

**Examination of Interaction Variables as Predictors of Students'  
Satisfaction and Willingness to Enroll in Future Web-Based Courses  
While Controlling for Student Characteristics**

by  
**Veronica A. Thurmond**

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EXAMINATION OF INTERACTION VARIABLES AS PREDICTORS  
OF STUDENTS' SATISFACTION AND WILLINGNESS TO ENROLL  
IN FUTURE WEB-BASED COURSES WHILE CONTROLLING FOR  
STUDENT CHARACTERISTICS

by

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Submitted to the School of Nursing and the  
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Doctor of Philosophy in Nursing

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## ABSTRACT

The impetus for this study was the need to gain a better understanding of what interaction activities in the virtual classroom affect student outcomes. The purpose was to determine which perceptions of interactions contributed to predicting student outcomes of satisfaction and future enrollment in Web-based courses – while controlling for student characteristics. The problem is that the interaction that occurs in the Web-based classroom is markedly different than what occurs in the traditional classroom setting.

The study was a secondary analysis using data from 388 student evaluations of Web-based courses. Using Astin's Input-Environment-Outcome (I-E-O) conceptual framework, influences of student characteristics [inputs] and virtual classroom interactions [environment] on student outcomes were examined. Student input predictors were perceptions of computer skills; knowledge of electronic communications; number of Web-based courses taken; distance living from campus; and age. Environmental predictors included interactions with the instructor, students, technology, and perceptions of presence.

Hierarchical, multiple regression analyses were performed to answer two research questions:

1. Do students' self-reported ratings of interaction help predict their satisfaction in a Web-based course, while controlling for student characteristics?

2. Do students' self-reported ratings of interaction help explain their willingness to take another Web-based course, while controlling for student characteristics?

The most significant predictor of both student outcomes was students' perceptions regarding their interaction with their instructors. Second, satisfaction and enrollment were affected by students' perception of the technology as contributing to wasted time. Third, students who did not miss the face-to-face interactions as much tended to be more satisfied and were willing to take other online courses. Finally, information on distance living from campus helped in predicting satisfaction and likelihood of enrolling in other similar courses. These four variables contributed 72% of the variance in predicting satisfaction and 60% in likelihood of enrolling in future online courses.

The overall regression findings supported the need to examine student characteristics and the educational environment when assessing student outcomes. Findings provided support for the idea that the *interaction activities* that occur in a Web-based environment – not student characteristics – have a greater impact on students' satisfaction and likelihood of enrolling in other online courses.

## DEDICATION

This study is dedicated to my best friend, Timothy J. Thurmond. I have been fortunate to have shared this journey with such a wonderful and caring man. Thank you for cooking the meals and keeping the home fires burning and allowing me to focus on my educational endeavors. Tim – your love, support, and guidance has made this journey one that I will treasure always. We both had many blisters on this road march, but in the end, they toughened our resolve and made the accomplishment more worthwhile. Thank you for always being there and for keeping me balanced. But most of all, I thank you for being my husband. I appreciate you.

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## CHAPTER I

### INTRODUCTION

Offerings of distance education (DE) and Web-based courses are on the rise. Between 1998 and 2001, one-fifth of the nation's two-year and four-year educational institutions planned to offer distance education courses. Further, in 1999-2000 eight percent of undergraduates and 12% of master's students enrolled in distance education courses (NCES, 2002a). According to the National Governor's Association (NGA) 58% of two-year and four-year institutions offered distance education courses in 1998 and 84% of all colleges were expected to follow by the year 2002 (NGA, 2001). As a medium for DE, course specific Web sites were used by about 40% of full-time faculty in a nationally representative sample of post-secondary institutions (NCES, 2002b). The Web-based classroom differs substantially from the traditional classroom in several ways. For example, interaction between students and faculty, other students, and the course content are very different. The ideal Web-based course is designed to promote "interactivity" to simulate the classroom and improve learning outcomes. Because of the proliferation of Web-based courses and the differences in interaction between the traditional and Web-based pedagogical platforms, a vital need exists to assess the effectiveness of interactivity in a Web-based course.

#### Purpose

This research study focused on the concept of interaction as it pertained to Web-based courses. Using Astin's (1993) Input-Environment-Outcome (I-E-O) conceptual framework as a guide, the study examined the influences of student

characteristics and the classroom environment – specifically interaction – on student outcomes. The purpose of the study was to determine which interaction variables contributed to predicting student outcomes of satisfaction and future enrollment in other online courses – while controlling for student characteristics. A major emphasis of this study was on the importance of considering student characteristics in the analysis so that a stronger statement could be made about the effect of the online environment on the specific outcomes. The study was a secondary analysis using data from student evaluations of Web-based nursing courses. The instrument used in this database is called *Evaluating Educational Uses of the Web in Nursing (EEUWIN "you-win")*.

## Background

### *Distance Education*

Distance education (DE) is not a new concept in learning. Moore and Kearsley (1996) defined distance education as "planned learning that normally occurs in a different place from teaching. . ." (p. 2). Basically, distance education occurs "when a teacher and student(s) are separated by physical distance, and technology . . . is used to bridge the instructional gap" (Willis, 1993, p. 4). Because of the distance between teacher and student, special technologies and methods of teaching and communication are needed to deliver the course. In the past, methods of delivering DE included correspondence courses, radio broadcasting, cable or satellite television (Nasseh, 1997; Reinert & Fryback, 1997; Sciuto, 2002), computers, teleconferencing,

interactive and compressed video (Reinert & Fryback, 1997), and direct-beamed microwave signals (Benjamin-Coleman, 2001; Sciuto, 2002).

More recently, the creation of the World Wide Web and other advances in technological communications have sparked a tremendous interest in an electronic medium for distance education – the Internet (Meyen & Lian, 1997b). Unlike the traditional classrooms where synchronous meetings require students and teachers to gather at the same time to interact and participate in learning, Web-based courses do not require a face-to-face interaction component. A Web-based course is delivered totally via the Internet (Glossary, n.d.). Furthermore, Web-based instruction (WBI) can be conducted without the need to have students and teachers present together at the same place/time (Berge, 1999).

In contrast to courses taught in the traditional classroom, Web-based instruction can be delivered completely asynchronously and in the absence of face-to-face meetings. In the traditional classroom setting, students and instructors must be present physically during some of the course. The physical presence allows both students and instructors to have not only a visual impression – but also a real, concrete physical sense of each others' presence. The visual and physical presence adds another layer to sensory stimulation. The Internet format excludes physical interaction – which may have an impact on learning (Beard & Harper, 2002). In the Web-based classroom, this visual and physical stimulation must be simulated through electronic means.

Moreover, courses delivered in a Web-based format require students to learn not only the course content, but also the technology by which it is delivered. The combination of the absence of face-to-face meetings, the asynchronous nature of a Web-based course, and the necessity of learning the technological medium creates challenges in developing the necessary interaction component of classes (Berge, 1999; Muirhead, 2001a).

### *Interaction*

No consensual definition for interaction exists in the educational literature (Anderson, 2002; Soo & Bonk, 1998). Authors have described some of the dimensions that comprise the concept of interaction, such as communication, collaboration, and active learning (Kenny, 2002). Among the definitions reviewed, frequently the social process was highlighted (Beard & Harper, 2002; Crawford, 1999; Gunawardena, 1995; Sutton, 2001; Wagner, 1994). The definition of interaction used in the current study is a compilation of the interaction descriptions offered by Moore (1989), Hillman (1994), and Wagner (1994). The definition of interaction used in this study was developed by the investigator. The investigator defined interaction as:

The learner's engagement with the course content, other learners, the instructor, and the technological medium used in the course. True interactions with other learners, the instructor, and the technology results in a reciprocal exchange of information. The exchange of information is intended to enhance knowledge development in the learning environment. Depending on the nature of the course content, the reciprocal exchange may be absent – such as in the case of paper printed content. Ultimately, the goal of interaction is to increase understanding of the course content or mastery of the defined goals.

Wagner (1994, 1997) made a distinction between interaction and interactivity. According to Wagner (1997), interactions “occur when objects and events mutually influence one another. Interactivity . . . appears to emerge from descriptions of technology for establishing connections from point to point . . . in real time” (p. 20). The disparity seems to be that interactivity involves the technology used in learning, while interactions describe behaviors of individuals and groups. For this study, the term interaction will be used and the text will specify whether the interaction is with the technology, humans, or the content.

Interaction in Web-based courses can occur synchronously or asynchronously (Smith & Dillon, 1999). Four types of interaction identified in the distance education literature include learner-content, learner-instructor, learner-learner (Moore & Kearsley, 1996), and learner-interface (Hillman, Willis, & Gunawardena, 1994). These four types of interaction have been cited frequently in the literature (Berge, 2002; Chen, 2002; Crawford, 1999; Ehrlich, 2002; Kirby, 1999; Navarro & Shoemaker, 2000; Rovai, 2002; Sherry, Fulford, & Zhang, 1998; Smith & Dillon, 1999; Swan, 2001). The first three forms of interaction can be found in both traditional classrooms and Web-based courses. The last type of interaction, learner-interface, may be present or totally absent in traditional classroom courses; thus, instructors may not need to consider this interaction.

However, in a Web-based course, the learner-interface interaction can have a tremendous bearing on students learning the content (Hillman et al., 1994); consequently, instructors need to consider the impact that Web-based technology will

have on learning when designing Web-based courses. Moore and Kearsley (1996) provided an in-depth explanation of the first three types of interaction, while Hillman (1994) described the last interaction.

### *Learner-Content Interaction*

Learner-content interaction is the interaction that results from students examining and studying the course content. The focus is on the understanding and perspectives that students gain from the knowledge they construct while interacting with the content. In the traditional classroom, students have interacted with course content through textbooks and journals (Muirhead, 2001a) – or some other printed format. In addition, instructors can elect to use technological tools, such as the Internet (Faux & Black-Hughes, 2000) or specific Web pages of lecture notes or class syllabus, to augment learning course content. In contrast, the use of these electronic tools is not an option, but rather a necessity, in a Web-based course.

In the Web-based environment, the content interaction may include those found in the traditional classroom; however, much of the content generally is delivered in the form of hypermedia text. Much of the time, the learner in a Web-based course interacts with the content on Web-pages designed by the instructor, links included in the course content, or other Web-sites *discovered* by the student as part of the learning. A major challenge for instructors is in designing a Web-based course that fosters interaction with the content in an effective manner.