STUDENT-DRIVEN CLASSROOM TECHNOLOGIES: TRANSMEDIA NAVIGATION AND TRANFORMATIVE COMMUNICATIONS

Leila A. Mills, Gerald A. Knezek and Jenny S. Wakefield
University of North Texas, 3940 Elm Street, Denton, TX 76207

ABSTRACT

This research paper explores middle school student attitudes towards learning with technology and proposes a design-based approach to formulating instruction that includes innovative classroom technology use with computers and communications technologies placed in the hands of students. The intent of this research is to advance practice and theory on student-centered use of information and communications technology (ICT), going beyond the implementation of school technologies for delivery of lessons and data processing. The focus of the recommended design-based approach is teaching and learning that provides opportunities for student-driven ICT use in the classroom, including transmedia navigation for classroom activities that encourage students to think, interact with instructional content, and engage in transformative communications.

KEYWORDS

Transmedia navigation, student-centered learning, design-based research

1. INTRODUCTION

Research indicates that all too often school technology is being used to support new options for delivery of traditional instruction rather than technology integration for teaching and learning (Bauer, Kenton; 2005). Cuban (2001) stated that the instruction in schools has changed very little in the last 20, 50, or even 100 years. Little progress has been made in school technology as a vehicle to deliver innovation for classroom learning activities (Halverson and Smith, 2009). Renowned technology expert, computer scientist, and educator Seymour Papert envisioned the transformative power of a new kind of system for education, one comprised of a student and a computer (Papert and Harel, 1991). Papert and Harel (1991) recognized that technology-related change in education would face an uphill battle. The dream of Papert has yet to be actualized in the majority of schools. That is, "although technology enthusiasts expected a revolution in technologies for school learners, what schools experienced was a revolution in technologies for measuring and guiding learning" (Halverson and Smith, 2009: 53).

This research is based on a sample of middle school students and their attitudes toward learning with technology and suggests a flexible design-based approach to the design, implementation, evaluation, and extension of successful strategies for design of student-centered instruction with student-driven use of classroom technologies. A focus on classroom discourse, transformative communications, and transmedia navigation are recommended as methods to extend knowledge and practice of successful, innovative classroom use of ICT.

2. CONCEPTUAL RATIONALE

2.1 A Design-Based Methodology

Design-based research is a systematic yet flexible methodology set in place to improve practice through iterative analysis, design, development, implementation, and re-redesign. This research and practice paradigm requires collaboration among researchers and practitioners and can lead to improved practice and revised theories (Van den Akker et al., 2006; Wang and Hannafin, 2005). Brown (1992) warned that examination of separate processes, as isolated variables within laboratory or other impoverished contexts, will provide incomplete pictures. A design-based methodology, however, allows researchers to incorporate theories and approaches to the classroom practice with continual re-evaluation, allowing for testing and validation of theories through a series of adjustments in application. Each adjustment can be considered a form of experiment that allows for generation of new theories for learning in naturalistic contexts (Brown, 1992; Collins, 1992).

2.2 Transformative Communications

Slow if gradual progress is being made towards acceptance of Dewey's assertion, offered nearly 100 years ago, that knowledge and common understanding cannot be passed physically from person to person as can bricks, nor can they be shared among persons as could a sliced pie (Dewey, 1985). Dewey, father of American pragmatism, believed it is fair to claim that any social arrangement that is vitally social, or vitally shared, is educative to those who participate in it, and further, that social interaction is identical to communication, while communication is the central process of education. Student initiated communication of ideas, reactions, and content are potentially transformative catalysts to the learning process. Sharples (2005) identified a need for a conceptual framework that recognizes the essential role of communication for learning in the mobile age. Sherry and Wilson (1997) conceptualized a transformative, dynamic, two-way system of communication for education within the Web environment that combines elements of transmission and ritualistic views of communication. Student-centered instruction incorporating transmedia navigation within the classroom can provide opportunities and channels for transformative communications.

Learning and teaching as communicative actions theory (LTCA) (Warren et al., 2010) supports instructional design for transformative classroom communications. LTCA discourse allows shared expression of identity and meaning making within a learning and teaching context that comprise four essential communicative actions defined as normative, strategic, constative, and dramaturgical (Wakefield, Warren & Alsobrook, 2011). The dramaturgical action (expressions of subjective understanding in the objective world), in particular, supports dynamic new models of classroom instruction that extend instruction beyond traditional classroom walls. Dramaturgical communicative actions are the result of individual understanding from interactions with content and ideas. The LTCA framework for learning has been used in Web environments utilizing tools such as Twitter (Wakefield, et al., 2011), blogging (Warren and Wakefield, 2012), in role play within virtual worlds (Wakefield et al., 2012), and in transmedia storytelling (Warren et al., 2013).

2.3 Information Technologies in Education

From the rise of the motion picture in the 1920s, to the appearance of the computer in the mid-1970s, educators have been intrigued with the potential of technology to aid in the transformation of education and improvement of student learning (Hew and Brush, 2007). Visionaries such as Papert and Harel (1991), predicted computers would be more than powerful classroom tools that would allow learners to construct and test complex hypotheses. Engelbart (2001) studied systems with the potential to improve effectiveness of individuals by connecting tools and methods suited to the capabilities of the person to the problem at hand.

School technology implementations typically have not been in the direction of student use of technology tools as media for interaction with classroom content within the school (Halverson and Smith, 2009). While it has been shown that appropriate application of information technology can, in fact, enhance student learning (Voogt and Knezek, 2008), the promise of personal computers as tools with power to support new systems connecting learners, instructors, and digital information for learning interaction and knowledge construction continues to be mostly unfulfilled (Halverson and Smith, 2009).

2.4 Classroom Activities: Transmedia and Learning

To learn, Ritchhart et al. (2011) noted, we must think and engage with content. There is, however, concern among educators that trends toward accountability-driven instruction have limited learning opportunities for students (Ravitch, 2010), decreasing instances of critical discourse, problem-solving, and collaboration within the classroom. One option for the introduction of engaging instruction in the 21st century classroom is interactive instruction implementing transmedia. Transmedia navigation, as noted by Jenkins et al. (2006: 4), is the ability to conduct research and follow topics, stories, and ideas "across multiple modalities" or media. Transmedia navigation can serve an important component of a technology-mediated learning paradigm known as the New Media Literacy (NML) framework (Jenkins, et al., 2006). Correctly designed, a transmedia lesson that offers students a choice from a variety of media, to include ICT tools, for interaction with contents can function as a blend of student-directed and instructor-mediated research, discourse, and expression that can provoke student thinking. A very simple implementation of transmedia navigation for middle school would allow students to read in class using paperback books, the Kindle, or iPads; topic-related discourse would include classroom discussion and posts to shared blogs; and final presentation choices would include classroom presentation with visuals, student-generated video, or enacted dramatic skits (Warren, et al., 2013). As noted by Wakefield et al. (2013:1612), "Learning through digital tools, actively seeking content, weaving together storyline, sharing, communicating, and expressing individual understanding—arguing, defending, and critiquing—may provide a way for cognitive learning in a community" and will additionally provide opportunities for development of NML skills for collaboration, problem-solving, and knowledge construction.

3. STUDENT ATTITUDES TOWARDS LEARNING WITH TECHNOLOGY

Student attitudes can be measured with reliable, validated survey instruments such as the Computer Attitude Questionnaire (CAQ. which includes five parts that build subscales to gauge: Computer Attitudes (Comfort with Computers and Learning with Computers), Empathy, Creative Tendencies, Motivation, Study Habits, Self Concept, and Attitudes toward School. The CAQ has foundations in an instrument designed for the youngest school-age children: the Young Children's Computer Inventory (YCCI). The research and development of the CAQ was funded by the Fulbright Foundation of Washington, DC, the Japan Society for the Promotion of Science, and the Texas Center for Educational Technology. The CAQ was formalized as a validated measurement tool in 1995 and was extensively used in research studies (Knezek and Christensen, 1995, 1996, 2000) before being released for public use in 2000. It was then revalidated in 2011 (Mills et al. 2011). The CAQ is comprised of 52 Likert-type statements with a 5-point response scale ranging from 1 = strongly disagree to 5 = strongly agree. Cronbach's Alpha internal consistency reliability for the CAQ subscale Learning with Computers (*alpha* = .83) and Creative Tendencies (*alpha* =. 88) were found to be very good, according to guidelines by DeVellis (1991) for the subjects of this study. One new prototype item was added to the Learning with Computers subscale for the purpose of this study: *The more often I use a computer at school the more I enjoy school.*

Selected items from the Student Attitudes Inventory (SAI) were also examined during this study. The SAI instrument gauges students' school-related dispositions. The SAI was developed for studies at the Hawaii State Department of Education (Dunn-Rankin, et al., 1971). This instrument and its subscales demonstrated strong internal consistency and reliability for these subjects (Mills, et al., 2013).

4. STUDY PARTICIPANTS

Survey subjects were students enrolled in one of two middle schools in a public school district in north Texas. The sixty-three (63) students completed a survey battery to report their attitudes towards school, technology, and learning during the spring semester of 2012. Survey participants were 48% boys (n = 30) and 52% girls (n = 33).

5. FINDINGS

Student survey data, as reported on the CAQ and SAI, were analyzed for Pearson product-moment correlations in order to examine students' attitudes towards school, ICT, and learning.

Significant positive correlations were identified between student perceptions that *computers give me opportunites to learn many new things* and:

1) *the more often the teacher uses computers the more I will enjoy school* (r = .33, p = .009)
2) *the more often I use a computer at school the more I enjoy school* (r = .46, p < .0005)
3) *I find learning new things interesting* (r = .40, p = .001)

These reponses indicate that students who associate computers with learning opportunities are interested in learning and they feel that computer use at school makes school more enjoyable.

Significant positive correlations were also identified between students' perception that *I would work harder if I could use computers more often* and:

1) *Computers give me opportunities to learn many new things* (r = .50, p < .0005)
2) *I find learning new things interesting* (r = .36, p = .004)
3) *the more often the teacher uses computers the more I will enjoy school* (r = .40, p = .001)
4) *the more often I use a computer at school the more I enjoy school* (r = .48, p < .0005)

These responses indicate that there is a relationship between feeling motivated to work harder when using computers and perceived opportunity for, and interest in, learning new things. These data also indicate a relationship between feeling motivated to work harder when using computers and feeling that school computer use makes school more enjoyable.

A positive significant relationship was identified between the items *I enjoy books, newspapers, magazines* and *I really like school* (r = .36, p =.004). A negative significant relationship was found between *I enjoy books, newspapers, magazines* and *The more often I use a computer at school the more I enjoy school* (r = .28, p = .024). These correlations indicate that students with a high preference for learning with traditional learning media tend to like school and do not feel that school ICT makes school more enjoyable. Closer examination of a preference for traditional learning media reveals a troubling trend between students preceptions that they do not *enjoy books*, *magazines*, *newpapers* with the subscale *Hate School* (r = .42, p = .001). Additionally, student preferences indicated a trend between not *enjoying books, magazines and newspapers* with *The more often I use a computer at school the more I enjoy school* (r = .28, p = .02).

Additional findings were that subscale scores from the CAQ indicated students' preferences for *Learning with Computers* align with perceptions of having *Creative Tendencies* (r = .51, p < .0005).

The magnitudes of the findings reported, Pearson product-moment correlations, range from medium to small (where large (r = .8), medium (r = .5), and small (r = .3)), according to the guidelines by Cohen (1988).

6. DISCUSSION AND CONCLUSIONS

The promise of personal computers and ICT as a powerful force for school change and improved student learning remains largely unfulfilled, yet the advent of personal computers and Internet-based ICT tools are forcing a re-conception of teaching and learning. This study of student attitudes towards learning with technology reveals that students who report a dislike of traditional learning media, such as books, newspapers, and magazines tend to have a negative attitude toward school, yet they tend to find that school is more enjoyable when they have more opportunities to use computers in the classroom.

The authors suggest that student enjoyment of school is an important consideration for improved educational outcomes and that additional research is needed to determine the extent to which students who do report not liking books and traditional media might benefit from alternative access to information such as that provided by transmedia navigation for learning activities. Perhaps the relatively unfulfilled promise of enhanced student learning with classroom technology may be fulfilled if classroom instruction is planned via the design-based research framework, allowing teachers to flexibly adjust the design and composition of lessons based on the dynamics of individual classrooms and individual students in directions that promote discourse and interaction, which can encourage transformative communications and knowledge construction. Transmedia navigation within the classroom—allowing students to choose from the wide range of electronic and traditional media for interaction with curricular content—is recommended to support engaging instruction that provides students with opportunities to think, problem-solve, and engage in transformative communications. The authors contend that a design-based research paradigm and continual re-evaluation of classroom practice based on theory-guided experience can guide in the extension of theory and practice that will assist in improving curricular, pedagogical, and assessment practices within schools. Additional research is needed to determine if student technology tools applied to student-centered learning in the form of student-driven classroom technologies will be effective in improving learning outcomes for students who report a dislike of school and traditional classroom media such as books.

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