An Investigation of Instructional Technology: 
Do Students Learn More Technology Skills in Technology-Assisted Courses? 

Scott Alan Hutchens, Ph.D. 
Associate Professor of Psychology 
Psychology Program 
Delta State University 

Abstract 
Undergraduate students in three technology-assisted General Psychology courses were compared to students in three traditionally-taught General Psychology courses. Students in all six courses completed a technology skill self-report assessment (i.e., The Profiler [30-item scale]) at the beginning of the semester (i.e., pre-test) and then again at the end of the semester (i.e., post test). This self-report measured technology skill levels in 5 categories (i.e., Operating Systems, Trouble Shooting and Maintenance, Tool Applications, Internet, and Multimedia). Longitudinal data were analyzed using a 2 X 2 X 5 ANOVA in order to empirically measure whether a technology rich learning environment engages students in more technology usage and promotes the learning of additional technology skills.

Do students learn more technology skills when taking technology-assisted courses (PowerPoint and WebCT) versus traditionally-taught courses using a chalkboard? Since students are exposed to and required to use more technology in technology-assisted courses, those students should gain more knowledge about how to use technology. Hutchens (2005) demonstrated that student teachers were more likely to gain technology skills when student teaching in schools which were technologically advanced. That is, the student teachers who were placed in a technology-rich learning environment with mentor teachers who modeled the appropriate use of technology reported leaning more technology skills over time (i.e., pretest and post-test) than student teachers who were not placed in technology-rich learning environments (see Hutchens, 2005). The current study investigates whether freshman students in general courses also benefit from technology-rich environments.

Method 
Participants 
Participants were 173 General Psychology students (107 females and 66 males) from Delta State University. Ninety-one participants were in technology-assisted courses and 82 were in traditionally-taught (i.e., chalkboard lecture) courses. Since all Delta State University students are required to take General Psychology as a general education requirement, the participants consisted of students from various majors. Thus, even though the sample was not truly random, it was reasonably representative of Delta State University students.

Materials 
Three courses were traditionally-taught and three courses were technology-assisted. In the technology-assisted courses, PowerPoint presentations were used to present course material during class using a laptop computer and a digital projector. The PowerPoint presentations also contained digital photographs, tables, diagrams, movie clips, charts, hyperlinks to web pages, interactive demonstrations, and online simulations. Also, in the technology-assisted courses, students downloaded PowerPoint lecture outline notes from WebCT before being presented with course information during lecture. In the technology-assisted conditions, students also used WebCT to check grades, review PowerPoint shows, access a wealth of information from various Internet links, participate in interactive demonstrations and simulations, and communicate with each other and the professor via electronic discussion boards and e-mail. In the traditional condition, the professor lectured and wrote notes on the chalkboard.
The Profiler, an online self-evaluation survey, was used to assess the participants’ technology knowledge and skills. The survey consists of 30 questions related to one’s technology knowledge and skills. The questions are divided into five primary categories: Operating Systems (OS), Trouble Shooting and Maintenance (TS), Tool Applications (TA), Internet (I), and Multimedia (M). Each of the five categories contained six questions with each question being equal in value. The survey was formatted using a Liekert scale with a response of 1=not at all, 2=inadequately, 3=adequately, 4=efficiently, and 5=expertly. Therefore, a total possible score for each of the categories was 30. The questions on the Profiler were related to general technology skills and contained such statements as: (1) Open a file from a disk or a local network hard drive; save a file to a disk or to a specific location on a local network hard drive. (2) Set up a computer system and connect peripheral devices. (3) Develop instructional processes which ensure student self-directed use of technology resources. (4) Send e-mail messages and send/receive attachments. (5) Produce a slide show/presentation (PowerPoint, Hyper Studio, Corel Presentation, etc.)

Design & Procedure
The design consisted of a longitudinal 2 (time of test: pre-test, post test) X 2 (course type: traditional, technology-assisted) X 5 (technology skills: operating systems, trouble shooting and maintenance, tool application, Internet, and multimedia) mixed-participants design. The dependent variables were the self-report ratings on the Profiler. The Profiler was administered online at the beginning (pre-test) and end of the semester (post test). Participants were instructed to complete the self-report to the best of their knowledge.

Results
Student Performance
A 2 X 2 X 5 ANOVA yielded the following for student ratings on the Profiler: The main effect for course type (traditional M = 13, technology-assisted M = 16) was significant, \( F(1, 75) = 7.45, p < .01 \). The 3-way interaction between time of test, course type, and technology skills was not significant, \( F(4, 300) = .65299, p = .62 \), but specific mean comparisons were significant (see Figure 1 for specific means and “Discussion” for Tukey HSD post hoc comparisons).
Discussion
Tukey HSD post hoc comparisons indicated significant differences between specific mean comparisons ($p < .05$) (see Figure 1). Specifically, participants in technology-assisted courses reported gaining significantly more technology skills from the time of the pre-test to post testing (see the right graph on Figure 1) than participants in traditional courses. Interestingly, this increase occurred in all five technology categories. Thus, the data are consistent with the findings of Hutchens (2005). In Hutchens (2005), mentor teachers served as models for the student teachers in a one-on-one situation. In the current study, the course instructor served as a model for the general psychology students in a global situation. The current study provides empirical support that a technology rich learning environment engages students in more technology usage and promotes the learning of additional technology skills.

References