



July 2004, Vol. 6 Issue 2

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Usability News is a free web newsletter that is produced by the Software Usability Research Laboratory (SURL) at Wichita State University. The SURL team specializes in software/website user interface design, usability testing, and research in human-computer interaction.  
[Barbara S. Chaparro](#), Editor

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## Technology in the Classroom: Investigating the Effect on the Student-Teacher Interaction

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**Summary:** Recent studies have shown that use of technology in the classroom is increasing. This study investigates the effect of the changing role of instructor as this trend continues. Findings indicate that, in order for technological integration in the classroom to be successful, the instructor must retain a prominent role within the class format.

### INTRODUCTION

Over the last ten years the World Wide Web and related technologies have developed and dramatically expanded (Lavooy & Palmer 2003). As Internet use increases and innovative Internet applications are utilized, more of one's daily activities will be influenced by technology. Education is an area which is undergoing major restructuring due to increased Internet usage and applications. Every year more universities and colleges are deciding to implement completely web-based classes and classes that are technology enhanced (Ewing-Taylor, 1999). Experts estimate that within the next year, software and services for web-based classes will surpass \$1 billion (Kaplan, 2003).

A greater reliance on technology alters the student-teacher interaction. Instruction through computers can give students more control over their learning environments and access to a wider range of materials to use in the learning process; however, for computer-assisted learning to be effective, the instructors need to put careful thought into their lesson plans. The level of student understanding must be taken into consideration. "Instructional software makes the human teacher more important, rather than less" (Ransdall, 2002). In order to fully understand how computers contribute to learning, there has to be an investigation into how the use of a computer controls the behavior of both students and teachers (Karasavvidis et. al., 2003).

In a previous study done by Lavooy and Palmer (2003), the group dynamics of the traditional classroom and virtual classroom were observed and compared. This study revealed that a technologically-enhanced class environment resulted in a greater cooperative group dynamic without any prompting from the instructor. Another comparison revealed that almost every student that accessed the lecture in the virtual classroom participated by asking and answering questions, while little participation was observed in the traditional classroom setting. Another illustrative example comes from a study done at Drexel University, which explored the effect of technology on the student-instructor interaction (Andriole, Lytle & Monsanto 1995). In the fall of 1994, Drexel University began offering courses over an asynchronous learning network. Seventy-five percent of

the participants in this study felt they had more communication with fellow students and with the instructor than in a conventional course. Seventy-three percent felt they learned more in asynchronous-learning, network-based courses than they would have expected to learn in a conventional course.

Previous studies indicate that the introduction of technology alters the student-instructor interaction. This study investigates how students' performance and use of the technology offered to them is affected by the changing role of the instructor.

## **METHOD**

### **Participants**

Thirty-six undergraduate college students volunteered for this study. They were all enrolled in one of two sections of the "Statistics for the Behavioral Sciences" class offered in the Spring of 2004 at Wichita State University.

### **Procedure**

Two sections of behavioral statistics were used in this study. Each section had an different class format but presented the same information. Both classes were taught by the same instructor, had the same text books and were given the same exams. The material covered in class was covered at the same pace, with tests being given on the same date for both classes. Each participant had access to the same material via Blackboard™, a web-based course management software used at Wichita State University that allows instructors to post announcements, class notes, practice quizzes and conduct lectures in the virtual classroom.

The independent variable in this study was the instructor's method of conducting class. Condition 1 was structured as a "hybrid" class, a combination of the traditional classroom setting and an online course. This arrangement offered the students a balance between formal classroom instruction and time for student-directed learning each day. During the student-directed learning time, students were able to use Blackboard™ to access class materials, take practice quizzes, and engage in virtual chat with others, etc. Condition 2 was completely student-centered and offered the students only student-directed learning time each day, with the instructor physically present to ask questions and assist the students with any problems.

In Condition 1 the teacher-student interaction was initiated by both parties, while in Condition 2 the teacher-student interaction was primarily initiated by the student. Condition 2 most closely represented the types of relationship that is present in asynchronous learning, web-based courses.

The participants in each condition completed a full semester of "Statistics for the Behavioral Sciences" and their performance and use of Blackboard™ was monitored and compared.

## **RESULTS**

A comparison of student performance and student interactions is summarized in Table 1 below. Students in Condition 1 performed significantly better on the first exam than students in Condition 2 (Table 1). Students in Condition 1 spent significantly more time interacting with material via Blackboard™. Students in Condition 1 also spent significantly more time collaborating with other students and instructors tools available on Blackboard™ (e.g., virtual classroom).

**Table 1. Comparison of performance and student interactions**

	<b>Condition 1</b> <b>(Hybrid class)</b>	<b>Condition 2</b> <b>(Complete Student Centered)</b>
<b>Grades on first exam (0-4 scale, 4 representing greater performance)</b>  <b>(t(25) = 3.05, p &lt; .05)</b>	3.42 (0.79)	2.4 (.91)
<b>Student number of interactions with course content on Blackboard™</b>  <b>(t(34) = 2.22, p &lt; .05)</b>	604.25 (51.96)	399.47 (221.34)
<b>Interaction with other students and instructor via Blackboard™ tools</b>  <b>(t(38) = 1.72, p &lt; .05)</b>	93.52 (51.96)	51.24 (25.56)

## DISCUSSION

In this study two different class formats, each with differing instructor roles, were compared. Our hypothesis was that the more student-centered the class format, the more performance and collaboration amongst students would be enhanced. Our findings contrast this idea. This study supports the notion that, in order for technological integration in the classroom to be effective, the instructor must take a prominent role in the class structure. Technology and computer-mediated instruction cannot replace what is contributed by the presence and formal guidance of the lecturer. Technology is a powerful tool for enhancing educational settings, but the instructor must guide the students when using these tools.

The short lecture and list of objectives offered at the beginning of each "hybrid" class not only changed the teacher-student interaction and the way the technology in the class was used, but also altered the student-student interaction. The experience of all students receiving the same lecture every class period may have fostered a more cohesive group than a setting wherein a group of individuals sat in a classroom and worked at their own pace.

The preliminary review of this study supports that a balance between student-centeredness and formal lecture is optimal and attainable. The data presented in this study, however, represents student performance and interactions only to mid-semester. There is still more data to be reviewed, which will assess if individual differences had an effect on the way students performed in each condition and how they used the technological tools. There are also "student perceptions of teaching effectiveness" (SPTes) concerning these two classes to be reviewed. Future research will also assess the ways in which students in these two conditions used the online textbook and if it had an effect on their performance.

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