Analog vs. Digital Instruction and Learning: Teaching Within First and Second Life Environments

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Pre- and postsurveys were administered and analyzed regarding student knowledge of course content and attitudes concerned with the instruction for two groups of students for the same class—one taught completely in a traditional, face-to-face classroom setting and the other taught completely online with Blackboard and Second Life software products. Both groups were taught by the same instructor. Results indicate that online students learned just as much and enjoyed the teaching experience just as well as their traditional counterparts.

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''I really liked doing Second Life. That was a lot of
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*Student in a **Second Life***
visual communications class

With online, web-based instruction a popular alternative to classroom teaching, several studies have been conducted to show if there are significant differences between face-to-face and online classes. As student ask for more flexible educational experiences (being able to take classes on a computer from home or work) and as are administrators concerned about space restrictions with crowded on-campus auditoria, instructors and researchers have been asked to investigate whether teaching an online class is a benefit or a hindrance to the educational experience for students.

This study adds to this growing body of research by comparing the learning experience of students in traditional visual communication courses to those taking the same course via online instruction. The course selected for this study provided

a unique opportunity to explore the value of online teaching methods, not only because of it's curricular focus on visual communication, but also because the online version incorporated the use of both Blackboard, a commonly used online instruction software and Second Life, a popular virtual world website platform.

Literature Review

Perhaps predictably, results from experiments and surveys exploring the effectiveness of online instruction have been mixed. Some studies report that web-assisted instruction is favored more than traditional classroom instruction. Maki, Maki, Patterson, and Whittaker (2000) found that students in an online version of an "Introduction to Psychology" class had higher comprehension scores than those in the same face-to-face lecture sections. Students who used asynchronous web-based teaching tools (such as discussion boards) produced higher-quality final reports than those in face-to-face groups according to Benbunan-Fich and Hiltz (1999). Twigg (2003) reported students in sociology, chemistry, and introductory biology courses had higher grades on class and national exams if instructors employed online teaching tools than if they only used traditional teaching methods. Winsler and Manfra (2002) showed that students who used the web-based tools offered by WebCT frequently performed at a higher rate than those who used the tools sporadically. In a 3-year quasi-experimental study of computer science students Connolly, MacArthur, Stansfield, and McLellan (2005) found that "the online students consistently performed better than the face-to-face students."

However, other studies showed that traditional classroom methods are superior to online techniques. Wang and Newlin (2000) and Waschull (2001) reported that final exam grades were higher for students who went to face-to-face lectures than for students who were in online classes only. In a study that compared traditional and online class instruction for a geography class, Rodrigue (2002) reported that the online students scored less than their lecture/lab cohorts.

Finally, a third group of studies found that there were no significant differences between the two teaching techniques. In a political science course, web and traditional lectures did not make a difference in grades (Botsch and Botsch, 2001). Business students who favored web instruction did better online while those who had a positive attitude about traditional teaching performed better in that environment as reported by Sankaran, Sankaran, and Bui (2000). Hensley (2005) reported that an online version of a course "had almost identical pass and drop rates as that of a face-to-face course." In a study conducted by Shelley, Swartz, and Cole (2006) business law students in online and traditional classroom settings reported "no significant differences between the two formats with regard to student satisfaction and student learning."

Benoit, Benoit, Milyo, and Hansen (2006) published a three-year experiment sponsored by the Andrew Mellon Foundation that investigated "the differences between traditional and web-assisted instruction" through a longitudinal study of an introduction to speech communication course taught at the University of Missouri.

During each semester from Fall 2000 to Winter 2003, eight sections were delivered via online using the WebCT program, ''an integrated set of course management tools written in HTML and Java'' and eight sections used the traditional lecture format with the instructor meeting with students face-to-face. Although both groups used the same ''textbook, syllabus, midterm exam, and final exam,'' individual instructors varied for the 100-plus classes. The researchers found no differences in learning between the two groups when the students' grades for individual speech assignments, ratings of those speeches by invited ''experts,'' and end-of-the-semester overall grades were compared. However, students in traditional classroom environments were slightly more satisfied with their course than their web counterparts. Furthermore, teacher evaluations were slightly higher in lecture than in web-assisted courses. The authors concluded, ''both modes of instruction were equally effective but students had a slight preference for traditional instruction.''

With such mixed results from studies concerned with online teaching versus traditional face-to-face learning environments, perhaps concentrating on equivalency as it relates to student perception is the wrong focus. This paper attempts to show that if a broader determination of measuring analog versus digital teaching techniques is employed, instructors can improve their teaching in either world.

Online Teaching Tools

WebCT and Blackboard. For the reported studies above, the predominant online software program used was WebCT. Developed by Murray W. Goldberg, a computer science faculty member for the University of British Columbia in 1995, WebCT at one point served about 3 million online students in 30 countries. In 2006 its online course rival Blackboard acquired WebCT and phased out the name (''WebCT,'' 2008). Consequently, most universities around the world switched to the Blackboard program for the delivery of online classes. In 2004 Blackboard, Inc. became a publicly traded company on the NASDAQ exchange. Today the Washington, D.C.-based educational delivery business is used in more than 2,200 educational institutions in more than 60 countries (''Blackboard Inc.,'' 2008). Blackboard is similar to WebCT with asynchronous features that include grade checking, discussion board assignments, course material links, paper depository, classroom discussion recordings, and examinations as well as the synchronous feature known as the ''virtual classroom.''

The virtual classroom in Blackboard, in which students meet online at a specific day and time for class discussions is an important and vital instructional tool because without it a class is not much more than a textbook. In the online classroom, slides with words and pictures, websites, and video clips can be shown to students as the text-based discussion continues (See Figure 1).

After the initial shock from students who realize that as a participant in an online class they will never meet face-to-face, the text-based format in Blackboard is easily incorporated as a teaching tool because most students are familiar with chat room technology offered by American Online and other companies. As students are
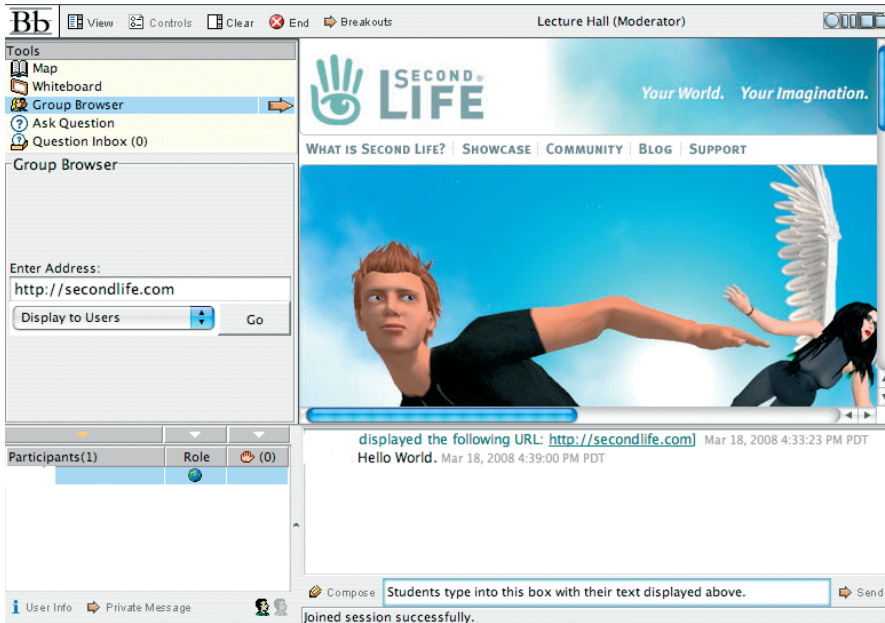
Figure 1 As viewed through the Firefox web browser, the virtual classroom in Blackboard can present websites, in this example the Second Life site, in the upper window and text-based discussions in the lower window.

usually at home using their personal computers, class discussions are often more insightful and penetrating as students feel comfortable, can think before they type, and overcome any shyness they may experience when attempting to participate in a face-to-face classroom setting.

Second Life. Another "class" of online instruction in which the visual display is as important as the communicative features are those that employ online "virtual worlds" as venues for teaching. One of the most recent and popular software programs for this purpose is Second Life (SL), an avatar-based virtual social community of residents who can walk, fly, drive a vehicle, and teleport to rural and urban simulated environments to engage in all kinds of activities. With credit card information, residents can accessorize their avatars with hair, skin, and clothing. With a premiere account (SL is otherwise free to join), residents can buy land and build stores and homes and sell their creations to other users of the program. Roughly inspired by Neal Stephenson's 1992 science fiction classic S*now Crash* about a user-dominated virtual reality, Second Life was launched in 2003 and currently has more than 13 million registered accounts.

Although essentially an elaborate chatroom, SL combines the visual cues found in the real, analog world (color, form, depth, and movement) with an interactive communicative experience. In that sense it is possible to make the learning and teaching experience more real for online students than with the virtual classroom

provided by Blackboard. Presently there are over 100 educational institutions, from Aachen, RWTH University, Germany to the University of Warwick in Coventry, England throughout the world that have a presence with many offering live, synchronous classroom instruction ("Institutions," 2008).

During the spring semester of 2007, one of the authors learned that the Faculty Development Center on campus requested instructors to attend an orientation lecture concerned with Second Life. It was hoped that courses might be delivered using the software program. This author had been teaching online mass communications classes using Blackboard since the summer of 2000, the opportunity to experiment with Second Life as an educational tool was appealing. After an initial orientation, the author was given access to memory space in the form of an "island" and with the various tools available through the Second Life program constructed a class site during the summer of 2007. After some initial testing and feedback from fellow faculty members and users of Second Life, it was determined that for the fall 2007 semester, a mass communications class with an upper limit of 220 would be taught using Blackboard and Second Life. The two educational software packages must both be employed because SL is not set up as a teaching program. For example students cannot participate in discussion board assignments, turn in papers, and most importantly, check their grades in a secure format in Second Life.

As opposed to previous studies that compared traditional and online teaching environments, for this study the same instructor would teach the same course in a face-to-face lecture hall and with the online software products during the same semester. The course for this study is called "visual communications," a survey class for undergraduates that details visual literacy and analysis in all manner of media. It is a popular core elective offering within a large Department of Communication program. Each semester two sections of the class are taught with approximately 700 students during a school year.

The use of a visual communications course for this study provided a unique opportunity for studying online instruction because a key purpose of the course is to educate students on how to become come more engaged and critical consumers of visual media. The course includes units that specifically focus on various forms of media, including online communication. Thus, it was thought that students in this course would be uniquely positioned to evaluate their experience.

As noted previously, results in existing research on online instruction have been mixed. An effort was made to identify factors that might account for these differences. A primary consideration is the influence that sample selection may have on study results. In studies such as the present investigation, the concern is that self selection might differently influence the performance and perceptions of students who choose each course format. For example, students who possess greater confidence and competency regarding course material might be willing to take online courses, and it might be those advantages rather than the online instruction itself that is responsible for their success. Conversely, students selecting online courses might be less motivated students who hope that online instruction is a more convenient, easier alternative

to traditional courses. In this case, performance in online classes might be lower. As a result of this concern, the first focus of this study is to determine if students who choose to take visual communication online initially possess different attitudes and competencies than those who opt for traditional instruction. With that baseline established, the second focus is to determine if students differ in their perceptions upon completion of the course. From these considerations, two research questions emerge:

RQ1: Is there a significant difference in the initial attitudes and perceived competencies of students who take visual communication online compared to students who choose traditional face-to-face instruction?

RQ2: Is there a significant difference in the postcourse attitudes and perceived competencies of students who take visual communication online compared to students who receive traditional face-to-face instruction?

Methodology

Overview
Based on the Benoit et al. (2006) study, pre-/posttest survey design was used to compare attitudes toward learning experiences in traditional face-to-face and online visual communications courses. Results were analyzed in a 2×2 MANOVA design with completing the course (pre, post) and course format (traditional, online) as independent measure factors.

Respondents
Respondents included 334 undergraduates, 161 in a traditional face-to-face visual communications lecture course and 173 taking the same course via online instruction. The same instructor taught both courses during the period from August until December 2007. Each class met once a week for 2 hours and 45 minutes.

Procedure
The pretest was administered during the first week of classes. Students in the face-to-face course completed hard copies of the survey during class time. Students in the online course completed the same survey online via Survey Monkey. Participation was voluntary. Students were told that they were participating in an anonymous survey to assess their attitudes about the course, and they were informed of their rights as human subjects. The university's internal review board for human subjects research approved this protocol.

Students in the lecture and online sections were given the same assignments and grade distributions:

Attendance	5 Percent
Discussion Board Responses	12 Percent
Chapter Paper	18 Percent
Term Paper	20 percent

Test One   10 Percent
Test Two   15 Percent
Final Exam   20 Percent

For the traditional face-to-face class, students heard lectures given by the instructor before a presentation screen with projected PowerPoint slides that included text, still images, and video clips. Papers were printed by each student and turned in during class. Each week students had to answer an asynchronous discussion board question presented on the Blackboard course program pertaining to the reading and lecture for that week (Appendix A).

For the online, web-based class, the first 4 weeks was conducted using the "Virtual Classroom" on Blackboard. Since the Second Life program had to be downloaded by each student, the month-long period allowed enough time for the downloads (computers in the Department's open lab had Second Life loaded on them as well as two computers in the instructor's office if students were unable to access the program). The 4-week period also gave students experience in the etiquette of chatting online. Once in Second Life, students were requested to find a seat on simulated rugs on the ground, sofas, or "air chairs." Students were requested not to fly or change their appearance during class (See Figure 2).

Although it is possible on Second Life to simply speak as with a face-to-face class into a computer-connected microphone that can be heard by students through the sound system provided by their computers, the instructor typed out lectures that

Figure 2 The instructor's avatar stands ready in the foreground as students await the class to begin while sitting on rugs, couches and yellow air chairs. All Second Life users can modify the basic avatar supplied at the time of registration. Men and women avatars are common, but if you look closely, an animal avatar or "furry" sits on the couch in the middle.
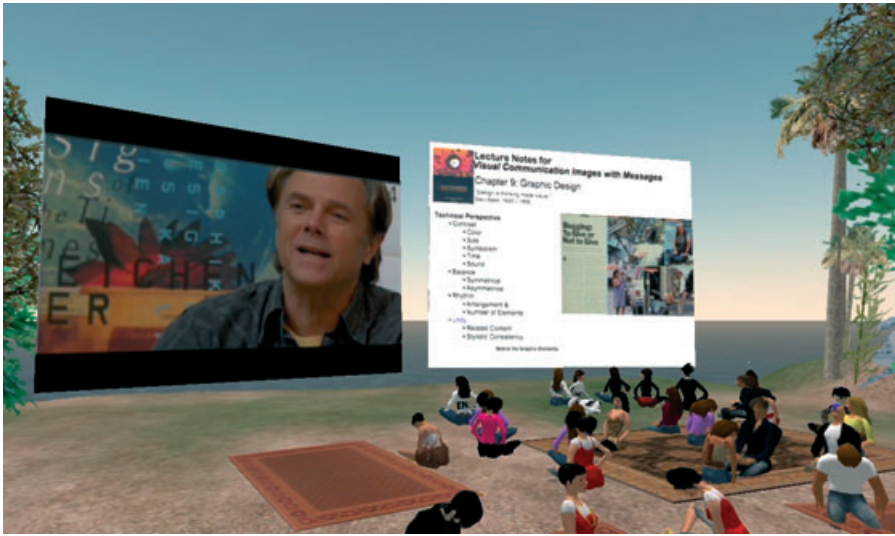
Figure 3 A video clip of designer David Carson from the documentary Helvetica plays on the left screen while a PowerPoint slide displays on the right screen.

students could read. This strategy was employed because an archive could be saved for later review or if a student missed the class for any reason (see Appendix B). As with the face-to-face class, PowerPoint slides and video clips were shown during class (Figure 3).

Students also had the option of reviewing the slides and video clips on Blackboard if their computer connection was slow or to review for an exam. Papers were submitted electronically via Blackboard's "Digital Dropbox." In addition, students could check their grades anytime during the semester via Blackboard.

At the end of the semester, the same survey was administered as a post-test during the last week of the course.

Measures
Using the Benoit et al. (2006) survey as a guide, students were asked their responses within four sections:

Demographics. Questions querying student gender, age, and major were included to gain insight into the demographic make-up of the study sample and for possible use in a follow-up analysis.

Student Output. Face-to-face and online students produced extra credit papers, hundreds of Discussion Board responses, an assigned chapter paper, a final term paper, and took the same three exams.

Computer Literacy. To assess perceived competence with computer and online technology, students were asked to rate their confidence level on six items: creating a word processed document on a computer, sending and receiving e-mail, searching for information on the Internet/Web, using Blackboard, using Second Life, and

overall computer knowledge on 5-point scales ranging from 1 "No Knowledge" to 5 "Expert level."

Attitudes. Students were asked to rate their feelings about the course with 14 items: motivated, interested, involved, stimulated, want to study, inspired, challenged, invigorated, enthused, excited, fascinated, looking forward to it, important and useful on seven point scales ranging from 1 "Not at All" to 7 "Extremely."

Perceived Knowledge. Students were asked to rate their knowledge of course content on 17 items including: visual communication; light; eye, retina and the brain; color, form, depth and movement; visual theories; visual persuasion; pictorial stereotyping; six perspectives for image analysis; typography; graphic design; informational graphics; cartoons; photography; motion pictures; television and video; computers; and the World Wide Web on 7-point scales ranging from 1 "No Knowledge" to 7 "Expert Level." Each of these items corresponded to a unit in the course.

Results

Demographics

Overall, 194 surveys were collected including 97 pretests and 64 posttests in the traditional course and 86 pretest and 87 posttests in the online course. On the pretest, 59% (107) of the students were communications majors, however, since the course meets university general education requirements, 41% (76) of the students came from other departments and colleges. The posttest included 57% (86) communication majors and 43% (65) students from other departments. The pretest included 35% (63) males and 65% (118) females and the posttest included 31% (46) males and 69% (103) females. For both the pre- and posttest the average age was 23.

Student Output

Grades. Students in both the face-to-face and the online classes were given an attendance mandate as well as the same assignments.

Each Average is from a Grade out of 100 Points and Weighted

	Classes	
Class Requirements	*Face-to-Face*	*Online*
Attendance	95	85
Discussion Board Responses	90	83
Chapter Paper	84	78
Term Paper	88	82
Test One	79	78
Test Two	78	77
Final Exam	80	78
Overall Average	**84**	**80**
	$n = 108$	$n = 130$

Overall, the average grades for the face-to-face students were slightly higher than for the online students.

Attendance. Each week attendance was taken. For the face-to-face class, a sign-in sheet was passed around the class. For the online students on Second Life, they were asked to type their actual names during the discussion so that attendance could be checked after reviewing the recorded archive of the class. If a student missed a class for any reason, a student from either class could write a two-page paper related to the topic of the missed class to make up the attendance grade for that week (Appendix C).

Discussion Board Responses. For each of the 12 Discussion Board questions, students answered the instructor's question, responded to at least one other student's answer, and posted their responses by the deadline. Appendix D presents the first 10 responses from face-to-face and online students to a Discussion Board question on photography.

Chapter Papers. Students for both classes were randomly assigned a chapter and wrote a three-page paper elaborating with outside sources any topic they wished (Appendix E).

Term Papers. Using a six-point analytical method that features personal, historical, technical, ethical, cultural, and critical perspectives, students wrote up to 10 pages detailing their analysis of a photograph. Appendix F details the technical analysis section of the paper for a face-to-face student who wrote about a picture of Commerce Secretary Herbert Hoover visiting children at a relief camp after the 1927 Mississippi River flood and an online student who wrote about Robert Capa's ''Moment of Death'' photograph taken during the Spanish Civil War.

Exams. It is beyond the scope of this article to include a comparison of the answers to the three examinations for both sets of students. The exams were the same for each class and were composed of 25 multiple-choice questions that assessed the students' comprehension of the material within three time periods: From the beginning of the class until the chapter on pictorial stereotypes, from the chapter on typography until the chapter on cartoons, and from the chapter on photography until the end of the class. In addition to the multiple-choice questions, the final exam also included short answer questions related to the information from the entire semester. Below are the standard deviations for the scores for each exam by class:

	Test One	*Test Two*	*Final Exam*
Face-to-Face	15.56	16.56	13.81
Online	15.67	18.06	13.17

Data Reduction

Principle component analysis (PCA) with Kaiser Varimax rotation was conducted to reduce and analyze the reported data on computer literacy, attitudes and perceived knowledge. Only scales that loaded .5 or greater on a given factor and less than .5 on all other factors were retained. The Eigenvalue accepted criteria level was 1.0.

Computer literacy. Two factors were retained for computer literacy. The first factor labeled *computer literacy* had an eigen value of 2.77 and accounted for 46.15 of the variance. It was characterized by high loadings of five of the six items including: creating a word processed document on the computer (.73), sending and receiving e-mail (.83), searching for information on the Internet/Web (.81), using Blackboard (.52), and overall computer knowledge (.52). Cronbach's alpha was .76. The single item, using Second Life (.91) loaded separately on a separate factor labeled *Second Life literacy*. It had an eigen value of 1.08 and accounted for 17.96 of the variance.

Attitudes. All 14 attitude items loaded together on a single factor, labeled *attitudes*, including motivated (.81), interested (.83), involved (.81), stimulated (.90), want to study (.74), inspired (.85), challenged (.64), invigorated (.86), enthused (.90), excited (.86), fascinated (.84), looking forward to it (90), important (.71), and useful (.76). This factor had an eigen value of 9.33 and accounted for 66.66 of the variance. Cronbach's alpha was .96.

Perceived Knowledge. Two factors emerged for perceived knowledge. The first factor, labeled *general knowledge* of visual communication had an eigen value of 10.53 and accounted for 61.96 percent of the variance. It was characterized by high loadings on visual communication (.78); light (.80); eye, retina, and the brain (.77); color, form, depth and movement (.79); visual theories (.84); visual persuasion (.82); pictorial stereotyping (.78); six perspectives for image analysis (.86); typography (.84); graphic design (.74); informational graphics (.75); with a Cronbach's alpha of .96. The second factor, labeled *field knowledge* had an eigen value of 1.92 and accounted for 11.30 percent of the variance. It was characterized by high loadings on cartoons (.65); photography (.72); motion picture (.84); television and video (87); computers (.78); and the World Wide Web (.82); with Cronbach's alpha at .92.

Analysis of Variance. The reduced factors were analyzed in a 2 × 2 MANOVA design with completing the course (pre, post) and course format (traditional, online) as independent measures. Observed power for main effects as calculated by SPSS ran no lower than .84 and observed power for interaction effects ranged no lower than .66. Simple effects for interactions were calculated via t-tests. Mean comparisons for these tests are reported in Table 1.

Computer Literacy. Analysis of the *computer literacy* factor revealed a main effect of completing the course, $F(1, 263) = 8.88$, $p < .003$, Partial Eta Sq. $= .08$, such that, on average, students felt significantly more computer literate at the end of the visual communication course ($M = 4.40$) than they did at the beginning ($M = 4.20$) regardless of the course format. An analysis of perceptions of *Second Life literacy* revealed an interaction between completing the visual communication course and the course format, $F(1, 263) = 26.28$, $p < .01$, Partial Eta Sq. $= .09$. Not surprisingly, those who took the course online rated themselves as significantly more competent in Second Life ($M = 2.91$) at the end of the course than did those who took the course face-to-face and did not use the Second Life program ($M = 1.52$). Those who took the course online also rated themselves as slightly more competent in Second

Table 1 Mean comparisons of attitudes and perceived competencies pretest and posttest by course format

	Course Format	Computer Literacy	Second Life Literacy	Attitudes Attitudes	General Knowledge	Field Knowledge
Pretest	Face-to-Face	4.2280	1.38	5.2218	2.9186	4.2378
	Online	4.1714	1.53	4.9910	2.8492	4.2490
	Pretest Total	4.2011	1.45	5.1179	2.8866	4.2430
Posttest	Face-to-face	4.4000	1.52	4.5987	4.6487	5.2323
	Online	4.3837	2.91	5.0370	4.7908	5.2980
	Posttest Total	4.3907	2.31	4.8478	4.7318	5.2797
Total	Face-to-face	4.2981	1.44	4.9790	3.5771	4.4922
	Online	4.2788	2.22	5.0143	3.8259	4.7798
	Total	4.2881	1.84	4.9968	3.7054	4.6549

Life prior to the start of the course (M = 1.53) compared to traditional students (M = 1.38) although this difference was not significant.

Attitudes. Analysis of the *attitudes* factor also revealed a significant interaction between completing the course and course format, $F(1, 263) = 5.70$, $p < .02$, Partial Eta Sq. = .03. Students who took the course face-to-face indicated more favorable attitudes at the start of the course (M = 5.22) than students taking the course online (M = 4.99). At the end of the course, however, this trend was reversed. While online student attitudes toward the course remained about the same (M = 5.03), the favorable attitudes of face-to-face students had actually dropped (M = 4.59).

Perceived Knowledge. Main effects for completing the course were found for both the *general knowledge*, $F(1, 263) = 205.43$, $p < .01$, Partial Eta Sq. = .15 and *field knowledge*, $F(1, 263) = 46.84$, $p < .01$, Partial Eta Sq. = .44, factors. After completing the course, students felt that they had more general knowledge (M = 2.89 pre, M = 4.73, post) and field knowledge (M = 4.24 pre, M = 5.28, post) of visual communications.

Student Written Comments. As with most universities, instructors are required to conduct end-of-the-semester, student-generated course evaluations without the teacher present. As a part of the evaluation process is the opportunity for students to write written comments. For the traditional class setting, students wrote their comments on printed sheets that were taken up by a proxy. For the online class, students were directed to a web link where they could fill out the evaluation online. These comments were qualitatively reviewed and excerpted anecdotally to provide additional insights into student perceptions of the course formats.

For the face-to-face class comments related to the technology used in the class included, "Made semiboring course content interesting with examples (videos, cartoons, etc)," "too many examples for some points. We would spend 30 minutes or more on some points/topics and my interest would be lost. (Computer animation is one example)," and "Well presented and engaging for students. Active examples that clearly demonstrate course material."

For the online class, comments related to Second Life included "Did not enjoy the class through Second Life, not a good way to lecture," "The semester got off to a rocky start. But once everything was figured out and organized it all seemed to work out and I had a lot of fun in Second Life. Very interesting idea," "I did have a little difficulty with the Second Life avatar based classroom," "I enjoyed the online course, though I might have to upgrade my computer to make things work smoothly in Second Life," "I have never had a more easy yet challenging experience with an Internet course. Working with Second Life is amazing and a great feature for students who work 40+ hours a week and can make it online to every class," "Frankly, this class was a headache and I think it is a terrible idea to use Second Life to teach a class," and "I really liked doing Second Life. That was a lot of fun, and it was just something cool and new."

DISCUSSION

The survey results suggest that students' experience in a visual communications online course compared favorably with traditional face-to-face instruction. First, we were interested in determining if students who chose to take the course online might initially differ from students who took the traditional course. It was speculated that students who considered themselves more computer literate or more knowledgeable about the course content might be more willing to take the course online, while those who were less confident in their knowledge and skills might be more inclined to stick to traditional instruction. Results, however, did not uncover any notable initial differences in perceived competencies between online and traditional students. Students in the online course did report a slightly higher initial competency with Second Life, but this difference was not statistically significant.

Traditional students did report more favorable attitudes toward the course initially than did the online students. Not surprisingly, students in the online course may have been more cautious in their attitudes toward the course initially because of its unusual format. Interestingly, however, the attitudes of the online students remained fairly constant from the beginning of the course to the end, while the attitudes of the face-to-face students actually dipped slightly. The fact that attitudes toward the online course remained constant is an encouraging sign that student expectations can be met by courses delivered in an online format.

As we would hope, both face-to-face and online students reported significantly more knowledge of visual communications at the end of the course than they did at the beginning. Course format appeared to have no impact on perceived knowledge gained. The averages were virtually identical for both online and face-to-face students. Once again, these results are encouraging for online instruction, suggesting that online students at least feel that they are learning as much as students in traditional classes.

As with any learning and teaching experience, students will have differences of opinion. An anecdotal review of student evaluations taken at the end of the course suggested some polarization of opinion in both class formats regarding the way the

material was presented. In the traditional course, the abundant use of examples, video clips, etc. was mentioned, while in the online course, the comments predominantly focused on the Second Life format. In both courses, some students strongly objected to the format that was used while others praised it. There did appear to be somewhat more students who were critical of the format in the online course; however, many of the criticisms seemed focused on technical glitches that may be overcome as the online tools improve and students become more comfortable using them.

Conclusions

This study shows that for two nearly identical sections taught by the same instructor within a large auditorium and on a virtual island in Second Life, students overall reported that they enjoyed the experience, and they appeared to learn the information on a comparable basis. With students requesting more flexible teaching schedules and more creative learning environments and administrators concerned about the shortage of halls for large lectures, experiments in teaching with such software products as Blackboard and Second Life are necessary in the development of the teaching profession. This study joins a compelling body of research suggesting that online instruction can compare favorably to traditional instruction. However, studies also show that the success of these strategies is not guaranteed. Perhaps the teaching tips offered in Appendix G will be helpful to those considering using Second Life as an additional teaching tool. Whether an instructor's digital avatar is a man, woman, or furry, knowledge can be communicated about a course's topic in a comparable way as in an analog auditorium for motivated students who choose to click their way through higher education.

Appendix A

Discussion Board (DB) questions students must answer each week. To get full credit a student must answer the question, respond to at least one other student's comments, and get both DBs in on time:

Visual Cues
Which is your personal favorite visual cue: color, form, depth, or movement? After reading this chapter, pick an example from the textbook and tell us why you like that visual cue over the others.

Visual Persuasion
Come up with three reasons why "shock advertising" using graphic visual messages can be justified as a legitimate advertising tool.

Stereotypes
"There is always a little truth in a media stereotype," is a common defense. Regardless, tell how the Jerry Lewis Telethon might be different if those on the show who use wheelchairs were treated like everyone else who had able-bodied legs.

Typography
Why do you think in surveys most admit they know the least about typography? What do you think is the importance of typography?

Graphic Design
Name a movie you have recently seen and describe the opening title credits. What did you like and/or dislike about the sequence?

Informational Graphics
Television weather segments are sometimes criticized for their lighthearted, perhaps unprofessional comments and displays. What is the funniest or oddest moment you have seen a weather person do? If you don't watch TV, can you tell us about an example of "chart junk" you have seen in a printed medium.

Cartoons
Tell us your favorite cartoon (and I would prefer if it is a printed, rather than an animation example). When did you first see it and why do you like it so much?

Photography
If there were a fire where you live and no one was hurt but you lost all of your photographs, how would you feel? What are you doing to make sure that doesn't happen to you?

Motion Pictures
Do you think characters engaged in smoking in motion pictures should be banned from G- and PG-rated movies or should any movie with actors smoking be given an R rating? Why?

Television and Video
Television is often criticized for its many low quality programs that seem to respond to the base instincts of many individuals. Can you name one or two TV shows that you think are of the highest quality and that we should know about and watch?

Computers
When was the first time you used a computer and how has your use changed over the years?

Web
It's the year 2058. Please describe for us what using the World Wide Web is like for the rest of us still stuck in 2007.

Appendix B

In order to reduce the number of students online, only those who were assigned to write chapter papers for the week are required to attend the class.
With 17 students in attendance, the discussion concentrated on photography:
You: OKAY. . .

> *["You" is how the instructor is identified in Second Life]*
> *[The convention ". . ." is used to tell the rest of the class not to interrupt—more text is on the way]*

You: Before I start the lecture. . .
You: I want to talk a little about the DB. . .

> *[DB is the Discussion Board in Blackboard. Students were asked: "If there were a fire where you live and no one was hurt but you lost all of your photographs, how would you feel? What are you doing to make sure that doesn't happen to you?"]*

You: What did you come up with when thinking about losing all of your photographs?
You: Anyone?
Sabina Jetcity: that i never want that to happen to me. . . . . .

> *[Students must use their avatar names. When taking attendance, students are asked to state their actual name]*

thepaultheory Enoch: I would be devistated

> *[Spelling and grammar has not been changed]*

Sabina Jetcity: that now a days we are lucky with the technology we have
ktann Doobie: how to avoid it
Christopher216 Burger: It would really hurt that fact that I lost all my photos
STEFNY Nightfire: TRAGIC! and i really feel for those going through it as we speak. . .
You: All those memories!
Jager Burger: computers are amazing
You: Yes.
Sabina Jetcity: exactly!
Kristen Gibbs: that it's a good idea to have them stored many pllaces
thepaultheory Enoch: yes! alot of memories
You: A reminder to back up your computers!
Hopey Back: I figured out that I wouldn't be able to recover those wonderful memories and I better get a fire proof safe
ambie Heartsdale: have photos put in a photo album. . . .not all scattered around the house

urquizu Aeon: We have copies in several different places.
Jager Burger: put them in a album dont just throw them around
Sabina Jetcity: especially what our state is going through now. . . .
Jessie Lutrova: I'm happy I have most of my recent photos online
Hopey Back: that's a very good idea
STEFNY Nightfire: save pictures to disks easier to store
Sabina Jetcity: its sad we lost that castle with all tht memorabilia
You: Right. Having a virtual space somewhere not on your computer is a good idea, ala myspace or flikr?
urquizu Aeon: We have an external hard drive.
Hopey Back: yeah, I think most people have pictures saved on photbucket
Basic Chair: Right click me and choose 'Sit Here' to sit down

[A student's avatar is sitting on an object in the classroom]

Jager Burger: facebook it
You: Just a reminder how precious these images are, yes?
Kristen Gibbs: it's a good way to share photos too
You: Good.
Jessie Lutrova: Yeah, external drives and online sites. . .but it sucks for all the older photos that were before the digital age
thepaultheory Enoch: i'll stick to cds and external drives
You: Scanners are fairly cheap!
Hopey Back: very good reminder, I never thought about just how priceless those memories are
urquizu Aeon: I took all of our older photos and scanned them.
You: Great idea!
Ajay Proto: i just scanned some pictures of my great great great grandparents
You: Wow.
Jessie Lutrova: yes. . .but imagine all the time spent..its worth it but thats a lot of work
urquizu Aeon: It is important to keep those.
You: I wish I could find a picture of my great grandmother.
You: She lives in my mind!
thepaultheory Enoch: Having a scanned picture saved my mom from a heart ache because she ruined the original
Ajay Proto: yeah and it was a amzing how well they came out when a printed them
urquizu Aeon: My mind too with mine.
You: OKAY. Should I get started?
urquizu Aeon: That is neat when all you have is photographs
ambie Heartsdale: yes
Sabina Jetcity: sure !!
thepaultheory Enoch: Yes please
Hopey Back: ready

urquizu Aeon: yup
You: Okay. . .
You: This chapter starts off. . .

[With the discussion about the Discussion Board question concluded, the lecture on photography begins]

STEFNY Nightfire: i cant see the powerpoint its to small how do i zoom in?
You: with one of the most famous images ever taken. . .
You: Think of all the images taken since. . .
Ajay Proto: right click, edit, zoom

[Students often help each other]

You: photography was first invented. . .
You: to say that ONE is one of the best is an amazing thing to say. . .
You: but as with all great works of art. . .
You: there are always three aspects. . .
You: the back story. . .
You: how the image was made and by whom. . .
You: the image itself. . .
You: and what happened to the picture after it was made. . .
You: With this one. . .
You: all three stories are interesting. . .
You: But the main thing I want you to remember. . .
urquizu Aeon: She got nothing for it.
You: is that the image you see on the screen. . .
You: ''the Migrant Mother''. . .
urquizu Aeon: No
You: an icon of America's Great Depression. . .
urquizu Aeon: I see a worried mother
Ajay Proto: i think so
You: was a product of something that would be unethical today. . .
You: and would probably get the photographer fired!
You: Dorothea Lange, the photographer. . .
Sabina Jetcity: why ?
urquizu Aeon: Yes, because she did it without permission
You: ''stage managed'' the people in the picture. . .
You: In other words. . .
You: she told them where to be and how to act. . .
You: for news images. . .
You: that's considered unethical today. . .
You: but back then. . .
Christopher216 Burger: True

You: it was acceptable. . .
urquizu Aeon: That takes away the authentic art about it
You: that's why ethics is interesting to study. . .
ktann Doobie: but doesnt that still happen?
You: it changes over time. . .
Hopey Back: ethics evolves as society evolves

[The lecture and class discussion continues for 32 single-spaced pages.]

Appendix C

A Typical Extra Credit Paper

The ancient Greek philosopher, Aristotle, is still mentioned in everything from textbooks to myspace pages even though he lived in the third century BC. Perhaps the reason he is still mentioned is because his quotations on life are still relevant today. Indeed, they are.

The beginning of Chapter 5 in our textbook opens with one of Aristotle's famous quotations: ''There can be no words without images.'' To fully understand this intense quotation, one must stop and think deeply about its meaning. After doing so, it is easy to conclude that this is true—a word comes about when it has a specific image intrinsically connected to it. This quotation reminds us how vital images are in our world. Our language is the result of images. Feelings are the result of certain images. Images shape the way we perceive things and make judgments about concepts. It is the reason why films and photography can have such an impact on a human being. They elicit emotions in us. . . I even cried when I recently watched the animated film ''Meet the Robinsons''! However embarrassing it is to admit, it just conveys how strongly an image can impact us.

Though it might seem simple enough, Aristotle was profound in delivering this quotation to mankind. His insight into the human psyche was deep indeed. But what else do we know about this man named Aristotle? If one were to use the search engine Google.com and type in the philosopher's name, many links to articles appear. Though there are many, the one that gave me the most pleasure in reading was from the popular internet encyclopedia site, Wikipedia.org. What I thought was most interesting was that ''Aristotle's conception of logic was the dominant form of logic until 19th century advances in mathematical logic'' (http://en.wikipedia.org/wiki/Aristotle). I think this is an excellent summation of Aristotle's contributions to society. . . even though there were many and nothing can quite truly explain how profound he was in shaping civilization.

Personally, I value simple and effective reasoning and I think that Aristotle was very wise in using these traits for the many quotations he has left for us. They are all profound yet simple and easy to understand once one stops and ponders them. Another quotation which is an excellent example of this is: ''It is the mark of an educated mind to be able to entertain a thought without accepting it''

(www.quotationspage.com/quotes/Aristotle/1). I love this quote because it is so relevant today. I think it reminds us to remember how important education is and how important it is to not be so quick to pass judgment upon others because in doing so, we hinder ourselves from growing and learning more.

Reading quotations from Aristotle has always been inspiring to me because it makes me realize that even though he was a philosopher from a time so long ago, human nature will always be the same. His quotations still hold great relevance and importance in our lives during the 21st century. I was so excited to see that Aristotle was used for the opening quote in Chapter 5 and I know that I'm probably not the only one who finds it fascinating to decipher his deep insights into this life.

Appendix D

For the Discussion Board Question

"If there were a fire where you live and no one was hurt but you lost all of your photographs, how would you feel? What are you doing to make sure that doesn't happen to you?"

The first 10 of 224 responses for the face-to-face class (students answered the questions and responded to at least one other student's comment):

I have very few pictures saved on a flash drive too. It is a good way to protect them, but i think i would panic too much to bother saving the flash drives. Now that i think of it, uploading them to a website like photobucket would probably be a good idea.

I haven't lost all of my pictures, but i have lost photos from a recent trip that i took which really bummed me out. It's sad becuase you have these pictures to help you remember things later on, but once they're gone it's almost as if your memory goes with them a bit. Apparently i haven't learned my lesson because i'm not doing much to prevent it from happening again. I only save my pictures on my computer, but i really should save them on discs.

That is true but now you can save them to websites or your own websites that can be brought up on any computer with a personal ID and a password. Photobucket and other sites do exist. It's better trying that than not being able to rely on your hard drive withstanding a fire.

My parents generation didnt have the technology that's available today, so all the pictures of when I was younger would be permanently lost. However, the past five years or so all my pictures have been downloaded to my computer and saved in a website that can be accesed from any computer. So I wouldn't have to worry about pictures bring lost in a fire which is really nice due to technology. I would be upset losing the ones that weren't digitally saved though. Those you can't get back. Makes me realize what I might grab first if I have the chance to salvage anything.

I agree that my parents too would be far more upset than I would be. They thrive on the pictures they have saved up and I am sure they would be heart broken.

I honestly wouldn't feel that bad. I don't have very many physical photographs of my own because I have digital copies on my computer and I also have them backed

up on a hard drive. Even if I lost those pictures it wouldn't really be the worst thing ever.

I agree with this person most of my photos are on my computer or flash drive, but I would feel more disappointed because I do have alot of pictures that mean alot to me!

If there were a fire and I lost all my photographs, I would feel so angry and sad because my pictures are the only memories I have of things, people, and places that mean alot to me. I wouldn't know exactly what I can do to prevent this from happening because there is really no safe place you can save your stuff, but for now I have my pictures saved on my computer and my flash drive because these things are always with me so if a fire were to start at least the things would be with me.

yes john, every body do that, but remember one thing, pictures are moments of your life that you can capture

yes, it is true. these days everybody save their picture digitally but what is going to happen when you dont see any more paper picture?

The first 10 of 379 responses for the online class:

That is such a smart idea. I have quite a few photos already on my computer, but I never thought of doing that.

I would feel completely lost. My photographs mean a lot to me. I do not have one now, but I would like to own a fire -proof safe for all of my photographs and other precious items.

Wow a safe is a great idea. I recently lost my puppy and I do have a lot of pictures of him, all I can think is I wish I took more pictures of us. Pictures are tangible memories that are there to remind us of life's best moments. I think we all need to realize how devastating it would be to lose that.

To be honest I would be crushed! I would want to be so sad to have lost all of my pictures, but I would be grateful nobody was hurt. I love taking pictures, I have pictures of my friends and family, and pets. Most of my recent pictures are on my computer, but my older ones are in photo albums. I think the ones on my computer would be easy to save because I would want to take my computer anyway. My whole life is on that thing.

Yeah, but wouldnt it be difficult in a stressful situation to open a safe? especially if you are in a hurry. . .

Yes, I would definately be hurt. I have scanned all my old pictures, and have them on my laptop, as well as the new, digital ones. So I would just grab my computer and run :)

I completely agree. . .all material items can be replaced, but photos are memories that last a lifetime..so it is important to take care of them.

If there was ever a fire in my house, God forbid, I always think about what would be the most important things that I would take, and pictures are always on my top list. I believe that all material things can be replaced, but pictures cannot, that has to be one of the most precious things to have . I would feel empty if I had lost my pictures. To prepare for any emergency i have alot of my more recent photos saved

on my external hard drive or USB, but my older pictures that are not digital i have in photo albums, so they are easy to grab just in case anything ever did happen.

If there was a fire where I lived and I lost all of my old photographs I would be absolutely devastated. I am a firm believer in looking towards the future and never looking back. But photographs hold a special place in my heart because they capture a moment, friend, or loved one from your past that you will never get back again. Memories are what keeps us going sometimes, and losing all of my photos would make it much tougher for me to find comfort in my memories. I have taken the necessary steps to ensure that it wont happen to me by uploading all of my photos to an online photo album.

I scrapbook as well.. People call me like they call your wife, pictures are worth a thousand words!

Appendix E

A Typical Chapter Paper
Computers: The History of Computers and the GUI

Visual messages are everywhere. From Photographs and cartoons to even computers. In the last 15 years computers have really progressed and become something so huge that people back then probably would have never imagined. Not only is there the Internet, online shopping and myspace but also the breakthrough in computer graphics is amazing. We use computers for shopping, entertainment, and school and to expand our knowledge and intelligence. Probably one of the hugest breakthroughs was *Titanic,* written and directed by James Cameron. In other movies before that the CGI effects were said to be very distracting but he found a way to use the graphics to enhance the scenes and not take away from them and distract the audience. In the book, *Images with Messages,* it says that visual messages must always stress the message before the visual. James Cameron made a breakthrough in making graphics much more real for the audience but that is definitely not where the experiments began. The development and history of the GUI (graphical user interface), is very interesting and all began in the 1930's.

The historical perspective to the beginning of computers started in 1833 when a man by the name of Charles Babbage was said to have invented the computer along with a program-controlled calculator. It was called the Analytical Engine and it never went beyond the design stage due to the fact that his machine was too far advanced for the technology of that day. A few years after Babbage passed away a man by the name of Herman Hollerith invented the first electric calculator. Hollerith began working at the Census Office and while he was there he invented an "electromechanical system that could count and sort data from punched cards" (Lester 356). The invention ended up being a big success and Hollerith merged his company with the Computing-Tabulating-Recording Company and the International Business Machines Corporation. From that moment on computer technology started becoming huge and year after year it began progressing. In 1975 "IBM introduced

its first personal computer'' (Lester 364). It's amazing what we can do on computers and the history behind them. Computers started out as calculators that barely worked and no one understood. Now we can file our taxes and watch television on them.

First off, what is a GUI? A GUI stand for graphical user interface and according to the website Webopedia, a program interface takes advantage of the computer's graphics capabilities to make the program easier to use. Well-designed graphical user interfaces can free the user from learning complex command languages. On the other hand, many users find that they work more effectively with a command-driven interface, especially if they already know the command language. The idea of a GUI began in the 1930s by a man named Vannevar Bush. He wrote about a device called the ''Memex.'' He basically thought about a computer that was touch screen where ''it would allow the user to access all human knowledge using connections very similar to how hyperlinks work,'' but because technology then wasn't very advance no one really talked about it. During World War II the idea of a computer came back again and groups around the world started constructing these computers. ''The perfection and commercial production of vacuum tubes provided the fast switching mechanisms these computers needed to be useful.'' In 1948 Douglas Englebart began working at the NACA Institute after earning his degree in electrical engineering. He receives his PhD in 1955 and was able to receive several patents for computer components. He wrote an essay titled ''Augmenting Human Intellect'' and in this paper he basically was writing to prove to people that computers could be the next big thing and would help solve a lot of complex problems. I think that at first people probably could not take this way of thinking seriously because technology was definitely not very advanced and to think about something that could change the way of thinking so much was probably a huge shock to people. The only thing that was available at that time was a program called ''batch processing'' and was used with punch cards and the ''computer would run the program at some schedules time, and then the results would be picked up hours or even days later.'' At this point, there was a lot of work to be done and a lot more technology to be figured out. Within the next few years they started inventing a lot more things like the Xerox printer, a program called small talk and Apple. During the 1980's there were many more GUIs and that was the beginning of the generation of computers.

Technical perspective is very important when it comes to computers. There are so many parts to using a computer and the technology that has to do with it. According to the *book Images with messages* a computer has five basic components: memory and storage, the central processing unit (CPU), a switching device, peripherals, and software.

In conclusion, you can find visual messages in your cartoons, in your photography and on your computers. Computer graphics have really come a long way and there is no stopping the technology because they are discovering new things everyday. From computer graphics like the ones in *Titanic* to the new Apple graphics on MAC computers technology is changing everyday. The historical perspective on computers is very interesting to read about. Computers started off as calculators and no one

knew what to think about it or take out of it. We now use computer for online shopping, entertainment and we are even able to see the world from a satellite. I can't wait to see where technology will take us next and how these graphics will soon expand.

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APPENDIX F

Part of the Technical Perspective from Two "A" Final Term Papers
Face-to-Face Student

As with all artwork and photographs, a better understanding of the piece is obtained by the viewer through technical analysis. This analysis should take into consideration several areas in order to achieve a higher appreciation. These areas include, but are not limited to, lighting, type of camera, lens, film and shutter speed.

To begin, the black and white photograph is an indication that it was taken a long time ago. The picture was taken outside using natural light, facing south, most likely early to mid afternoon as shown by the darkened, shortened shadows. The sun is still bright however because Hoover is squinting under the brim of his hat.

As mentioned, the lens and aperture opening are important elements to be considered when analyzing any photograph. The background images, such as the tree bark and pine needles, are in focus as are the human subjects in the foreground. With this depth of field clarity, I would suggest the photographer used a wide angle lens with a small aperture opening. According to Dr. Lester, ''A photographer who wants objects in both the foreground and background to be in focus will use a wide angle lens with a small aperture opening.''

Image quality is dependant on the quality of the camera. The large view cameras, usually supported by a tripod, produced superior quality reproductions. It is possible that this type of camera was employed for this photo shoot, given the importance of the subject matter. However, it is more reasonable that a smaller, portable view camera, popular in the 20's and 30's was used.

Film speed is important in achieving clear reproduction results. Not knowing the film speeds available during this period, it is my estimation that a low speed was used. With enough natural light, low speed film produces the best resolution. High speed film under these circumstances would produce a more grainy result, which is not the case with this photo.

Online Student

Robert Capa used a small Leica camera to create *The Falling Soldier* (Schwendener, 2007). The technology allowed Capa to take sharper faster images than his predecessors as seen in the photograph. The image captures a single moment: the death of a man.

The photograph is horizontally oriented and in black and white. The moment of time captured indicates the use of a fast shutter speed. The mountains in the background are difficult to clearly see, which seems to indicate that the photograph uses a shallow depth of field. While the photograph has a shallow depth of field, it does fully compensate for the lack of light absorbed from a quick shutter speed. Rather, Robert Capa used a more light-sensitive film to take the photograph. Evidence of such film can be seen in the large grains in the background of the photograph.

The lighting of the photograph indicates that the photograph was taken closer to midday. Capa does not use a flash in this photograph. The man's shadow is sharp and dark, indicating that the sun is responsible. The photograph has high contrast oriented around the subject. The man's rifle and his shirt are respectively the darkest and lightest objects on the photograph. The background creates a somber mood to help accentuate the tragedy of a man dying.

APPENDIX G

Second Life Teaching Tips

- **Ownership**. If possible, the instructor should be the so-called owner of the Second Life (SL) space where the class is to be conducted. Such a designation allows the instructor to show QuickTime video clips available from a website, restrict the class space to only registered students, restrict building on the site, and eject or ban troublesome participants.
- **Money**. Instructors need some funds in their account if nothing more than to upload PowerPoint images for class presentations ($10L per upload). One U.S. dollar roughly equals 250 Linden dollars.
- **Presentations**. Make screen saves of PowerPoint (or equivalent) slides, convert to .jpg files, and upload to the class site. For presentations, build a flat screen comparable to one in an auditorium. In Edit, select Texture and use the PowerPoint images as overlays for the screen.
- **How-to**. Produce a guideline for students for learning how to create a SL account, complete the orientation tasks, and teleport to the class site.
- **Avatars**. For guest speakers or students with access issues, create a male, female, and "furry" avatar that can be used.
- **Alternatives**. For students without computers or with access issues, an open lab during class time should have SL installed.
- **Speech**. Since not all students have computers with a speech-capable feature, classes should be taught in a text-based mode.

- **Archive**. The instructor should set the preferences so that a recording is made of the text-based discussion. The chat.txt file should be uploaded to the External Links section of Blackboard (BB) for student access. In addition, make the entire collection of PowerPoint slides and video clips available in BB.
- **Etiquette**. Students should learn not to chat all at once and respect when some other student or the instructor is texting. Students must also stand off to the sides or sit down so others can easily see the screen. Students should also not change their appearance or fly during class.

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