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Teachers' Perceived Barriers to Using Computers and the Internet for Instruction

Lisa M. Thompson

Abstract

Once peculiar to business and research, computer technology has evolved into an important instructional tool in the classroom. Because the attitude of the teacher is paramount to the implementation of technology for instruction, there is a need to define and understand teachers' attitudes toward computers and related technology, such as the Internet. Negative attitudes are barriers to the implementation of technology. The purpose of this study was to identify the three most frequently reported barriers to using computers and the Internet for instruction. This descriptive, survey study used a 17-item survey to gauge the responses of 15 High School InTech educators at Macon State College in Macon, Georgia. The three barriers most frequently reported, among the "Moderate barrier" and "Great barrier" rankings, were "not enough computers"; "outdated, incompatible, or unreliable computers"; and "lack of release time for teachers to learn, practice, or plan ways to use computers or the Internet." These perceived barriers must be addressed in order to increase the percentage of teachers who use computers and the Internet for instruction.

Once peculiar to business and research, computer technology has evolved into an important instructional tool in the classroom. As efforts are being made to transition from teacher-centered instruction to student-centered instruction, in order to enhance student achievement, computer technology has become an effective means to that end (Schenck, 2003). However, in order to see the successful integration of computer technology into curriculum across the United States, as mandated by the federal government, the teachers' perceived barriers to using computers and the Internet for instruction must be appropriately identified, addressed, and resolved.

The focus of this study is to identify three frequently reported barriers to using computers and related technology, namely the Internet, for instruction. This study will not attempt to identify

new barriers, but it will address those barriers that have already been identified in previous studies.

Viewed as an important and powerful tool in the support of curricular goals, technology is no longer a frill in the classroom (WestEd, 2002). (Technology is being defined as digital technologies such as desktop or laptop computers, the Internet, digital cameras, digital camcorders, scanners, PDAs, or MP3 technology.) Technology has been proven to bolster student achievement when coupled with the standard-based teaching of complex thinking and problem solving (WestEd, 2002). In an effort to enhance student achievement across the nation, the Enhancing Education Through Technology initiative, a component of the Elementary and Secondary Education Act (ESEA), requires that teachers show proficiency in technology integration. Its three goals are (a) to improve student academic achievement using technology, (b) to aid students in becoming technologically literate, and (c) to ensure that teachers can integrate technology into the curriculum. Thus, the use of technology in the classroom is no longer an option for educators or students (Loschert, 2003). Although mandated by federal and state law, the attitude of the teacher is the determining factor in this implementation.

How do teachers feel about integrating technology into instruction? Although the National Center for Education Statistics has documented a large increase in access to computers and the Internet in the nation's public elementary and secondary schools, public school teachers do not feel prepared to use computers and the Internet for instruction (U.S. Department of Education, 2000, April ; U.S. Department of Education, 2001). Teachers lack the knowledge and skill needed to implement technology in a comprehensive, results-oriented manner (WestEd, 2002; Yildirim, 2000; Hong & Koh, 2002).

Because the attitude of the teacher is paramount to the implementation of technology for instruction, there is a need to define and understand the teachers' attitudes toward computers and related technology, such as the Internet. Research yielded no consistent definitions for attitudes toward computers, but the definitions found were composed of multiple components. In some studies, attitudes toward computers were defined in terms of cognitive, affective, and behavioral domains. The cognitive domain described

what a person believes about computers. The affective domain described what a person feels about computers, and the behavioral domain described how a person actually responds to computers based on cognitive and affective domains (Hong & Koh, 2002). In other studies, attitudes toward computers were defined as attitudes toward computers for instruction, attitudes toward access to computers, and attitudes toward support received in computing (Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999).

Whether the attitudes were positive or negative, teachers' attitudes toward computer technology were related to computer experience. Teachers with at least three years of computing experience have low computer anxiety and positive attitudes toward computers and are thus more likely to implement computer technology for instruction (Hong & Koh, 2002; Koszalka, 2001). In addition, teachers with fewer years of teaching experience (less than nine years) feel more prepared to use computers and the Internet than their more experienced colleagues (20 or more years). Newer teachers were also more likely to use computer technologies to gather information for lessons and create instructional materials using computers and the Internet (U.S. Department of Education, 2001; U.S. Department of Education, 2000, April). Computing experience increases positive attitudes which increase the likelihood of technology integration.

The overwhelming consensus in the research is the need for ongoing professional development in technology integration. Research recommends pre-service and in-service professional development and support to give teachers the needed skills to successfully integrate technology (Loschert, 2003; WestEd, 2002; Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999; Koszalka, 2001; Hong & Koh, 2002; Yildirim, 2000). Professional development should provide hands-on learning, peer collaboration, exploration and reflection, practice, and peer support (whether face-to-face or computer-mediated) in order to promote the positive attitudes that increase the likelihood of implementing technology integration (WestEd, 2002; Koszalka, 2001; Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999; U.S. Department of Education, 2000, April). Because teachers teach as they have been taught, recent studies also suggest that professors model effective teaching strategies using technology (Yildirim, 2000; Loschert, 2003). Teachers with more

professional development in the use of computers and the Internet are more likely to assign various types of work involving those technologies (U.S. Department of Education, 2000, April).

Negative attitudes are barriers to the implementation of technology (Hong & Koh, 2002; Hazzan 2002/2003), but negative attitudes are not the only barriers to using computers and the Internet for instruction. Computer anxiety is also a barrier to technology integration. Computer anxiety is defined in conceptual and operational terms. The conceptual definition focuses on the emotional aspects of computing, such as fear, apprehension, and phobia toward computers and the use of computers. The operative definition focuses on the extent of the anxiety, such as the fear of using a computer or the fear of making a mistake (Hong & Koh, 2002). Some pre-service teachers have expressed a fear or apprehension (a) that all students would not learn the same material because computing allows them to work at their own pace; (b) that students would become dependent on computers, making them unable to solve problems for themselves; (c) that a lack of human interaction between teacher and student and student and student would develop; (d) that the changing role of the teacher from leader to facilitator would lower their status as respected educators; and (e) that students would be exposed to information without learning how to use that information (Hazzan, 2002/2003). These anxieties created barriers to the use of computers for instruction for these pre-service teachers.

Barriers to the use of computers and the Internet exist that are unrelated to the teacher's attitudes or anxieties toward computers. Those barriers are due to lack: of materials, of training, of support or of protection. Barriers due to lack include (a) not enough computers, (b) lack of good instructional software, (c) lack of release for professional development and lack of technical support, (d) lack of administrative support, (e) lack of funding, and (f) concern about students accessing inappropriate materials (U.S. Department of Education, 2000, September; U.S. Department of Education, 2001). The purpose of this study is to identify the three most frequently reported barriers, due to lack, that hinder the use of computers and the Internet for instruction. I propose that the three barriers most frequently reported will be (a) not enough computers, (b) lack of time in schedule for students to use computers in

class, and (c) lack of funding. In this study, a barrier is being defined as that which deters the use of computers and the Internet for instruction. Instruction is being defined as that which (1) supports curricular goals and standards, (2) communicates facts, ideas, and concepts, and (3) requires the student to solve problems and think critically.

Methods and Procedures

Participants

A purposive sample was chosen from a High School InTech (Integrating Technology) class, meeting at Macon State College, in Macon, Georgia. InTech is a course designed to teach educators how to effectively integrate technology into instruction (Georgia Educational Technology Training Center, 2001). The participants, who were in the midst of their 4th (out of 7) instructional session, were selected because they were receiving formal technical training in the use of computers and the Internet for instruction. This training gave the participants a foundation in the use of computers and other digital technologies (such as digital cameras and scanners), the use of operational and instructional software, and the use of the Internet. In addition, participants were required to spend extensive computer time, during the course and in the field, incorporating technology into instruction. This foundation in technology integration reduced the interference of negative attitudes toward computers and anxiety towards computers, thus enabling the participants to make informed choices when rating the barriers to the use of computers and the Internet in their instructional settings.

The participants were high school (grades 9 through 12) and adult education educators from the middle-Georgia area, including Bibb County, Henry County, and Baldwin County. The class consisted of 15 educators, 13 females and two males. Of the 15 educators who participated in the survey, there were 12 teachers, two administrators, and one technology specialist. The educators ranged in teaching experience: 40% taught for 1-5 years, 0% taught for 6-10 years, 13.3% taught for 11-15 years, 20% taught for 16-20 years, 6.7% taught for 21-25 years, 13.3% taught for 26-30 years, and 6.7% did not record teaching experience. The educators also ranged in hours of professional development in the use of computers and the Internet. During the last three years, 13% of the

educators had 0 hours, 33.3% of the educators had 1-8 hours, 13% of the educators had 9-32 hours, and 40% of the educators had more than 32 hours of professional development.

Instrumentation

The instrument was a 17-item survey. The first 13 items measured perceived barriers to the use of computers and the Internet for instruction. Each of these items was rated on a 4-point Likert-type scale (1=Not a barrier, 2=Small barrier, 3=Moderate barrier, 4=Great barrier). The remaining four items included demographic questions regarding gender, number of years employed as a teacher, present position, and hours of formal professional development during the last three years. The instrument included clear directions for completing the survey and a box that could be checked to give the researcher permission to use the responses in the study. The instrument was not pilot tested. Sixteen of the 17 items were taken from a survey conducted by the U.S. Department of Education, entitled *Public School Teachers Use of Computers and the Internet*. Items 11, 17, and 19 were used from this survey (U.S. Department of Education, 2001). Because my survey questions were used by the U.S. Department of Education National Center for Education Statistics, I was confident that the items of my instrument had been tested for reliability and validity for ranking perceived barriers to computers and the Internet for instruction. See Appendix.

Procedures

Before conducting the survey in the InTech class, I obtained permission for the InTech director for Macon State College. The survey was administered on the fourth day of training, the second Thursday in April 2003. During the introduction, I informed the participants of the purpose of the study and its voluntary nature. I also informed the participants that their permission was needed before their responses could be included in the results of the survey. I instructed them to check the box at the bottom of the survey to indicate permission to use their responses. After the surveys were completed, I enclosed them in a folder until the data was tabulated in Microsoft Excel.

Because the small sample size may not represent the general population of high school and adult education educators in the middle Georgia area, the results of this study cannot be generalized beyond these participants. The results are valuable to the degree that they indicate perceived barriers that must be addressed in order to increase the use of computers and the Internet for instruction. Experimenter bias would be the only internal threat to validity relevant to this study. I did not make leading statements in my introduction of the survey; therefore, I did not detect any internal threats to validity in this investigation.

Design and Data Analysis

This is a descriptive, survey study. Perceived barriers to using computers and the Internet for instruction will be analyzed using percentages to determine the three most commonly reported barriers. The three barriers with the highest percentages within the “moderate barrier” and “great barrier” ranks will be selected.

Results

The purpose of this study is to identify the three most frequently reported barriers to using computers and the Internet for instruction. The three barriers most frequently reported were “Not enough computers” (40%); “outdated, incompatible, or unreliable computers” (53%); and “lack of release time for teachers to learn, practice, or plan ways to use computers or the Internet” (40%). Two barriers, “not enough computers,” and “outdated, incompatible, or unreliable computers” did not add up to 100 percent of the responses due to participants choosing not to rank those barriers.

The three barriers with the highest percentages within the “not a barrier” and “small barrier” ranges were “Internet access is not easily accessible” and “concern about student access to inappropriate materials” (40%), “lack of administrative support” (47%), and “lack of support regarding ways to integrate telecommunications into the curriculum” (53%). Under the barrier “other” two educators wrote in the responses “learning and teaching technology simultaneously” (rated as a “great barrier”) and “not enough computers in classroom” (unrated).

Discussion

Of the three barriers most frequently reported, “not enough computers” was the only barrier consistent with my original hypothesis. Most educators reported that the computers that are available for instruction were “outdated, incompatible, or unreliable.” Educators expressed a need for more time for professional development by rating “lack of release time for teachers to learn/practice/plan ways to use computers or the Internet” among the three most frequently reported barriers to using computers and the Internet for instruction, which is consistent with current research (Loschert, 2003; WestEd, 2002; Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999; Koszalka, 2001; Hong & Koh, 2002; Yildirim, 2000).

There were no confounding variables that would affect the internal validity of this study. As to the external validity of this study, I believe it provides a snapshot to the perceptions of educators in regards to the use of computers and the Internet for instruction. Because the sample size was small, I will not form a generalization based on the data. I do believe that the data does suggest a need to make more computers available to educators and their students, especially in the classroom—as one educator added. I also believe that the data suggests a need to keep those computers up-to-date, compatible with new software and reliable in function. I still maintain that a lack of funding is a contributing factor to the lack of computers; the lack of up-to-date, compatible, reliable computers; and the lack of release time for teachers to learn/practice/plan ways to use computers and the Internet for instruction.

Overall, the educators who participated in this study believe that they are well supported by administrative support, technical support, and support in the integration of technology into the curriculum. This positive outcome is probably due to the requirement of the federal government for teachers to learn to use computers and the Internet for instruction (Loschert, 2003).

The three barriers most frequently reported were “not enough computers;” “outdated, incompatible, or unreliable computers;” and “lack of release time for teachers to learn/practice/plan ways to use computers or the Internet.” I believe that the findings of this study confirm and extend existing knowledge of the barriers to using computers and the Internet for

instruction, but further study is recommended. Barriers must not only be identified but addressed and resolved by state and local school boards in order to increase the percentage of teachers who use computers and the Internet for instruction.

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Percent Perceived Barriers

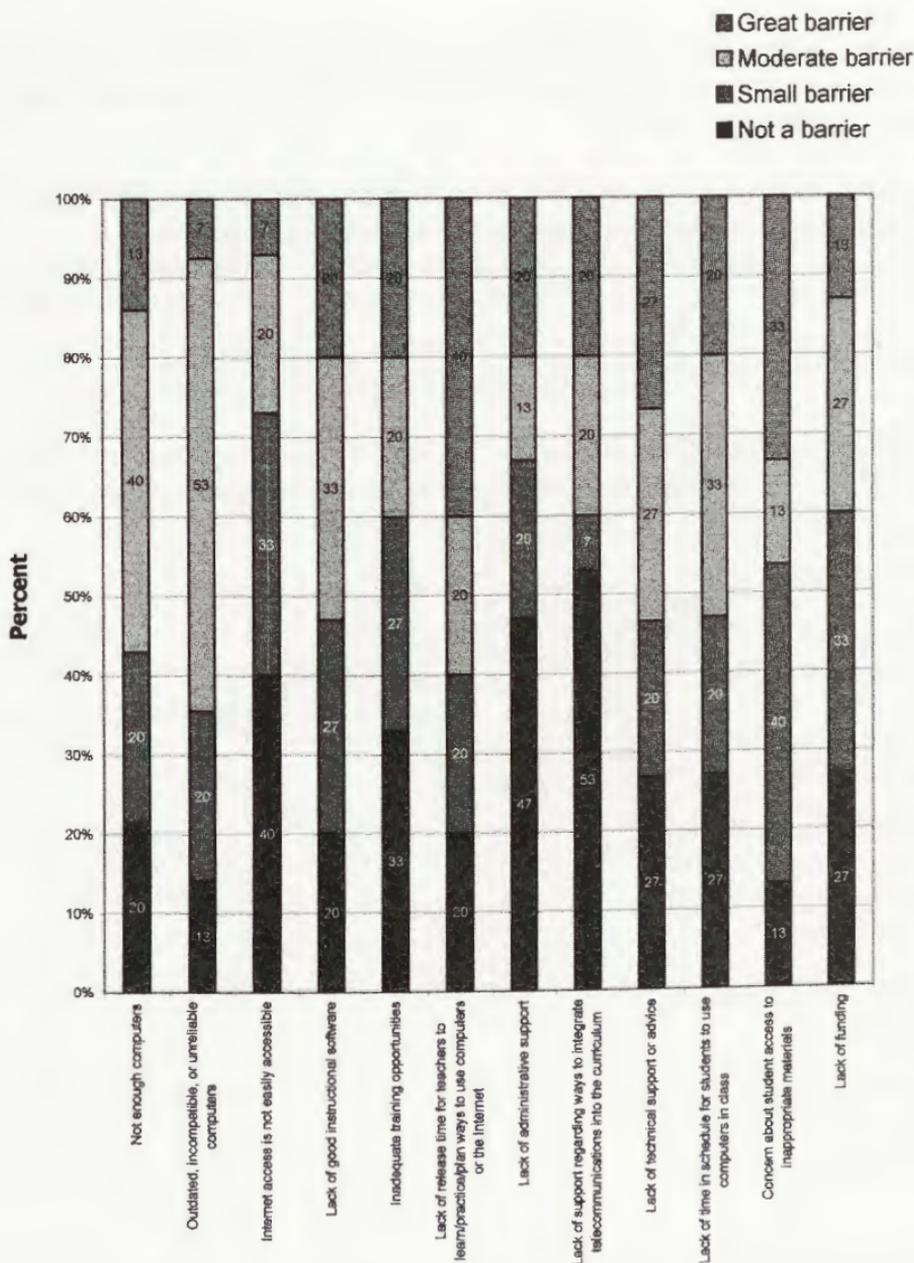


Figure 1. Percentage of educators who reported perceived barriers to using computers and the Internet for instruction.

Appendix

Possible Barriers to the Use of Computers and the Internet for Instruction

You are being asked to participate in a study investigating perceived barriers to using computers and the Internet for instruction. Your participation is voluntary. Thank you

1. Please indicate to what extent, if any, each of the following are barriers to your use of school computers or the Internet for instruction.

	Not a barrier	Small barrier	Moderate barrier	Great barrier
a. Not enough computers	1	2	3	4
b. Outdated, incompatible, or unreliable computers	1	2	3	4
c. Internet access is not easily accessible	1	2	3	4
d. Lack of good instructional software	1	2	3	4
e. Inadequate training opportunities	1	2	3	4
f. Lack of release time for teachers to learn/practice/ plan ways to use computers or the Internet	1	2	3	4
g. Lack of administrative support	1	2	3	4
h. Lack of support regarding ways to integrate telecommunications into the curriculum	1	2	3	4
i. Lack of technical support or advice	1	2	3	4
j. Lack of time in schedule for students to use computers in class	1	2	3	4

