



# Student Success in a University Introductory Networks and Telecommunications Course: Contributing Factors

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## ABSTRACT

*Students at a large southeastern university typically find the introductory networking and telecommunications course difficult. This study examines the factors that contribute to the success of undergraduate technology support and training management students in this required course. College transcripts and academic student files provided the data, which were analyzed using multiple regression. In contrast to previous research, only performance in an introductory technology prerequisite course significantly predicted success. These findings have implications for faculty designing or organizing curricula who want to improve the success students in networking and telecommunications courses.*

**Keywords:** *curriculum design; IT education; learning outcomes; networking; telecommunications; undergraduate education*

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## INTRODUCTION

Networking and telecommunications are vital curriculum components in college and university information systems (IS) curricula (Crews, 2004a; Crews, 2004b; Crews & Ray, 1998; Johnson, Stallard, & Tanner, 1999; Peslak, 2005). Basic knowledge in the area of networks and telecommunications must be mastered to achieve prerequisite content for other technology courses or to successfully move forward

into other technology areas. Significant student attrition rates in the beginning networks and telecommunications course can affect student enrollment in higher level courses and in the IS program as a whole.

At a large southeastern university, many students in the technology support and training management (TSTM) program find the required introductory networks and telecommunications course difficult to complete successfully initially. The networks and telecommunications

course has a typical failure rate of approximately thirty percent. TSTM faculty concern for student success increased when a curriculum update mandated that students could not take a course more than twice, and that students must receive a grade of C or better in all core TSTM courses. The networks and telecommunications course is part of the core. Students who do not achieve a grade of C or higher in two attempts at the course will no longer be allowed to continue in the TSTM program. This curriculum change caused concern for the retention of students in the program.

Topics in the introductory networks and telecommunications course include networks and telecommunications concepts, network design essentials, networking media, network interface cards, managing networks, network communications and protocols, network architectures, network administration and support, wide area networks, local area networks, and solving network problems, among others (Barnard, Bryant, Jones & Reilly, 1996; Crews, 2004a; Crews, 2004b; Crews & Ray, 1998). The course is taught in a lecture format and provides the foundation for two additional advanced networking courses in the program. The course requires students to make an oral presentation, but does not contain many hands-on activities.

When preparing students for careers in the area of technology educators must investigate the issues involved in student success. If an inordinate number of students are unsuccessful in a course, faculty members need to delve into the reasons behind the lack of success and adjust as necessary. Consequently, a better understanding of the factors that affect students' success or failure is required. The purpose of this study was to review available data on typical undergraduate technology students and develop a predictive statistical model that would give insight into factors affecting student achievement in the introductory networks and telecommunications course.

## LITERATURE REVIEW

Several studies have identified networks and telecommunications skills to be important. Zhao (2002) found that a vast majority of *Fortune* 500 companies responding to his survey named telecommunications skills as important for professionals both now and in the future. Cappel (2001-2002) found data communications and networking skills were important to employers. Lee (2005) found that telecommunications skills such as web server and Internet proficiency were in high demand. Maier, Greer and Clark (2002) found a dramatic increase in the demand for telecommunications skills. Universities have responded by developing telecommunications curricula as disciplines or major fields of study (Barnard, Bryant, Jones & Reilly, 1996).

Research has not been published on factors contributing to student success in a networks and telecommunications course or curriculum. However, many researchers have examined factors related to success in other computer-related courses. A study by Wilson and Schrock (2001) involved twelve factors contributing to the success of students in an introductory computer science course. The authors investigated this area of study because students at their university had an attrition rate of approximately 50%-60% in this course. The twelve factors they examined included computer self-efficacy, previous programming experience or lack of experience, and gender. They found that comfort level with the course and math background had positive effects on success.

Other studies investigating factors contributing to student success have found previous computer experience is a predictor of student success in computer courses (Bunderson & Christensen, 1995; Kersteen, Linn, Clancey, & Hardyck, 1988; Taylor & Mounfield, 1991); however, other factors also contribute to success. Forte and Guzdial (2005) noted that the introductory computer science course at a particular university, which is required of all students, was not engaging for students who were not computer science majors, leading to less success.

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