Examining the Use of Technology: Affordances and Constraintsin a Blended Learning Environment

Déana Scipio, University of Washington, Box 353600, descipio@uw.edu
Annie Camey Kuo, University of Washington, Box 353600, anniekuo@uw.edu

Abstract: Project-based learning environments that leverage technology have the potential to bring experts into classrooms, introduce youth to contemporary writing practices, and create avenues to participate in the information economy. This study focuses on the affordances and constraints within a blended learning environment for youth from two settings that both claimed to be one-to-one laptop schools. Preliminary findings show students were caught in the digital divide because of their school's definitions of appropriate technology use.

Proponents of Connected Learning

A blended learning environment seeks to bring together the best of the classroom and the affordances of technology integration. This study explores the student experiences of blended learning environments at Ruby and Sapphire, which were both one-to-one laptop schools engaging in a six-week project-based curriculum. The phenomenon of the digital divide intersects with the notion of being a one-to-one laptop school especially when learners encounter barriers to participation.

Challenges and Affordances of Blended Learning Environments

With this analysis, we hope to draw attention to the affordances and constraints of blended learning environments in one-to-one laptop schools and to highlight the ways in which learning context and structure matter. We propose that the students in the schools were caught up in the digital divide because of their school's definitions of appropriate technology use and the ways that the schools were equipped to support teachers and students use of technology.

Ruby was a large comprehensive public high school serving over 2000 students. Demographics from the 2010-2011 school year, the most recent data available on the school website, show that the school population was 27% White and 73% Students of color from a wide variety of ethnic backgrounds. There was also a large free and reduced lunch and ELL population. Ruby's district was in the beginning stages of a one-to-one laptop program at the school, which assigned a laptop to each incoming ninth grader. Teachers were also equipped laptops and Smart Boards in their classrooms.

Sapphire, the second context, was a girls-only independent school serving 100 young women in grades five through eight. Although it was located in a diverse neighborhood near the center of the city it served a relatively upscale student population with 35% students of color. They had a commitment to providing 30% of their student body with need-based financial aid. The school offered students a large degree of autonomy, trust, and responsibility. Sapphire does not give grades instead teachers write narratives that describe student's strengths, weaknesses, areas for improvement, and chart their participation in class projects over the course of the quarter.

We collected data from both schools during the implementation of a project-based learning unit designed for the English language arts classroom as part of a larger research study. The unit incorporates technology to cultivate thriving social networks and leverages video, disciplinary tools to help youth progress along competency pathways, the use of experts to provide feedback to students for multi-faceted learning supports, and positions students with multiple ways of expression. Materials for the six-week unit were loaded into a platform called Canvas, which students and teachers accessed on a daily basis.

Theoretical and Methodological Approaches Pursued

We viewed the classroom as an activity system with various components interacting with one another. Yorjo Engeström (2008) generated activity theory to represent how learning is a process driven by tensions and contradictions within an activity system. The system is composed of a number of components utilized by an individual or a group working towards a shared object to obtain a desired outcome. Cultural historical activity theory (CHAT) stems from Vygotsky's activity theory where "human behavior results from the integration of socially and culturally constructed forms of mediation into human activity" (Lantolf, 2000, p.8). CHAT highlights the development of various components such as tools, division of labor, goals, outcomes, subjects, rules, and community to understand an activity system and the activities that occur within the system. We employed CHAT to represent the classroom-learning environment and the challenges and affordances for students with regards to the technology used within the PBL space. The components of the system represented by Engeström triangle are subjects, tools, rules, community, division of labor, objectives, and outcomes. We will show the mapping of each classroom setting using these elements to highlight the affordances and

constraints for students. The data sources in the analysis include video recordings of the classroom during the implementation, focus groups with students after the completion of the unit, teacher interviews, and field notes of daily classroom interactions with students.

Preliminary Findings and Implications

This comparison between research context is not intended to establish a deficit framing for the students or teachers at the comprehensive high school or set them in direct competition with the outcomes at the independent high school rather we seek to compare the activity systems surrounding both implementation contexts. Our intent is to highlight the ways in which the tools, rules, community, division of labor, had an impact on the objectives, and outcomes in each context. These findings suggest the need for new implementation strategies for blended learning environment designers, the design of curriculum, as well as choice of educational technology platforms that lead to sustainability of use amongst all student populations.

We noticed vast differences in technological literacy, school infrastructure and teacher familiarity which all had an impact on students' experience of the blended learning environment in the classroom. We also noticed that the schools had different expectations of classroom regulation and the purposes for technology in the classroom.

At Ruby, the PBL unit was the very first unit of the year. We started working with students during the second week of their ninth grade year. We worked with a single teacher, Ms. Prince, who had three sections of Fundamentals classes. There were 20-23 (total 63) students in each class from a variety of linguistic and cultural backgrounds. Ms. Prince was very motivated to do this curriculum with her students. She saw the collaboration with our program as an opportunity to develop her technology implementation skills. She was particularly interested in working with the SMART board and students laptops more effectively. She bemoaned the fact that her school had very little support for teachers who wanted to learn about blended learning environments.

The students at Ruby were assigned a laptop at the beginning of the year, however, the integration of technology was a challenge for the teachers and the staff. The students' school emails could only reach other students, teachers, and staff within the school and did not connect to the outside world. Many of the students left their laptops in their lockers overnight. And while the students were tech savvy with utilizing technology for non-academic purposes, they were inexperienced with the use of technology connected with academic learning. We attributed this lack of familiarity with the school's insufficient facilitation of the use of technology.

Our collaborating teachers Ms. Fenrich and Ms. Archer at Sapphire were used to designing interdisciplinary project-based units and working with a mixed specialty team. We worked with the entire eighth grade, 35 students total who were divided into two groups called cores.

The students at Sapphire were high functioning and autonomous in their academic endeavors and were focused on applying to high school at the end of their fall quarter when we were there. Sapphire was also a one-to-one laptop school that provided every student with an Apple MacBook Pro. The students were not allowed to bring their computers home, however, most if not all had access to technology at home. Because they were familiar with technology use in academic settings, the students were at ease with accessing the platform to download materials, conduct online research and reviewing websites, and exchange messages with the experts.

Given our experiences in these vastly different implementation contexts, we would advocate for the design of a mobile application as a platform that could be more sustainable across our study population. Literature on the digital divide can foreground the ways in which certain segments of the population have restricted access to computers and other technologies, whereas this study explores the larger activity systems necessary to support teachers and students' use of computers in sustainable ways.

Relevance To Conference Theme

Our study is connected with the conference theme "Learning and Becoming in Practice" because we are contributing to the body of literature that examines learning environments that foster disciplinary engagement with technology. We compare the curriculum implementation of the same unit in two different settings with specific focus on the technology use of teachers and students. Our students are positioned in the environment to become digital experts but experience challenges due to the school structure.

References

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