate Student)

**Beginning Script:** I will ask you to use two different types of applications. One is a traditional Web application (DeviantArt) and the other is an AIR application (The Evaluation App). I will ask you to complete a series of tasks one at a time for each application. I will give you a time limit for each task. The time will begin when I say “begin”. The time will end with you either complete the task successfully or your time is complete. You will receive multiple attempts if the time is not over.

I will observe you during the study. Remember, the application is being tested, not you.

### Task #1: Install Application

**Task Description/script:** Double click on TheEvaluationApp.air file on the desktop to install the application. Run through the install steps.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #2: Register Username

**Task Description/script:** Register a username. Please do not use your career account username. Register a username that is generic to this application only.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			



### Task #3: Logging in

**Task Description/script:** Log in with the username you just created.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #4: Upload a project

**Task Description/script:** Upload a project into the photography section. Use the picture.jpg located on your desktop. You may give it a title and description of your choice.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #5: Search your uploaded projects

**Task Description/script:** Search for your gallery of projects that you have uploaded. Once you find the gallery, click on the project that you just uploaded. How many comments are there for this project?

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #6: Search for a project by author

**Task Description/script:** Search for a photography project titled “Humpback Whale” by the user brian. Once you find the project, report the rating?

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #7: Favorite list a project

**Task Description/script:** Place the “Humpback Whale” project on your favorite list.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes ____ No ____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #8: Rate/Comment on a project

**Task Description/script:** Comment and rate the “Humpback Whale” project.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes ____ No ____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #9: Search for a favorite listed project

**Task Description/script:** Search for the “Humpback Whale” project on your favorite list.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #10: Search highest rated projects

**Task Description/script:** Search for the highest rated photography project.  
What is the title?

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

## Appendix G. Observed Task List (DeviantArt)

<b>AlphaNumeric ID:</b>	CGT256-_____		
<b>Test Date:</b>	____/____/2010	<b>Test Time</b>	
<b>Test Location:</b>	KNOY 340 Lab		
<b>Test Application:</b>	DeviantArt		

**Administrator:** Brian Michael McCreight (Graduate Student)

**Beginning Script:** I will ask you to use two different types of applications. One is a traditional Web application (DeviantArt) and the other is an AIR application (The Evaluation App). I will ask you to complete a series of tasks one at a time for each application. I will give you a time limit for each task. The time will begin when I say “begin”. The time will end with you either complete the task successfully or your time is complete. You will receive multiple attempts if the time is not over.

I will observe you during the study. Remember, the application is being tested, not you.

### Task #1: Install Application

**Task Description/script:** This task was omitted. There was no need to install a Web based applicaiton

### Task #2: Register Username

**Task Description/script:** This task was omitted because of time. The subjects were required to have a DeviantArt account before they began the study.

### Task #3: Logging in

**Task Description/script:** Log in with the username you just created.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #4: Upload a project

**Task Description/script:** Upload a project into the photography section. Use the picture.jpg located on your desktop. You may give it a title and description of your choice.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #5: Search your uploaded projects

**Task Description/script:** Search for your gallery of projects that you have uploaded. Once you find the gallery, click on the project that you just uploaded. How many comments are there for this project?

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #6: Search for a project by author

**Task Description/script:** Search for a photography project titled “Michael Jackson Guitar” by the user Amanderr. Once you find the project, report the number of “joy” ratings?

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #7: Favorite list a project

**Task Description/script:** Place the “Michael Jackson Guitar” project on your favorite list.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #8: Rate/Comment on a project

**Task Description/script:** Comment and rate the “Michael Jackson Guitar” project.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			



### Task #9: Search for a favorite listed project

**Task Description/script:** Search for the “Michael Jackson Guitar” project on your favorite list.

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

### Task #10: Search highest rated projects

**Task Description/script:** Search for the highest rated photography project [of all time]. What is the title?

<b>Answer:</b>			
<b>Start time:</b>		<b>End time:</b>	
<b>Completion:</b>	Yes_____ No _____	<b>Attempts:</b>	
<b>Navigation Errors:</b>			
<b>Application Errors:</b>			
<b>Additional Notes:</b>			

VITA

## VITA

Brian Michael McCreight

**Academic Appointments**


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2008-2010	Master of Science in Computer Graphics Technology, Purdue University
2006-2008	Bachelor of Science in Computer Graphics Technology, Purdue University
2004-2006	Associate of Science in Computer Graphics Technology, Purdue University

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**Academic Memberships**


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2007-present	Alpha Phi Omega-Alpha Gamma Chapter, Purdue University
2007-2008	Epsilon Pi Tau-Gamma Rho Chapter, Purdue University
2006-2007	ACM-SIGGRAPH student chapter, Purdue University

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**Professional Activities**


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2008-present	Graduate Teaching Assistant, College of Technology, Purdue University
2009	Adjust Graduate Instructor, College of Technology, Purdue University
2009	Web Designer/Developer, Entomology Department, Purdue University
2008-2009	Graphic Designer, The Engineering Design Graphics Journal, Purdue University
2008	Flash Game Technical Designer, Computer Graphics Department, Purdue University
2007-2008	Cover Production Internet, School Datebooks, Lafayette, Indiana
2007-2008	Print Media Designer, Oncological Sciences Department, Purdue University

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**Academic Research Projects**


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2009-2010	Comparison of Peer Evaluation: The Evaluation App versus DeviantArt (thesis), Purdue University
2009	Comparison of 3D AIR Applications vs 2D AIR Applications, Purdue University
2008	The HIV Game, Purdue University
2008	Stick-to-School: The Game, Purdue University
2008	A Study of Rich Internet Applications in Education, Purdue University

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**Awards, Honors, and Accomplishments**


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2010	Graduate Student Teacher Mentor Nominee
2008	College of Technology Student Representative, ACM SIGGRAPH Conference, Los Angeles, CA
2008	Outstanding Project, Best Product, Best Presentation Award, Senior Design Project, Purdue University
2008	Dean's Choice Award, College of Technology-Purdue University Research Poster Symposium
2008	Most Informative Piece, ACM SIGGRAPH-Purdue University Spring Show
2008	Best Student Collaboration, ACM SIGGRAPH-Purdue University Spring Show
2006-2007	Marketing Director, ACM SIGGRAPH-Purdue University Student Chapter
2004-2008	Dean's List, Purdue University
2005-2007	Academic Semester's Honors, Purdue University
2006	Student Volunteer, ACM SIGGRAPH Conference, Boston, MA

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