

The Effects of Technology Integration on Student Engagement and Learning

Angela B. Burgess

Kennesaw State University, ITEC 7470

Introduction

Change has always had a difficult time being adopted into the classroom. In the time of the ancient Greeks, the change was from memorization of texts to question and answer sessions, the Socratic Seminar so praised today. Later, students learned to read and had textbooks, slates, and chalk to take to school with them, or paper and pen. Even more recently, radio, film, and calculators were available for students to use to supplement their daily learning experience. While today's teachers and students may not see the radio or calculators as technology that had to struggle to be integrated into the classroom, at the time they were just as innovative and groundbreaking as the Web 2.0 tools that teachers struggle to integrate today.

Why do teachers struggle with new technologies so much? The vast majority of people will tell you that calculators absolutely should be an integral part of a mathematics curriculum. However, many of those same people might argue that current technologies have no place in the classroom today and that they will just provide additional distractions for students who already struggle with attention and focus. Therefore, it is necessary to look at current research on the effects both positive and negative of technology integration on student engagement and performance to counter their arguments.

This review of current literature was performed using a combination of Galileo and Google searches using the search terms "BYOT," "BYOD," "classroom technology integration," and "effects of technology integration." Searches on Google were limited to scholarly articles, and all searches were limited in date from 2000 to 2013. A review of the resulting applicable research reports revealed several commonalities on which this

review will focus. While there are potential negatives associated with technology integration, when done effectively and correctly, current technologies can serve to expand the learning environment, assist students to reach higher levels of thinking, and to increase student engagement as seen through participation and collaboration.

Expanding the Learning Environment

One of the first things mentioned when discussing technology integration in a classroom is how it expands the learning environment. Downes and Bishop found in their 2012 study that the middle school students who participated did not stop learning just because the school day had ended. Instead, these students “felt the technology made it easier to continue their learning at home, either after school or if they were absent that day” (p. 10). Kiger, Herro, and Prunty also cited studies that show how teachers are able to extend the school day when they incorporate technology effectively (2012, p. 62). A benefit to this expanded school day is that teachers are able to move “lower levels of the taxonomy outside of the class where students work on mastering concepts and can pause, rewind and review the lesson at any time” (Hamdan, McKnight, McKnight & Arfstrom, 2013, p. 5).

This result can be seen even when examining the habits of graduate-level business students. In a 2012 study, students received BlackBerry© devices during orientation to their program. Unfortunately, because the project began so shortly before the term, instructors were not given much time to decide how to integrate the devices into their lessons. Instead, students managed to find “ways to use them within and outside of their classroom even when specific uses were not provided by instructors,”

(Mueller, Wood, De Pasquale & Cruikshank, 2012, p. 43) showing that students want to continue learning – they just need the appropriate tools.

Reaching Higher Levels of Thinking

Another common finding in studies on how technology integration affects student engagement and learning when used appropriately is students are able to reach higher levels of thinking as assessed by Bloom's Taxonomy. For example, a recent study by The National Survey of Student Engagement shows that "activities that call on students to construct, transform, and apply knowledge are generally more educationally effective than rote memorization and recall" (2012, p. 5). The use of technology to achieve this goal can be seen through Project Tomorrow and Blackboard K-12's study, *2013 Trends in Online Learning: Virtual, Blended and Flipped Classrooms*. In all of the classes surveyed, technology was integrated into the curriculum, serving as a tool to be used instead of a concept to be studied. When asked if their students were developing creativity, an average of 51% of teachers responded affirmatively. Asked if students were "developing problem solving and critical thinking skills," approximately 44% of teachers believed that this was true as a result of the digital tools that students can now use as a resource (p. 7).

The effects of technology integration on higher order thinking skills can even be seen in areas that have been traditionally resistant to technology, such as physical education. A 2011 study in Australia on using video technology to increase student engagement and performance found something else that was unexpected. While students were more engaged and their performance did improve, their thinking process improved as well. The teacher-researcher observed the following:

Self-observation [of watching themselves throw a ball] allowed them to develop and utilise a subject-specific vocabulary well beyond what was 'normal' for them. It seems reasonable to surmise that the discussions and evaluations prompted by the use of video analysis were explicit in the formation and use of this technical vocabulary. Furthermore, the experiences they gained in assessing their peers allowed them to apply this knowledge rather than simply regurgitating those words of their teacher that they could remember. (Casey & Jones, 2011, p. 60).

Increasing Participation and Collaboration

Of course, the reason for most educators to choose to integrate technology into the curriculum is to increase student engagement as seen through participation and collaboration. Casey and Jones found in their study that using technology as basic as a video recorder to record students' pitching and then showing them their results gave the project an "oohah" aspect that immediately increased student engagement and desire to improve via participation, collaboration, and reflection (2011, p. 62). R.A. Hill reported in 2011 that "students are sharing their work more between each other using [mobile digital] devices" (p. 24). This self-chosen path to collaboration increases students' engagement and their knowledge, as they begin to learn from each other.

In his study entitled, "I've Never Seen or Heard It This Way! Increasing Student Engagement through the Use of Technology-Enhanced Feedback," Professor Brian Harper experimented with technology-enhanced feedback as a way to increase engagement, participation, and comprehension of the material. He found that the use of digital technologies "contributed to increased perceptions of competence, intrinsic

motivation, autonomy while promoting pro-achievement behaviors like regular attendance, careful reading and engaged learning that will increase the likelihood of academic success” (2009, p. 7). Rick Allen found the same in 2011, reporting in an article entitled “Can mobile devices transform education?” published on the ASCD website that students involved in a study in North Carolina proclaimed themselves as having “increased communication” with teachers and peers, as well as being “more engaged in learning math.” Another study done by Foundations of Flipped Learning also found positive results with math classes, finding that after one teacher received positive reinforcement as he observed his students “actively doing math rather than passively watching [him] do math,” he decided to flip almost all of his math classes. As a result of his innovation that was quickly followed by the rest of the math department, test scores increased by 9-12 percentage points across the board (Foundations of Flipped Learning, 2013, pp. 1-2). Another teacher found that when she asked students to participate in class “conversations” via Twitter that previously silent and disengaged students were able to “find their voice” and began actively participating in class discussions (Osterman, 2011). Yet another study found that 81% of teachers participating reported that student engagement had increased post-implementation of a BYOT policy, and 70% of students felt that the initiative had increased their learning (Single Path, 2011).

Recognizing the Negatives

With all of these positive signs, it can be easy to overlook potential negatives. Nevertheless, they do exist and those interested in integrating technology should not overlook them. The National Survey on Student Engagement found that students who

participated in social media for non-academic purposes during class time “reported lower grades and satisfaction,” as well as “perceiving their campus environment to be less supportive” (2012, p. 18). Institutions and educators must also recognize the importance of classroom arrangement when utilizing technology in the classroom. A study by Miller-Cochran and Gierdowski found that they faced decreasing student engagement and participation as a result of a fixed, unmovable classroom arrangement. As a result, they designed a “flexible BYOT classroom” for writing classes with furniture that could move so that students could collaborate on writing projects, participate in whole-class discussions, watch the professor give a lecture, or write independently, all with the same level of engagement, just by moving the furniture as needed (2013).

Another concern is how to handle students who do not have access to technology when implementing a BYOT policy. However, while this is a real concern, the Single Path case study of Indian Prairie School District found that “those needing school-supplied devices are a small percentage, which frees the District to invest the majority of its technology budget on building a first-class infrastructure” (p. 2).

Lastly, and perhaps most importantly, is the issue of student attention and focus. As difficult as it can be to engage students in the material at hand, how much more difficult will it be if they have the entire world at their fingertips? All educators know the importance of focusing “more on what they want the kids to know and to do, and how they should demonstrate mastery of concept rather than the avenue or tool that they use to get there” (Hobson, J. as cited by Hill, 2011, p. 26). But as Downes and Bishop found, “Students’ quest for identity and struggle for peer acceptance sometimes hinder their ability to learn, even in the best of classrooms. As one student explained honestly,

‘There are some days when we’re really focused and other days when we are not’” (p. 9).

Conclusion

Despite the overabundance of talk in education circles today about the use of technology in education, there has been relatively little actual research. The research that has been done seems to be mainly small-scale, action research projects with one teacher-researcher or one teacher and one researcher. There is still a need for larger-scale quantitative research studies that focus on the effects of different types of technologies and technology-integration policies (BYOT, 1:1) on student engagement and performance as measured by data such as surveys, performance reports, and attendance reports. There is also a need for several qualitative research studies that examine student perceptions of technology integration and its effect on their engagement and performance.

However, until that time, teachers can still gain insight from the research and its implications for their daily practice. While it is true that technology has the ability to expand the learning environment, it also has the ability to take over our daily lives. Educators who begin using an online Learning Management System or a form of digital communication with students must have clear expectations and boundaries for themselves and for their students. Once these are established, everyone involved must adhere to them closely and responsibly. Additionally, schools must recognize the importance of choosing the right technology to meet a higher level of achievement on a specific curriculum goal. Sometimes the best technology to accomplish that goal is not the latest and greatest, but is instead a familiar stand-by. Lastly, teachers need to

consider how technology integration will affect student participation, achievement, and engagement. Does the chosen path of technology integration have any potential drawbacks? What will the teacher do if the technology fails? What will the teacher do if students do not have access to the technology? Can the teacher explain clearly and concisely how the technology supports curriculum goals? How will the teacher measure student participation, achievement, and engagement? These are all questions that educators must answer during the planning stages of any lesson, project, unit, or academic year that plans on a full-scale integration of technology.

While there are many people today who believe that schools are “broken,” that technology is the way to “fix” education in America and elsewhere, this student researcher does not find that to be true. Technology is not a panacea to heal all wounds and repair all injustices. It cannot make up for many of the social and economic difficulties that students face every day. However, when integrated appropriately and considerately, it can have great effects on student engagement and achievement.

REFERENCES

- Allen, R. (2011). Can mobile devices transform education?. *Education Update*, 53(2), Retrieved from <http://www.ascd.org/publications/newsletters/education-update/feb11/vol53/num02/Can-Mobile-Devices-Transform-Education.aspx>
- Casey, A., & Jones, B. (2011). Using digital technology to enhance student engagement in physical education. *Asia-Pacific Journal of Health, Sport and Physical Education*, 2(2), 51-66. Retrieved from <http://ehis.ebscohost.com/eds/pdfviewer/pdfviewer?sid=0c46d2f9-3b2e-4f82-9019-d919691992c7@sessionmgr4&vid=6&hid=16>
- Downes, J. M., & Bishop, P. (2012). Educators engage digital natives and learn from their experiences with technology: Integrating technology engages students in their learning. *Middle School Journal*, 43(5), 6-15. Retrieved from <http://www.eric.ed.gov/PDFS/EJ984921.pdf>
- Foundations of Flipped Learning. (2013). Flipped learning model increases student engagement and performance. In Pearson. Retrieved from http://assets.pearsonschool.com/asset_mgr/current/201320/Byron_standalone_casestudy.pdf
- Hamdan, N., McKnight, P., McKnight, K., & Arfstrom, K. (2013). *The flipped learning model*. Retrieved from <http://www.flippedlearning.org/review>
- Harper, B. E. (2009). I've Never Seen or Heard It This Way! Increasing Student Engagement through the Use of Technology-Enhanced Feedback. *Teaching Educational Psychology*, 3(3)

- Hill, R. A. (2011). Mobile digital devices dipping your toes in technological waters. *Teacher Librarian*, 39(1), 22-26. Retrieved from <http://ehis.ebscohost.com/eds/pdfviewer/pdfviewer?sid=0c46d2f9-3b2e-4f82-9019-d919691992c7@sessionmgr4&vid=5&hid=16>
- Kiger, D., Herro, D., & Prunty, D. (2012). Examining the influence of a mobile learning intervention on third grade math achievement. *Journal of Research on Technology in Education*, 45(1), 61-82. Retrieved from <http://ehis.ebscohost.com/eds/pdfviewer/pdfviewer?sid=0c46d2f9-3b2e-4f82-9019-d919691992c7@sessionmgr4&vid=9&hid=16>
- Miller-Cochran, S., & Gierdowski, D. (2013). Making peace with the rising costs of writing technologies: Flexible classroom design as a sustainable solution. *Computers and Composition*, 30(1), 50-60. doi: <http://dx.doi.org.proxy.kennesaw.edu/10.1016/j.compcom.2012.12.002>
- Mueller, J., Wood, E., De Pasquale, D., & Cruikshank, R. (2012). Examining mobile technology in higher education: Handheld devices in and out of the classroom. *International Journal of Higher Education*, 1(2), 43-54. doi: 10.5430/ijhe.v1n2p43
- National Survey of Student Engagement. (2012). Promoting Student Learning and Institutional Improvement: Lessons from NSSE at 13. Bloomington, IN: Indiana University Center for Postsecondary Research. Retrieved from http://nsse.iub.edu/NSSE_2012_Results/pdf/NSSE_2012_Annual_Results.pdf

Osterman, L. (2011, June 10). *One teacher's call to students: Login to twitter, and byot.*

Retrieved from <http://www.studysync.com/blog/one-teachers-call-to-students-tweet-and-byot/>

Project Tomorrow., & Blackboard K-12, (2013). 2013 trends in online learning virtual, blended and flipped classrooms. Retrieved from

<http://whitepapers.blackboard.com/2013trends>

Single Path. (2011, 03). *Wireless technology helps create first-class 21st century learning environment.* Retrieved from [http://www.singlepath.com/wp-](http://www.singlepath.com/wp-content/uploads/2013/01/Single_Path-IndianPraire_Case_Study.pdf)

[content/uploads/2013/01/Single_Path-IndianPraire_Case_Study.pdf](http://www.singlepath.com/wp-content/uploads/2013/01/Single_Path-IndianPraire_Case_Study.pdf)