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The Effects of Technology Integration on Student Engagement

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An Action Research Report

By Justin Banitt, Sharon Theis, and Lucas Van Leeuwe

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Abstract

The intent of this action research project was to determine the effects of technology integration on student engagement in the secondary classroom. The study involved three teachers in one rural and one metropolitan district involving roughly 200 students in English, special education, and mathematics courses in grades 8-12. Data collection methods included pre- and post-intervention surveys, observations, teacher journals, assignment completion rates, and brief questionnaires after technology integration lessons. The results of the data analysis showed an average overall increase of 5-10% in student engagement as well as improved student enjoyment and enthusiasm for lessons involving technology when compared to traditional, parallel lessons. The results of this action research investigation indicate that incorporating technology elements into lessons may be an effective way to increase student engagement and motivation.

Educational theorist John Dewey once said, “If we teach today’s students as we taught yesterday’s, we rob them of tomorrow” (as cited in Pilgrim, Bledsoe, & Reily, 2012, p. 16), and in today’s digital 21st-century classroom, these sage words still ring true. Today’s students learn differently than they did even a decade ago, and teachers are expected to do more than just teach the curriculum. The current generation of students, known as digital natives, has grown up with technology their entire lives; they have never known a time without texting, social media, or Internet access at their fingertips. In fact, the Kaiser Family Foundation found in a 2010 study that teenagers spend an average of 7½ hours per day consuming media, including watching TV, playing video games, surfing the web, using mobile devices, and listening to music (as cited in Ahuja, 2013). To many, including politicians, teachers, educational theorists, and neuroscientists, this always-connected, digital environment has changed the way students learn today. Consequently, approaches to teaching, learning, and student engagement must correspondingly change as well to embrace and harness the technology-rich environments that have become the norm and that 21st-century digital natives have come to expect.

However, the transition and adoption of systematic technology integration for teachers is not nearly so seamless as just placing technology in the hands of students. Teachers are digital *immigrants* rather than digital *natives*, and as such encounter numerous barriers and fears to incorporating technology within their classrooms. Much of this trepidation and resistance stems from the fact that many teachers today did not grow up with ubiquitous technology nor use it themselves to learn; teachers sometimes argue that they learned just fine without technology and were engaged in school, so what is the point or the rush now in using technology?

Due to the fact that students today are digital natives, they often seem bored with traditional lessons and pedagogical techniques, presumably in part because of the lack of technology access and integration in the classroom. Buckingham (2007) notes that a digital gulf often exists between students' in-school and out-of-school lives (as cited in Downes & Bishop, 2012). Outside of school, students actively engage and interact with technologies providing them with 24-hour access to games, social networking, and information. Inside of school though, those interactions with technology that students find engaging and helpful are often severely limited by school policies banning them, inadequate technology access, poor infrastructure, or lack of technology integration within curriculum. On the other hand, technology initiatives at schools by administration, the technology industry, and politicians are on the rise. Some tout technology as more effective, engaging, and the solution to slumping test scores and achievement. Schools are increasingly pressured to incorporate new technology, participate in 1:1 initiatives, and pilot online courses, for example, with little training or solid research-based evidence. Sometimes educators get the sense that technology is a new method of learning and because they now have it within schools that teachers should use it on that basis alone. The digital gap that often exists between teachers and students and increased pressures from administrators and society to implement more technology without clear, research-based explanations led us to our action research question: What effect does technology integration have on student engagement in the secondary classroom?

To teachers, it seems that today's students demand new, innovative learning methods that bridge the digital divide between their in-school and out-of-school lives. For educators, this means fusing proven pedagogy and curriculum with technology

integration in innovative, meaningful, and engaging ways. Teachers have the sense that technology integration must be a focus and priority in today's 21st-century classrooms. Technology, though, should not be seen as threatening or as just an "add-on" if students are to be deeply engaged and motivated to learn. Instead of fearing what we did not grow up with, educators must harness what students find engaging and motivating and use it to our advantage to help students learn and succeed. Therefore, teachers need to expand their current use of technology and embrace new tools to expand student-centered, constructivist learning opportunities in lieu of traditional lecture-based formats.

Credence for the potential benefits of integrating technology is building in the educational community. Technology today can encompass anything from educational gaming, document sharing, real-time collaborative tools, using digital organizational methods, and creating authentic digital projects. Even though there is not much longitudinal research on the effects of using technology, short-term research, anecdotal reports, surveys, interviews, and classroom observations show many positive effects. "Technology in Education" (2011) noted that the reason longitudinal research is not available nor feasible is because "the kinds of studies that produce meaningful data often take several years to complete – a timeline that lags far behind the fast pace of emerging and evolving technologies" (para. 12). By the time a study is completed, the technology that was studied would be obsolete. Nevertheless, early technology integration research suggests several positive effects related to student engagement, organization, collaboration, and critical thinking.

For many researchers and teachers, an increase in student engagement is one of the greatest effects of integrating technology. First, Schlechty (2005) defines engagement

as students "being attracted to their work, persisting despite challenges and obstacles, and taking visible delight in accomplishing that work" (as cited in Downes & Bishop, 2012, p. 7). Research by Dawson (2012) noted that teachers report increased "on-task behaviors when allowed to use technology" (p. 210). One technology generating considerable buzz is the Apple iPad and exciting 1:1 programs in which all students are given their own iPad. The iPad can become a one-stop device for students to read their textbooks, complete tests and quizzes, write papers, submit homework to dropboxes, organize calendars, and communicate with teachers and peers. Manuguerra and Petocz (2011) found that students were positive and optimistic about using the iPad for educational purposes.

Besides general engagement increases, studies show gaming to be a powerful motivator for students. Part of the 7½ hours per day teenagers spend consuming media includes time for video gaming, both on consoles like Xbox and PlayStation but also mobile devices like cell phones and iPads. "Technology in Education" (2011) notes that games and simulations provide a means for students to learn using a method seen by them as being similar to leisure gaming. Students enjoy leisure gaming and relate educational gaming to the same enjoyable feeling. Moreover, Downes and Bishop (2012) found that video games motivated students and kept them engaged even as concepts became more difficult. In addition to the fun aspects of gaming, students can use educational gaming to manipulate and change 3-dimensional views of objects. The 3-dimensional views provide enrichment beyond any traditional textbook.

Dawson (2012), Downes and Bishop (2012), Martinez and Schilling (2010), and "Technology in Education" (2011) all noted increased engagement and motivation in

students when they had the opportunity to use technology tools for the creation of authentic learning experiences. Students find technology more engaging because it bridges the gap between their digital lives outside of school and their too often non-digital lives inside of school (Downes & Bishop, 2012). In using technology, teachers often find students extend their learning beyond the traditional school day. Students continue authentic learning experiences in collaboration with peers through digital, video, audio, and animation options (Downes & Bishop, 2012). Technology also provides opportunities for students and teachers to collaborate in sharing documents, videos, and projects. Downes and Bishop (2012) also stated that students gain a sense of belonging and acceptance through the use of technology tools that lend themselves naturally to group work or other real life tasks in professional, adult work environments. "Technology in Education" (2011) stated that sometimes shy or quiet students who tend not to participate in normal class activities will often be more engaged using technology because they see it as more non-threatening. Collaboration can additionally happen within technology tools like Google Apps for Education. Google Apps cannot only be used for collaborating with peers, but its capabilities extend to its use as an organizational tool. Many students mentioned during Downes and Bishop's (2012) research that they were able to stay better organized using electronic means, as opposed to keeping track of handouts and other paper assignments. Moreover, Downes and Bishop (2012) noted that teachers in 1:1 programs or utilizing more technology reported that turn-in rates for homework increased significantly. One of the greatest features provided by technology tools is the opportunity to express learning through any one of many options. Students are more likely to take ownership of their learning and create a portfolio of their learning

experiences when they are given the freedom to use various technologies. As Martinez and Schilling (2010) mentioned, students gain a sense of pride when they complete authentic work that shows their perceptions and newly found knowledge.

For all of these reasons, our learning team decided to investigate what effect, if any, technology integration would have on student engagement in secondary classrooms. We wanted to start bridging the digital gap between in- and out-of-school technology uses and also investigate if the push to utilize more technology is warranted, at least regarding the engagement of students using devices. Our action research project involved three teachers in two schools in Minnesota—1 rural and 1 metropolitan district. Our teaching assignments allowed us to include roughly 200 secondary students in 8^{th}-12^{th} grades in English, special education, and mathematics courses.

Lucas and Sharon both teach in the same rural high school with an enrollment of roughly 900 students in grades 7-12. Lucas involved roughly 105 students (25 seniors, 80 sophomores) across four sections of his English classes. Of these students, 24 were honors students, seven received special education services, and there were no ELL students. Roughly 45% of Lucas's students were female and 55% male. Lucas's students were a very homogeneous group since 96% identified themselves as white and English speaking. Sharon involved 10 students in her special education reading course. All of these students qualify for special education and have active IEPs. Students in this course ranged from 9^{th} through 12^{th} grade.

Justin teaches in a suburban junior high school of approximately 700 students in grades 7-9. Justin involved around 90 students, all in the eighth grade, throughout three sections of algebra. All of his classes were mainstream classes, which also included eight

special education students and two English as a secondary language students. Of Justin's students, 58% were female and 42% were male. Justin's students were more diverse, including 52% white, 22% black/African American, 7% Native American, 2% Asian, and 17% identified as other.

In today's 21st-century classroom, teaching and learning must look different than even 10 years ago. Current digital native students demand new styles of teaching and engagement, and through innovative technology integration teachers can meet these demands. Early studies indicate that effective technology integration results in a host of positive educational benefits, including increased student engagement, motivation, organization, efficiency, and creative, real-world applications students find rewarding and dynamic. Teachers must be willing to overcome their fears of technology and push themselves to take the leap forward into effective technology integration lest, as John Dewey warns, we rob students of their tomorrow by continuing to teach them only yesterday's skills and knowledge. Mindful of Dewey's words and our students' needs, we developed an action research process to integrate more technology into our classrooms, which is outlined in the next section.

Description of Research Process

In order to assess the effect of technology integration on the motivation and engagement of secondary students, we devised several methods of data collection that could be used in order to triangulate our results. Our data collection sources included: (1) pre-intervention and post-intervention student surveys, (2) teacher observations of student engagement during both technology and non-technology integration lessons, (3) teacher

journals, (4) assignment completion rates, and (5) brief questionnaires/surveys after technology integration lessons.

Our original action research plan was to collect data for four weeks: two weeks of lessons without technology integration and two weeks with technology integration. However by the time we formulated the pre-intervention survey and action plan, the Minnesota Comprehensive Assessments (MCAs) testing window was approaching. Due to increased online testing, the MCAs limited the availability of certain technology tools in our schools. Additionally, due to curriculum restraints at the end of the school year, we changed our plan so that each of us would implement both technology and non-technology intervention lessons where they would fit in our remaining curriculum; thus, data collection happened on different days for each member of our team with different lessons and using different technologies. Nevertheless, we collected data throughout a five-week period from mid-April through early June of 2013. During the data collection period, Justin's collection was also delayed due to the birth of a child. In addition, Sharon's data collection period was shortened due to seniors graduating early and needing to collect separate end-of-the-year data for students' IEP reports.

We all began our action research project by administering the same pre-intervention survey to all of our students using an online Google Form to measure students' attitudes and beliefs regarding classroom engagement, interest, and learning preferences related to technology use in school (see Appendix A). Our survey collected both quantitative data using Likert scales and closed-ended responses and qualitative data using open-ended responses. After the survey was administered, we each incorporated various technology tools within our lessons as curriculum allowed and compared these

lessons to traditional, parallel lessons not using technology. Most of the technologies we incorporated were new additions to our typical lessons, and as such required explanations, demonstrations, and creating user accounts with students.

We used two methods to record student engagement. First, we developed an Engagement Observation Form to collect quantitative data (see Appendix B). The form allowed us to monitor and collect data on five randomly selected students throughout a lesson. Using five-minute intervals, we observed these five students and coded their behavior using three on-task codes (listening/watching, writing/reading, and hands-on/interacting) and three off-task codes (passive/inactive, disturbing others, unrelated activity). Second, we also used seating charts to record student engagement data. Using quick scans of the whole class during regular 3- or 5-minute intervals, we coded each student as either on-task (+) or off-task (-) below each student's name. While this did not give us as detailed of information about behaviors, we were able to collect a larger data set.

In addition to student observation forms, we each recorded our observations and field notes in narrative format within a teacher journal for each day that we integrated technology into our lessons. This data collection tool allowed us to gather more qualitative data about our personal experiences, successes, and failures at integrating technology. Our journals were an informal tool as we jotted down our impressions after a lesson and did not track any specific students.

Lucas integrated technology into a series of six lessons to measure its effect on student engagement. Screenshots of each technology used are included in Appendix C (along with hyperlinks in electronic versions of this report) for reference. The first lesson

compared several vocabulary review activities over three days to prepare students for a quiz, including a traditional paper and pencil worksheet, a team-based vocab review game at the white board, and flashcards and games at Quizlet.com. Second, students began an advertising and propaganda unit using a NearPod app survey, PowerPoint presentation, YouTube video, and the traditional reading of a chapter and answering study guide questions. Lucas's third lesson fused traditional note taking with the back channel technology of TodaysMeet.com. As students were taking notes, they could participate in an online chat with the class and teacher by posing questions and providing examples using their iPads. Likewise, the teacher could answer questions and monitor the conversation for more immediate assistance. Fourth, students analyzed sample magazine advertisements in order to identify the propaganda strategies at work. One section of students walked around the classroom with iPads using QR Codes and the NearPod app to record their responses for later class discussion; the traditional, parallel class's lesson simply examined the same print advertisements on the SMART Board and wrote their responses on individual white boards for comparison and class discussion.

Lucas's remaining lessons focused on completion rates and more critical thinking skills. In the fifth lesson, students completed two advertisement deconstruction worksheets (one paper and pencil and one online using Google Forms) analyzing two magazine ads found on a class website. In this way, Lucas was able to compare completion rates for traditional paper and pencil assignments versus similar worksheets using technology. Similarly, students in two classes read novels during the study. Students participated in online discussion posts through the course management website Schoology in lieu of a traditional paper and pencil study guide. Instead of everyone

answering the same packet of questions for a novel, students picked one theme-based question to write a one-paragraph response to each night on Schoology. Lucas provided three questions each day and three students were assigned to provide questions each day as well. In this way, students wrote more in-depthly on events and themes in the novel and were required to cite textual evidence in lieu of more rote, short answer responses on traditional study guides. Lucas again compared completion rates of online versus paper and pencil study guides for previous novels' during the same semester to measure engagement. Finally, Lucas's students completed an advertisement deconstruction project on their own. Utilizing the same critical analysis components, one group completed a traditional poster project and another group created a video presentation using the Educreations app on the iPad. In addition to collecting student engagement data, Lucas collected post-technology intervention survey data for the use of Schoology, the Educreations and poster project, and TodaysMeet (see Appendix D).

Sharon created four paired lessons for data collection purposes by offering two lessons over two days: a lesson using technology paired with a traditional, parallel lesson. The first lesson involved students researching specific topics using the Internet and answering questions assigned by the teacher using Google Documents (see Appendix C). The students were paired for the research and assignment completion using individual computers in a lab but collaborating on the same Google Document. The parallel lesson used an informational sheet read to the class then students individually answered questions on a worksheet. The second set of lessons started with a traditional student journal entry into a notebook. The following two days students were guided through the Educreations app on the iPad and then given an assignment in which they used

Educreations to create a video presentation using a visual and audio summary of a comparison between two characters, one from a recently completed novel and one from a recently viewed movie (see Appendix C). The third set of lessons started with the use of TodaysMeet on Chromebook laptops. The students used the technology tool to demonstrate their knowledge in a reading strategy review lesson and to demonstrate their use of reading strategies through an online discussion during class. The parallel lesson used a textbook with a small group reading assignment and writing group responses on paper of the reading strategies that they used. The last set of assignments involved the use of TodaysMeet again but using iPads. Students continued reading the passage in the textbook from the previous lesson–this time individually–and used TodaysMeet to discuss their use of reading strategies throughout the continuation of the passage. The parallel lesson involved students finishing the textbook passage then writing their summary of the information in a journal entry.

Students in Justin's mathematics classroom utilized graphing calculators, smart phones, and laptops during the action research process. For one lesson, the students were asked to graph linear inequalities by hand on paper one day and then use the graphing calculators to produce the same results on the second day. Throughout the technology intervention lessons, students used TodaysMeet to post questions and answers to Justin and their peers regarding the lesson, the practice problems, or the performance task (see Appendix C).

The main use of technology in the data collection process was for Justin's students to research a review topic for the final exam, create a presentation, and present their findings to the rest of the class (see Appendix C). This entire process took five

school days: three days of researching the topic and creating the presentations and two days of student presentations. For the presentations, students were required to have a visual display for their peers to look at, but they were given the freedom to choose what presentation software they would use. For this project, Justin's students used a variety of technologies, including Google Presentation, Prezi, and Microsoft PowerPoint as well as TodaysMeet while they created their presentations. In addition to collecting student engagement data, Justin partnered with Lucas to collect post-technology intervention survey data for the use of TodaysMeet to question students about their use of the back channel.

To help clarify and cross reference all the technologies implemented in our action research project, Figure 1 briefly lists the technologies each teacher integrated as described in this section.

Lucas	**Sharon**	**Justin**
• Schoology • Educreations app • QR Codes • NearPod app • Quizlet • TodaysMeet • Google Forms	• Educreations app • Google Documents • TodaysMeet	• Google Presentation/Prezi/ PowerPoint • TodaysMeet • Graphing calculators

Figure 1. Technologies implemented by each action research team member.

At the conclusion of our action research project, we all administered the same post-intervention survey using another Google Form to measure any changes in students' attitudes and beliefs regarding technology and student engagement since partaking in our action research project (see Appendix E). All data collection was completed by the beginning of June 2013. The following section analyzes our data as it relates to our

research question regarding the effect, if any, implementing more technology in the secondary classroom has on student engagement.

Analysis of Data

In order to answer our action research question "What effect does technology integration have on student engagement in the secondary classroom?" we collected data from five sources: pre- and post-intervention surveys, observations, teacher journals, assignment completion rates, and brief questionnaires given following lessons with technology integration. Because each teacher in our action research project integrated different technologies on different days, we organized our analysis of data based on the type of technology used. Final conclusions and an analysis of pre- and post-intervention survey data are given at the end of this section.

During the action research project, Lucas first used Quizlet.com across three sections of sophomore English classes to compare student engagement during three vocabulary review activities: an individual review worksheet, a team review game at the whiteboard, and individual review games using Quizlet.com (see Figure 2). (Note: The significantly lower level of engagement shown for the review worksheet at the 10-minute interval is due to both a relatively small sample size of only 10 students and the fact that several students had already completed the worksheet and were waiting to correct it at that time. Additionally, there is no review worksheet data for 15 minutes because the activity had concluded at that point.) From the Engagement Observation Form, the mean for on-task behaviors for Quizlet was 90% as compared to the mean of 97% for the two non-technology activities. These data suggests that while still engaging, Quizlet is not as engaging for students as traditional review activities.

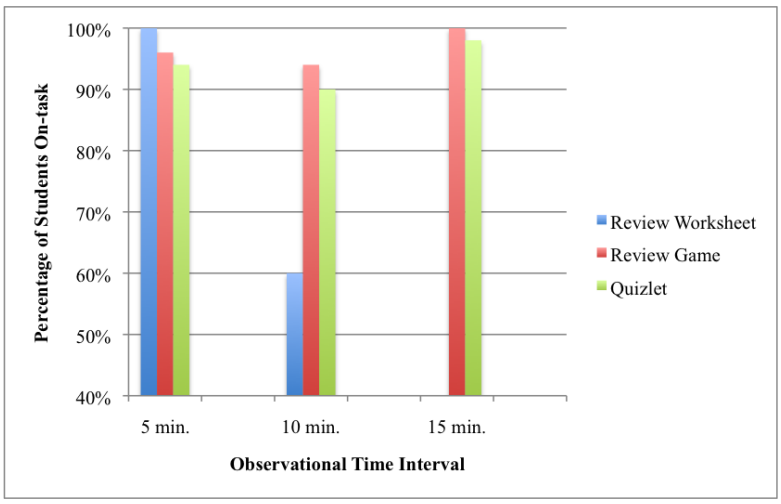

Figure 2. On-task behavior levels during three vocab review activities.

All action research members used the back channel technology of TodaysMeet.com for various lesson applications. Lucas used TodaysMeet in two sections of classes (1 regular education, 1 honors) to allow students to pose questions and provide examples during lecture and note taking. As Figure 3 shows, student engagement varied significantly by class. The regular education class was on-task an average of only 55% of the time and analysis of the transcript revealed that only one out of the total 80 comments were germane to the lesson; the rest were side comments, jokes, and insults between classmates. Lucas's teacher journal indicated a repeated sense that TodaysMeet was more of a distraction than benefit to student engagement. In fact, the journal noted that simple questions students would normally answer instantaneously were delayed by several seconds. Students only seemed to look at the teacher or SMART Board when the screen changed and they needed to take more notes. Perceived engagement by Lucas was so low, he stopped using TodaysMeet after 15 minutes and resumed note taking without it. The honors class, on the other hand, was much more engaged, used TodaysMeet for the entire lesson, and used the technology for its intended purposes with a mean of 95% on-

task behavior and 27 out of 100 comments that were actual questions for the teacher, answers to each other's questions, and examples related to course content.

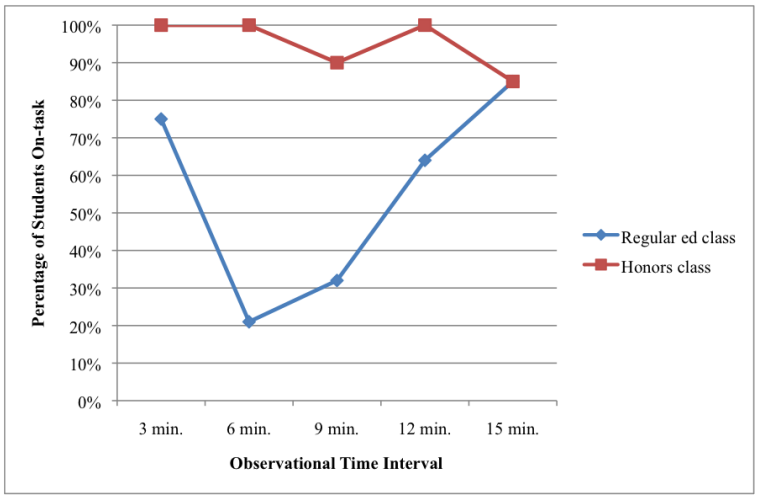

Figure 3. Lucas's student observations of on-task behavior using TodaysMeet.

Sharon used TodaysMeet for two separate lessons in the same week with her group of 10 special education reading students. The students used TodaysMeet to submit evidence regarding reading strategies. In Sharon's class, all 10 students used the technology for its intended purpose during times that they were all expected to write, but during times when the class was engaged in a verbal discussion, there would be a student or two who would post comments unrelated to the topic. Shortly after starting TodaysMeet, a student questioned why he was using the computers to respond to the questions instead of having only a verbal discussion. The class quickly realized that all students were being held accountable for responses instead of just the few students that typically responded during discussions. Overall, in the 25 minutes that TodaysMeet was used in coordination with verbal discussion, students were on-task 97% of the time during Sharon's first use of this technology tool. In Sharon's second TodaysMeet lesson, students began reading a passage and writing their specific use of various reading strategies. Percentages of on-task behaviors varied more during the second lesson.

Student behavior was impacted by the time periods in which they needed to read by themselves, several transitions, and the lack of general importance students started to place on using TodaysMeet. During this use of TodaysMeet, the overall on-task behavior rate was 91%.

Sharon compared her two TodaysMeet lessons with parallel lessons given in the same week. On both days, students read from the same passage. Students read in small groups during the first parallel lesson and wrote their use of reading strategies collectively on a sheet of paper. On this day, students' overall on-task behavior was 87%. On the second parallel activity, students read and noted reading strategies individually. When they finished reading the passage, students wrote a short summary. Student on-task behavior during this activity was 97%. There was a 10% increase in on-task behavior the first day that TodaysMeet was used but by the second use of TodaysMeet, the positive effect with respect to engagement was more evident in the parallel activity. In an informal interview with students, Sharon's class generally said that they did not find that using TodaysMeet was beneficial in their learning.

Justin used TodaysMeet for a lesson that spanned two days with three of his 8th grade algebra classes. The students used TodaysMeet to pose questions and ideas while they researched a topic and created a presentation in small groups. Analysis of the transcripts showed that questions were directed mostly at Justin, but students were also able to respond to each other. The use of TodaysMeet was optional for students, so the number of student responses was fewer in number than Justin had hoped. In Class A, 100% of student responses were on-task both days. In Class B, there were a couple of individuals that abused the technology and skewed the results, so Justin discontinued

using TodaysMeet for this class. In Class C, 80% of the student responses were on-task and appropriate.

Based on Justin's journal entries, students generally enjoyed using TodaysMeet as an alternative method to asking questions and participating in discussions during class. Students said that they appreciated being able to type a question on TodaysMeet so that they did not have to wait until the teacher was available to ask it in person. Justin also noticed more engagement among the students as they tried to answer each other's questions before the teacher had the chance to respond.

Both Justin and Lucas administered a survey to students after using TodaysMeet. According to the survey, only 35% of respondents indicated they used the back channel to pose a question. Moreover, 27% said they found TodaysMeet helpful and engaging, 47% were neutral, and 27% said it was distracting and ineffective. Based on our three experiences with TodaysMeet, it seems the use of this technology was not particularly engaging or effective for secondary students in our settings. Anonymity and distractibility factored into the limited effectiveness based on the number of inappropriate comments, decreased student response rates, and teacher observations.

Sharon used Google Documents as another technology tool to monitor student engagement. Students conducted research online and answered questions on a collaborative Google Document. Students were on-task 95% of the time. In a parallel activity, information was read to the students and they individually completed questions on paper. Students were on-task 87% of the time. Sharon's teacher journal noted that students liked working with partners on the same document at the same time. The effect of technology use in this lesson increased student engagement by 8%. Sharon's journal

also noted that students were able to recall greater amounts of information from the Google Document lesson than in the parallel lesson when completing an assessment three weeks after the completion of the lessons.

Beyond the classroom setting, Lucas wanted to see if using technology to complete assignments outside of the classroom affected student engagement as measured by homework completion rates. He studied this aspect by utilizing both Google Forms and Schoology. First, students completed two similar worksheets: one paper and pencil and one Google Form worksheet. Comparing the two parallel assignments, Lucas classified each student's work as either completed on-time, late, or missing (see Figure 4). Lucas found 76% of students completed the online worksheets on-time compared to 71% for the printed worksheet. Even though some students completed the assignment late, fewer students failed to complete the online worksheet (20%) compared to the printed worksheet (27%).

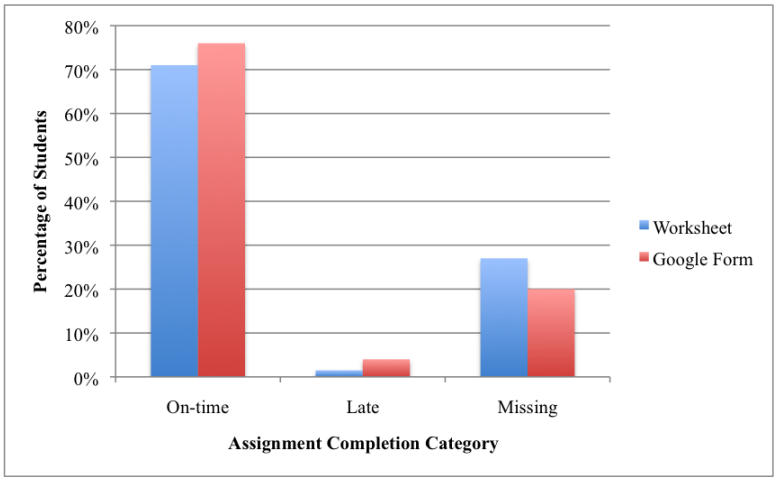

Figure 4. Assignment completion rates for paper vs. online worksheets.

Second, Lucas also studied completion rates for paper study guides versus online Schoology daily discussion posts while reading novels. Comparing this online study guide to traditional paper and pencil study guides from earlier in the semester, Lucas

found 96% of students turned in their Schoology study guides on-time as compared to 91% of printed study guides. When it came to 'missing' study guides, the data showed virtually the same rate (4-5%). (Note: Percentages of 'late' work are not reported because there was not a direct comparison between one final due date for printed study guides and daily due dates for Schoology.) In a survey comparing printed and Schoology study guides, students were evenly split on which type of study guide they preferred. Survey data also showed 55% of students rated their experience with Schoology as 'liked' or 'really liked.' Finally, 75% of students indicated that Lucas should continue to use Schoology again. Taken together with the online worksheet study, these data suggest students are more likely to complete their homework, and by extension are more engaged, when assignments are completed using technology than without although students seem neutral on their preference.

The Educreations app for iPads was another technology both Sharon and Lucas used in their action research project. Sharon's students used the app over a two-day period to summarize their understanding of two characters, one from a novel and one from a movie. Students in Sharon's classroom were on-task 93% of the time during her Educreations activity. However, in a parallel activity where students wrote a journal entry into a notebook about characters in the same novel and movie, they were on-task 83% of the time. The Educreations activity yielded a 10% increase in student engagement. Students mentioned during an informal interview that they enjoyed using Educreations to show their knowledge of the characters and that they would like to use Educreations in the future.

In Lucas's classroom, students in Class A used Educreations to deconstruct a magazine advertisement while students in Class B created a traditional poster. Both Class A and B received instructions on how to complete the project with either a poster or Educreations, and both classes completed the same eight steps and points of analysis. As Figure 5 shows, Class A's mean on-task rate was 78% using the Educreations app as compared to Class B's mean of 84% for the poster. Lucas's teacher journal noted that he observed more students than normal collaborating by helping each other with the technology and aiding in analyzing their individual advertisements. Class A did have an extra day of instruction, training, and creating a sample Educreations video upfront, but the technology was new to many students; still, some students in both Class A and B had used the technology before in their German classes. This "newness" may account for the lower observed engagement in Class A using Educreations because students were still helping others navigate the technology and seemingly looking off-task during observational checks but really were not, as compared to Class B where students were more acclimated to creating posters in previous classes. In a survey given to Class A who used Educreations, 70% of students reported their engagement with the app as either a '3' or a '4' on a Likert scale, and if given the choice between making a poster or making an Educreations video, an even 50/50 split resulted. In a parallel survey given to Class B who made a poster, 81% reported their engagement with the poster as either a '3' or a '4' on a Likert scale, but if given the choice between making a poster or a generic digital presentation on an iPad (since they had no training in Educreations), 69% would still choose to make a poster.

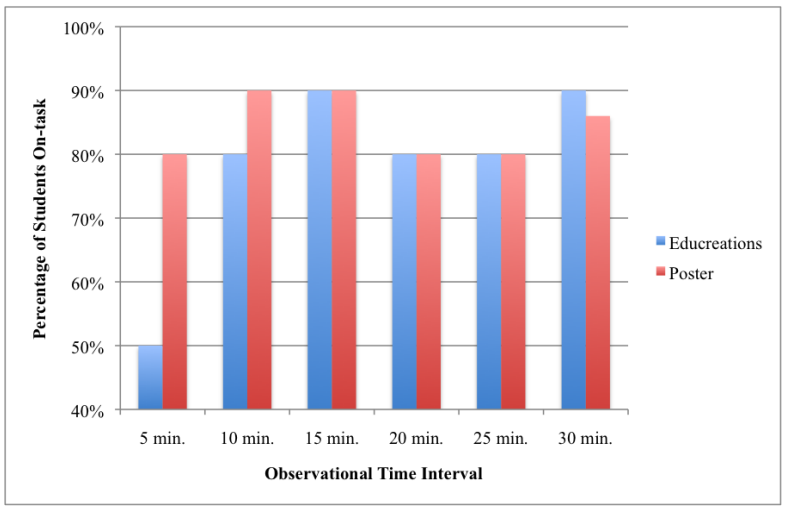

Figure 5. Lucas's observational levels using Educreations vs. posters.

In another technology implementation, Justin's students completed two parallel lessons on graphing linear inequalities that targeted the same content and objectives. In each class, completion rates increased through the use of the graphing calculator technology (see Figure 6). Justin collected additional student engagement data through observations during the technology lesson, and students were observed on-task 90% of the time during this technology lesson. While there is not any engagement data from the non-technology lesson to compare it to, Justin's journal entries indicate that students appeared to be more engaged in the content when using the graphing calculators.

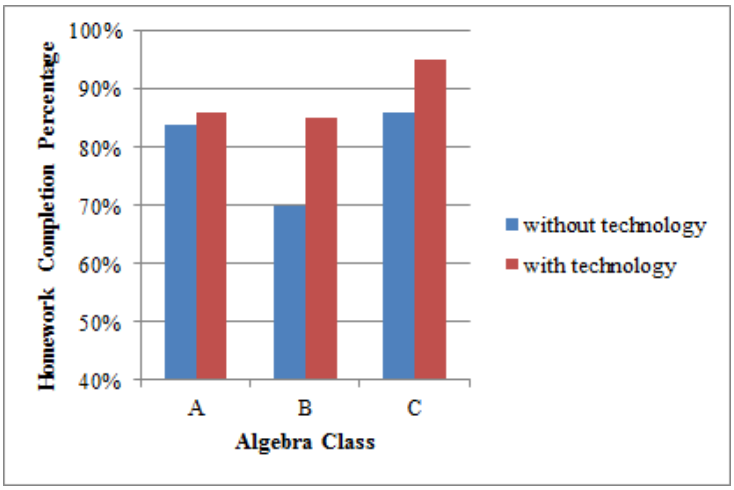

Figure 6. Completion rates for linear inequality lessons with and without technology.

Lucas used a variety of additional technologies to introduce his advertising and propaganda unit (see Figure 7). The lesson began with students participating in a NearPod app survey on iPads, which maintained a 100% on-task rate for the first ten minutes of class. Next, students viewed and participated in a brand identification and trivia PowerPoint, which averaged an on-task rate of 91%. Students then watched a 5-minute YouTube video on social media and advertising, which also maintained a 100% on-task rate. Finally, students read a chapter and answered study guide questions for ten minutes, which resulted in a mean on-task rate of 90%. Lucas's teacher journal noted an overall high level of student engagement and seeming enthusiasm for all components of this lesson. Students were remarkably engaged despite the use of and transition between three different technologies and one traditional paper and pencil component. Overall, engagement levels were high for all types of instruction, but technology components of the lesson averaged higher engagement levels.

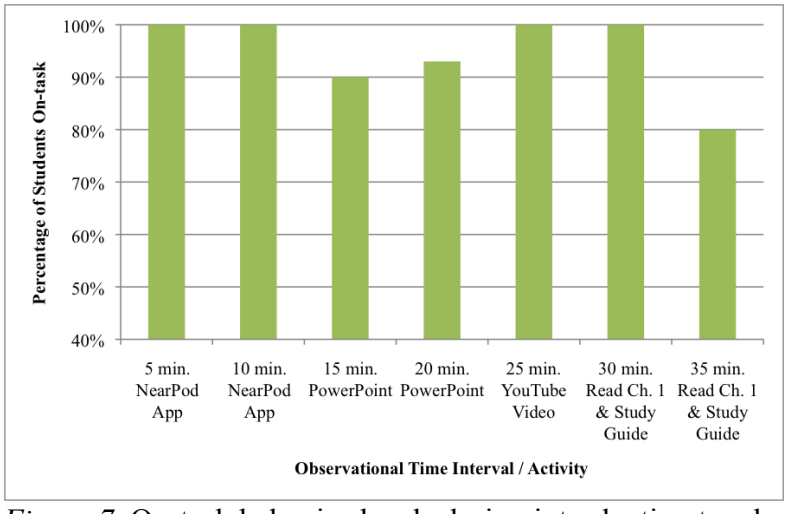

Figure 7. On-task behavior levels during introduction to advertising unit.

In another lesson, Lucas again used the NearPod app but this time paired it with QR Codes (see Figure 8). Students in Class A moved around the classroom, scanned QR Codes, analyzed magazine advertisements, and inputted their answers into NearPod for

class discussion. Students in Class B acted as a non-technology control group by instead looking at the same advertisements together on the SMART Board and writing their responses on individual whiteboards. (Note: No Class B data exists on Figure 8 during the 20- and 25-minute time intervals because Class B did not need that time to enter data into NearPod, so the lesson went more quickly.) All students in Class A and Class B then read from a textbook and answered questions. As Figure 8 shows, students in Class A had an average of 93% on-task behavior using iPads compared to the 100% on-task behavior observed in Class B using whiteboards for the same lesson. In this case, students were more engaged using non-technology instruments than the iPads. Nevertheless, the mean of 92% on-task behavior collectively for reading in both Class A and B suggests that students are more engaged with technology or other hands-on tools like whiteboards than independent seatwork like reading.

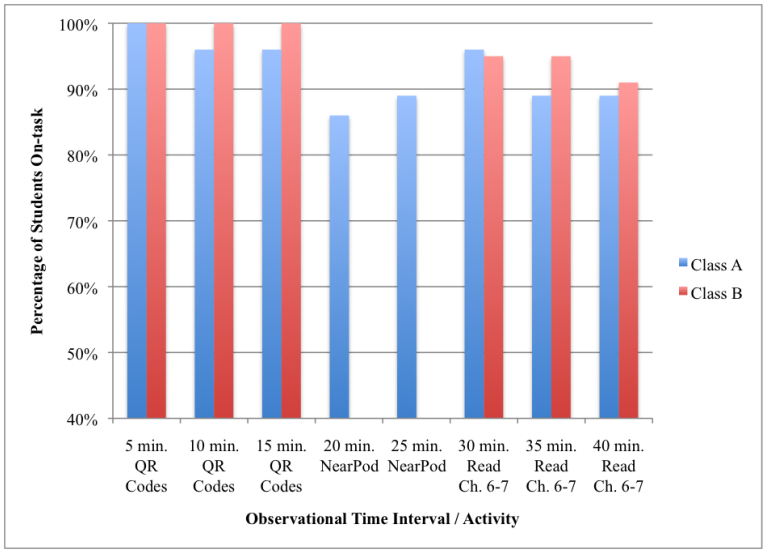

Figure 8. On-task behavior for NearPod vs. whiteboard activity.

Justin's largest collection of data occurred during the three days in which the students were planning and creating a review presentation using Google Presentations, PowerPoints, and Prezis. Five different students were closely observed each day in each

of the three classes (see Figure 9). Based on the data, Classes A and C showed similar results, which indicated a lull in engagement levels in the middle of the class periods, but they each finished strong. Class B started with low engagement levels, but increased throughout the period and finished with their highest engagement levels. Overall, students were observed as on-task 88% of the time. Justin's teacher journal supported these findings as well. When compared to a traditional lesson, Justin noted that students tended to have their highest engagement levels at the beginning of class and slowly decrease as the period ends. While there still may be a lull in engagement in the middle of the period, the use of technology appears to increase engagement at the end of the period.

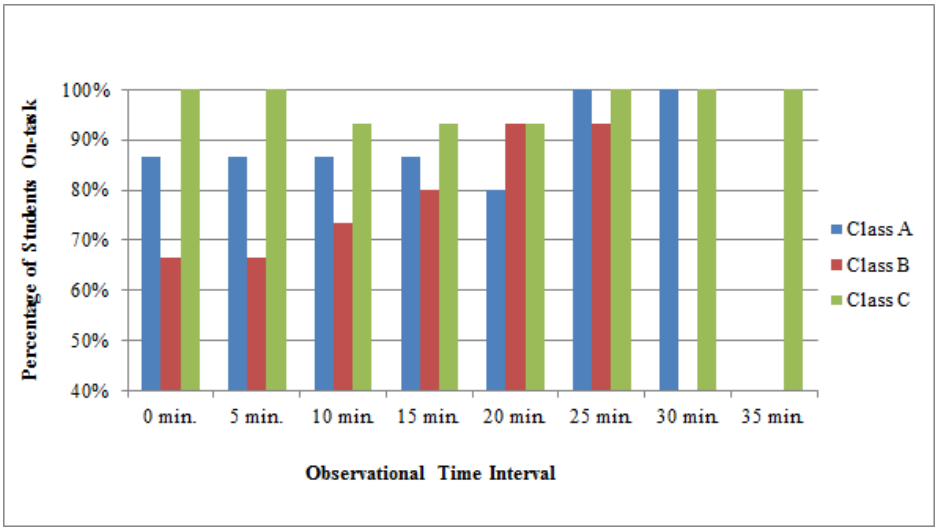

Figure 9. On-task behavior levels during a three-day presentation project.

At the beginning and end of the action research project, students completed a survey to measure the change, if any, in students' attitudes and beliefs toward technology and engagement. On the pre-survey, 59% of students reported that they agreed to some degree that they felt engaged most of the time in class. The post-survey indicated that 69% of students felt more engaged to some degree than before the intervention period, which suggests technology is effective at increasing student engagement (see Figure 10).

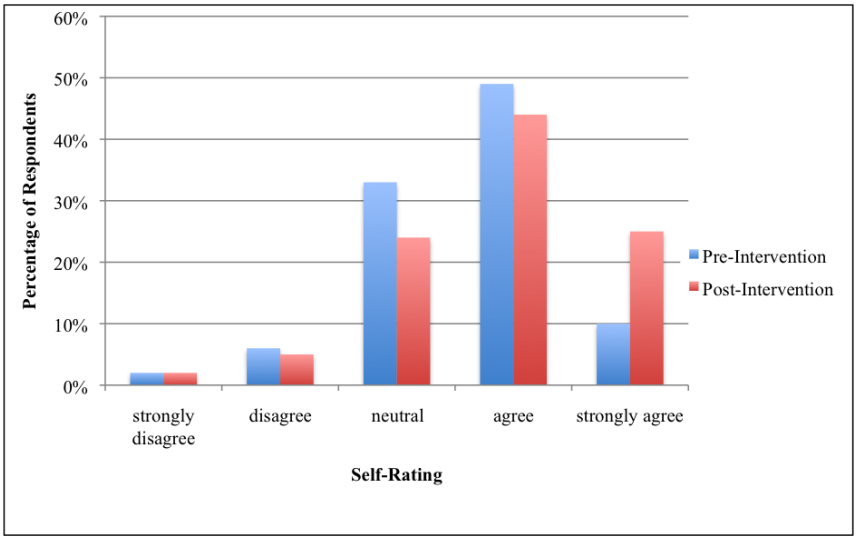

Figure 10. Self-rating: changes in student perceptions of classroom engagement.

However, while our technology integration did show an increase in students' self-perceptions of engagement, the survey did not show dramatic gains in focus by using technology. The data showed an increase of only 2% for students that said the use of technology helped keep their focus, but there was also a gain of 1% for students that said it was distracting.

We noticed there were some shifts in the types of activities students reported that keep their interest. Disaggregating the data by teacher did show different increases and decreases in each activity type, but they unsurprisingly and predictably reflected the dominant technologies each teacher was able to implement and showed the same general trends. After integrating more technology lessons, there was an overall increase of 12% for students who reported small group work as maintaining their interest, a 6% increase in using computers, but then there was a 25% decrease in watching movies and films (see Figure 11). Our data coupled with observations noted in our teacher journals suggests that using technology not only increases engagement but also enjoyment and collaboration in

small groups. (Note: Students were allowed to pick two activities that most keep their interest in class, so percentages in Figure 11 may add up to more than 100%).

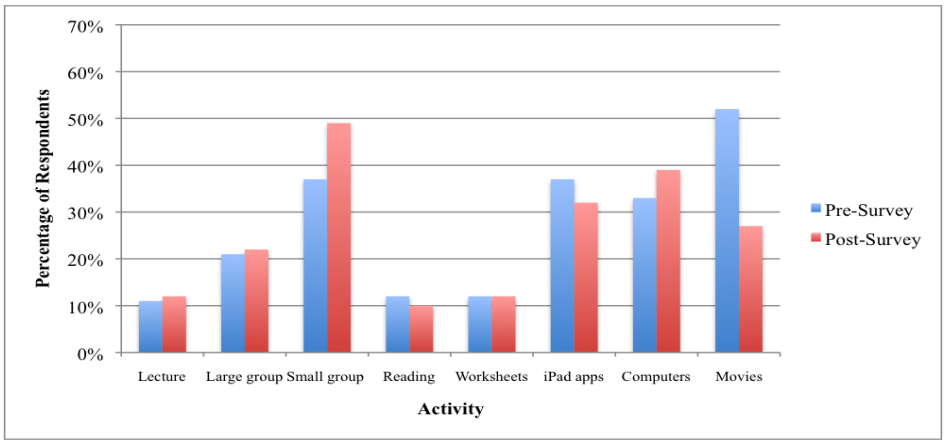

Figure 11. Self-rating: changes in student interest by activity.

Overall, our technology integration lessons were well received by our students. Survey results yielded a 9% increase in students who enjoy technology, a 12% drop in those who just feel neutral about technology, but a 3% increase in students who dislike technology in class (see Figure 12). Additionally, the post-survey indicated that 42% of students wished their teacher would continue using about the same amount of technology as during the study while 39% desired more technology. The remaining students wished for either less or about the same amount as before the study with 9% in each category.

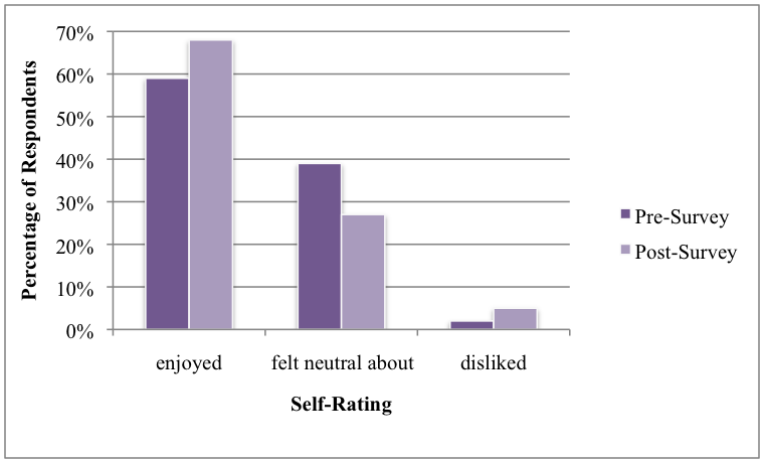

Figure 12. Self-rating: change in student enjoyment of technology in classes.

As another measure of student attitudes, students on the pre-survey responded that given the choice between completing the same assignment with or without technology, 73% would prefer to use technology because it is faster, easier to research answers to questions, more convenient, "it makes things more fun," and it allows for "more possibilities" or ways to complete an assignment. Several students stated that they just prefer traditional methods or that glitches with or inaccessibility of technology were reasons they would choose not to use it. On the post-survey, the percentage of students who would prefer to complete assignments with technology increased, but disaggregating the data by teacher showed different degrees of consensus: 89% of Justin's students would choose a technology option over one without as compared to 75% of Sharon's students and 70% of Lucas's students.

Finally, after sorting open-ended responses on how, if at all, their opinion had changed regarding teachers incorporating more technology into lessons, we noted several engagement themes emerging. Of all open-ended responses, 15% specifically identified technology as making lessons more engaging, interesting, or more fun. Students said comments like "It keeps us more engaged in class, and it also help students get their work done quicker[sic]," or "Technology not only helps keep everybody interested, it's a very interactive and visual way to learn more . . . than . . . worksheets or study guides." Moreover, 7% of respondents said that technology increases focus, with one student saying, "I think it helps me stay focused and participate instead of just ignoring and falling asleep or doing something else."

After analyzing and reviewing all five of our data sources, we can conclude that integrating more technology into lessons does increase student engagement overall in the

secondary classroom. Sometimes our data produced contradictory results, but at worst it seems that using technology is at least just as engaging for students as using traditional teaching methods without technology. Student surveys show increased self-perceived engagement and interest in using technology as students believe using technology to complete assignments is more fun, efficient, and convenient. Our teacher journals and observations noted increased use of small group work, which we thought also allowed for greater collaboration on assignments. In general, students showed high enthusiasm toward using more technology in the classroom. Homework completion rates also increased due to the use of technology. These results have several implications for our teaching practice. In the next section, we will explain how we plan to use this information going forward with our action plan.

Action Plan

Our action research study generated data that generally indicate students are more engaged with lessons that incorporate technology than those that do not. Overall, most technology lessons increased students' on-task behaviors by 5-10% (although in a few cases engagement levels actually declined by using technology when compared to parallel lessons not using technology). Besides increasing engagement, the use of technology also generally seemed to improve student enjoyment and enthusiasm for lessons. Students were excited to try new technologies and adapted well to the new formats.

Our data provide some insights toward informing our teaching practice and pedagogy. Our results suggest students enjoy using technology and are more engaged using it, so logically this would suggest that we strive to incorporate more technology

into our lessons. However, sometimes technology integration lessons resulted in lower levels of engagement, provided distractions, and had technology glitches that prevented students from working. Sometimes using technology took students longer to accomplish a task, produce a product, or learn a concept than non-technology methods. Thus, teachers should be judicious in selecting and designing technology integration and keep the age of the students in mind. For example, most students in our study found TodaysMeet too much like a chat room making jokes and posting under anonymous names. In the future, using a similar technology that requires a login or e-mail address could potentially reduce the number of inappropriate comments. Our data suggests that TodaysMeet might be more effective at the secondary level in smaller groups where there is more accountability or with more mature or advanced students. Therefore, technology should be carefully considered and used when appropriate. When traditional methods are more effective, efficient, or engaging than technology options, they should be used. Just because we have technology does not mean we have to use it if better (even if older or more traditional) methods will do a better job. Technology alone will not impact education the way we desire. It should be an enhancement, not an expensive and flashy replacement.

As we integrated new technologies into our classrooms, we learned that despite being digital natives and despite technology often being fairly intuitive, students need at least some demonstration of how each new technology works. At the very least, they need a chance to ‘play around with it’ or create a dummy project or file before the real one to try it out. Taking the time to explain the functions or features at the outset saves

time later and allows students to work more independently or cooperatively. Instead of asking technology questions, students can focus on learning.

Throughout the project, we discovered that the use of technology also seems to lend itself very well to both individual and small group work. In this way, technology allows a teacher to provide more differentiation opportunities if projects are tiered or leveled. Additionally, students in our study really seemed to enjoy working together in groups more than in traditional assignments. Lucas's students enjoyed how dynamic the Schoology discussion board was in reading and responding each other's posts. Lucas was pleased to see better quality and depth of responses using Schoology than traditional study guides, albeit that fewer content questions were covered. Schoology also appeared to Lucas to cut down on the amount of copying or cheating students could do on traditional study guides where every student answered the same packet of questions. Sharon's students expressed enjoyment and increased engagement during the paired Google Document assignments, and Justin's students collaborated online using Google Presentations while in class and at home. Students also enjoyed using the technology as a tool to teach themselves and others in the same class. In this way, students practiced reciprocal and peer teaching. Lucas and Sharon's students not only answered technology-related questions but collaboratively analyzed advertisements and character traits together in creating their Educreations video presentations. Justin's students did something similar in creating their group Google Presentations and Prezis. As teachers, we hope to continue incorporating more technology to provide these additional small group and collaborative opportunities.

Based on our action research experience, we noticed a few limitations to our study and a few design changes that we would make the next time around. The biggest obstacle that we encountered was the short time frame for data collection due to the MCA test season. Additionally, data collection occurred near the end of the school year when things were rushed and students were eager for summer vacation or seniors were graduating early. This likely affected our data. Therefore, we would try to conduct any similar research projects for a longer period of time and earlier in the school year. Because of the rush and interruptions, extended time would also allow us to more concurrently collect data and align our lessons and the types of technology used for more direct comparisons. For example, after hearing about Lucas and Sharon's use of iPads, Justin wishes that he would have had more time to incorporate them into his lessons. Given a longer time frame, we would attempt to use each technology multiple times over several months all in similar lessons. For example, we each might attempt to use iPads twice per month during a semester. In this way we could determine an engagement average across several days using each type of technology instead of basing our conclusions on only a single lesson or two. This would help to increase the validity of our findings. Likewise, collecting more data during traditional or parallel non-technology lessons would also increase the validity of those measures.

Another variation in our data occurred because sometimes we used seating charts to record engagement data and sometimes we used our Engagement Observation Form, which only tracks five students compared to a full seating chart of 25 or more. In this way, a different number of students were observed and each student accounted for a larger or smaller portion of the overall class percentage leading to less reliable averages.

Using a consistent form monitoring more students would have improved our results. Finally, we also would have video recorded lessons for later analysis and conducted more student interviews to collect more data and further investigate overall trends in the students' pre- and post-survey data. Student interviews would be another source to triangulate our data.

Overall, our action research project shows increased student engagement when technology is used. Increased engagement should translate to improved attitude and motivation in the classroom, which should then in turn improve student achievement. In fact, according to our post-survey results, 50% of students responded that they thought technology helped them learn more, 47% thought it had a neutral impact, and only 3% said that technology slowed their learning. Therefore, potential future action research should investigate whether technology integration's gain in student engagement results in a corresponding increase in student achievement. Taking it a step further, action researchers could also investigate whether certain technologies are more effective or engaging than others. With this research, today's 21st-century educator can be confident in heeding John Dewey's warning not to teach today's students like yesterday's lest we rob them of their future (Pilgrim, Bledsoe, & Reily, 2012, p. 16). If action researchers explore technology's impact in the classroom to turn it into an engaging, effective, and critical thinking tool, our students' tomorrow will be firmly in hand.

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Appendix A

Pre-Intervention Survey

Pre-Intervention Questionnaire

Students: Please answer the questions below honestly and to the best of your ability. Your responses will not affect your grade in class. Thank you for your participation!

(Note: When the survey uses the word "technology," it refers to the use of computers, iPods, iPads, clickers, smart phones, etc.)
* Required

Student #: *

Sex: *
female

Type of student: *
regular education

Race: *
White

1. I feel engaged in class most of the time. *

	1	2	3	4	5	
strongly disagree	○	○	○	○	○	strongly agree

2. Of the activities listed below, which TWO keep your INTEREST most in class? (Mark 2 choices) *

- ☐ Lecture/Presentation by teacher
- ☐ Large group work
- ☐ Small group work
- ☐ Reading by self
- ☐ Completing worksheets, posters, study guides, textbook questions, etc.
- ☐ Using iPad apps
- ☐ Using computers (typing, researching, creating a presentation)
- ☐ Watching movies/films

Pre-Intervention Survey (continued)

3. Of the activities listed below, which TWO do you feel you LEARN the most from? (Mark 2 choices) *

- [ ] Lecture/Presentation by teacher
- [ ] Large group work
- [ ] Small group work
- [ ] Reading by self
- [ ] Completing worksheets, posters, study guides, textbook questions, etc.
- [ ] Using iPad apps
- [ ] Using computers (typing, researching, creating a presentation)
- [ ] Watching movies/films

4. Outside of class, I use a computer/iPad/laptop that is connected to the Internet at my home. *

- ○ Yes
- ○ No

5. If yes to #4, I use that device for:

- ○ 0-1 hours per day
- ○ 2-4 hours per day
- ○ 4 or more hours per day

6. I feel connected to technology in school (similar to when I am out of school). *

	1	2	3	4	5	
strongly disagree	○	○	○	○	○	strongly agree

7. At school I typically use technology _____ times each day in my classes. *

- ○ zero
- ○ one-two
- ○ three-four
- ○ five or more

8. The use of technology in class _____. *

- ○ helps me stay focused.
- ○ does not affect my learning.
- ○ seems to distract me.

Pre-Intervention Survey (continued)

9. I am more likely to complete my school work, learn, and study if the lesson involves _____. *

- a textbook
- a computer
- a worksheet
- Neutral. I would complete the assignment regardless.

10. I generally _____ learning in class when technology is incorporated. *

- enjoy
- feel neutral about
- dislike

11. Of the following activities, I feel most creative: *

- creating a PowerPoint/presentation
- making a poster
- performing or acting
- making a video/photo collage
- writing a story
- teaching others
- Other:

12. I generally feel comfortable participating in class discussions or asking questions. *

	1	2	3	4	5	
strongly disagree	○	○	○	○	○	strongly agree

13. Which of the following do you feel best demonstrates your learning? *

- multiple choice/tests
- essays
- speeches
- posters/displays
- multimedia presentations (creating PowerPoints, videos)
- competitive/review games

Pre-Intervention Survey (continued)

14. What are the benefits of traditional teaching methods (lecture, paper/pencil, etc.)? *

15. What do you see as the benefits of using technology in the classroom? *

16. If you were given the choice to complete the same assignment with or without the use of technology, which would you choose? Please explain your choice. *

17. What technology do you wish your teachers would use? How would this help you to learn or to make school more meaningful for you? *

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Appendix B

Engagement Observation Form

Teacher: **Grade:** **Date:**

Class: **Period:**

Lesson:

Technology Used:

- ☐ Schoology
- ☐ iPads
- ☐ Back channel
- ☐ Other:

Method of Instruction (MI Codes):

LG: Teacher Directed Large Group
SG: Teacher Directed Small Group
IS: Independent Seatwork
TI: Technology Integration

MI Code:								
	(start) 0 min.	5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.

Student #1:

Student #2:

Student #3:

Student #4:

Student #5:

Totals:

On-task	Off-task	On-task	Off-task	On-task	Off-task	On-task	Off-task	On-task	Off-task	On-task	Off-task	On-task	Off-task	On-task	Off-task

	X	RW	H	P	D	U
#:						
%:						

Codes:

X = on task, listening/watching
RW = on task, writing/reading
H = on task, hands-on activity/interacting
P = off task, passive/inactive, playing with objects
D = off task, disturbing others
U = off task, unrelated activity
(*on-task means student is on-task for at least 80% of each 5 min. interval)

Notes:

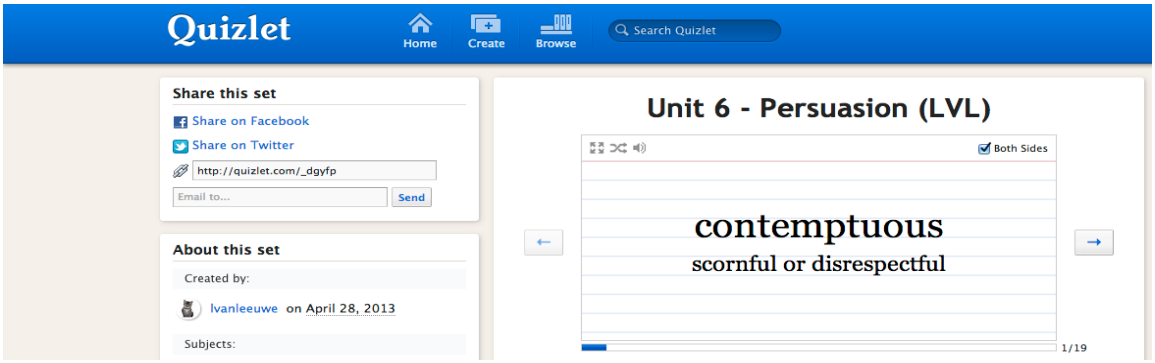
Appendix C

Quizlet Screenshots

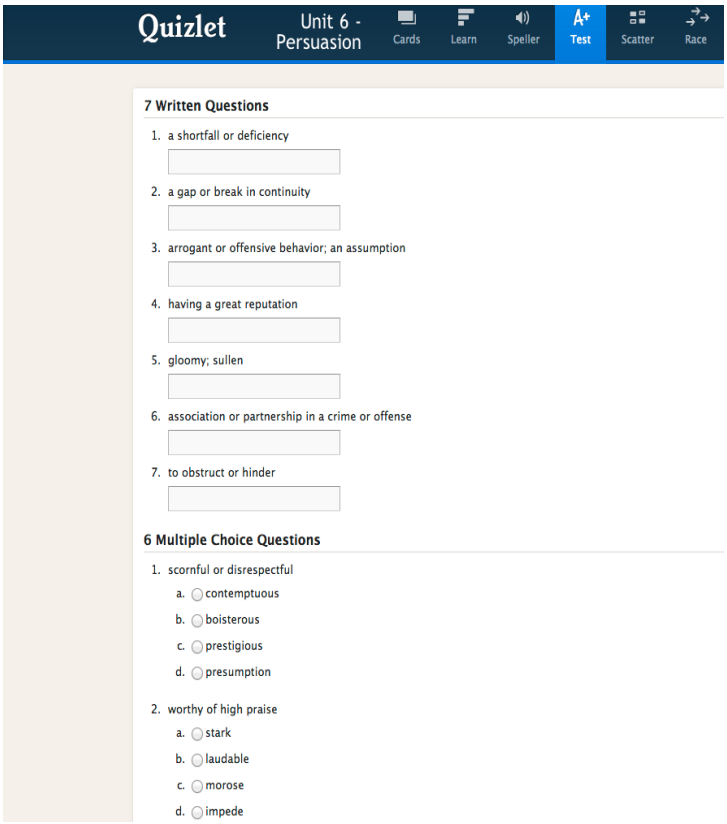
Unit 6 – Persuasion #1 (definitions)

In this first set of Quizlet, Lucas's students reviewed Unit 6 vocabulary definitions using a variety of formats, including flashcards and quiz/test formats, as shown in the screenshots below. In electronic versions of this report, hyperlinks are also provided when possible.

Flashcards:



Quiz/Test:

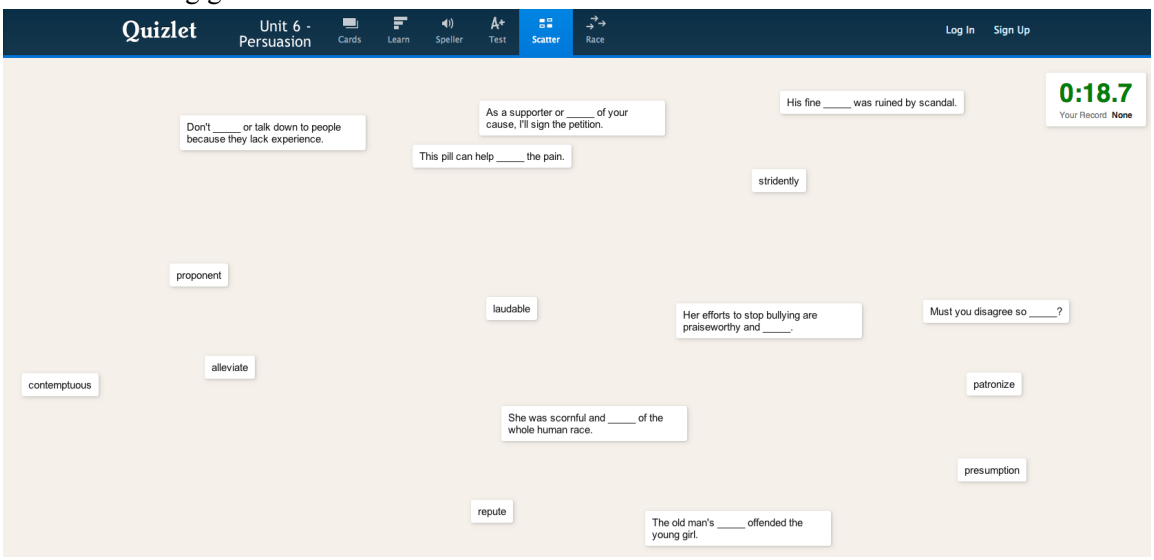


Quizlet Screenshots (continued)

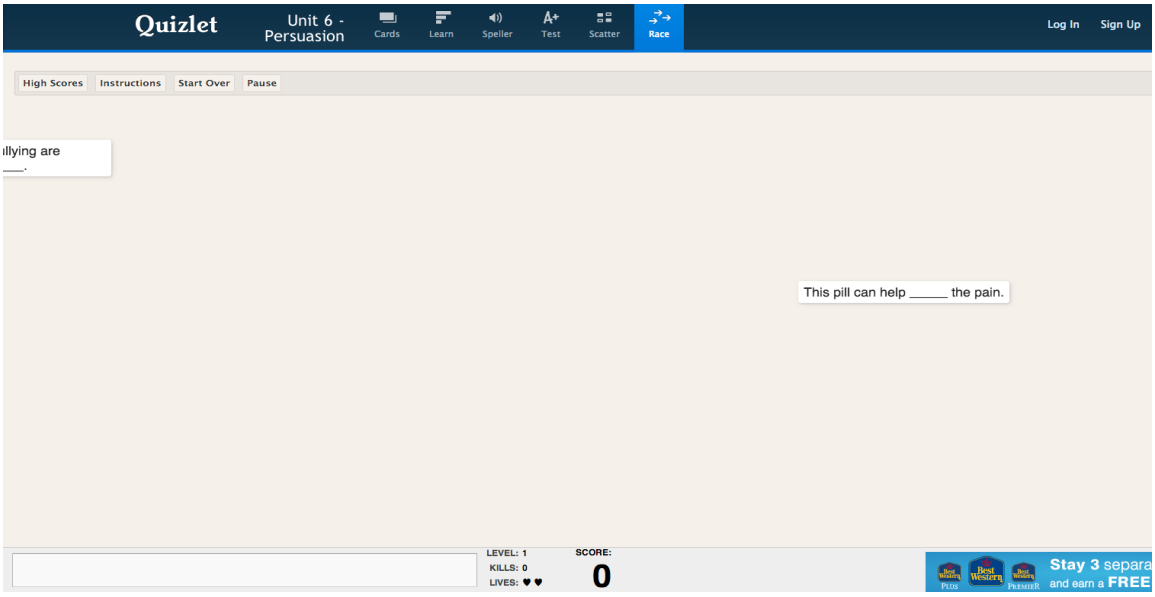
Unit 6 – Persuasion #2 (application)

In the second set of Quizlet, Lucas's students applied Unit 6 vocabulary words in fill in the blank situations. Formats included matching and space race games, as shown in the screenshots below.

Scatter/Matching game:

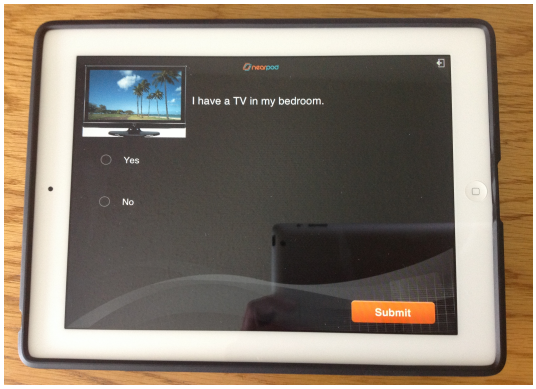


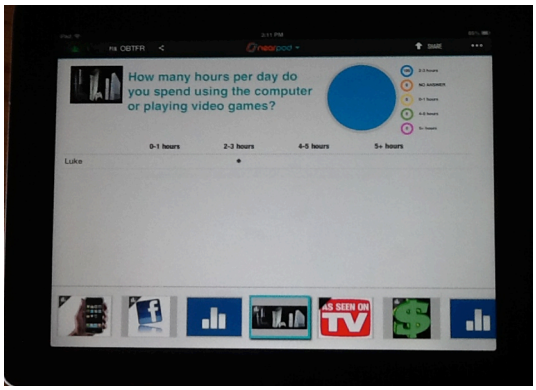
Space Race game:



NearPod Screenshots

NearPod is an iPad classroom survey app. In this introductory lesson, Lucas's students imputed their responses into NearPod to address habits and misperceptions of advertising.





QR Codes

Students in Lucas's class used iPads to scan QR Codes like this to quickly and easily take them to magazine advertisements online. They then identified the propaganda strategy used in each ad and imputed their responses into NearPod.

TodaysMeet Transcript

Students used the back channel TodaysMeet to communicate with each other and their teacher. The screenshot below is a transcript of Justin's classroom taken while students worked on their Google Presentations. They were able to pose questions and solutions using a laptop, iPad, or smart phone.

You can type each step in a line at a time or write the explanation of the steps on each line.
01:21PM Wed, 29 May 2013 GMT by Mr. Banitt

highlight the numbers you want to cross out and then look for the "strikethrough" feature.
01:21PM Wed, 29 May 2013 GMT by Mr. Banitt

How do you make a divide sign? /<-- isn't this sign?
01:26PM Wed, 29 May 2013 GMT by

where can you find good examples of problems for your presentation?
01:27PM Wed, 29 May 2013 GMT by

The "/" counts as division, otherwise you can use the "underline" feature.
01:27PM Wed, 29 May 2013 GMT by Mr. Banitt

Use your textbook or the online book for good examples.
01:27PM Wed, 29 May 2013 GMT by Mr. Banitt

÷ <-found it
01:27PM Wed, 29 May 2013 GMT by

Thank you, what is the password for the site?
01:29PM Wed, 29 May 2013 GMT by

how do you multiple
01:30PM Wed, 29 May 2013 GMT by

Ummm..... how do you make a fraction line ?
01:31PM Wed, 29 May 2013 GMT by

Username: Algebra863 Password: blaze
01:31PM Wed, 29 May 2013 GMT by Mr. Banitt

Use the "underline" feature after highlighting the part you

Ad Deconstruction Worksheets

Lucas's students completed a worksheet deconstructing an advertisement. Some students completed paper and pencil worksheets and some completed online versions in order to compare completion rates.

Deconstructing Advertising
Magazine Ad #1

Directions: Answer the following questions for one particular magazine ad. Be sure to write in complete sentences!

a. Name of product being advertised: _____

b. Who is the target audience? How can you tell?

_____

_____

_____

c. Which executional framework is used? *(circle one)*

Lifestyle Scientific Spokesperson/Testimonial Demonstration

Slice-of-Life

Why do you think the ad company chose this framework?

_____

_____

d. Which words in the ad entice the viewer? Why?

_____

_____

e. Which types of appeals are being used? *(circle all that apply)*

Sex appeal	Fear	Desires	Humor
Values/Morals	Vanity	Pity	Individuality

Why are these appeals effective?

_____

_____

f. How might this ad promote the idea of instant gratification?

_____

_____

Ad Deconstruction Worksheets (continued)
Online Version (Google Form):

Deconstructing Advertising - TV Commercial #1

Name: *

Hour: *

Name of the product being advertised: *

Who is the target audience? How can you tell? *

Which of the 9 propaganda strategies does the ad use? (mark all that apply) *

- [ ] Assertion
- [ ] Bandwagon
- [ ] Card Stacking
- [ ] Glittering Generalities
- [ ] Testimonial
- [ ] Name Calling
- [ ] Transfer
- [ ] Plain Folks
- [ ] Snob Appeal

How does the ad use the strategies you marked above? *

Ad Deconstruction Worksheets (continued)
Online Version (Google Form):

What is the ad trying to connect their product with? Does the association work well? *

Which emotions or feelings does the ad appeal to? Why? *

Which executional framework is used? (pick one) *

- [ ] Lifestyle
- [ ] Scientific
- [ ] Spokesperson/Testimonial
- [ ] Demonstration
- [ ] Slice-of-Life

Why do you think the ad company chose this framework? Explain. *

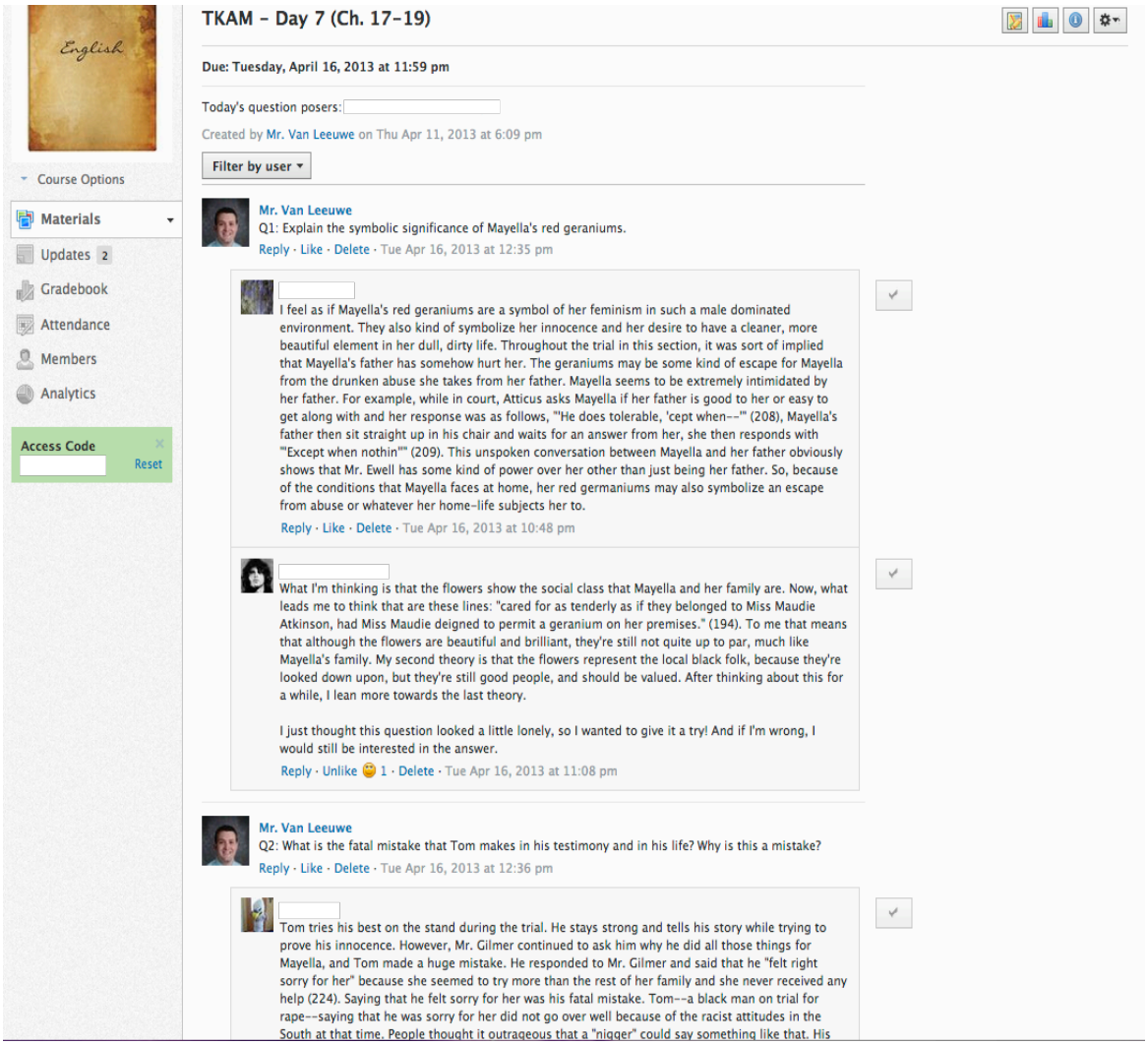
- [ ] Send me a copy of my responses.

Submit

Never submit passwords through Google Forms.

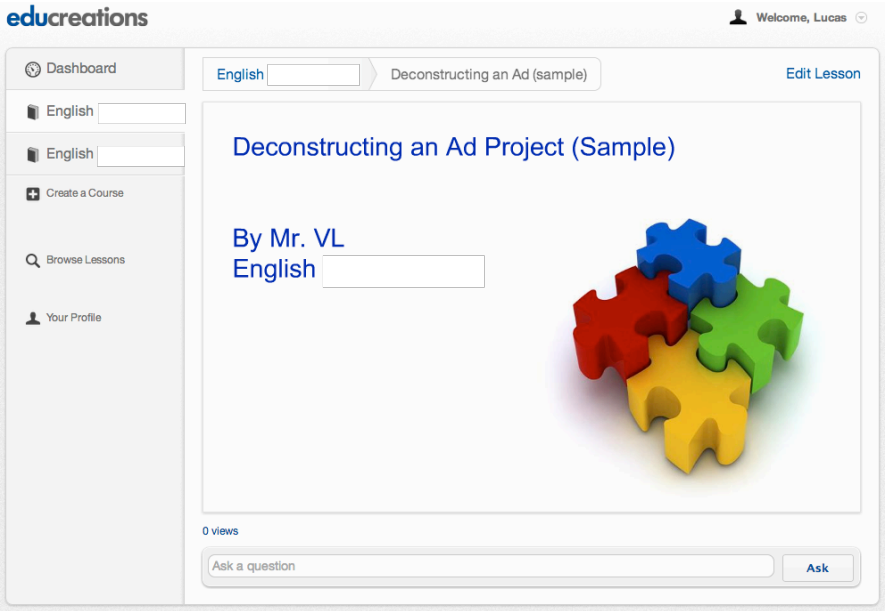
Schoology Screenshot

Schoology is on online course management software. While reading a novel, Lucas's students posted a daily discussion post answering a question on the novel. These posts were then compared to completion rates for traditional paper and pencil study guides.



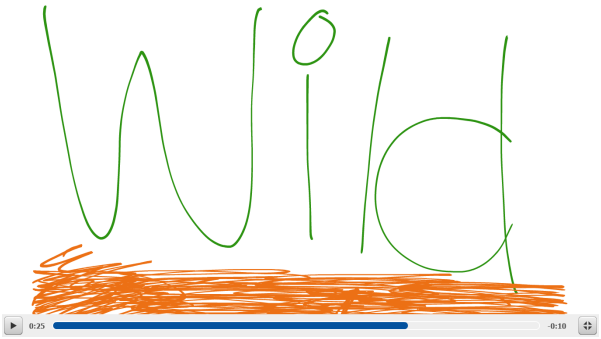
Educreations Screenshots

Educreations is a video presentation app that allows students to create and record slides. It also allows students to annotate with ink on the screen and record their own voices in real time, as shown in the second screenshot below. In the screenshots below, Lucas's students analyzed a magazine advertisement and explained it orally.



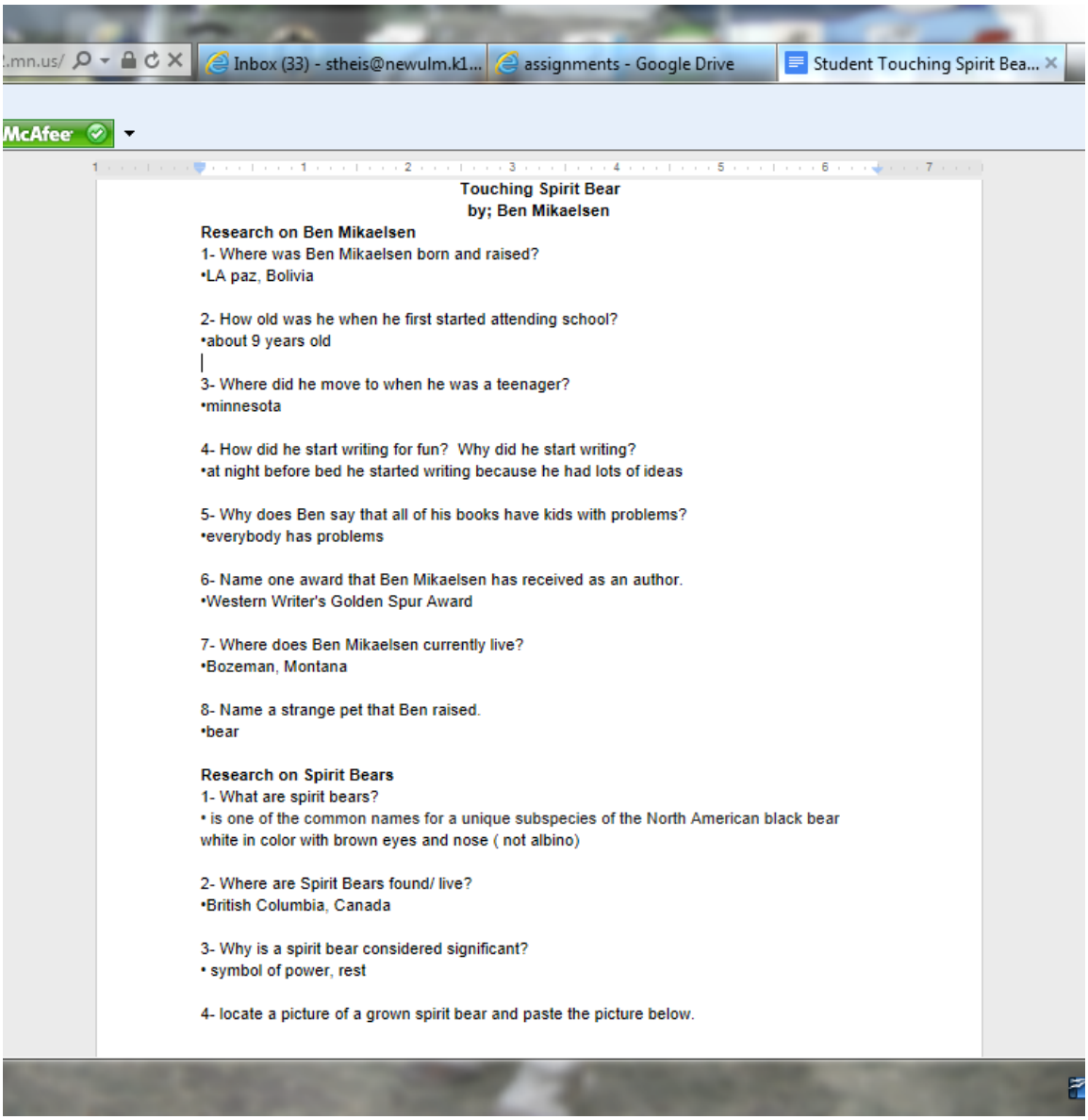
Educreations Screenshots (continued)

In the screenshots below, Sharon's students accompanied visual pictures with an audio explanation of why they chose the descriptive word and picture to match the novel and the movie they were reading.



Google Document Screenshot

Sharon's students answered questions posted by the teacher in their Google Document by each searching the Internet and then collaborating with a class partner to write the answers.



Touching Spirit Bear
by; Ben Mikaelsen

Research on Ben Mikaelsen

1- Where was Ben Mikaelsen born and raised?
•LA paz, Bolivia

2- How old was he when he first started attending school?
•about 9 years old

3- Where did he move to when he was a teenager?
•minnesota

4- How did he start writing for fun? Why did he start writing?
•at night before bed he started writing because he had lots of ideas

5- Why does Ben say that all of his books have kids with problems?
•everybody has problems

6- Name one award that Ben Mikaelsen has received as an author.
•Western Writer's Golden Spur Award

7- Where does Ben Mikaelsen currently live?
•Bozeman, Montana

8- Name a strange pet that Ben raised.
•bear

Research on Spirit Bears

1- What are spirit bears?
• is one of the common names for a unique subspecies of the North American black bear white in color with brown eyes and nose (not albino)

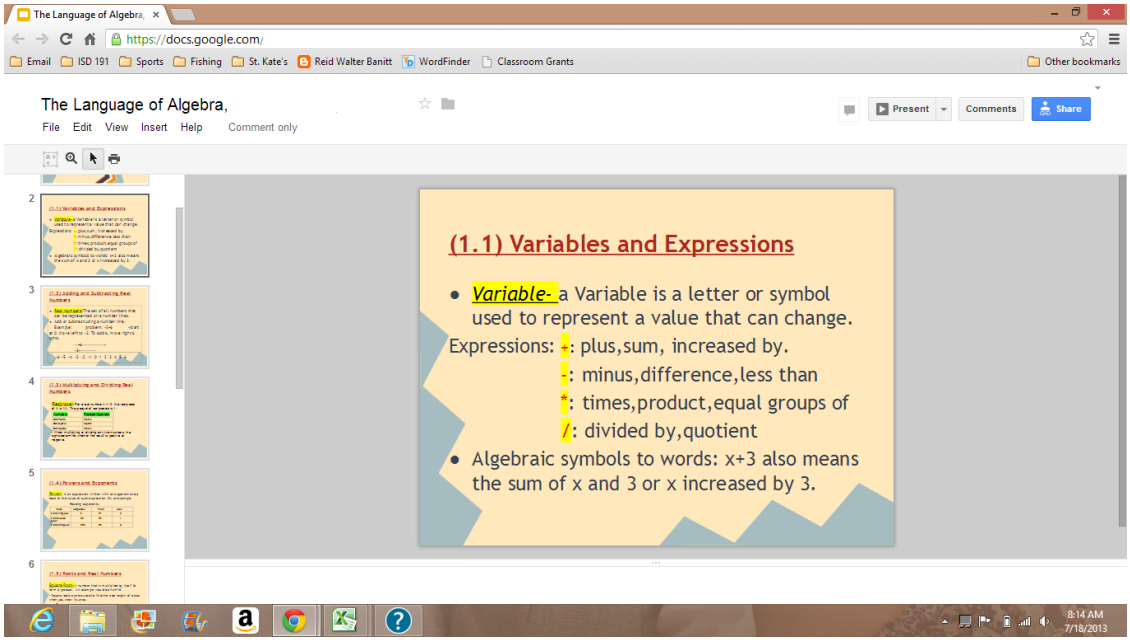
2- Where are Spirit Bears found/ live?
•British Columbia, Canada

3- Why is a spirit bear considered significant?
• symbol of power, rest

4- locate a picture of a grown spirit bear and paste the picture below.

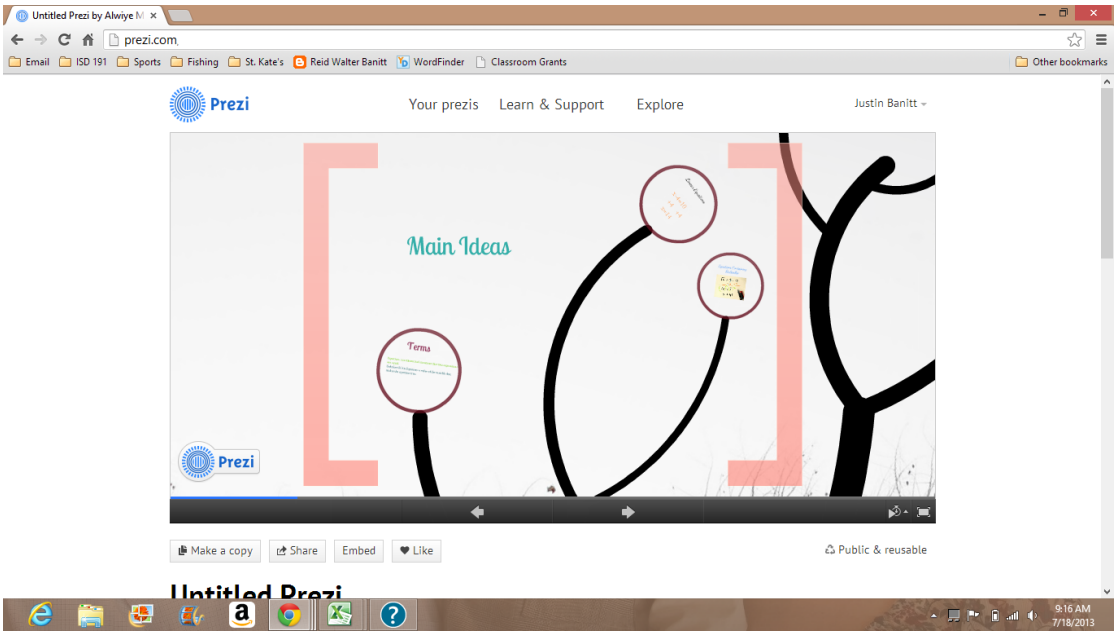
Google Presentation Screenshot

Justin's student groups used Google Presentations to collaborate on a math research project. Students were able to work simultaneously on the presentation.



Prezi Screenshots

Justin's students also chose to use Prezi as a presentation tool for their research projects. Peers were captivated by the transitions unique to Prezi.



Appendix E

Post-Intervention Survey

Post-Intervention Questionnaire

Students:
Please answer the questions below now after our technology integration for the past several weeks. Consider all the uses of technology used recently compared to normal class activities, including:

*iPads (Educreations)
*Schoology
*GoogleDocs
*BackChannel (TodaysMeet.com)
*Quizlet

Please answer the questions below honestly and to the best of your ability. Your responses will not affect your grade in class. Thank you for your participation!
* Required

Student #: *

Sex: *

Female

Race: *

White

A. I felt _____ engaged in class using technology recently compared to regular class activities. *

Consider iPads, Schoology, Back Channel, etc.

	1	2	3	4	5	
less	○	○	○	○	○	more

B. When it comes to your learning, which of the following generally describes your experience with new technology tried in class in the last few weeks? *

- ○ The technology helped me learn more.
- ○ Technology had a neutral impact; I learned the same amount whether I had technology or not.
- ○ The technology slowed my learning.

C. The use of technology in class the last few weeks _____. *

- ○ helped me stay focused.
- ○ did not affect my learning.
- ○ seemed to distract me.

Post-Intervention Survey (continued)

D. Of the activities listed below, which TWO kept your INTEREST most in class in the last few weeks? (Mark 2 choices) *

- [ ] Lecture/Presentation by teacher
- [ ] Large group work
- [ ] Small group work
- [ ] Reading/working by yourself
- [ ] Completing worksheets, posters, study guides, textbook questions, etc.
- [ ] Using iPad apps
- [ ] Using computers (typing, researching, creating a presentation)
- [ ] Watching movies/films

E. Of the activities listed below, which TWO do you feel you LEARNED the most from in class in the last few weeks? (Mark 2 choices) *

- [ ] Lecture/Presentation by teacher
- [ ] Large group work
- [ ] Small group work
- [ ] Reading/working by yourself
- [ ] Completing worksheets, posters, study guides, textbook questions, etc.
- [ ] Using iPad apps
- [ ] Using computers (typing, researching, creating a presentation)
- [ ] Watching movies/films

F. Which of the following did you feel most clearly demonstrated your learning in the last few weeks? *

- ( ) multiple choices quizzes/tests
- ( ) essays
- ( ) speeches
- ( ) posters/displays
- ( ) multimedia presentations (creating PowerPoints, videos, Educreations)
- ( ) competitive/review games

G. Using TodaysMeet.com I felt _____ comfortable participating in class discussions.

- (•) more
- ( ) just as
- ( ) less

H. I generally _____ using more technology in the last few weeks. *

- ( ) enjoyed
- ( ) felt neutral about
- ( ) disliked

Post-Intervention Survey (continued)

I. After integrating more technology lately, I wish my teacher would use _____. *

- ○ less technology overall
- ○ about the same amount as the last few weeks
- ○ about the same about as before this experiment
- ○ more technology overall yet

J. If you were given the choice to complete the same assignment with or without the use of technology, which would you generally choose? *

- ○ with technology
- ○ without technology

K. After trying some new technologies in class the last few weeks, how, if at all, have your opinions changed about teachers incorporating more technology into lessons? Explain. *

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