Instructional Design Changes Teacher Attitudes Towards Instructional Technology

Purpose

Using the principles of instructional design, we developed training to provide the necessary skills teachers need to integrate blogs with daily classroom lessons. A small, preliminary sample of teachers responded to the same survey before and after the training. We, subsequently, analyzed their responses to determine if there was a significant difference in attitude towards technology in general and the use of technology in the classroom.

Theoretical Framework

Students need to learn how to routinely and proficiently synthesize the uses of technology tools with the traditional curriculum of math, science, language arts, and social studies in order to participate in a work environment that is heavily dependent on those tools. Unfortunately, these skills are not taught consistently and effectively in most classrooms (Partnership for 21st Century Skills, 2007). While the government invests in increasing access to technology in the classroom, teachers continue to lack a productive level of comfort with rapidly changing and unfamiliar technologies (Zhao & Conway, 2001). They are often untrained and/or unwilling to embrace technology, possibly due to ingrained pedagogical beliefs and their own educational experiences. This discrepancy between the technology- and media-suffused environment that students are exposed to outside of the classroom and the stark, conventional environment that is void of any technology experienced in the classroom creates a disconnect between educators and learners (Ertmer, 2005). As one of our surveyed teachers stated, "Students today have to dumb down their technology skills for the teachers."

Previous research suggests that computer technology has increasingly proven its potential in helping teachers facilitate students' problem-solving skills, scientific inquiry, understanding of abstract mathematical concepts, communication skills, and workplace competencies (Office of Technology Assessment, 1995). Current learning theories, such as constructivism, emphasize using computer technology as a tool to access and organize information and to construct personal knowledge. Yet, "despite technologies available in schools, a substantial number of teachers report little or no use of computers for instruction" (p. 1). This is still the case today, as Lawless and Pellegrino (2007) indicate that the technology gap is not created by limited access to technology, but limited access to teachers who know how to integrate technology effectively into their teaching practices. As another one of our surveyed teachers stated, "Staff development needs to help teachers implement the technology more naturally."

Therefore, professional development should not only enhance teachers' technology literacy and skills, but also increase teachers' level of comfort with using technologies and, thus, changing their pedagogical beliefs (Lawless & Pellegrino, 2007). Professional development should enhance teachers' various teaching and evaluation strategies and foster teachers' abilities to identify students' differing learning styles, as well as introduce various communication modes, such as face-to-face, virtual, or blended. It has become increasingly evident that the key to the modernization of educating today's students is the proper development of teachers' information,

media, and technology skills, including the ability to adapt those skills to changing methods (Partnership for 21st Century Skills, 2007). These needs, the characteristics of the teachers as learners, and the concept that the training should be delivered in an authentic format (i.e., with technology) are all principles of good instructional design. Planning with all of these principles in mind is paramount to producing effective professional development that achieves the desired outcome – quality instruction that naturally integrates technology (Cennamo & Kalk, 2005).

When comparing technology tools and their capacity for use in the classroom, research shows that blogs have advantages over other tools (Wijnia, 2004). Blogs can be created without any knowledge of HTML or similar web design tools (Downes, 2004). They free users from extensive set up time, additional hardware, and insurmountable prerequisite skills. Their ease of use is enhanced by a more natural implementation with existing teaching methods and traditional curriculum formats than is found with other technology tools; for instance, blogs display contents in a chronological order, provide teachers with a platform to give feedback to each student publically or privately, and use platforms so basic that a teacher can simply "copy and paste" and be using a 21st century tool. They are relatively straightforward for a novice, yet at the same time are dynamic enough to incorporate advanced tools, such as hyperlinks, pod casting, photo sharing, and so on. In addition to the curriculum content set forth by the teacher, blogs allow students to serve as co-authors in a virtual community that incorporates collaboration, knowledge construction, and contribution to a global conversation (Jakes, 2003). Because they are user-friendly and an indicator of participation, blogs are poised to be one of, if not, the primary 21st century tool used in education, replacing more traditional tools, such as textbooks and worksheets, and fostering more effective and efficient in-class discussion and regular reflection (Farrell, 2003; Lankshear & Knobel, 2006).

We examined the question: Does training that is developed using the principles of instructional design significantly change the attitudes of teachers on using technology in the classroom? We predict that there will be a significant, positive change in attitude towards the technology and teaching students with the technology. This is a reasonable result due to the fact that the cornerstone of instructional design is to create curriculum around the competencies and desired outcomes of the students – in our case, the teachers being trained on implementing blogs in the classroom.

Methods

Instructional Design

The training consisted of an introductory discussion on the history and role of blogs in education. Next, the teachers were guided step-by-step on how to set up a new blog account on a free platform, Edublogs. They engaged in activities that paralleled what students do with blogs (e.g., posting blog topics, managing blog postings, and responding to blog comments). This was done through live instruction and a printed manual, which had been developed through needs analysis and several rounds of review and revision. Finally, the teachers analyzed the grade-level appropriateness of and brainstormed improvements to established blog-based lesson plans across all core subjects (math, science, language arts, and social studies) and grade levels (K – 12).

Feedback provided by the teachers establishes that the training was well designed, implying that the principles of instructional design had been followed. For instance, when teachers were asked to rate the effectiveness of the training and the materials, the mean was 4.14 (on a scale of 1 to 5, with 5 being the highest). When asked to rate the usefulness of the materials and the platform (Edublogs), the mean was 4.14 (on the same scale). More impressively, their ranking on the activities' effectiveness in assisting with the creation of classroom blog topics also provides evidence that the training had been well planned; teachers ranked the activities with a mean of 4.43.

Data

The training was conducted over a 2-hour session in an enclosed computer lab. Each teacher had a laptop, and a professional trainer conducted the training with the assistance of a technology specialist. Teachers were compensated with materials to use in their classroom and access to the blog sites developed for the training. The first group to be trained consisted of 7 teachers, all from the Central Texas area, who were not selected randomly but for a representative sample of today's urban educator:

- 85.7% female; 14.3% male
- 85.7% Caucasian; 14.3% Hispanic
- Age range, 26 – 57; median age 31
- 57% had a bachelor's; 14% had a master's; 14% had a doctorate
- 14% taught elementary; 71% taught secondary; 14% taught higher ed
- Years of teaching range, 2 – 15; median years 7

Each teacher was given a survey collecting data on the demographics listed above and competencies in technology. On the same scale of 1 to 5, teachers reported a mean competency of 4 when asked to self-rate their proficiency with computers and a mean competency of 1.57 when asked to rate their experience with blogs. In addition, teachers were given the same survey of 6 questions before and after the training, each rating on the same scale of 1 to 5.

Analysis

To analyze whether or not the data supports our prediction, we conducted a paired-samples *t* test for each rating (before the training and after the training) on three domains: general technology in the classroom, Internet-based applications, and blogs. Each domain asked teachers to rate their self-perception of aptitude and perception of their students' aptitude or rate their self-perception of aptitude and comfort level teaching students with a particular technology.

Results

Analysis of our first trained group indicates that there is a positive change in attitude on the use of technology in the classroom, both in the teachers' own comfort level ($M = 3.4286$, $SE = .52812$ (before); $M = 3.8571$, $SE = .40406$ (after)) and the teachers' perception of their students' comfort level ($M = 3.7143$, $SE = .52164$ (before); $M = 4.2857$, $SE = .28571$ (after)).

However, these positive changes were not significantly different ($t(6)$ = -1.441, p > .05 (teacher); $t(6)$ = -1.549, p > .05 (student)).

When asked about attitudes towards Internet-based applications, a positive change was again reported. Both teachers' own comfort level (M = 3.7143, SE = .56544 (before); M = 4.1429, SE = .45922 (after)) and the teachers' perception of their students' comfort level (M = 4.0000, SE = .37796 (before); M = 4.1429, SE = .34007 (after)) had an increase in mean ratings. These changes were not significantly different ($t(6)$ = -2.121, p > .05 (teacher); $t(6)$ = -1.000, p > .05 (student)) as well.

The analysis resulted in a positive change in attitude towards blogs. The teachers' own comfort level with blogs in general increased by 1.8571 (M = 2.0000, SE = .30861 (before); M = 3.8571, SE = .14286 (after)). Their comfort level teaching students with blogs increased by 1.8572 (M = 1.5714, SE = .42857 (before); M = 3.4286, SE = .20203 (after)). These positive changes in attitude towards blogs were significant, both in the teachers' own self-perception ($t(6)$ = -7.120, p < .001) and in teaching with blogs ($t(6)$ = -3.653, p < .05).

Conclusions

The analysis of the data from the training surveys confirmed our prediction that there would be a significant change in teachers' attitude towards blogs and teaching with blogs. Although there were positive gains in the mean scores for both self-perception and perception of student aptitude with respect to technology in general and Internet-based applications, they were not significant. This could be due to two main effects: 1) the sample size is considerably small and, although picked to be representative, may not be a valid indicator of the population; and 2) many of the ratings before the training were capped (i.e., their first rating was 5).

Our future research will include updating the training materials to reflect current uses and research in blogs. We plan on conducting the revised training with at least 50 more teachers in the Central Texas area, providing a more representative sample of the teacher population. Furthermore, we will seek to include teachers in rural areas and teachers-in-training at local universities and colleges. As other research has found, thorough instructional design is key in training teachers to successfully acquire and integrate technology skills in the classroom. Using these principles as the backbone of our professional development program, we expect to see similar if not better results with a larger sample size. We these findings, we hope to assist teachers in realizing the need to bridge the gap between the technologically advanced, dynamic environment in which students live and the disciplined, structured environment in which they currently learn. It is imperative that this conflict between two cultural environments be resolved so that both teachers and students can successfully use the advanced tools of an increasingly arduous and transforming work environment.

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