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From Blackboard to Browser: How Internet Capabilities Shape Teaching Practices

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Abstract

Through classroom observations and semi-structured interviews conducted during the 2002-2003 academic year, this qualitative case study examined the intersection of three perspectives on the use of Internet-based technology in K-12 classrooms: the teacher's experience, classroom processes, and Internet capabilities, in order to investigate how four constructivist-oriented teachers use the Internet to support their views of teaching and learning. This paper presents findings from the examination of the first perspective, focusing on the factors that experienced technology-using teachers in technology-enhanced schools described as influencing their use of the Internet in classroom practice. Preliminary analysis reveals several overarching themes: (1) Teachers felt influenced to use the Internet in their teaching when they saw it as helping them *adjust their teaching styles* in ways more favorable to students' learning or more favorable to their being the kind of teacher they want to be, (2) Teachers said that increased *access* to Internet resources, defined as physical access in classrooms and at home, time to tinker and explore, and the ability to quickly obtain useable resources, lead to their increasing use of the Internet as a reliable and efficient tool to use with students, and (3) Teachers said that watching their *students and/or their children's use of the Internet* drove them to use it in increasing and varied ways in their classrooms.

More and more teachers are finding themselves in increasingly technology-rich contexts. The findings of this study help to illuminate the practice of teachers currently using the Internet in similar technology-rich contexts and advance theory concerned with the design of online learning communities and teacher preparation programs that seek to support promising instructional practices in the presence of increasingly ubiquitous, powerful networked technologies.

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Introduction

The Internet is an underutilized, but powerful resource for teaching and learning. Internet technologies can help students learn critical problem-solving skills (Chan, Burtis & Bereiter, 1997), model complex ideas (Gordin & Pea, 1995), use advanced “tools to think with” (Jonassen, 2000) and help teachers improve instructional practice (Honey, Carigg, & Hawkins, 1998) and their professional development (Bransford, Brown & Cocking, 1999). Today, although teachers are in a better position than they ever have been to use the Internet in these ways (NCES, 2001), most are not using the Internet to significantly advantage their teaching and learning. Becker (1999), in conducting a survey of over 4000 technology-using teachers in K-12 schools, claims that--even among educators in “high usage” settings where teachers have expertise in using computers and high-speed classroom-based Internet access and believe in the Internet as “essential” for their teaching--less than 50% of these teachers use the Internet in a substantial way with students (p.3). While several identified studies have used mainly quantitative methods to illustrate the *frequency*, *types*, and *locations* of teachers’ use of computers (Becker, 1999; Anderson & Ronnkvist, 1998; NCES, 2000; PCAST, 1997), there has been a lack of qualitative educational research that has explored the *processes* teachers employ in using Internet resources specifically and the impact of Internet use *on teachers* (Becker, 1999). The purpose of this case study was to move beyond documenting the incidence of teachers’ Internet use to consider the processes that characterize such use in “high usage” classroom contexts, the relationships between these processes, and the nature of the individual’s experience in using Internet-based technology. Understanding teachers’ perspectives on their use of emerging technologies is essential if we, as teacher educators, are to help them develop and sustain practices that advance students’ learning.

Purpose

This investigation used in-depth case study to examine the intersection of three perspectives on the use of Internet-based technology in K-12 classrooms: the teacher’s

experience, classroom processes, and Internet capabilities in order to (1) describe the factors that “high usage” teachers experience as shaping their practices in using the Internet, (2) describe how such teachers use the Internet to support their views of teaching and learning in technology-enhanced schools, and (3) suggest how the Internet’s unique and varied capabilities assist, adapt, or frustrate classroom practice in these educational contexts. This paper presents a subset of this larger study, focusing specifically on the first research question by describing and discussing the factors that teachers experienced as shaping their practices in using the Internet.

Theoretical Framework

Much of the current relevant research on uses of the Internet in education builds on “constructivist” theory and can be placed within these conceptual categories:

Individual Focus: Which teachers use the Internet for instruction and professional development (i.e. teacher characteristics, beliefs, philosophy, etc.)?

Classroom Focus: How do teachers use the Internet to support classroom pedagogy (i.e. characteristics of use, interactions, constructivist practices, etc.)?

First, several researchers have moved beyond the treatment of teachers as a group to explore the *individual* factors that influence technology use in educational contexts (Lieberman, 1996; Fulton, 1999; Becker, 1999). According to Becker and Ravitz’ survey (1999) of over 4000 teachers in 150 U.S. K-12 schools, teachers who are most likely to use the Internet in promising ways in their practice demonstrate several characteristics: 1) certification in “core” subject, 2) four or more years of teaching experience, 3) experience in using computers, 4) above average length and quality of postsecondary education and participation in professional development, 5) belief in constructivist principles of teaching and learning, 6) perception of the Internet as a potentially valuable resource, and 7) belief in their capacity for learning and innovation. Moreover, there is growing consensus that teachers’ underlying beliefs (i.e. about themselves, about teaching and learning, about technology’s potential, etc.) enhance or impede pedagogical change in the presence of innovation (Harris & Grandgenett, 1999; Fulton, 1999).

Secondly, many researchers interested in technology use in education have focused their investigation on its *use in classrooms* (Chang, et.al, 1998; Fisher, Dwyer, & Yocam, 1996). Several frameworks for teaching with technology emphasize constructivist-oriented instructional designs such as M. Wiske’s Teaching for Understanding (1994), J. Bransford’s How People Learn (1999), D. Jonassen’s Mindtools (2003), and E. Wenger’s Community of Practice model. They suggest that the most promising uses of the Internet for teaching and learning are those that

are learner-centered, focused on the deep and multi-dimensional nature of understanding, promote active construction of knowledge in a meaningful context where there is ongoing feedback between the learner and the environment and dynamic interaction among learners, teachers, and the context in which they operate. Considering teachers' Internet use from this perspective seems particularly important today given that national standards for student learning in content areas emphasize higher order skills and in-depth knowledge (NCTM, 2000; NCTE, 1996; NRC, 1995; NCSS, 1994) which seem to require constructivist approaches to attain.

Participants

A purposive sample of middle and high school teachers drawn from technology enhanced schools within a large metropolitan area were selected for this case study (Yin, 1994). Teachers were selected from "high usage" (Becker, 1999) schools where the following were demonstrated: teachers had a high-speed Internet connection in their classroom and Internet access at home and used the Internet on a weekly basis (i.e. for gathering information, communicating with other teachers, posting information to the World Wide Web, providing instruction for their students, etc.). In addition, teachers represented dimensions of variation in the target population believed to affect teachers' use of the Internet such as education, teaching experience, computer-using experience, beliefs about teaching/learning, content area expertise, etc.) (Becker, 1999). Participants had at least nine years of teaching experience, at least seven years of computer-using experience, education beyond a bachelor's degree in their content area, expressed their orientation toward constructivist teaching practices and believed in the Internet as essential for teaching and learning. The first participant, Charlie, taught life science in seventh grade at a suburban middle school. The second participant, Sonya, taught earth science in seventh grade at an urban middle school. The third participant, Keith, taught art in grades 10 through 12 at a large regional high school. The fourth participant, John, taught biology in grade 10 and 11 at a suburban high school in an affluent community. Selecting teachers who differed from one another but who shared similar teaching beliefs and practices, computer skills, and frequency of Internet use in the classroom allowed me to capture the unique richness of each teacher's experience as well as identify similarities across cases.

Methods

Qualitative data were collected through semi-structured long interviews and classroom observations with teachers approximately every six weeks throughout the 2002-2003 school year in order to examine the teacher's Internet use in practice and identify and corroborate emergent themes. ATLAS qualitative software was used to analyze data according to an iterative, grounded approach to theory building (Strauss & Corbin, 1994).

Findings

This investigation of teachers' perspectives on how Internet capabilities shape their use of it for teaching and learning revealed several overarching themes: (1) teachers mentioned a range of factors that influenced how they used the Internet in practice (i.e. their view of its impact on teaching styles, sense of time and access to Internet resources, students' and/or their kids' use of the Internet, educational experiences such as teacher preparation or professional development and their personal interest), (2) in reflecting on their classroom practices with the Internet, experienced Internet-using teachers said they believed that the Internet was a valuable tool for hands-on learning or learning that is active and engaging to students, (3) teachers said they preferred to teach in ways that support a constructivist-oriented classroom but did not, in fact, consistently use the Internet in ways that supported these views, and (4) teachers were able to articulate a limited range of Internet capabilities but were less clear on how these could support students' understanding of key content area concepts or of the teacher's own professional learning. In focusing on this first finding that teachers experienced several factors as shaping their practices in using the Internet, three interesting themes emerged from the coding process.

Theme 1: Teachers felt influenced to use the Internet in their teaching when they saw it as helping them adjust their teaching styles in ways more favorable to being the kind of teacher they want to be or more favorable to students' learning.

In discussing their views of teaching and their preferred teaching style, participants talked about wanting to move away from behaving like the "expert" or "center stage" and move toward helping, guiding and facilitating while students do more hands-on activities in their classrooms. For example, John, a high school biology teacher, talked about wanting to teach in ways that were more "constructivist"-- which he defined as setting up opportunities for students to find

multiple entry points into the subject matter such as writing poetry, creating collages, debating issues as ways of learning biology -- and less “traditional, lecture” oriented. He viewed the Internet as a potentially information-rich and interactive resource that students could utilize in ways that enabled him to replace the “song and dance” he would typically do in lecture-oriented teaching:

The less I have to do, the better. The less I have to be the show, the better, I think... you can find all sorts of resources out there that you can use in class that would do the same thing that you would do in a song and dance up front and students are able to use it [the Internet] in an interactive way that they wouldn't in an open-your-head-and-let-me-pour-it-in sort of thing. But they get to do it themselves. Again, I don't like having to stand and be the lecturer. So if there's any other way that I can do it and I can have fun doing it. <pause>. You know, creating can be fun. So if I can have fun doing that and my students will go “ooh!” I think that it's worth it.

Similarly, Sonya, a middle school science teacher, discussed how the Internet fit with her goals for herself and for her students:

I might have them then practice with a friend a problem...but then, when we pull together for discussion, I might have one of the students become the teacher. I really truly *believe* <emphasis> in being a *guide on the side*. I really don't like lecturing. So part of my class is usually review and introduction to new stuff, and then, I try to get the kids involved in some way: lab, working in small groups, and then coming to the front and being the teacher, essentially, and summarize...I really want them to be truly challenged. I want them to be pushed to that far out angle, wonder 'if.'

Teachers saw the Internet's ability to infuse their teaching with new energy and fun as, in turn, engaging them in developing and reinventing classroom practices to support the kind of teacher they wanted to be. More specifically, they saw the Internet's ability to bring information and resources in a content area into the hands of students as enabling them to transition from knowledge source to assistant. Interestingly, in shifting into a helping role while students used the Internet, teachers were observed focusing their interactions with students on search procedures or technical questions rather than on the content being explored. One teacher discussed his belief in the Internet's ability to foster students' understanding of a “variety of issues” with little direction from him:

[The Internet]...is an incredible, rich resource for them which will give them a better understanding of where they are in the world. And how much more there is in the world than where they are. That is my big hope. And I think they do get that. I think the more the Internet has grown over the last very few years, the more they seem to have a better understanding of a variety of issues, and they don't have to wait to be told. And so I think that is very positive.

If teachers saw their use of the Internet as helping shape their teaching toward student-directed practices, they seemed less certain about what student-teacher interactions in the presence of the Internet should look like to be most effective.

Furthermore, teachers cited their views on student learning as a positive influence on increased use of the Internet. Participants talked repeatedly about their beliefs that students learn differently, that they have multiple learning styles in any given classroom, and that an activity that “hooks” some students may overwhelm or turn off others. Thus, to be a more effective teacher they needed to offer students multiple learning opportunities from which to approach the same content. They said using the Internet helped them do this. For instance, Charlie, a middle school teacher, said he was influenced to use the Internet the more he saw how it expanded the range of tools he could use to help his students learn life science:

What influenced me to use the Internet is that it has enhanced my teaching... simply because it has given me different tools to get different kids to tap their learning ability. I could just go back to this whole quiz thing. Now kids have this fear factor of taking a test. Do it over, and over, and over. And, it's a practice tool. It's another thing I can use to give them a different option or way to learn.

Sonya said she was influenced to use the Internet when she saw how it helped her teach to kids that she might otherwise never reach.

That is the other thing, you are maybe pulling out a talent in these kids in Science that you never pulled out before: a creativity or the technical part of a kid.

When participants saw the Internet as helping them shape their teaching in ways that made it more enjoyable and aligned with their teaching philosophies as well as helping them draw individual students into the act of learning, they were more likely to use it.

Theme 2: Teachers said that increased access to Internet resources, defined as physical access in classrooms and at home, time to tinker and explore, and the ability to quickly obtain useable resources, lead to their increasing use of the Internet as a reliable and efficient tool to use with students.

Although more teachers than ever before can access the Internet in their school buildings, issues of Internet accessibility are still foremost in the minds of even those in “high usage” settings where teachers can utilize high-speed Internet in their classrooms, in computer labs, and at home. In this study, participants interpreted the word “access” broadly as: (1) the ability to

physically get online, (2) time to spend online exploring, trying things out, getting familiar and comfortable with the Internet, and (3) knowing how to quickly locate or download useable resources and utilize them in practice. They cited all of these access issues as influencing their use of the Internet in practice. For example, Sonya discusses below how being able to get online within her classroom lead to her using the Internet more often:

If you would have come and seen me last year, I wouldn't have been able to give you a third of this stuff. It's [using the Internet] so much more convenient with the airports and the laptops; I am able to complete stuff because they are mobile. Sometimes I can't get into the computer lab but I can always get this [mobile lab]...now with all this access, we can't help but use it now. I have one computer for every two kids. That is the other thing. Outside of our building, I don't know anyone else who has that...I am really impressed with what the airport has done for us so we can actually bring it into the classroom and the technology has gone so far. I never would have dreamed in a million years that it would have gone this far where I would actually have the kids sitting in their desks, able to go on the Internet and we can even print from the Internet to a printer...from that mobile lab. I never would have dreamed that.

In addition, teachers cited access to time online as a key factor influencing their increased use of the Internet. They mentioned that at first, they saw time spent on the Internet as wasted time when they had to sift through kid-unfriendly or irrelevant Web sites where the reading level was too high or too text heavy or lesson plans they found were not easily implemented; however, the more familiar they got with how to search and sift online, the more they saw using the Internet as saving them time and as a time savings tool to use with students. For example, one teacher, Charlie, discussed feeling overwhelmed by the Internet until he spent time learning how to be more focused and effective in his searches and in turn, how students' using the Internet could make them more efficient:

I needed to feel more comfortable using it than I did. I didn't need to feel so overwhelmed, that this is going to take me hours. I might as well screw this prep time because it's over. I have to sit on the Internet for hours to find this information. And now that I've had more time to find this information... and I even took the step further than going to Google in that I strictly went to, like, enhanced teaching, teacher sites where they were giving me direct things like lesson plans. And I thought by doing that I'd even focus my search more because they [Web site developers] had already gone through and found some of those sites to use with students...if I didn't visit these sites before today, this lesson would have gone very wrong....And now after doing it [using the Internet] with the kids and seeing what they found, they went right to these Ask Jeeves and Google, and they got their information. You know what, it was pretty effective. They got what they needed to get.

Seeing the Internet as a teacher-friendly, efficient tool they felt comfortable with influenced these teachers to use it in more frequent and varied ways with students. Most importantly, teachers said they used the Internet more when they experienced repeated success in accessing or downloading materials they understood how to use to make teaching better and easier. As one teacher put it, he saw how using the Internet helped him get away from “cookie cutter” stale lessons to make his teaching “cool” without having to “reinvent the wheel.”

Now when I got here the Internet was something that oh, geez, this is easy, I can do this here. I can write my own web classes; I can have my students do the stuff that I want them to do and not have to do the cookie cutter, recipe book stuff that is out there. And I can tailor the lessons that I want to use based upon what I can find on the Internet....it is those sorts of things that you can find that you can use in your classes that are cool. Not going to have to reinvent the wheel. It is already there...something that is concise, something that is... they are not going to have to search, use search engines to find, something that is relevant to what we are studying, something that is at their level. Not above or below... something that I can easily tie in to what I am doing.

This interview excerpt is interesting in that it illustrates both the teacher’s wanting to teach in new, interesting ways, which would seem to require innovation, without having to “reinvent the wheel.” A distinction is made between creating or tailoring lessons without also having to create the materials students use in the lesson, thus freeing up time to develop teaching methods. To sum up, the Internet was seen as accessible when it was available to students and teachers in the classroom, when time invested in using it was returned in finding easily integrated resources, and when locating and using online resources were seen as enriching teaching practices.

Theme 3: Teachers said that watching their students and/or their children use the Internet drove them to use the Internet in increasing and varied ways in their classrooms.

Finally, teachers in this study cited use of the Internet by younger generations as a major influence on their use of it in the classroom. They saw that their students and/or their children use the Internet as “a part of their life” and consequently, saw their role as helping students use the Internet not just for entertainment but as a tool for learning:

The kids are now...they are born with computers. I was born with a calculator. So it is a part of their life. My children, it is a part of their life. They have never known life without it. So as a teacher, it is my job to make sure I am teaching them how to use it as a teaching tool to make them expand knowledge.

Also demonstrated in their comments was the teachers’ sense of needing to catch up to where they believed students were in using the Internet.

I use Google. I use Yahoo, just like the kids do and it really got me to where I needed to be...it's been really helpful. So I've enjoyed it. It's been good for me.

The participants in this study felt that students were increasingly aware of how to find information on the Internet and often brought that awareness into the classroom. They wanted to use the Internet to build on the Internet-using skills their students possessed as well as teach them to use the Internet in ways that could make students more self-directed. Thus, they were able to turn what could have been interpreted as intimidating pressure from students to use the Internet into an opportunity to learn how to be a better teacher, as Charlie put it "it really got me to where I needed to be...It's been good for me."

Implications for Practice

More and more teachers are finding themselves in increasingly technology-rich contexts. Teachers' experiences in classrooms wired for Internet use have implications for how or whether students utilize this resource for learning. As outlined in this paper, in-depth research on constructivist-oriented teachers' use of the Internet for classroom teaching and their own learning helps to illuminate the practice of teachers currently using the Internet in similar technology-rich educational contexts. The findings of this study also lend further insights to how teaching with the Internet can align with and support standards-based instruction toward improving students' higher order thinking. Finally, in seeking to contribute to a deeper understanding of a teacher's activities and interactions with the Internet and his or her perceptions of practice and professional learning, this study has implications for research concerned with the design of online learning communities for teacher development.

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