The Influence of Aesthetics in an E-learning Environment

Presented in Partial Fulfillment of the Requirements for

The Master of Education Degree in the

College of Education and Human Service Professions

By

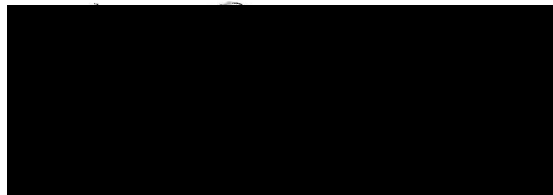Geri Huibregtse

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Chapter One: Introduction

What in the e-learning environment supports student success? While both aesthetics and usability have been highly correlated in product use and software interaction, only a small number of research articles in instructional design specifically look at the impacts of overall aesthetics on learning in an e-learning environment (Miller, 2007; Pomales-Garcia & Liu, 2006). In addition, a report on the state of online learning among higher education institutions in the United States conducted by the Babson Survey Research Group (2011) found that "31% of all higher education students now take at least one course online" and "65% of all reporting institutions said that online learning was a critical part of their long-term strategy" (p. 4). Therefore, with the increased prevalence and importance of e-learning combined with the gap in instructional design literature, this study is of utmost importance to identify the influence of aesthetics to support learning.

Purpose of the Study

This study examined learner experiences in an e-learning course instructionally designed with aesthetic considerations in mind. The study drew upon principles in the fields of usability, graphic design, information architecture, and cognitive psychology to examine learner outcomes and learner experience in order to surface principles for aesthetic considerations that can be incorporated into the instructional design process. The focus of this research was not upon the technical tools used (e.g., the online delivery mode), but on the discovery of principles that apply to the online learning environment (such as interface, navigation, usability).

Background

Currently, the instructional design literature lacks connection between student learning and aesthetic considerations for the entire learning experience with regards to their role in supporting learners' positive emotional response, reducing cognitive load, and increasing satisfaction and motivation. While some research has started to examine the component of aesthetics and its power in relation to technology (Tractinsky, 2004), additional research is needed in the area connecting instructional design and aesthetics of learning environments.

Considering the aesthetic components of e-learning when designing instruction could enhance learning. Tractinsky (2004) stated, "aesthetic evaluations may take place on all three levels of the Norman model, but there are some hints that first aesthetic impressions are affective and are formed immediately at a low level and thus precede cognitive processes" (2004, p.13). In other words, taking into consideration the aesthetics when designing an e-learning experience could immediately encourage motivation and emotional response at the onset of a student's experience. This may be particularly useful when designing e-learning that is not mandated as part of an academic program of study, such as self-study or professional development. Furthermore, Kirsh (2004) stated, "navigational cues and page layout can significantly affect student behavior," and he expects "broad agreement that visual design is more than an aesthetic choice in the design of learning environments and that it can have an impact on learning outcomes" (p. 1-2). This impact is demonstrated in a study by Giff (2003) that took place in a multimedia learning environment in which he examined two table-of-contents (TOC) layouts. The findings suggest that users favor a TOC design, which reduces their cognitive load

through consistent placement and a single, major navigational element. While they did

not find any connections to learning outcomes from the preferred TOC, they speculate

that this finding is due to the section of the course they examined; the TOC is not where

the bulk of the content, and therefore the learning, occurred.

Eric Miller (2005) argued, "although learners may initially be captivated by the

aesthetic appeal of animated graphics in CBI [computer-based instruction; another term

for e-learning] programs because of their novelty, this effect eventually wears off and the

instruction must stand on its own" (p. iii). His findings support that simulations, when

used effectively, do positively impact learner outcomes; however, his research was

focused upon individual learning objects, not the entire learner environment presented,

and while the research suggested considerations of aesthetics, it really examined several

different modes of delivery: static graphics, animations, and video.

This study addresses the gap in instructional design literature by answering the

question: Do aesthetic considerations influence student learning in an e-learning

environment?

Setting

This study took place at a multi-campus, urban, research university. It examined a

sample of graduate and undergraduate health professions students (e.g., medicine,

nursing, clinical laboratory science, pharmacy) enrolled in a hybrid course covering the

core competencies of interprofessional practice in healthcare.

Assumptions

During the research, the university at which the research took place employed the

researcher: she worked in the office that administered the interprofessional course. The

researcher also served as part of the instructional design team that developed the online

component being studied. Research participants were informed of the connection so they

felt comfortable when consenting to participate. The researcher also holds a Bachelor of

Science degree in design communication, also known as graphic design. These personal

characteristics are obviously connected to the subject matter of this study and are the

foundation of the researcher's interest in the connection between the incorporation of

aesthetics into the instructional design process and the resulting influence upon the

learner experience and outcomes. As someone trained in design, the researcher believes

that aesthetic considerations influence user experience and could positively influence

both satisfaction and learning outcomes. However, because little connection has been

made among aesthetics, instructional design, and the learning environment (as opposed to

individual learning objects), it's necessary to continue the research into the influence of

aesthetics on learning.

Limitations

The web-based course being examined was first created using HTML and

distributed as a website (the high-aesthetic environment). For purposes of comparison of

aesthetic versus non-aesthetic learning environments, a second course with identical

content was created in the learning management system, Moodle (the low-aesthetic

comparison environment). This could be a potential ethical issue because the researcher

collaborated with a colleague to fabricate the comparison conditions; typically, students

in this course receive only the HTML-based, high-aesthetic treatment. However, the

Foundations of Interprofessional Communication & Collaboration (FIPCC) course

coordinator and course director approved the Moodle course version so that it was sure to

be identical in content to the original course and addresses the learning outcomes set forth for the e-Professionalism course.

Thirteen students volunteered to be research subjects, which is considered to be a small sample size, and therefore, not statistically reliable.

Definitions

Aesthetics (or aesthetic considerations), in this study, are defined as elements of the e-learning environment and interface, which are purposefully designed to enhance the learner's experience and support learning.

E-learning (or online learning) can be described as learning experiences that are delivered electronically via the World Wide Web.

Instructional design (ID) is the discipline of creating educational materials and environments. One widely used and well-established ID model is known as ADDIE, an acronym for Analysis, Design, Development, Implementation, and Evaluation. The focus of instructional designers tends to be on learning outcomes and instructional strategy (or pedagogy) and not upon aesthetics.

The Norman Model comes from research of the human brain, which examines three levels of processing, "the automatic, prewired layer, called the *visceral level*; … the brain processes that control everyday behavior, known as the *behavior level*; and the contemplative part of the brain, or the *reflective level*" (Norman, 2004, p. 21). These levels work together to inform how humans experience the world. This paper argues that each of these levels should be attended to when considering aesthetics in e-learning design.

Summary

The purpose of this study was to discover how aesthetic considerations and course design affect learners; their user experience and achievement of learning outcomes. When designing educational experiences for students, it is important for the course design team, instructional designers in particular, to take all influential forces into consideration; aesthetics being a very powerful one. As Daniel Pink (2005) states in his book, *A Whole New Mind*, ―It‘s no longer sufficient to create a product, a service, an experience, or a lifestyle that‘s merely functional. Today it‘s economically crucial and personally rewarding to create something that is also beautiful, whimsical, or emotionally engaging" (p. 65).

Chapter Two: Literature Review

This literature review examines the relationship of aesthetics to the instructional design process within the context of e-learning development. First, it will look at the different definitions of aesthetics and relate that term to ID in e-learning. It goes on to discuss cognitive load theory, usability, graphics for learning, and, finally, reviews some related studies. The literature review provides a foundation and background to support a study whose purpose was to discover how aesthetic considerations influence online learners.

While some research has started to examine the component of aesthetics and its power in relation to technology (Tractinsky, 2004), additional research is needed in the area connecting ID and aesthetics of learning environments. The well-known ADDIE model (Analysis, Design, Develop, Implement, Evaluate) is considered by some to be a rigid process (Hokanson & Miller, 2009); as an alternative, Hokanson & Miller (2009)

offer a ―role-based design" approach that takes into consideration aesthetic components when designing learning experiences.

Aesthetics Defined

Aesthetics can be defined in several ways. Parrish (2009) describes aesthetics as pertaining ―…to heightened, integral experience. Aesthetic experiences are those that are immersive, infused with meaning, and felt as coherent and complete" (p. 511). This definition is quite involved and provides more breadth when compared with Lavie and Tractinsky's common definition from Merriam-Webster's Collegiate Dictionary, ―a pleasing appearance or effect: beauty." Parrish (2009) actually talks specifically about the learner experience in instructional design and how the ―learning experience describes the transaction that takes place between individual learners and the instructional environment…learning experience includes the way that the learner feels about, engages with, responds to, influences, and draws from the instructional situation" (p. 512). Miller (2007) defines aesthetics in his research as ―those elements of an interactive design that are carefully orchestrated to enhance and heighten the learner experience, as opposed to elements designed merely to satisfy the pedagogical or technical needs of the instructional objectives" (p. iii). Therefore, to define aesthetics in e-learning is complicated and somewhat subjective, but exciting as it is influential to the entire system, as both Miller and Parrish describe.

The researcher argues that aesthetics include a pleasing appearance, intuitive interface, and well-organized content, and that it is the combination of all three of those elements that enhances the learner experience and encourages increased learning outcomes. It is also important to note the difference between the design of individual

learning objects, as opposed to the design of the larger learning environment. It is impossible to completely separate the two. Though this literature review looks at both individual learning objects and entire learning environments, its goal is to provide a foundation for research related to the influence of the aesthetic learning *environment* (e.g., navigation, interface) and not necessarily to individual learning objects (e.g., survey component, labeled graphic).

Aesthetics and Instructional Design

Jenkinson (2009) discussed the ―multimodal nature of interactive technology‖ and that it ―demands of us that we develop evaluative tools capable of capturing the learning process that occurs when students interact with technology‖ (p. 278). This attentiveness to the learner experience should be studied further and attended to through the instructional design process.

"Increasingly, research seeks to study the aesthetic aspects of human-computer interaction and to strike a balance between usability and aesthetic considerations" (Lavie & Tractinsky, 2004, p. 276). When considering the relationship of aesthetics and usability to user experience, it all relates to instructional design of the learner experience. "Viewing learning as experience broadens the concerns of instructional designers because it necessitates consideration of the quality of that experience and not just its goals and mechanics" (Parrish, 2007, p. 512). As previously mentioned, Hokanson and Miller (2009) propose a new method for instructional design, which attends to the user experience through an "artist" role. This role "advocates for user/viewer experiences and aesthetics, both areas with vast potential for improvement in the field of instructional design" (p. 24). In addition, Alben, Lowgren, and Norman (as cited in Kirschner,

Strijbos, Kreijns, & Beers, 2004) discuss interaction design, a new field, as a good method of instructional design that is "concerned with aesthetics (or attractiveness) and emotion, and with the usability of user interfaces" (p. 51-52). Miller (2011) describes the interaction design framework as:

> *concerned with aesthetics and emotion; more precisely how the software may appeal to and benefit learners. For a system to be perceived as useful by its audience, the design of a software environment must embrace an equilibrium of utility and usability (p. 312).*

All seem to agree that the aesthetic component is important to instructional design and the learner experience. Parrish (2009) sums it up nicely when he states, "Aesthetic approaches to instructional design do not make the difficult problems of instruction any simpler; but they can help us embrace those problems in all their richness rather than encouraging us to oversimplify and, perhaps, misjudge them" (p. 526).

Cognitive Load Theory

The study of aesthetics and instructional design theory is linked to cognitive load theory (CLT), as is demonstrated in Miller's 2007 and 2011 research, which examined the impact of the aesthetics of interface design and e-assessment design on learner experience. Miller's (2007) findings "suggest that aesthetic design not only played an important role in lowering participant cognitive load, but also increased participant satisfaction, willingness to continue use, voluntary self-assessment time, and overall task performance" (p. iv). In short, Miller found that his high-aesthetic interface (one that was designed and enhanced with aesthetics) actually helped students' perceived learning and motivation. In his 2011 study, Miller found that:

in addition to increasing learner satisfaction through affording a pleasant online environment for assessment, aesthetic design, as examined in this study, can significantly decrease the learner's cognitive demands (i.e., mental effort, stress, and task demands), promote self-assessment, and increase motivation for continued use, ultimately leading to higher task performance ratings when compared to an environment with little consideration for aesthetic design (p. 333).

He goes on to say that "instructional designers and distance educators must focus on designing *experiences*, as opposed to developing products or processes" (Miller, 2011, p. 333), in addition to their concentration upon pedagogical considerations.

Usability and the Learner Experience

Aesthetic considerations are closely tied to usability, as has been mentioned in the previous themes of this literature review. When a designer considers aesthetic decisions, the user/learner should be at the center of his/her thinking. One of the main purposes and important factors to incorporating aesthetics into e-learning is the ability to improve the user/learner experience. Jakob Nielsen (n.d.), an expert in website usability, talks about usability and its relationship to utility (What – Definition of Usability section, para. 4):

- *Utility = whether it provides the **features you need**.*

- *Usability = how **easy & pleasant** these features are to use.*

- ***Useful = usability + utility**.*

Graphic designers might describe this same concept as similar to *form follows function*; in other words, the aesthetic considerations should support the function or utility, which, in the case of this study, is *learning*. The two concepts go hand in hand; an

online course could be beautifully designed, but fails to achieve evidence of learner success in grasping the material presented. In contrast, an online course might present rich content, but a lack of concern for aesthetics might actually distract or detract from the content, to the point that the learner cannot focus on the rich content.

Nielsen (2010) also studied college students on the web and found that ―students often judge sites on how they ―look;" they ―prefer sites that look clean and simple rather than flashy and busy" (Myth 2 section, para., 3). He also found that ―a good site is one that helps them quickly accomplish their goals" (Myth 2 section, para., 3). In addition, college students also ―prefer websites that are easy to scan and don't intimidate them with a wall of gray text" (Reading section, para., 1). That said, do these preferences cross over into the e-learning environment? Or, do these findings just relate to web use outside of the educational context?

Graphics and Learning

While the literature is lacking in the aesthetic impacts upon user/learner experience, Ruth Clark and Chopeta Lyons (2004) wrote an entire book about graphics for learning. In their book, they focus upon graphics and the aesthetic considerations that impact learning in relation to individual learning objects (and not as much upon the overall aesthetics of the learner experience). One of the main points of this book is that well-designed graphics positively impact learning, and those graphics that are not well designed can actually detract from learning (Clark & Lyons, 2004). This argument is also supported by Dr. Stacy G. Ulbig (2010) in her article, *A Picture is Worth What? Using Visual Images to Enhance Classroom Engagement.* What is important to note about much of the current research is not that it completely ignores aesthetics, but rather that it

doesn't adequately examine these considerations outside of learning objects, such as individual graphics to be included within a lesson or unit. In response, this study examined an *entire* online learning experience in which identical content was presented in two different ways: an interface designed with a high level of aesthetic consideration and another that was designed solely to deliver content in an organized manner.

Methods for Designing

As discussed, many factors, among them, aesthetics and usability, influence the learner experience. What is interesting is that contradictory opinions can be found when attending to these issues. Waniak and Ewald (2008) concluded that when designing online courses or activities, the ID should consider providing navigation in a content list (rather than a map-type aid). Their study found that a content list has the least amount of impact on a user's cognitive load. This linear representation is somewhat contradictory to Ruffini's (2008) work, which concluded that a visual, non-linear organization of e-maps more closely matches how the brain works. From these conflicting results we can draw the conclusion that in practice, successful approaches of instructional design vary. This was part of the point that Jenkins was making about the complexity of e-learning and how the many different parts must be studied in a manner that attends to the sometimes interdependent elements and the ―messy" system in which learning naturally occurs (2009, p. 278). Both Norman (2004) and Clark and Lyons (2004) also contend that aesthetic preferences are dependent upon the individual learners; for example their culture, learning style, and level of knowledge (e.g., novice vs. expert) all have influence on their preferences. Therefore, audience analysis is paramount in the instructional design process, especially in relation to aesthetic considerations.

In conclusion, aesthetics defined as the beauty of something and its influence on the learning experience—by enhancing usability, for example—is an important component of e-learning. One could argue that the research supports the importance of aesthetics, at least at the level of learning objects and website usability. Existing principles of design, human-computer interaction methodology, and the study of cognitive load also inform and support aesthetic considerations. However, it seems to be that when we ask the question about the influence of aesthetic considerations (as defined in this study) upon learning outcomes, the literature is lacking. More research should be conducted to determine the best method to integrate this component into the instructional design process; for example, at what stages in the ADDIE model should aesthetic considerations be inserted for the optimal impact on student learning? Julie Dirksen (2012), in her book titled, *Design for How People Learn*, says it well: —our environment is a massive influence on our behavior" (p. 246). If we assume that the learning environment in e-learning is the interface, instructional designers must do everything they can to ensure that the interface supports student behavior in order to encourage and enhance learning.

Chapter Three: Methodology

This study examined whether aesthetic considerations influence student learning in an e-learning environment. This chapter describes the participants and setting studied, discusses the research design, and concludes with a description of the timeline and procedures used to collect and analyze the data.

Participants and Setting

Study subjects were University of Minnesota health professions students who

were mostly in graduate programs. This population of students (770 at the Twin Cities

campus, 60 at the Duluth campus, and 32 at the Rochester campus) were enrolled in

Foundations of Interprofessional Communication & Collaboration (FIPCC) during Fall

2012.

FIPCC is an eight-week course and is required for all students enrolled in

Academic Health Center health professions schools. The course is designed around the

core competencies for interprofessional collaborative practice

(www.aacn.nche.edu/education-resources/IPECReport.pdf), which include the following

domains: (1) values/ethics for interprofessional practice, (2) roles and responsibilities, (3)

interprofessional communication, and (4) teams and teamwork. FIPCC is conducted

primarily face-to-face in interprofessional teams, each comprised of 12 students plus a

facilitator. The course includes an online unit on e-Professionalism, which addresses

competency domains (1) and (3) by teaching students how to appropriately use social

media tools in their personal and professional lives. Students enrolled in the FIPCC face-

to-face course must take the e-Professionalism unit (Module 4), and their grade for the

course includes both their participation in the face-to-face and online portions of the full

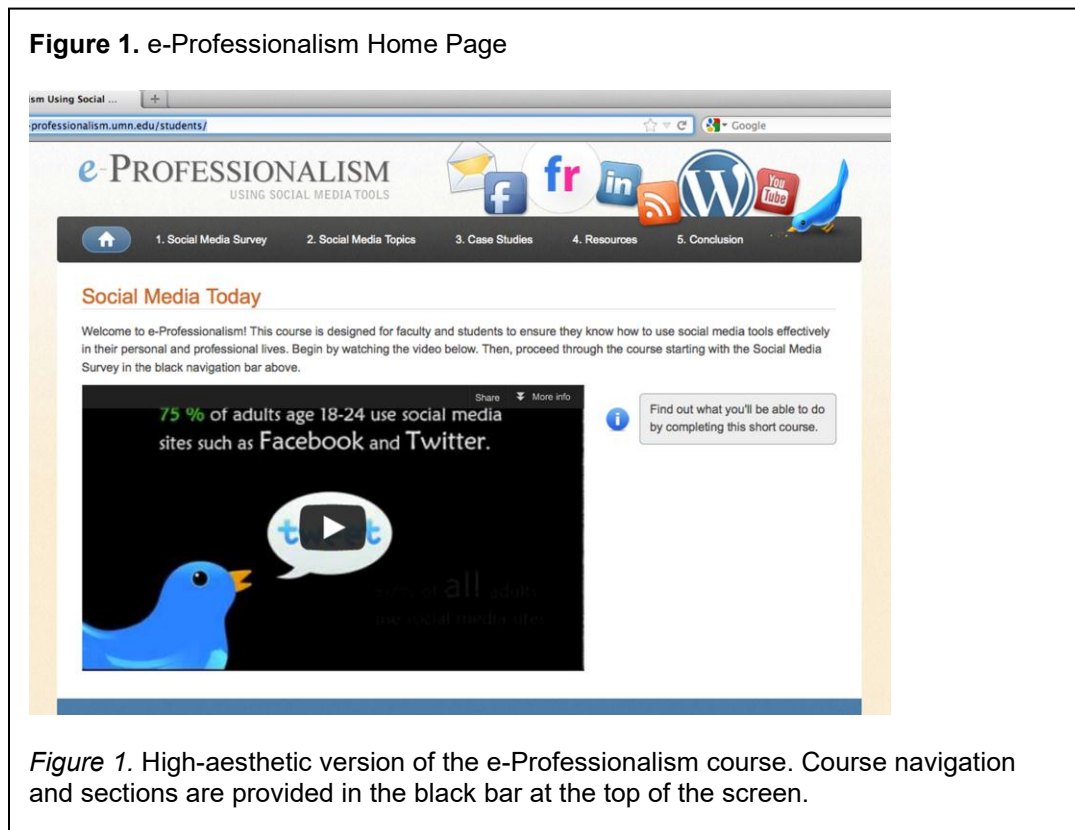course. The e-Professionalism unit was the online environment that this study examined.

Interface Design

An HTML-authored, web-based, high-aesthetic version of the e-Professionalism

course already existed. For purposes of comparison, the researcher and an instructional

designer together created a low-aesthetic version of e-Professionalism in the Moodle

CMS using the Lesson tool. The new, low-aesthetic version development was guided by the principles: content must remain exactly the same, navigation must be as much like the highly-aesthetic version as possible, Moodle tools were utilized to mimic interactivity as much is possible, and minimal imagery was transferred to the low-aesthetic version (e.g., icons were not transferred).

High-aesthetic Version

The high-aesthetic version is an HTML-authored, web-based course open to the public through Creative Commons licensing at https://e-professionalism.umn.edu/students/. As you can see in Figure 1, the course sections are listed (and numbered in the recommended sequence) in a black bar across the top of the screen. After the home page, the first section is the 1. Social Media Survey, which provides a series of likert scale questions to answer, and then once submitted, provides

**Figure 1.** e-Professionalism Home Page

Figure 1. High-aesthetic version of the e-Professionalism course. Course navigation and sections are provided in the black bar at the top of the screen.

the user with how their results compare with others who have taken the course. The results are generated by data gathered and assembled by a back-end database.

The next section, 2. Social Media Topics, is composed of the main course content in which pages of text are provided on the five topics covered in the course. The left-hand, sub-navigation tabs are first introduced to learners in this section (Figure 2).

Figure 2. Section 2. Social Media Topics

Figure 2. Section 2. Social Media Topics is composed of the content of the course. The left-hand, sub-navigation tabs are first introduced to learners.
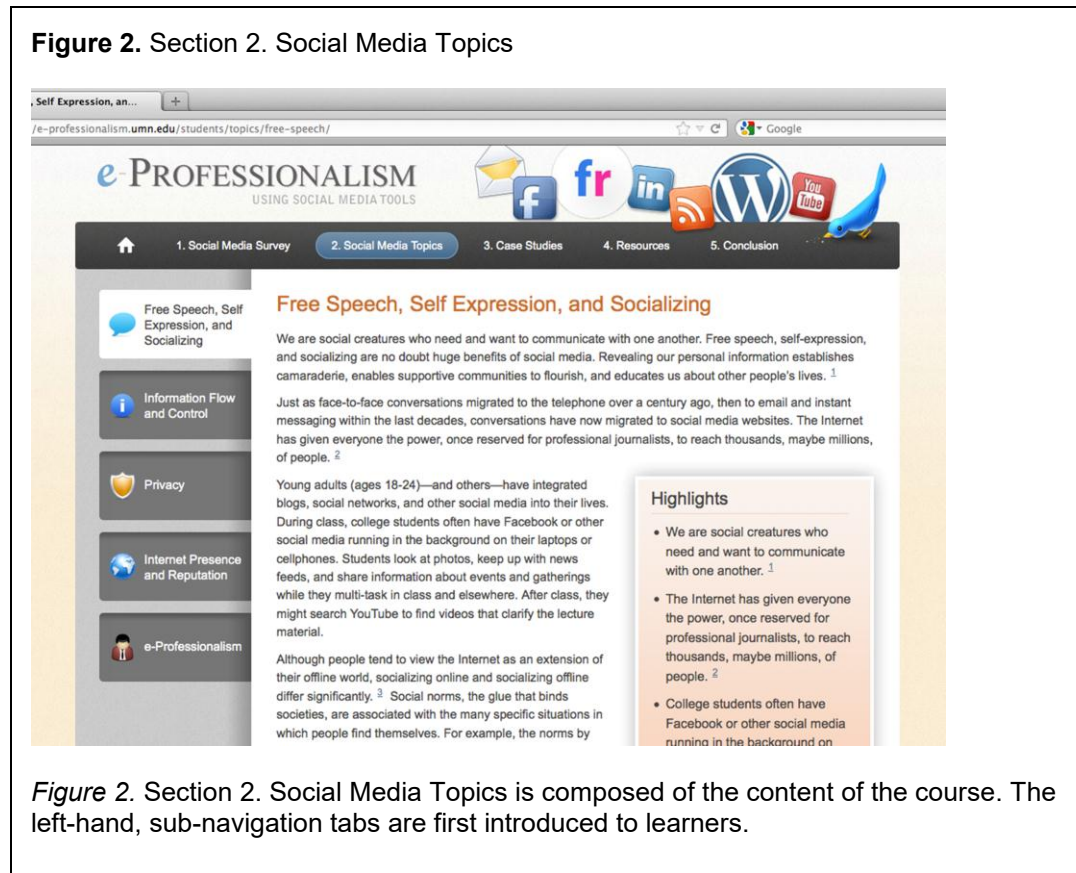
Case Studies (section 3) comes next, and provides learners with a short case description followed up by an interactive reflection exercise where several questions are posed, learners respond, and are then all given the same feedback as to how the instructor would answer the question (Figure 3).
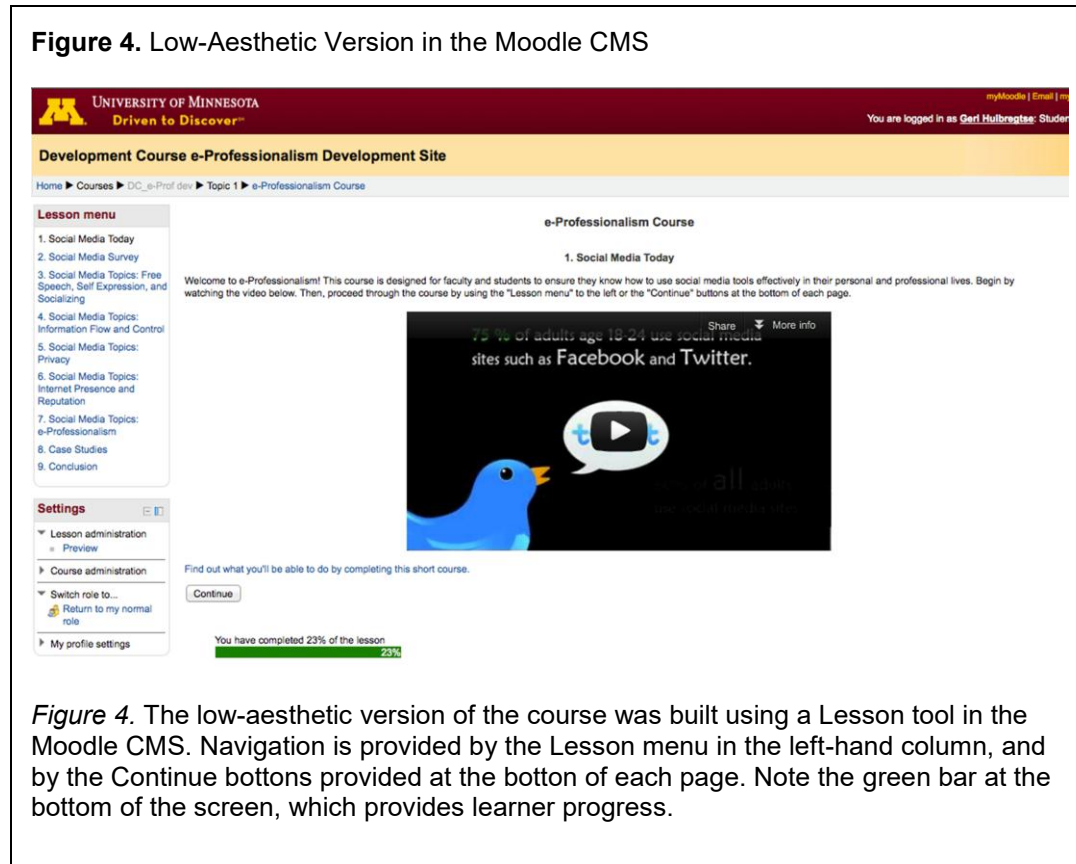
Figure 3. Section 3. Case Studies

Figure 3. Section 3. Case Studies provides a case and then learners are asked to reflect upon several questions. All students are provided with the same feedback for each question.

The final two sections of the course, Resources (section 4) and Conclusion (section 5), are both single screens that utilize only the top, black bar course navigation (no left-hand, sub-navigation).

Low-aesthetic Version

The low-aesthetic version was created in the Moodle CMS utilizing the Lesson tool. This tool was chosen because of the branching function that would allow each of the four case studies to branch off of the main Case Studies page. The low-aesthetic version of the course had to be set up in a more linear fashion because of the constraints of the Moodle system (e.g., students weren't able to choose which order they read the pages in). That said, in both the low- and high-aesthetics versions, students were guided to complete the course sections in the exact same order. Navigation in the low-aesthetic version was

provided both by the Lesson Menu in the left-hand column, and also with Continue

buttons on each screen. See Figure 4.

Figure 4. Low-Aesthetic Version in the Moodle CMS

Figure 4. The low-aesthetic version of the course was built using a Lesson tool in the Moodle CMS. Navigation is provided by the Lesson menu in the left-hand column, and by the Continue bottons provided at the bottom of each page. Note the green bar at the bottom of the screen, which provides learner progress.

Because the Social Media Survey (section 1) utilized a database backend in the

high-aesthetic version, this interaction could not be identically created in Moodle.

Instead, each survey question was created as a separate poll in the Poll Everywhere

online tool (www.polleverywhere.com/), which tracked the responses and reported the

results in Moodle. To do so, HTML code was taken from the Poll Everywhere site and

added to the Moodle lesson page in order to embed the questions and their results. See

Figure 5.

In sum, all efforts were made to create a low-aesthetics version in which the content must be identical, and the course was organized as close to identical to the high-aesthetic version as was possible using the Moodle CMS. Minimal imagery was transferred in order to create a low-aesthetic version, e.g., the course header/banner was not transferred.

Figure 5. Social Media Survey in Low-Aesthetic Version

Figure 5. The Social Media Survey in the low-aesthetic version of the course utilized a tool called Poll Everywhere to track and report results of each survey question.
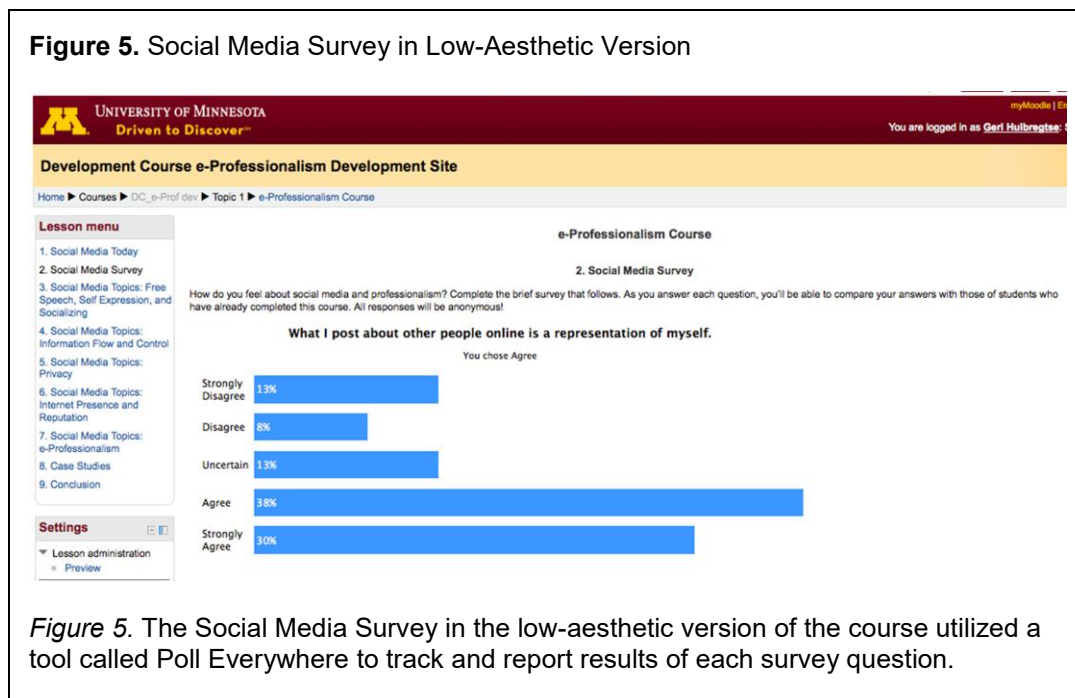
Research Design and Procedure

This study takes a qualitative approach to answer the research question: Do aesthetic considerations influence student learning in an e-learning environment? Through focus group interviews, the study explores whether learners' expectations for aesthetics, organization, and usability in an online learning environment differ from an online environment outside of the educational context (such as the online environments they encounter while shopping or consuming news).

The research proposal was submitted and approved by the Institutional Review Board (IRB) in August 2012 (#1208E19042). Due to a change in the timing of the focus groups a Change in Protocol Request form was submitted to the IRB and approved in September 2012. Shortly following IRB approval, students enrolled Fall 2012 in FIPCC (nearly 900) were invited to volunteer and participate in this study via email from the FIPCC Program Director. Two reminder emails were also sent.

Next, participants (13) were randomly assigned to one of two groups; Group A (7) accessed the high-aesthetic version of the course, and Group B (6) accessed the low-aesthetic Moodle version. As previously described, all course content, including interactivity, information architecture, and assessments, were kept as identical as possible. Virtually, the only difference was in the aesthetics of the e-learning course design.

Students completed the course and then participated in a one-hour focus group session in which the other students took the same version of the course that they did, i.e., there were two focus group interviews; Group A (high-aesthetic version) and Group B (low-aesthetic version). Focus group interviews were audio recorded and transcribed for analysis.

Data Collection

Following students' completion of the online course and the final assessment, two one-hour-long focus groups made up of 5-7 students each were conducted to gather qualitative data; conversations were transcribed, and participants were assured anonymity in the transcriptions. The focus groups were semi-structured by questions determined ahead of time based upon design and usability principles. The e-Professionalism course

(e-professionalism.umn.edu/students/) was revealed to both groups during the focus

group interviews. Group A (made up of those who took this highly aesthetic version of

the course) had the course available by projector during the entire focus group interview.

Group B (made up of those who took the low-aesthetic version of the course) were shown

the highly aesthetic version after the discussion about the Moodle version was complete.

Pizza was provided for both focus group interviews. Full disclosure was made

that the researcher is not only a graduate student in education, but works in the AHC

Office of Education, the office in which the FIPCC course is administered.

Data Analysis

The focus group interviews were analyzed thematically in order to surface

principles for aesthetic considerations that support the design of e-learning in a higher

education setting.

Summary

This study took a qualitative approach to explore the influence of aesthetic

considerations on learners in an e-learning environment. Thirteen participants

participated in focus group interviews providing their experiences taking the e-

Professionalism course. Focus group interviews were thematically analyzed and

described.

Chapter 4: Results

This study explored the influence of aesthetics on learning in an e-learning

environment by examining students' assessment scores and focus group interviews of

students who were randomly assigned into either of two versions of the e-Professionalism

course; a free-standing HTML course designed with aesthetics in mind (Group A) or a low-aesthetic version created in the Moodle learning management system (Group B).

This chapter will describe the results of the final assessment, outline the themes identified in the focus group interviews, and briefly discusses ties to the literature.

Final Assessment Results

All participants took a ten-question, multiple choice, final assessment covering the content in the e-Professionalism course. While two different versions of the e-Professionalism course were offered (Group A: highly aesthetic; Group B: low aesthetic), the final assessment for both groups was administered through the quiz tool in Moodle. Each assessment included ten questions assembled from a question pool organized by learning outcome in order to reduce the chances of cheating, i.e., students' assessment questions were different but covered the same learning outcomes.

Both groups had the same mean assessment score of 8 (out of a possible 10). A second look at the data, in which the first attempt scores were removed (students were given the option to retake the assessment for a higher score), also resulted in only minuscule differences (M = 8.5 vs. 8.67). The assessment scores for the two groups were nearly identical.

Focus Group Interview Results

Two, one-hour focus group interviews were conducted; one with students who took the highly aesthetic version of the course (Group A) and one with students who completed the low-aesthetic version of the course (Group B). During the Group A discussion, the online e-Professionalism course (https://e-professionalism.umn.edu/students/) was available for viewing. During the Group B

discussion, the Moodle course was not available for viewing because it was within their

FIPCC course, which the researcher didn't have access to, however, when the discussion

about the Moodle course ended, the researcher decided to show the group the highly

aesthetic version of the course, which spurred on more conversation. This was helpful to

regroup the conversation.

Group A Themes (Highly Aesthetic Version)

The themes that arose out of Group A, or those that took the highly aesthetic

version, were satisfaction with the introduction video, and the importance of navigation

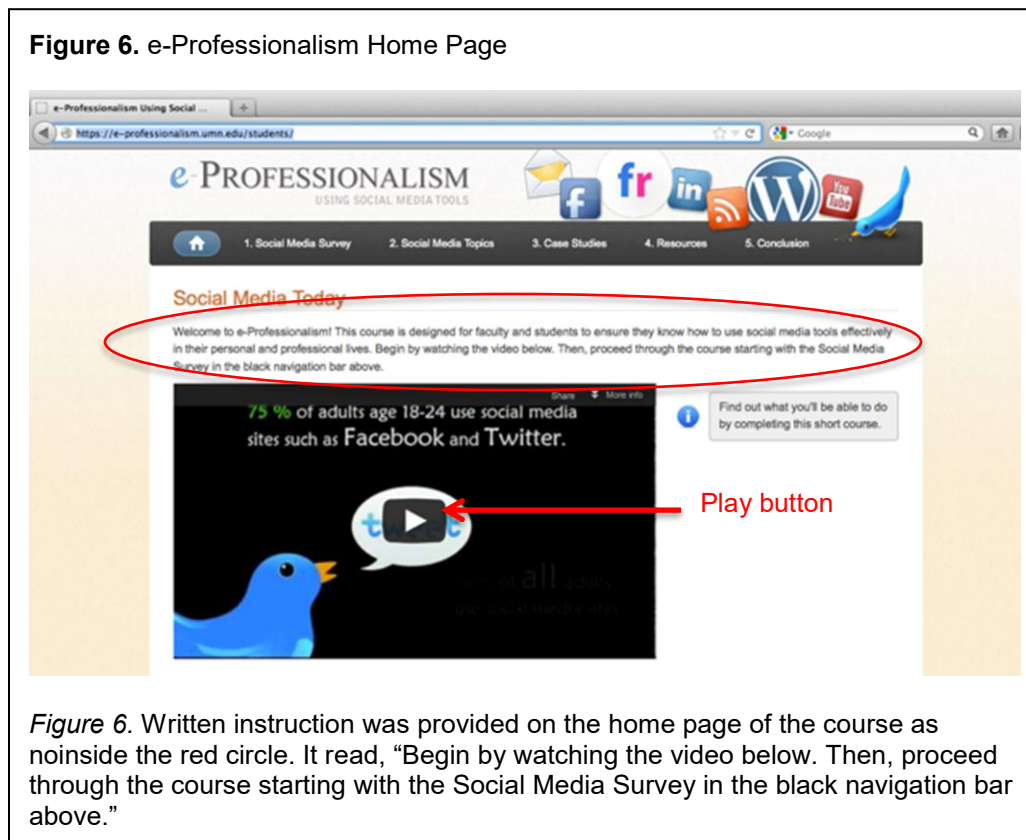(including guiding instructions and cues), and aesthetics.

Introduction Video

The students in Group A emphatically believed the introduction video was a great

way to present the content (though one student shared that his learning preference would

be to read content instead). They also talked about video length, that five minutes would

probably be the maximum amount of time they would tolerate for an online video. That

said, this group did discuss that if the *expectations* were clearly set (e.g., this important

online lecture will require 30 minutes of your time), they would make an exception. The

group even discussed putting the course into an entirely video-based format, though they

decided that content embedded entirely in video would not allow them the same ability to

―skim" the content.

Navigation and Instruction

The main topic of conversation with Group A was that clear and easy navigation

are of utmost importance. All of the students described how they started the course by

watching the video but that they were not sure what to do after the video ended; they

were stuck. No one noticed (and therefore did not read) the written instruction that was

provided on the home page of the course above the embedded video (Figure 6). The

Figure 6. e-Professionalism Home Page

Figure 6. Written instruction was provided on the home page of the course as noinside the red circle. It read, "Begin by watching the video below. Then, proceed through the course starting with the Social Media Survey in the black navigation bar above."

students described seeing the play button as the pertinent visual element on the screen

and therefore missed the instruction written in text above the video.

Students found the navigation to be clear on the site but did want more up-front

instruction about how to proceed through the course. One student said, ―I rarely read

directions for what to do next." The group consensus was that people don't read

instructions online, and one effective solution is to provide visual cues to do so as one

students described, ―…for me, when I look at something, it's the visual cue[s] that

instruct me where to go next, versus the actual content…"

When comparing regular websites to learning websites, it was clear that there

were some similarities, but really more differences in how they *use* the sites, which
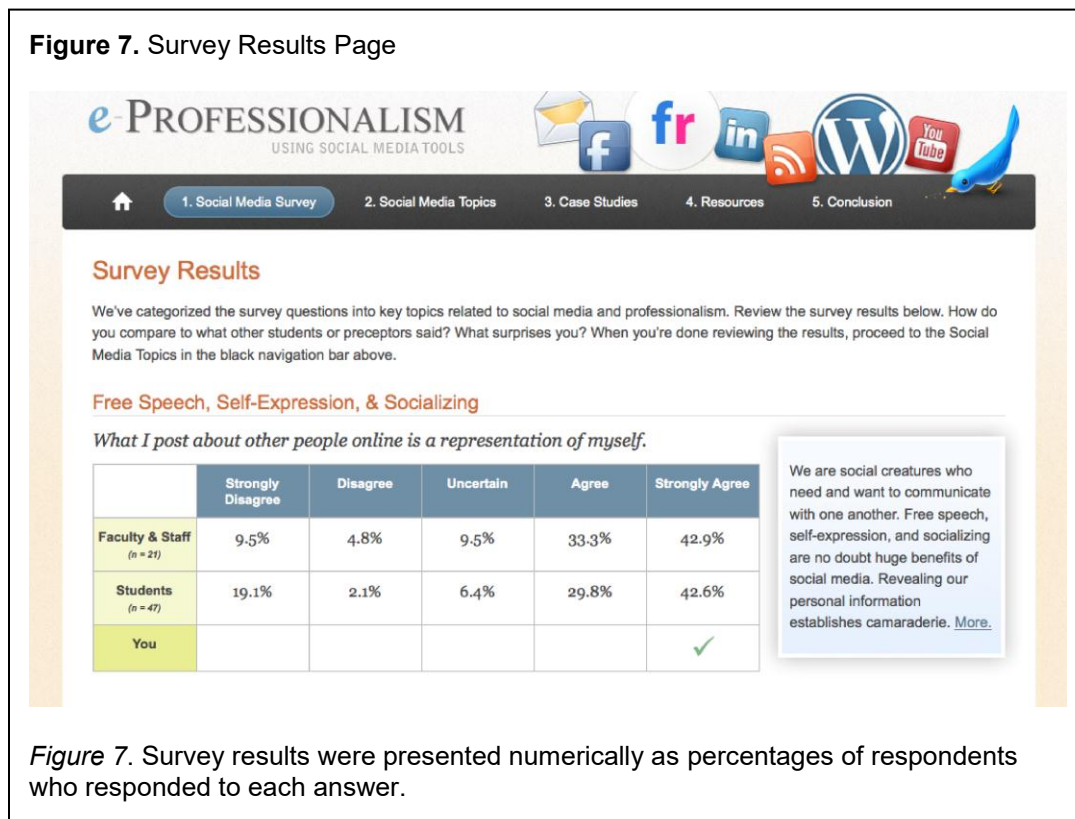
translated to different expectations for the aesthetics. They did say that the navigation should be well designed like a ―regular" (i.e., non-education) website, ―you kind of just want the same ease of navigation, 'cause I feel like learning is hard enough without having to learn how to navigate a website, too." However, they definitely expressed that a learning site should provide more instruction about what to do on the site. As a group, they agreed upon one student's statement,

> *if I knew what I was looking for, I would want it [my e-learning course] to be*
> *more like Target, because when I go there, I know what I'm looking for. But in*
> *situations like an online training, I don't know what I'm looking for…you're*
> *telling me what I need to know. There are things that I don't know what I don't*
> *know; or don't know what I'm looking for specifically. So having it be more like*
> *directing me though the site, like 'click here,' 'next,' is more useful to make sure*
> *that I get all the information that you're trying to give me.*

All in all, they agreed that the high-aesthetic course needed clearer navigation, including buttons for how to move to the next page, and they wanted the course to provide them with estimates of how long a course/section should take to complete. If the proper navigation, organization, and guiding instructions or cues for moving through a course are not provided, it could create barriers to learning. One student described an experience with another course in which ―the information was useful….when you can find it. But the professor is not a web designer, and I think he did it by himself. And all the links are not easy to find. You have to wait for him to email you the name of the link for what title you're supposed to look underneath, because otherwise, you could look at all of them, and never know. So, I think the credibility of the information is also at risk."

Aesthetics

The group found that aesthetics overall are important, but it‘s important to ―not overdo it.‖ In particular, Group A liked the survey portion of the course, but disliked the presentation of the results (Figure 7). They specifically recommended using a graphic representation of the data (as opposed to the text-based percentages presented, e.g., 75%).

Figure 7. Survey Results Page

Figure 7. Survey results were presented numerically as percentages of respondents who responded to each answer.

One student shared, ―if it were a bar graph or something where you could look at it, and you just got it right away. Like, ‗Oh, there‘s that, and that‘s how it compares here.‘‖

Another student shared that he does ―appreciate the time that somebody spends in making the website, like, user friendly and attractive. Because it makes it more enjoyable for that.‖ By contrast, another student shared that, ―I think, by default, my personality

might be that if it's really hip, like really trying to be cool, I will be like <sigh> and groan

a bit. Then probably think a little less of it. But I realize that's a personal bias, and it has

nothing to do with the content within it."

In sum, Group A (highly aesthetic version) spent the majority of the time

discussing navigation and the importance of providing clear instruction to guide the

learner through the site. They also found the video to be engaging and a good way to

deliver content. Finally, they were appreciative of aesthetics in e-learning, but they didn't

want it to be overpowering or ―over done."

Group B Themes (Low-Aesthetic Version)

Group B was a quieter group, and the conversation ended before the full hour was

up. Overall, they said they didn't face any distracting elements to their learning in the

low-aesthetic version of the course. The common themes that surfaced were that they

liked by the video, talked a lot about navigation, and described things that engaged them

(the video, case study reflection, and survey). They also found that aesthetics were

important, but didn't want their e-learning to be too ―flashy." The connection between

aesthetics and the credibility of the content was stronger for this group. After discussions

about the Moodle version were complete, the highly aesthetic version was shown. Given

the opportunity to compare the two versions, they were prompted to think more about the

aesthetic elements of the courses.

Introduction Video

The group discussed and agreed that they liked the introduction video component.

One student expressed, ―I liked the video too. I just really liked how…the video went

through, and there was small pictures during it, and there wasn't anyone speaking, I don't
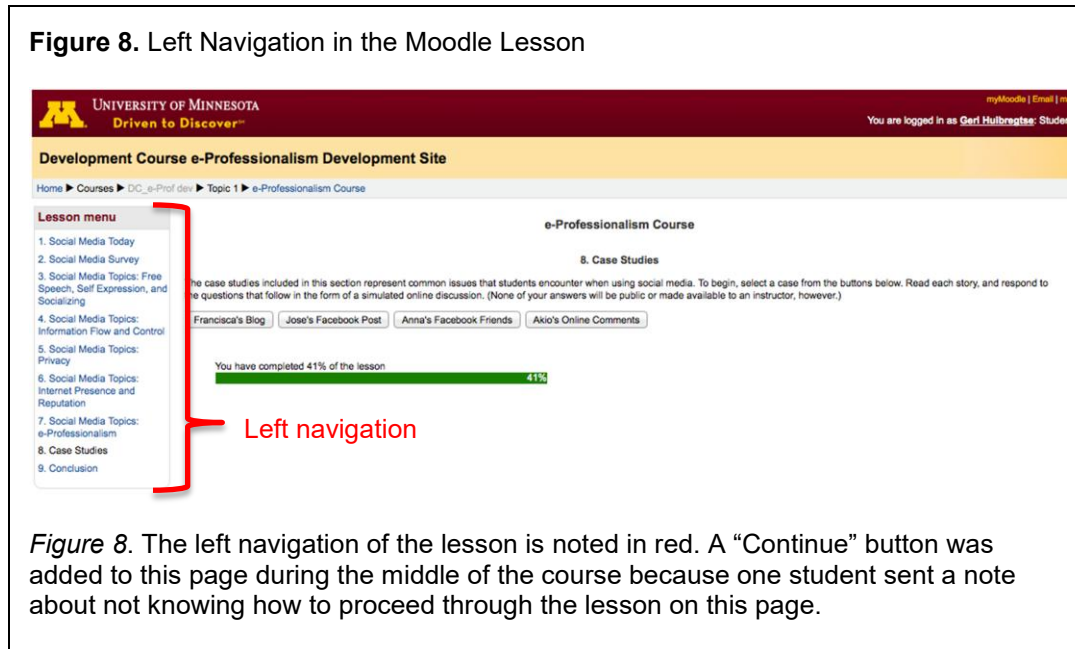
know it just bugs me when I have to listen to someone's voice speaking on a video and

you actually have to like read what it was saying, so it kept me engaged, and I wasn't on

Facebook or something else." In other words, this participant appreciated the

combination of graphic imagery, short lines of text to read (e.g., statistics, stories), and

background music instead of watching a video in which a person was talking or a person

talking along with text to read at the same time.

Navigation

As previously mentioned, the students didn't identify any stumbling blocks to

their learning in the low-aesthetic version. They expressed that clear navigation is

number one; without it, they won't be able to do what they're supposed to do, and they

felt that was true for both commercial websites and for e-learning.

They felt strongly about the importance and placement of a ―Continue" button to

move them from screen to screen. It's an important component that they use to navigate.

In fact, they wanted it to be placed at the end of the content, because ―otherwise they

wouldn't read through everything." In other words, a Continue button acts as a visual

motivator to move through the content on the screen. The importance of this visual

navigational component was evidenced by this group: in the middle of the course, one

student emailed the course coordinator because they had become ―stuck" on a page that

did not have a Continue button (students were supposed to advance to the next screen

using the navigational tools provided for them on the left side of the screen, but this

student missed the left navigation and could not figure out how to proceed). Following

that episode, a Continue button was added to the Case Studies page. In the focus group,

when asked whether they had used the alternative left navigation to move through the
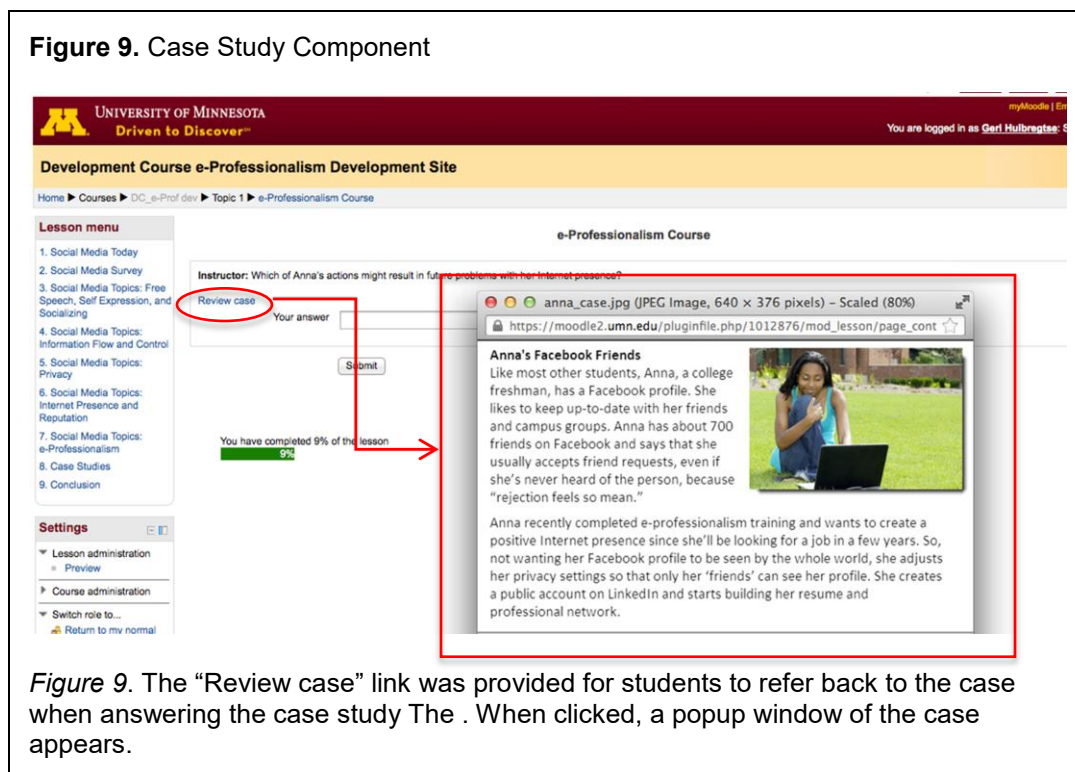
unit, this group of students revealed that none of them had even noticed it as an element of the screen, though it is prominently placed on the page (see Figure 8).

Figure 8. Left Navigation in the Moodle Lesson

Figure 8. The left navigation of the lesson is noted in red. A "Continue" button was added to this page during the middle of the course because one student sent a note about not knowing how to proceed through the lesson on this page.

Like the other group, these students looked for visual cues/buttons to move forward in the course. They shared that they also didn't read the text on the home page of the course describing what to do next; they just went straight to the Continue button provided.

It was interesting that the low aesthetic group discussed the middle block of content as the only area they focus on. They described everything else surrounding as ―noise" and ―clutter." Interestingly, Jacob Nielsen talks about an F-shaped pattern for reading on the web in his April 17, 2006 Alertbox, and this graphic clearly illustrates a users focus upon the middle block of a web page. This could be another potential area of exploration about how the use of the web is influencing online learning behaviors (e.g., people ignoring sidebar sections because they commonly include advertising).

Finally, the students talked about the Case Study component, in which they are presented with a short case, are asked to respond to specific questions about the case, and are provided with feedback about how an instructor would respond. They discussed wanting to refer back to the case that was provided on the first screen of the case study exercise. In fact, the ability to back navigate was built into the system, but none of them had noticed the link provided on subsequent pages, though it was, again, plainly visible on the screen (see Figure 9).

Figure 9. Case Study Component

Figure 9. The "Review case" link was provided for students to refer back to the case when answering the case study The . When clicked, a popup window of the case appears.

Content Organization

Group B discussed the organization of the content and how they thought that each case study should follow the related topic page, whereas the current version clusters all the topic information and then the learner proceeds through all the case studies together. They felt that their recommended reorganization would help to reinforce their learning of each topic presented.

They liked the ―Highlights" sections, which pulled out and provided the main points using bullet points and brief sentences set apart from the rest of the text, and they shared how they didn't care for large pages of text. This again was where they suggested it would have been better for the designer to break up the topic content (which is provided on text-heavy screens) with the related case study reflections.
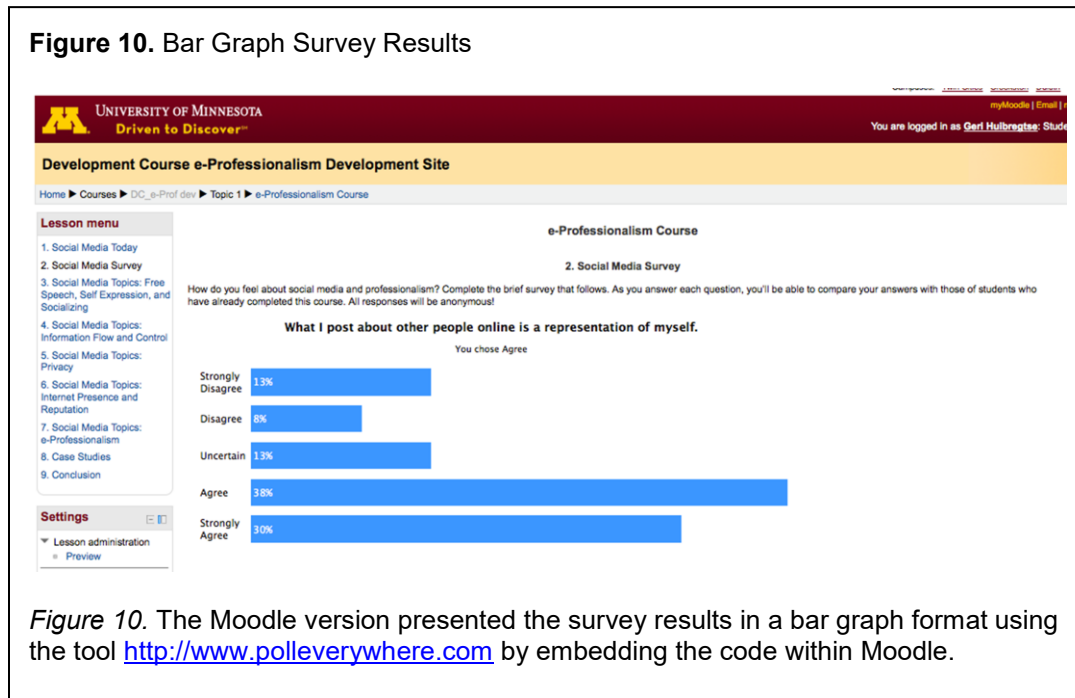
Credibility

During the focus group interviews, an unplanned question about credibility surfaced. Group B had a strong opinion about how aesthetics impact credibility. ―I'm just thinking of other resources that are out there that I've used, and I think, it's kind of kludgy, but it kind of works, but then there's some that are just—horrendous. And I totally question the materials that's in them." And the group came to agreement after another student shared that, ―…a lot of students from other schools have access to these sorts of things, so…I think you also need to think about how the University [of Minnesota] wants to present itself to the greater whole." This particular group of students was talking about how they share online resources (the good ones) with other schools around the country and some of the programs even participant in CourseShare, a program in which students from multiple institutions take courses together, and as a result many people will see and experience courses that should be well designed in order to present a positive picture about the University.

Aesthetics

Like Group A, this group of students really enjoyed the survey. They really liked how the data was presented in a bar graph format (Figure 10). Interestingly enough, this is exactly how the other group recommended that the data be presented.

Figure 10. Bar Graph Survey Results

Figure 10. The Moodle version presented the survey results in a bar graph format using the tool http://www.polleverywhere.com by embedding the code within Moodle.

Like Group A, Group B expressed that they placed a high value on aesthetics, but that e-learning doesn't need as much ―flash‖ or ―glamour‖ as commercial websites do. ―I think it's a fine line, that if it's too glamoured up, then you're thinking, God, this is what my money goes to?‖ In other words, some participants strongly expressed that if an e-learning object looks too ―slick,‖ or is full of stock images that don't appear to be entirely relevant, they will make a judgment about the learning object and wonder if too much money was spent to make it *look* good as opposed to money spent to *teach* them.

After the discussion about the low-aesthetic version concluded, the students were shown the highly aesthetic version, and their reaction was strongly positive. One student said, ―Yah, just this initial looking at this, it's a lot nicer, actually…There's not all that crap on the side.‖

What was interesting is that students said while the course banner (Figure 11) adds aesthetic value, they didn't feel that the other images or icons did. That said, they went into a lot of discussion about the navigation and how they could see all the parts of

Figure 11. e-Professionalism Course Banner

Figure 11. The course banner is visible at the top of every page of the highly aesthetic version of the e-Professionalism course.

the course they had taken represented in the navigation of the highly aesthetic version. One student said, ―I like how it's divided into, like, distinct sections, and that how each section, you have the sub-sections on the side, like it makes it a lot easier to see what you're looking at.‖ However, one student said ―it would take a bit of time to like, figure that out.‖ These students did compare the high- and low-aesthetic versions and noted that the case studies page in the highly aesthetic version provided the case along with the questions so that they could refer back to the case if needed (a frequent complaint regarding the low-aesthetic course's navigation). But, they still said they would like a Continue button added so they would know what to do next, which again points to the importance of providing multiple, even redundant, methods for navigation, especially visual cues such as navigation buttons.

This also brought up again the discussion of imagery. They said that imagery for imagery's sake is not useful, and if something is just text, provide a PDF instead of a screen full of text to read. However, when asked further about the PDF option, they said that it would depend upon how much you wanted them to learn, and that having some type of assignment or quiz attached to the content would provide the most motivation.

Interestingly, they said that if they were to have taken the highly aesthetic version, ―I would be very tempted to just kind of skim and then be done, like, 10 minutes earlier

than if I'd done it in Moodle," and ―Even though I hate how Moodle, like, confines you

to have to read and hit the continue button, at the bottom…it is so helpful…it forces me

to read it."

All in all, the researcher was surprised at the level of satisfaction that Group B

expressed with the low-aesthetic version. In fact, it was difficult to facilitate a productive

discussion with them until the researcher showed them the version of the course that they

had not seen, which spurred the discussion about navigation, aesthetics, and imagery.

With a comparison image in mind, they were able to postulate about the potential benefits

and detractors of each version.

Discussion

Based on the students' assessment scores and their focus group interview

feedback, it seems that the aesthetic considerations of the courses did not negatively

impact student learning. That said, many of the points that students raised could inform

guidelines for best practices to improve both versions of the course studied. The

aesthetics topic was difficult for students to articulate, which may be due to a lack of

vocabulary for talking about visual issues. They did, however, have a vocabulary for

discussing navigation, which is an essential element of the design of a course and which

can also influence its aesthetics, as well, but certainly is not the entire picture. This author

is left to wonder whether navigation, usability, and aesthetics can be extrapolated?

Coming from a graphic design background, it seems obvious that navigation and usability

are closely related in design theory and principles (such as placement, color, dominance,

balance, unity, etc.) and information design (hierarchy, chunking, etc.) that can't be

separated and certainly should not be ignored. As revealed in the literature review,

graphic designers might consider this the importance of *form follows function,* which means that aesthetic considerations support the function or utility, which, in the case of this study is *learning*. And the form would be described as the learning experience itself.

Further, it is important to think about aesthetic considerations as important throughout the instructional design process; not just at the beginning or at the end, but throughout the process, so that the designer is always thinking about the learner experience (both pedagogically and aesthetically). As Lavie and Tractinsky (2004) point out, we must ―strike a balance between usability and aesthetic considerations" (p. 276), which clearly surfaced in the focus groups for this study; students repeatedly emphasized the importance of usability and clear navigation, but also felt that ―flash" and ―glamour" may actually cause them to feel distrustful of the content, detracting from the learning experience.

The data also support what Parrish discussed in 2007 when he talked about ―viewing learning as experience" in order to consider the ―quality of that experience and not just its goals and mechanics" (p. 512). Instructional design is bigger than just aligning assessments and content with the learning outcomes, especially in the multimedia, e-learning environment. The Internet has created an entirely new learning space, without four walls and without a lecturer at the front of the room, and it will take some time to rethink the way the learner experience should be composed. The researcher believes, and the data supports, that it's very important to use aesthetics (including usability, imagery, design principles, etc.) as tools to create learning environments in which barriers to learning are removed. By that the researcher means that a well designed site or e-learning course should provide the learner with instruction about how to navigate the course;

provide visual cues that guide learners through the process (or guide them to explore by themselves); organize the content in a logical, well-organized fashion, with an ability to see the big picture or gestalt of the overall course and its contents. All of these elements combined help to create a learning environment in which cognitive load is reduced in order to free up the student mind to learning. A well-designed course is one in which the navigation and the mode of delivery are so intuitive as to become invisible, so that the learner is engrossed in what's most important; the learning.

One student summed it up exactly when he said, —…you totally need to be able to get there with ease…as soon as it gets frustrating, then you're more focused on your emotion of frustration than trying to learn something. It kind of shuts you down…for wanting to do that." The participant is describing how a lack of navigational ease creates barriers to learning. It's easy to see that this student's feelings are in alignment with Neilsen's 2010 findings about college students' preferences of —clean and simple sites," especially those that help them —quickly accomplish their goals" (Myth 2 section, para. 3). And finally, Clark and Lyon's 2004 book in which the main points discuss the fact that well-designed graphics positively impact learning and poorly-design graphics can detract from learning is also supported by the study data.

Interestingly, the low aesthetic participant group provided several recommendations for reorganizing content, while the high-aesthetic group did not. I have to wonder whether this was a result of the low-aesthetic group's lack of control or vision of the big picture due to taking the course inside the Moodle CMS, which included only a linear, one-way navigation route through the course. In other words, participants in Group B only were able to navigate one way, and because the groups disclosed that they

did not even use (or see) the left navigation, did not have a ―big picture" idea of what the course was about. They were just clicking through, screen-by-screen, completing one screen and moving onto the next. Because Group A was provided with a visual and navigational overview of the course (just by seeing the topics across the top of the screen and by seeing the sub-topics/pages once they clicked on each of the headings), they were able to understand the gestalt of the content better? Perhaps this topic should be explored.

Perhaps aesthetic considerations are not the true point of focus for improving online learning environments. Perhaps instead, instructional designers should be thinking more about the learning *environment* or the *experience* itself and how it encourages (or discourages) learning. In online environments, it is important to consider all that technology affords and constrains. It's certainly not a perfect mode of delivery, but well-designed instruction can be powerful when delivered in a multimedia format, as the students described in their excitement around the short introductory video in the e-Professionalism course.

Finally, the tone of the focus groups' interviews was different. Those in the low-aesthetic group seemed to take the course more seriously academically, while the other group (A) discussed skimming the course and one student said she took the quiz and passed without looking at the course; when asked if she even reviewed the course she quietly said ―yes." Some of the comments supported this hypothesis when students from Group B discussed how they would have skimmed the highly aesthetics version when they felt more forced to read through the Moodle version.

Summary

In summary, the focus group interview data support the current literature in that aesthetic considerations are powerful, but their direct influence on learning is very difficult to pin point. Visual cues are powerful, and college-age learners are concerned with clear and easy to navigate sites that are well organized so they can find what they're looking for. While the findings are not earth shattering, a list of best practices can be composed from the findings.

Chapter 5: Summary and Conclusions

This study took a qualitative approach to the question: do aesthetic considerations influence learning in an e-learning environment? Thirteen participants were randomly assigned to one of two groups; Group A was the highly aesthetic version of an online unit on e-Professionalism, and Group B was the Moodle version of the course. Final assessment scores and focus groups interviews were analyzed. This final chapter will summarize the study's findings by presenting a list of best practices to consider when designing e-learning in a higher education setting. Finally, the chapter (and paper) conclude with educational implications and suggestions for future research.

Best Practices for e-Learning in Higher Education

The results of the study have surfaced some themes that can inform a list of best practices for instructional designers who design online learning environments in higher education settings. Despite the small sample size, the qualitative data yielded solid guidelines for navigation and aesthetics in an e-learning environment. When designing online learning in a higher education setting:

1. **Provide learners with instruction about how to proceed through the designed experience/course.** On the first screen of a course, be sure that instruction pops

up or is communicated through some type of eye-catching visual, preferably graphical cue; text-based instructions are easily passed over or ignored.

2. **Provide students with the big picture/gestalt of the course.** This can be done visually with a well-designed navigation, introduction (described in best practice #1), or other visual element presented at the beginning of the course that provides a clear roadmap of the course or unit from start to finish.

3. **Conduct a usability test.** Before the course goes live, ask someone (preferably a student in the target population) to work through the course to be sure it provides intuitive navigation. It is difficult for a faculty member or instructional designer to think like a student.

4. **Consider representing data graphically.** For example, in showing comparisons between two groups, do so with a bar graph or other data visualization technique. Students found a graphical representation of data easier and faster to comprehend.

5. **Use visual cues (e.g., buttons) to direct and guide learners.** Students prefer to be guided (or at least provided very clear instruction) about how to proceed or navigate a learning experience. If an element of self-exploration is included for pedagogical reasons, ensure that self-exploration is clearly communicated as one of the intentions of the design.

6. **If the content is text-based, consider providing a PDF instead of or in addition to the on-screen text.** Students were clear that it is easier to read a PDF than to read a large volume of on-screen text.

7. **Provide engaging materials that utilize the multimedia abilities of an online environment.** Students repeatedly reported that they were ―engaged" with the

video component of the course, so much so that one of the groups even suggested that perhaps the entire course might be presented in a video-based format.

8. **Be aware that course organization and aesthetics may influence opinions about the credibility of courses.** Some students expressed that they would make negative judgments about courses that appeared to be poorly organized and unprofessional in appearance.

9. **Thoughtfully consider both LMS and free-standing HTML course formats when designing an e-learning course.** Students who retroactively viewed both course versions actually preferred some of the elements of Moodle that have been criticized as being confining and directive, as these elements helped them focus on the content of the unit.

Educational Implications

This study has important implications for the design of e-learning environments in that it reinforces the need for instructional designers to consider aesthetics and learner experience throughout the process of course design, as opposed to a consideration just at the beginning when a course look and feel is developed or just at the end prior to launch of the course. While it is possible to design a very basic-looking, easy-to-navigate course, it is the aesthetic considerations that provide the visual cues and the gestalt view of the course. Aesthetics is not just about what things look like, but rather part of a much larger conversation on usability: providing an enjoyable experience, free of stumbling and searching, which prevents any lack of understanding how to navigate or understand the environment. All in all, aesthetics support a better learning experience.

Recommendations for Future Research

One limitation of this study was that the online unit studied did not contain high-stakes content, as evidenced by the students who attempted the summative assessment without even reviewing the material first. Future research would benefit from examination of an e-learning environment where the stakes are high, and, presumably, learner motivation will also be high. It is this author's belief that, because students didn't feel that the content was essential to their professions, they didn't take it as seriously. So, the alignment of subject matter and participant profile is important, much as a course should be designed specifically for its intended audience.

Another area of exploration would be to conduct a series of short tests to examine retention with highly aesthetic and low-aesthetic versions, or a course that is a free-standing HTML component compared with something administered through the students' expected learning management system. In this way, it might be easier to get commitment from students to contribute to the research if the study is not part of a course in their curriculum.

Finally, the author would have liked to learn more about the participants' previous online learning experiences. This information could have provided even more rich data if the students were to be reaching and accessing their previous knowledge and connecting it with their current thoughts and experiences in the e-Professionalism course.

Conclusion

This study sought to explore the influence of aesthetic considerations upon learning in an e-learning environment. The findings, while inconclusive for a notable gain in summative assessment scores between the high- and low-aesthetic study groups, did provide insight into practical guidelines that faculty and course designers can employ

when designing e-learning environments. Given the advent of touch screens, smart phones, tablets, and smaller screen real estate on which learning can take place, designers are provided with numerous opportunities for exploration of the topic of aesthetics. As technological affordances expand and devices become more ubiquitous, the ID field will necessarily become even more focused upon the user and their experience.

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