

DETERMINING THE IMPACT OF THE ATKINS SCHOOL DISTRICT'S
TECHNOLOGY INITIATIVE ON THE STUDENT'S PERCEPTION OF HIS/HER
ABILITY TO LEARN, AND THE TEACHER'S ABILITY TO TEACH

by

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July 2014

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ABSTRACT

This descriptive study sought to assess the effects of the technology initiative that was undertaken starting in the 2013-2014 school year at the Atkins School District. The initiative began with the dissemination of laptop computers to each student in grades 9 through 12 combined with training for the teachers on how to use the technology. I gathered data for the investigation through surveys and interviews in order to ascertain the efficacy and success of the initiative from the perspectives of the students and teachers. The feedback from students and teachers alike was mixed, but showed an overall neutral feeling about the initiative. The data suggests that greater technology implementation can have a positive impact on the quality of education but only if it is implemented with adequate support.

INTRODUCTION AND BACKGROUND

As society continues to progress through the 21st century, schools must adapt to the technological needs of their students to ensure that they are fully prepared to meet the digital demands of the modern world. Many school districts have been experimenting with ways to meet this demand. At the beginning of the 2013-2014 academic year, the Atkins, Arkansas School District invested just over \$180,000 to begin a one-to-one technology initiative in order to try to meet this need for our students. The district purchased 350 Lenovo Thinkpad laptops to have enough for every student in grades 9 through 12 and have extras for loaning or replacing. We also purchased 35 Aerohive Access Points, a 48-port Cisco Powered Over Ethernet switch, a Dell Poweredge Server, and eight 1000 foot rolls of CAT6 cable to be able to handle the additional required bandwidth. We began coordinating with the local educational cooperative to adopt Moodle as a platform for online learning.

The district started training teachers before the school year began in the use of the hardware and software that went along with the initiative. Plans were made to continue teacher training throughout the school year. Additionally, the administration strongly encouraged teachers to implement the technology, requiring them to incorporate the use of the Moodle platform and to integrate at least one technology-based assignment or project per academic quarter. Some teachers, myself included, also sought out further ways to incorporate technology through online interfaces such as Remind101.com. I originally learned about this tool at a teacher workshop and realized that it might be the perfect way to communicate outside of school time with students using a medium that was very well-known to them: their cell phones. Remind101.com allowed teachers to

send one-way text messages to students and their parents, alerting them to upcoming assignments or review sessions or the like.

The technology initiative is what led me to begin this research project and answer the question “What impact does increasing the integration of technology have on my students’ ability to learn the curriculum and my ability to teach them?” I wanted to find out:

1. How do students perceive the effects of the technology initiative on their participation in class?
2. How is student interest in learning the curriculum affected by the instant access to the resources on the Internet?
3. How do frequent outside-of-class communications through resources such as Remind101.com impact the student’s perception of his/her preparation for class?
4. What impact has the technology initiative had on the educator?

This support team consisted of five diverse individuals, without whom this project would not have been possible. My building principal, Margaret Robinson, served in the capacity of administrator and curricular leader. She was truly integral in convincing the district to pursue the technology initiative in the first place. She was still relatively new to the district, this being only her second year as principal, but she made some major positive changes to the way the high school operates. For example, she created a Student Advisory Board consisting of members from each high school class. This group’s goal was to provide student input on day-to-day activities at the school, including input on the technology initiative. She also worked to encourage teachers to begin pursuing project-based learning utilizing the technology in some way.

Also on my support team was Mark Meredith, a teacher at a nearby school district who taught similar subjects I did. Mark and I have worked very closely together for many years so he was always there to listen to my ideas and frustrations, and helped come up with new approaches. Mark was participating in Montana State University's Master of Science in Science Education program concurrently with me, and had a similar research question. He was specifically investigating the effect of using Moodle in his classes, and Moodle was a part of my overall research focus.

Additional members of my support team included Allen Haney, Jessica Wygle, and Terry Cameron. Allen was the technology assistant for the Atkins School District. His technological expertise helped me immensely in trouble shooting glitches and networking issues, as well as coming up with novel ways to incorporate technology into my classes. Jessica was a history and Advanced Placement Human Geography teacher at my school. She and I shared similar educational philosophies and were of similar age and technological literacies. Terry Cameron was an English and literacy teacher at my school. He assisted me by providing the perspective of a well-seasoned teacher who fully embraced technology integration in his classroom activities. His perspective was further unique because many of the older teachers at the district were skeptical or resistant to the technology initiative. Of the entire faculty, he had really taken charge of implementing some of the more challenging aspects of the technology initiative, such as using the online learning platform Moodle.

These five individuals each contributed to this project in their own unique ways, providing perspectives from the administration side, the teacher side, and the support side. It likely would not have been successful without them.

CONCEPTUAL FRAMEWORK

Expanding access to educational technology and the Internet has provided novel ways to approach and supplement instruction. There are several ways online instructional technology can be used, including learning management systems (LMSs), course management systems (CMSs), and virtual learning environments (VLEs). Regardless of the technology incorporated, the educator should always use the following criteria: 1. the teaching-learning task to be performed should be essential to the course to which it is applied; and 2. The task could not be performed as well - if at all - for the students without the technology (Kussmaul, Dunn, Bagley, & Watnik, 1996).

Several platforms have been created to allow students to access course material outside of normal class time. Moodle is one of the more popular LMSs available and is completely free of charge to the user. Other LMSs exist but many charge a usage fee, which can be impractical for a district or individual educator to adopt. Moodle can be used for online-only delivery of course material similar to distance learning, or in a blended way alongside in-class instruction (Aranda, 2011).

Moodle, which is an acronym for Modular Object-Oriented Dynamic Learning Environment, was designed in the 1990s by Martin Dougiamas for a doctoral project. The software went through several revisions over a period of ten years, finally being published as Moodle 1.0 in August of 2002. Dougiamas sought to better facilitate distance learning using the Moodle software. He also wanted to provide Moodle for free to allow other teachers to improve their own pedagogy and create a supportive community to collaborate with each other about the software (Aranda, 2011).

Moodle is a type of open-source software and is completely customizable to the educator's requirements. It has several settings that can be turned on or off to suit the particular needs of the educator. For example, the educator may opt to only use the calendar setting as a way for students to keep track of upcoming assignments, or make it more interactive through the use of discussion forums or chat. A large amount of information is available online about software like this and further enhances the user's ability to integrate it into his or her own classroom (Perkins & Pfaffman, 2006).

The psychological basis for using software like Moodle is mainly rooted in Piaget's social constructivist theory of learning. Dougiamas himself saw learning as a social activity, thus he created Moodle to better facilitate interactions between students and their peers and between students and their teachers. The software platform can allow students themselves to act as teachers, publishing their thoughts and viewpoints on various topics for their peers to discuss and their teachers to critique. This kind of interaction allows students to construct new learning from within the framework of the online environment (Aranda, 2011). In fact, students in online communities may learn as much from collaborating with each other as they would from a more static form of information exposure. Cheng, Pare, Collimore, and Joordans (2010) found that students in an introductory undergraduate psychology course who thoroughly participated in online discussion forums performed better both on exams and in the course overall. Their study consisted of two experiments. In the first, they surveyed 1284 students who used an online discussion forum from the beginning of the course. In the next, they surveyed 1334 students who started using the forum halfway through the semester. In both, students exhibited better performance in the course, specifically better exam scores.

Importantly, their research suggests that teachers who do not have a large amount of time to devote to implementing online learning assignments can still see some level of performance improvement when they use these resources to some degree.

Another aspect that makes online learning platforms easily incorporated into the classroom setting is that they allow a class to be conducted asynchronously.

Synchronized classes are face-to-face learning environments where the students and the teacher are in the same place at the same time. Online learning communities like Moodle allow students to spend time on class activities at their leisure, thus allowing for more flexibility for people with busy schedules (Cheng, 2010).

Asynchrony also accommodates students who would not be as inclined to interact in person. The online environment gives students time to think through their responses to questions or to post discussion points themselves. It also allows the opportunity for multiple lines of discussion to happen simultaneously while avoiding the chaos that would otherwise occur in an actual classroom. In this way, online learning communities facilitate participation for all students, rather than only those most comfortable with speaking. This can be especially important in secondary grade levels where students face numerous social pressures from their peers and are often very adverse to answering questions aloud for fear of being wrong and being ridiculed for it (Cheng, 2010).

Communication is an integral part of improving educational outcomes. Kussmaul et al. (1996) suggest that technology can allow students to take a more active role in their learning. Distance communication facilitated by technology can make asking questions less intimidating than it could be in class discussions. Students can immediately ask questions they have rather than waiting for the next class meeting time. Many new one

way communication technologies, such as Remind101.com, are now being created and utilized by teachers and students to allow for quick one-on-one communications in a safe, controlled manner. Increasing the communication between the teacher and student or the teacher and parent has shown a consistent correlation to improvement in academic performance (Cheng, 2010).

A concern teachers may have with online learning communities is the unequal access to the Internet for some students. This has been greatly mitigated in recent years with increasing access to broadband connections and improving technology in schools. Hypothetically, students should be able to find the means of accessing their online classes through their school's technology, their smart phones, public libraries and other Wi-Fi hotspots, and even their friends (Adelstein & Texley, 2006).

Another aspect a teacher wishing to integrate more educational technology into the classroom must consider is ensuring that students are participating in quality discussion. As described earlier, online discussion forums lend themselves to social constructivist ways of learning because they allow students to construct their own learning through their experiences and reflection with each other. However, students must actively pursue relevant, rational discussion for it to be beneficial. If a teacher fails to take this into account, there is potential for frustration and failing to meet objectives. A way to address this potential shortcoming is by making appropriate participation in the discussion forums a requirement of the course. Assigning credit quantitatively to the number of posts a student makes and qualitatively to the relevancy of the posts would better ensure quality participation. This would make the integration of an online learning

environment more effective at enhancing how well students learn new information (Cheng, 2010).

Educational technologies also offer the opportunity for students and parents to keep track of grades in real time. Typical classroom settings usually provide grade updates every few weeks, when students request it, or when their teacher deems it necessary. Students and parents having constant access to grades through an open, online grade book would allow students to look ahead and plan accordingly for upcoming assignments, as well as to see what they may have missed if they were absent. This takes a large amount of the burden off of the teacher to supply this information, and also makes students more responsible for keeping abreast of their grades (Adelstein & Texley, 2006).

Assessment is an important component of any effective curriculum. Educational technologies, including online learning communities like Moodle, enhance a teacher's ability to use a wide range of assessments. Students can be graded formatively on participation and quality of work, and they can be graded summatively on traditional assessments such as exams. Some teachers may be leery of this way of testing because students can easily look up information online to help them answer a question, but this mirrors real world situations where in most situations today people have ready access to the Internet. Also, as Loertscher (2011) points out, upcoming assessments provided by the Partnership for Assessment of Readiness for College and Careers (PARCC) will require students to demonstrate their grasp of reading and writing in terms of doing research. These assessments will be taken on a computer rather than the traditional pencil and paper format. Giving students practice doing online assessments through systems like Moodle both better prepares them for the higher level PARCC assessments and also

allows the teacher to investigate the metacognition of his or her students. Certain test questions can include a follow up asking the student, in an open response format, to describe why he or she answered in the way he or she did. This type of metacognition can effectively inform the teacher about how students are processing and understanding the concepts they are learning in class (Adelstein & Texley, 2006).

There are some other potential concerns teachers may have about integrating more technology into their daily classroom activities. One particular activity, note-taking, can be done much more quickly and efficiently on a computer than hand writing. On the surface, this would seem like a benefit. However, a recent study conducted by Pan Mueller and Daniel Oppenheimer (2014) suggests that note-taking on a computer may have an adverse impact on a student's ability to understand and retain the information. Mueller and Oppenheimer had 65 college students watch a series of videos in the Technology, Engineering, and Design (TED) format. These videos covered subject matter that would not be considered common knowledge. Some of the study participants used Internet-disabled laptops and others used normal paper notebooks. The laptops were Internet disabled to ensure that students were not being distracted by online activities. After watching the educational videos and taking notes over them using either the laptop or notebook, the students completed a series of distracter tasks for 30 minutes, and then answered questions about what they had learned from the video. The results were that both sets of students performed equally well on simple factual recall, but the ones who used the pencil and paper notebooks performed much better on conceptual understanding questions. Mueller and Oppenheimer speculated that the tendency for computer users to copy everything a lecturer says verbatim possibly led to a shallower

understanding of the concepts than hand writing. This seemed to go against conventional wisdom, as the usual thought behind note-taking is that more detail is better. Mueller and Oppenheimer's study suggests that quality note-taking is much more important than quantity of note-taking, and that an educator may want to use technology in a blended way alongside traditional teaching methods in his or her classroom, rather than exclusively using technology.

Educational technologies can greatly enhance the efficiency of conveying information to students, from the use of laptops instead of traditional notebooks to take notes, to expanding the classroom experience to beyond the classroom by using online learning environments. These technologies are now commonplace and easily available to the educator and the student, and the benefits seem to far outweigh the costs or difficulty of implementing them into the classroom environment. It seems the largest factor that determines the efficacy of integrating technology into the classroom is not whether students will adapt to its use. Their world largely revolves around electronic connectivity to each other. The largest factor seems to be whether the teacher is able to not only keep up with the quick evolution of technology, but is willing to take the initiative to seek out novel ways of using it to enhance instructional strategies. For instance, Google software makes collaboration between students very easy and likely more interesting to them. They can work together in real time on Google Document or Google Spreadsheet, independently researching part of a project and then adding their portion while peer editing each other. This could better prepare them for the new PARCC assessments that are on the horizon for all public school educators. The totality of the above research

seems to suggest that educational technology can be very beneficial to a student's quality of education if used in a logical, tempered manner.

METHODOLOGY

The following section explains how I conducted the research and gathered the data for this study as well as the treatment that was implemented. Some of this information was collected from colleagues, but as these colleagues were also seeking to improve students' performance through the use of educational technology, I felt that including their information was valuable.

The research methodology for this project received an exemption by Montana State University's Institutional Review Board (Appendix A), and compliance for working with human subjects was maintained. Administration approval and informed consent was also obtained (Appendices B and C).

Demographic Information

The Atkins School District is a small district with only 298 students in grades 9 through 12. Each high school grade level has an average of 60 to 70 students. Racially, the district is approximately 96% Caucasian, 2% African American, 1% Hispanic, and 1% Asian/Pacific Islander or Other. We are also in a relatively low income area, with approximately 70% of the district's students receiving free or reduced lunch cost. The low socioeconomic status of the district entitles it to Title I funding, as well as additional funds for purchasing technology. These facts are all important in relating to the technology initiative the school undertook during the 2013-2014 year. For some students in the school, the Lenovo Thinkpad they received at the beginning of the school year was the first computer of their own. For many others they might have already had their own

computers, but the one given to them by the school represented the first one they would be comfortable bringing back and forth to class.

For my own purposes, this was my first year to add a very high rigor course like Advanced Placement Biology to my daily schedule. It was important for me to be as effective at presenting the curricula of several different classes at several different depth levels as possible, and I believed that the technology initiative would provide a way for me to ensure I did them justice.

Treatment

The students received their computers within the first two weeks of school during the 2013-2014 academic year. Because of this, my treatment period was basically the entire academic year and encompassed all of the difficulties and learning curves that came along with shifting how students would participate in and outside of class. I allowed students the option of using their laptops to take notes or to use a regular notebook if they were more comfortable with that.

Unfortunately, at the time I was conducting this research, I was not aware of the study that suggested that taking notes on a laptop may decrease a student's comprehension of concepts as I cited in my conceptual framework. Had I known this, I may have focused my research solely around measuring the differential impact of note taking by students using their computers versus those who chose not to use the computer.

Other than note taking, students also were required to use their computers to write and submit some of their assignments to me electronically. In the fall semester toward the beginning of the school year, we were studying experimental design in 10th grade Biology and students were required to use their computers to write a lab report detailing

their findings. They found they could use the technology to graph their data and calculate slope more easily than if they had done so by hand. Likewise, 12th grade AP Biology students also used their computers to write and submit their lab reports to me. In doing so, students were not burdened with having to keep up with hard copies and my desk did not become cluttered with papers. It was also easier for me to grade and submit these assignments back to the students digitally through e-mail or Google Drive.

Students also used the technology for research purposes. In a biology classroom, questions would often arise that I could not easily answer. Before the technology initiative, I would have to either stop teaching, go to my computer and research it right then, or tell the student that I would need to look it up later and tell them the next day. After starting this initiative, each student had an Internet-capable computer at his or her disposal, so when questions arose that I did not know, the students could immediately research the answer themselves.

This aspect also helped me address one of my other research questions about student participation during class. Giving the students the ability to look up additional information on a certain topic or find a picture of whatever strange organism we were discussing allowed them to become more involved in what they were learning. I hoped the easy access to information through the technology they were given would encourage them to be more willing to participate in class discussions or assignments.

During this treatment period, I also began using a student contact system through the website Remind101.com. It allowed me to send one-way batch text messages to all students in a particular class. I asked the students who had cell phones, which was approximately 98% of them, to sign up for the service. I also had them take home a flier

with sign up instructions for their parents. Periodically throughout the school year, I would send out notices through this service reminding students about upcoming exams or quizzes, prep sessions, or upcoming labs for which they would need to dress appropriately or bring supplies. I did not have a set schedule for how frequently I utilized the service as my use of it depended upon what event was upcoming, but I did use it frequently enough that students grew accustomed to it and often expressed thanks to me for reminding them about something they otherwise would have forgotten. I also shared this resource with colleagues at my school and others, and some of them began using it with their own students.

Finally, at the beginning of the year, I had high aspirations of utilizing Moodle extensively throughout the year. Unfortunately, we had issue after issue with the server we were using, so much so that we had to resort to using our local education cooperative's Moodle server temporarily while ours was repaired. Those teachers who had begun using Moodle extensively early on lost all of their data and had to start from scratch. This made me very cautious about utilizing it very heavily, and so I tended to rely mostly on the Moodle calendar, which at the very least would keep students informed about upcoming assignments or projects. Students too had seemingly an unending number of problems with accessing their Moodle accounts, having to reset their passwords frequently, or losing their submitted work. These problems are presented in the views of Moodle reflected in the surveys students took later in the year.

My conceptual framework strongly guided me to think that when used properly, educational technology would have a measurable, positive impact on student learning and participation. Because my district began the new technology initiative at the beginning of

the school year and the majority of the data analyzed in this research was gathered during the spring semester, months later, I decided to conduct a descriptive study. I collected data from several different student groups and from the faculty, but I focused mainly on the students who would likely have the broadest view on the effectiveness of this enhanced technology use: my senior Advanced Placement (AP) Biology students. This is a small class, consisting of only 17 students out of a total grade level class size of 63 students. The gender breakdown is skewed largely toward female, with only 3 males in class and 14 females. This would skew any analysis based on gender but it was unavoidable. Most of the students taking AP Biology were planning to pursue some kind of degree in the medical field. For whatever reason, this career interest seemed to attract more female students than males at my school.

The racial breakdown of the class is also fairly homogenized, with one of the males being of mixed African American/Caucasian descent and all the others being Caucasian. However, the racial demographics closely mirror those of the entire school. There are larger school districts nearby with a more racially diverse student population, but the Atkins community has remained relatively racially homogenized over the years.

As these particular students represent the most academically motivated of their peers, being those who sought out an academically rigorous course like AP Biology, I felt I could get the most serious participation from them. I also taught 10th grade Biology and gathered data from them for comparison's sake, but I believed the seniors, being more mentally mature on average than sophomores, would provide a more valid perspective on how much of an impact the technology initiative had on them. Additionally, these students have all been in the Atkins School District for at least the

four years of their high school tenure, and thus could provide a better perspective stemming from several years before the implementation of the initiative. I also managed to collect some data from a small number of the high school faculty members who were willing to participate in a survey. I wanted to compare their views to my own and to those of my students to see if there might be a correlation between attitude toward technology and the success of the initiative. I suspected there might be a strong correlation between attitude and successful implementation, so I spoke with and gathered data from three members of my support team, Mark Meredith, Terry Cameron, and Margaret Robinson. Mark teaches at a larger school district and himself has a very positive view of technology use. He agreed to provide data from his own research into one aspect of technology integration: the use of Moodle. Terry and Margaret both gathered data from students at my school about how the technology initiative impacted their learning.

In all, I attempted to assess the impact of the technology initiative by measuring student and colleague attitudes about how technology affects preparation for and participation in class. I specifically looked at how students viewed the efficacy of using the laptop they received to take notes, look up information during class, or access the Moodle platform. I also measured their attitudes about how outside-of-class communication systems like Remind101.com prepared them for class.

Instrumentation

Considering that this was a descriptive study, the majority of the data I collected was through surveys and interviews. I surveyed the senior AP Biology class which provided quantitative data (Appendix D) and qualitative data (Appendix E). I also

interviewed those who were willing in order to obtain more detailed feedback (Appendices F, G, and H). I surveyed all of my sophomores and randomly selected 10 students (5 male and 5 female) from the Pre-AP sections and 10 students (5 male and 5 female) from the regular sections. These were analyzed quantitatively (Appendix I) and qualitatively (Appendix J). Faculty members were surveyed, and those who responded are depicted quantitatively in Appendix K and qualitatively in Appendix L. Mark Meredith's student's data is included in Appendix M and Terry Cameron's student's data is included in Appendix N. Margaret Robinson's survey data is included in Appendix O. To ensure that apparent trends in student and faculty responses were statistically valid, I analyzed them with a Chi-Square test (Appendix R).

My data collection methods are presented in the data triangulation matrix below in Table 1. I collected a variety of types of data, both quantitative and qualitative, to help ensure that my research findings were valid.

Table 1
Triangulation Matrix

Research Questions	Data Source 1	Data Source 2	Data Source 3
1. How do students perceive the effects of the technology initiative on their participation in class?	Senior Surveys/Interviews	Sophomore Surveys	Colleague Data
2. How is student interest in learning the curriculum affected by the instant access to the resources on the Internet?	Senior Surveys/Interviews	Sophomore Surveys	Colleague Data
3. How do frequent outside-of-class communications through resources such as Remind101.com impact the student's perception of his/her preparation for class?	Senior Surveys/Interviews	Sophomore Surveys	Colleague Data
4. What impact has the technology initiative had on the educator?	Self-Reflection	Faculty Surveys	Colleague Data

The survey (Appendix R) students took to answer the above questions were done anonymously and with the caveat that the students did not have to complete them if they felt uncomfortable doing so. They clearly signified that student participation in the survey was in no way to affect their class grade. Given this information, a small number of 10th grade Biology students opted not to complete the survey. Enough were willing to complete the survey, however, to provide a large amount of feedback. All 12th grade AP Biology students completed the survey. I modeled the survey questions similar to a

Likert scale, wherein students were asked to rank a statement on a scale of 1 to 5, with 1 being the least and 5 being the most. They were then asked to qualify their answer by commenting on why they selected that numerical score.

The interviews (Appendices F, G, and H) I conducted were with my 12th grade AP Biology students. Three of those students were willing to come see me before or after school and provide their input. I designed the interview to give the students ample opportunities to provide feedback on how the technology initiative impacted them this year, and specifically to compare that to the previous three years of their high school tenure. I also asked them to comment on how our technology changes affected their preparations for whatever chosen career they were thinking about pursuing. As it turned out, each of the three students was, as of that time, planning to pursue a degree and career in fields that would heavily involve technology. One was planning to pursue international business, another digital art, and another interior design.

The faculty were surveyed (Appendix P) through the intra-school mail system. I placed surveys in their boxes and sent out e-mails alerting them to the nature of the survey and for what it would be used. Only a small number of surveys were returned, which could be because some faculty members rarely check their mail boxes or because they simply chose not to participate. Throughout the school year, both from overhearing things students said and from the general ambience of after school faculty meetings, I suspected that there were a number of our faculty who did not enjoy pursuing the technology initiative and were not planning to change the way they taught. This general air of skepticism may have possibly trickled down to the students and skewed their view of using the technology or believing in its efficacy.

Despite the somewhat scarcity of data from some of the sources I chose, I believe I obtained a sufficient amount to garner a good understanding of the current impact of the technology initiative on student and teacher perception.

DATA AND ANALYSIS

The following section presents the data obtained in this study. As this was a descriptive study in particular, the data is largely qualitative, and thus subject to skewed reliability. I attempted to avoid this as much as possible by collecting qualifying commentary for each numerical score on the surveys that students and faculty members completed. I analyzed the commentary for trends in frequent responses. I also compared the numerical responses from each subgroup I surveyed with a Chi-Square test (Appendix R) to determine whether their responses were statistically preferential or if they simply reflected a neutral perspective. Additionally, the data I obtained from my colleagues Mark Meredith, Terry Cameron, and Margaret Robinson provided interesting perspectives from students of similar age as the ones I surveyed but in a different school or a different class that used different approaches to technology.

It is important to note that because my research was centered on the impact of the technology initiative my district undertook at the start of the school year, the majority of my data was obtained very late in the year. I wanted to be sure that students and faculty members, myself included, had plenty of time to work with the new technology, fix some of the inevitable problems, and become comfortable with it. I believed that gathering this data from the later part of the year would provide a more valid perspective from each subgroup than if I had collected data earlier in the year.

My research spans six different subgroups: my senior AP Biology students, my sophomore regular and Pre-AP Biology students, Terry Cameron's sophomore and junior English students, Mark Meredith's sophomore Pre-AP Biology students, the students Margaret Robinson surveyed, and my school district's faculty. My main focus group was my senior AP students for reasons I have already discussed, but I wanted to include the other subgroups for the sake of comparison and reliability, because my main group is relatively small and thus could be easily skewed. Also, though I believed that senior students would perhaps provide the most valid student perspective because of the time they spent in the district, I realized that all student perspectives are valid when it comes to what they feel about how certain activities affect their education.

I administered the following survey in early April after students had been using the technology since August and obtained these results, represented below in Figure 1.

On a scale of 1 to 5, with 1 being least helpful and 5 being most helpful, rank each of the following statements relating to our use of technology in education.

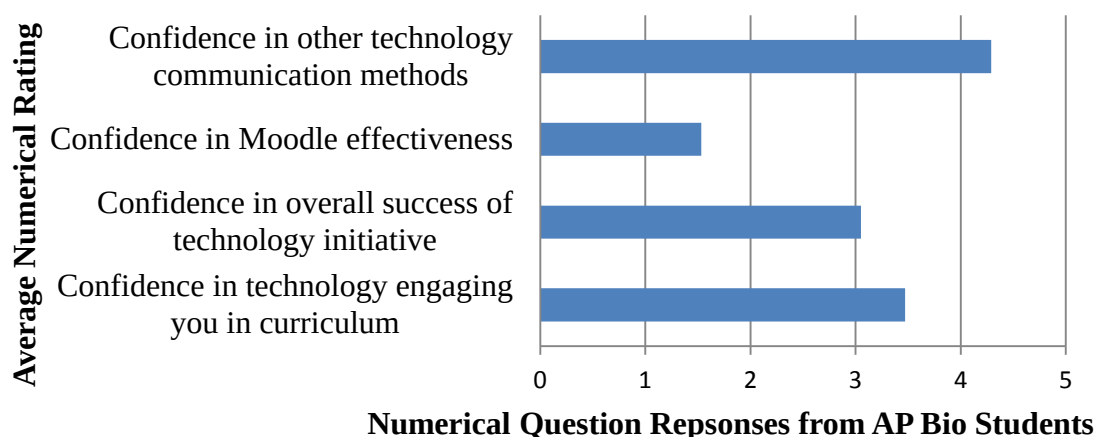


Figure 1. Senior Student Confidence Ratings of the Use of Technology in Education, (N = 17).

Their responses indicate a relatively neutral (3.07 out of 5) confidence in their view of the overall success of the technology initiative and only slightly higher (3.47 out of 5) in technology engaging them in the curriculum. Some reasons specifically cited in the interviews I conducted included thinking that the initiative “...kind of helped and hindered in a way” and that “...it makes it kind of hard if the Internet goes out because you can’t really study.” It seems that they may think that we are relying too heavily on the new technology available in some cases. On the other hand, one recurring theme amongst their qualifying responses (Appendix E) to these survey questions was that not all teachers are equally on board with the technology initiative. One student responded that she didn’t “...think that three teachers in the high school should use Moodle and do the websites online” while “...the other teachers just don’t. If you’re going to do it, you need to go all in with it. You have certain classes where you don’t use technology and other classes that you do, so if you’re going to actually get a student involved in it, it needs to be all immersed.” This is a very important point and will be made even clearer in other data I will present later. Something I did not specifically investigate in this study and would be interesting to look into was whether students would similarly wish that their teachers would all use textbook-based instructional strategies if they were not going to be willing to implement technology-based instructional strategies consistently.

Overall, they had the lowest amount of confidence (1.53 out of 5) in Moodle’s efficacy in engaging them in the curriculum. This was surprising to me, even despite the problems we had with Moodle earlier during the school year. My prior research suggests that using Moodle should be very effective in enhancing a curriculum and engaging students in the learning process, and though we have had some trouble with the

platform's stability and we have not really utilized it very much in AP Biology, I thought they had been using it extensively in at least a few of their other classes. Their qualifying commentary (Appendix E), however, contradicts this assumption I made. Most of them made statements including "we don't know how to use it," or "we created an account and haven't used it since." Some were more specific and identified that "it's difficult to maneuver through" or "Moodle is difficult to use and doesn't list out assignments, etc. as other technology does." Strangely, these results completely contradict the findings of the two colleague data sets I have included in this research.

Terry Cameron taught English at the same school I did, but did not have any of these particular students. This was his first time to use the Moodle platform, as it was mine. His findings (Appendix N) suggest an overall very positive impact of using Moodle. He found that out of his 90 sophomore and junior students, 63 showed an improvement in test scores after he began using Moodle. He began the school year without utilizing the technology initiative, including Moodle, and had an average test grade for his students of 74%. He then began extensively utilizing the technology initiative and Moodle during the second nine weeks and saw an increase in average test scores to 81%.

Likewise, Mark Meredith's findings (Appendix M) also suggest a positive impact of Moodle. Unlike Terry, Mark was very well experienced using Moodle. He had been using Moodle for two years before he began his research during the same school year this study was conducted. This was his first year at his current school district though, so his students were new to the platform. He surveyed 46 of his Pre-AP Biology students toward the end of the year, when they had been using Moodle since August, and found

that the vast majority ranked Moodle very highly in helping them learn the Biology curriculum.

Margaret Robinson, principal of Atkins High School, conducted a survey (Appendix O) of all willing students at the end of the school year. Students were directed to come by the office and complete the survey after they turned in their laptops. In all, 142 students participated in her survey. Her data suggested that a majority of these students (87%) rated the technology initiative to be at least somewhat effective. They had reservations about the actual device they were given, only 16% saying it met their needs as students. However, 81% of them rated the laptop as at least somewhat effective as a tool for learning. The most surprising result from her survey was the question asking students to rank their enjoyment of having the laptop as a tool for learning. Almost a third of the respondents (27%) said they did not like using technology. Similar to my findings, the qualifying commentary students added to her survey suggested a universal dislike of Moodle.

My take away from these conflicting data are perhaps obvious. A technology platform will not be successful, nor will it be viewed highly positively, without the student being extensively exposed to it. Since my AP Biology students rarely used it for my class, and apparently rarely used it in any of their other classes, they overall had a very negative view of it. Terry Cameron's and Mark Meredith's students, on the other hand, either had a very positive view of it or at least showed a positive impact in their test scores. In their classes, students used Moodle to do their beginning-of-class bellwork and take quizzes and tests. In my classes, students only used Moodle for the calendar feature to keep track of upcoming assignments and due dates. We never used it in class, only as

a supplement to class outside of normal class time. It is very probable that the lack of direct support and integration they received in my class negatively colored their perception of the platform, whereas in Terry's and Mark's classes, students had adequate teacher support and extensive in-class incorporation of the platform.

My students had the highest amount of confidence (4.29 out of 5) in other technology communication methods helping them with the curriculum in some way. These other technology communication methods include their normal school e-mail and online resources like Remind101.com. Remind101.com provides a way to contact students using something they use all the time: their cell phones. This is something I utilized extensively myself and have promoted to my colleagues. Comments the students made to qualify their answers include "I prefer Remind101 because I use my phone to check things, not Moodle" and "being reminded really helps me because I forget sometimes." Another of my seniors commented that "I think the texting thing would be more of our generation." These other technology communication methods are nowhere near as involving as a system like Moodle, but students seem to prefer the simplicity which may explain their ranking as I will discuss later. One of my colleagues at another school district, Mark Meredith, began using Remind101 for his classes and extracurricular groups after I told him about it. He told me that it was "extremely helpful" for his students. Very few of the other teachers at my school, other than me, chose to use it, so I did not obtain any data from them.

I wanted to see how my 10th grade Biology students would compare to the senior AP Biology students, so I administered the same survey to them (Appendix I). I randomly selected 10 students (5 male, 5 female) from regular Biology and 10 students (5

male, 5 female) from Pre-AP Biology, and obtained the following data, represented below in Figure 2.

On a scale of 1 to 5, with 1 being least helpful and 5 being most helpful, rank each of the following statements relating to our use of technology in education.

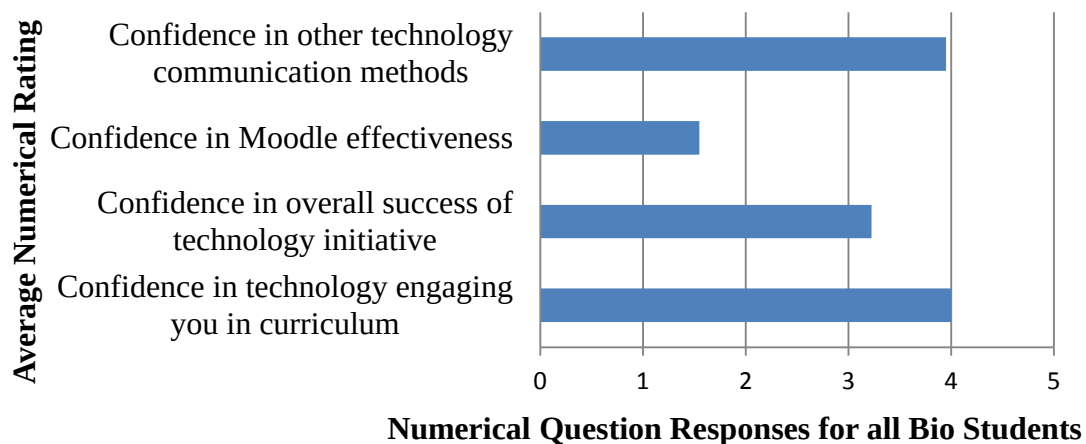


Figure 2. Sophomore Student Confidence Ratings of the Use of Technology in Education, ($N = 20$).

Their responses are very similar to those of the senior students who took the same survey. They are similarly skeptical of Moodle's efficacy (1.55 out of 5 for sophomores compared to 1.57 out of 5 for seniors), have a similarly neutral view of the overall success of the technology initiative (3.23 out of 5 for sophomores compared to 3.07 out of 5 for seniors), and are slightly more confident in how well the technology engages them in the curriculum (4.00 out of 5 for sophomores compared to 3.29 out of 5 for seniors). They are similarly confident in other technology communication systems engaging them in the curriculum (3.95 out of 5 for sophomores compared to 4.29 for seniors).

A common theme among the sophomore's qualitative feedback (Appendix J) on Moodle was about it being too difficult to use. Their comments included "Moodle isn't

great at all. It's cheap, badly designed, and very confusing" and "Moodle is not user-friendly and often glitches." These correlate with some of the sentiments from the seniors. Like them, this year was the first time the 10th graders had ever used an online platform. Unlike the seniors, however, none of the sophomores were taking any distance learning college classes, which almost all extensively use BlackBoard, a different online learning platform. This means that the sophomores were completely unexposed to an online learning platform before this year. They universally disliked Moodle, whereas at least some of the seniors said they enjoyed using BlackBoard. I think it again came down to a question of exposure and consistency. If the student was required to use the software on a daily basis, he or she would become comfortable with it and may even begin to enjoy using it. If, instead, the student only intermittently used the software in some classes, and then only sporadically, then the teacher could not expect the student to embrace it and benefit from it. Their trepidation was understandable owing to the numerous problems we had with the program. Some of these issues were out of the district's control, specifically the frequent software crashes that we experienced at the beginning of the school year. Others, however, such as students finding it difficult to use, could have probably been remedied by simply more exposure and time out of class making sure students understood how to use the platform.

I wanted to compare students' views of the technology initiative to the views of the faculty, so I asked the faculty members of the high school to participate in a simple two-question survey. These were the same two quantitative ranking questions the senior and sophomore students had, asking for their confidence in using technology to engage students in the curriculum and their confidence in the overall success of the technology

initiative. Ten faculty members were willing to participate in the survey, and their results are presented below in Figure 3.

On a scale of 1 to 5, with 1 being least helpful and 5 being most helpful, rank each of the following statements relating to our use of technology in education.

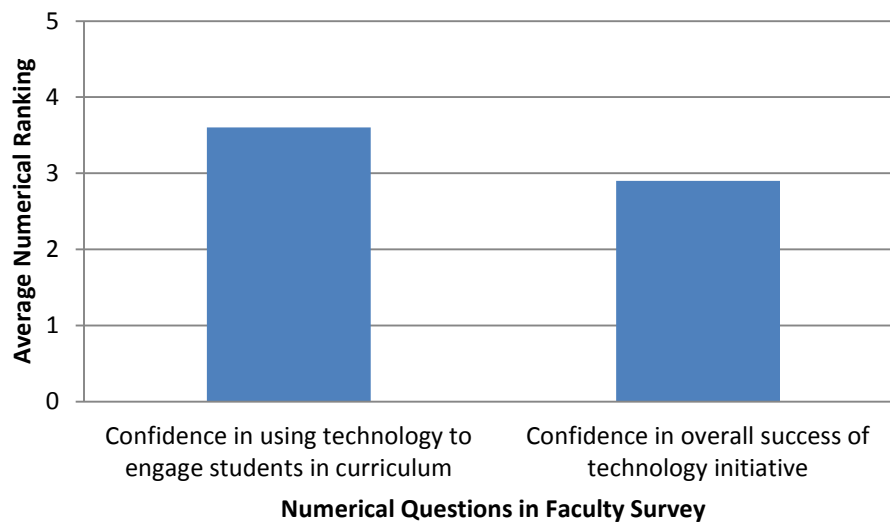


Figure 3. Faculty Confidence Ratings of the Use of Technology in Education, ($N = 10$).

Their data appeared to favor an average response, neither strongly in favor nor strongly out of favor. Their commentary, too, similarly reflected the sentiments of the students. My principal commented (Appendix L) on her survey “I am disappointed with the incorporation of a learning management platform (Moodle) due to technical problems beyond our control (server crashing)...We are desperately lacking in effective training for our staff on Moodle which slowed the implementation process quite a bit.” Another educator commented “The early problem with our platform of Moodle was very frustrating in the early going. And, because of the frustration, many students have remained skeptical of the technology incorporation.”

Their quantitative data gave me the idea to do a Chi-Square test (Appendix R) of their responses compared to those of the seniors and those of the sophomores to see if there was a statistically significant variance between them. I used this test to compare their responses to the null hypothesis: that there would be no preference one way or another to technology having a positive or negative effect on education. I operated from the assumption that if $p > 0.05$, then I must accept the null hypothesis and say that, at this time at least, students do not have a statistical preference for or against the aspects of the technology initiative I was investigating. The Chi-Square analysis suggested that with at least 95% confidence, I could say they statistically favored the null hypothesis and neither strongly favored nor disfavored using technology.

I mentioned earlier that a small number of students, less than 10 of the 120 students I saw on a daily basis, chose not to use their laptops to take notes during class. I did not make note taking on the computer mandatory, and I was slightly surprised that some students chose not to use it. I assumed students could type faster than they could write and this would encourage them to use their laptops to take notes instead of hand writing them. As the year progressed, this number grew to around 30 out of the 120 students. Some of these who started using the computer and then stopped said it was because they felt like they could learn better if they wrote their notes. Others damaged their computers and could not afford to fix them, so they abandoned them. Though the number of students who chose to use a traditional paper notebook over a laptop remained a small minority across the school year, the number was still surprising to me. The majority though continued using the laptops to take notes, and commented “I like how fast you can get things done...” and “It helps us do our homework and take notes.” Even

faculty comments included: “Students are more engaged and responsible for their learning. More students take notes.” I would have needed to do a more quantitative study to determine if students using their laptops to take notes versus writing them by hand had a noticeable effect on their comprehension of the curriculum, as suggested in my conceptual framework. From the data I did obtain, I would have to say that using the laptops to take notes helped those who chose to use it. I could not say at this time though that using the laptop would have helped or hindered those who chose not to use it.

A final question I sought to answer was to assess what student’s thought about being able to access information from the Internet to supplement discussions we had in class or assignments they had to do. This was addressed by the first question of the survey I administered to the Biology and AP Biology students, asking them to rank how effective they think technology is at engaging them in the curriculum. Seniors rated this at a 3.47 out of 5, sophomores ranked this as a 4 out of 5. Margaret Robinson’s survey also addressed this research question by having students rank how much they enjoyed have the laptop as a tool for learning as well as how effective they believed it was as a tool for learning. For the first survey question about how much they enjoyed it, 73% of the respondents at least liked using the technology occasionally, while on the second question about how effective they felt it was, 81% rated it as at least somewhat effective. These bits of data, combined with the qualifying commentary including “We have a way to look up stuff we are unsure about” and “It explains better than what the teacher can sometimes”, suggest that Internet access during class has a positive effect on engaging students in the curriculum. I would slightly temper that statement though with a cautionary note about distraction. In each group of individuals I surveyed, several people

commented that it was easy to be distracted by things unrelated to the task at hand.

Instant access to the world's information via the Internet is great for education, but with it also comes instant access to social media and other forms of electronic distraction that can take the place of focusing on the curriculum.

INTERPRETATION AND CONCLUSION

Over the following several paragraphs, I have attempted to coalesce the information I obtained from this investigation and make a conclusion about my main research question; that is, does increasing the use of technology have an overall positive effect on the quality of education?

The Chi-Square analysis I performed of the faculty's numerical responses compared to those of the seniors and the sophomores suggested that they statistically favored the null hypothesis: that they neither positively nor negatively viewed technology's impact on education. This was surprising to me, because from my superficial observation of their responses it seemed that there were definite trends. The faculty's qualitative commentary (Appendix L) reflected an apparent overall theme of strong confidence in technology helping to engage students into the curriculum, though they did temper that confidence with cautionary statements about the shortcomings of our technology in particular. Their confidence in the overall success of the initiative was lower, qualified by comments including how teachers were not consistently implementing its use and dismay at the technical difficulties we had over the course of the implementation. It was very possible that only, or mostly, the teachers who were more or less in favor of the technology initiative were the ones who responded to the survey. Many teachers seemed skeptical of the efficacy of increasing the use of

educational technology in their classes. I suspected, both from my own observations and from hearing comments made by students, that many of these teachers continued teaching during this year following the methods they had been using since before we began the initiative. The correlation I noticed tended to be most centered on age and length of time teaching. Teachers who were more on board with using the technology were, on average, younger, newer teachers than those who were more resistant to using it. Because of this inconsistency, students were being bombarded by a radical change in the way learning happened in some classes, but not in others. Inconsistencies like these could have easily contributed to skepticism about the initiative on the part of the students. This was possibly the most important point, as the entire purpose of the initiative was to better engage students in the learning process through the use of technology. If the faculty did not buy into the project, the students would not either, and the entire attempt could have been for nothing.

Within my main research question, I also attempted to answer several sub-questions, including whether or not student participation in class and whether student interest in learning the curriculum were impacted by the technology initiative. I believe from the data I obtained, this was the case. Students' commentary strongly suggested that they enjoyed having access to the Internet while we were discussing the material. This seemed to make the content more relevant to them. Faculty and colleague commentary also suggested that it was helpful because it helped to keep students organized and engaged. Based on this data from students and faculty, as well as my own personal observations over the course of the school year, that student engagement in learning was positively impacted by the technology initiative.

Interestingly, when I performed the same Chi-Square test on only the senior and sophomore responses (Appendix R) to their numerical questions, they also all matched the null hypothesis. Before doing this test, I thought at the minimum that they would strongly statistically disfavor the use of Moodle, yet their numerical responses match an average neutral response. This illustrated the importance of using statistical analyses of quantitative data, to avoid biasing one's own interpretation of that data. Qualitatively, they hated Moodle (Appendices E and J), yet quantitatively (Appendices D and I) they were neutral on it.

It was also interesting to compare to Mark Meredith's data (Appendix M) and Terry Cameron's data (Appendix N). Both of them used Moodle extensively throughout most or all of the year, and both of them found positive effects on the quality of education. Mark's students even seemed to positively view using Moodle. I did not obtain that kind of qualitative data from Terry's students, and it is important to point out that Mark's students were at a different school district while Terry's students were at my district. It would have been useful to have some qualitative feedback from Terry's students since they may more closely reflect those of my own students. The takeaway from their students was that apparently regardless of whether students enjoyed using an online platform like Moodle or not, it helped them be more successful.

I believe the biggest problem with the quantitative data in this study is that each numerical survey question only had five choices. In discussing the study with Mark Meredith, whose survey questions had ten choices, I realized that a greater range may have shown a trend farther away from neutral than mine did. The faculty's commentary, for instance, seemed to favor technology engaging students, yet their numerical ranking

was a more cautious 3.6 out of 5. If they had more choices, I believe it would have shown a stronger quantitative support to match their qualitative comments. If I was to conduct another study similar to this in the future, I would offer more choices in hopes of obtaining clearer results.

To address my research question about using technology communication resources like Remind101.com, I would have to say it was very beneficial to the student's preparation for class. Their commentary on the survey regarding these text message based reminders was nearly universally positive. In person, I received numerous thanks from students for reminders about things they otherwise would have forgotten. This was clearly illustrated to be a resource I would like to develop further and make more frequent use of in my classes. I would also like to demonstrate its use more to my colleagues so that they can begin using it successfully. Any resource like this, which allows the teacher to approach the student through a medium that is very familiar to them like text messaging can be massively helpful at engaging the students.

I think that is an important aspect to consider in this study. Students needed to be familiar with a particular piece of technology in order to take full advantage of using it. They used their cell phones all the time, but the laptops and the Moodle platform were wholly new to them. If we were able to help the students become more familiar with the hardware and software we, as a district, chose to use, I think it would have been much more successful. This relates to my final research question: how did the technology initiative impact the educator? For a person like me, who is younger and already very familiar with various technology media, the initiative was something I wanted to happen and wanted to succeed. It provided a way to approach class very differently from how I

normally would, and it also provided numerous resources to help students take on more of the responsibility of learning the curriculum. I saw students better able to keep track of their class materials because they were organized into a digital format on their computer. They had fewer papers to manage because many of their assignments were electronic. If they had a question in class, they could take an active role in looking up the information and not have to rely solely on me for information. Of course I had to be cognizant that students would sometimes fail to utilize their computer access responsibly, as some students I surveyed and interviewed themselves suggested that it was sometimes hard to do what they were supposed to when they had easy Internet access at their fingertips. In all though, I have to say that, from my perspective, the initiative was very beneficial in aiding me to be more effective.

My final conclusion would have to be a cautionary, tempered one. From the data I gathered and the observations I made over the course of this past year, combined with conversations I had with the administration and with other faculty members, both at my school and at others, I must conclude that educational technology has a perceived positive impact by students and educators both. I grant that perceptions are not reality, and the study leaves much room for further investigation into actual impacts on students' grades and educator effectiveness. The underlying theme that ran throughout the entire study is that major initiatives school districts undertake are works in progress that extend beyond the scope of a single school year. Like many undertakings, education is always a work in progress, and each school year brings a new set of opportunities and challenges. Only time will tell if, ultimately, the Atkins School District's technology initiative will have a measurable, positive impact on students' preparation for the future.

VALUE

This final section will be my attempt to assess the value of this study. I have attempted to reiterate the fact that this was a descriptive study, so I was not really taking an active role in making a specific change for a limited time and measuring its effect. Instead, the entire district began undertaking a big shift in how we approached education, and the year this study was conducted was the very first year of the implementation. It is important to point out that changes like these do not happen suddenly, nor even very quickly. Many of the faculty members at my school seemed somewhat resistant to utilizing the new technology, somewhat evidenced by the fact that only 10 out of the 34 teachers at the high school were willing to participate in my survey. There were many changes happening in education at the time of this study, including Common Core State Standards (CCSS) for Math and Literacy implementation, the new Teacher Excellence Support System (TESS), Partnership for Assessment of Readiness for College and Careers (PARCC) testing, and the upcoming Next Generation Science Standards (NGSS). Perhaps many teachers who were skeptical of the technology initiative believed it was one thing too many to deal with along with the other changes in education they were facing. To me, however, it was a way to better approach these changes. CCSS, NGSS, and TESS all required teachers to begin moving the burden of education from themselves to the students. Technology seemed to be a perfect tool to use to accomplish the goals of all these initiatives. No longer was the teacher the fount of all knowledge. With modern technology, students now literally had the world at their fingertips. This is how I felt about our technology initiative.

The major take away from this school year, however, is that any kind of initiative will be largely unsuccessful without willingness and proper support. My colleague Mark Meredith informed me that his district has had several Moodle trainings throughout the school year, for instance, whereas my district only had two trainings during the year. A system like Moodle can obviously be very beneficial to a student's education, but it would not be beneficial if the student's teacher was uncomfortable using it. The teacher would remain uncomfortable as long as he or she felt unable to use the system. This was true not only for Moodle but for any modern technology system. Older teachers may have had hurdles to get over in terms of simple technology interaction, so more complicated systems like Moodle can be very difficult for them.

I do believe that over the course of this school year, teachers at my district have all, even if somewhat slowly, began accepting that technology will be a great way to meet the requirements of CCSS, TESS, NGSS, and PARCC. I believe that over the next few years, my district will continue to improve the implementation of technology and thus improve the quality of education our students receive. This study suggested, from my colleagues' data, that using online learning platforms was very beneficial as long as it is done consistently. It would be interesting to follow up next school year by increasing my own use of platforms like Moodle, especially since the technology initiative will no longer be a new thing to students or teachers, and see if I can measure the same benefit to my own students. I would like to see if it would be beneficial to my students to collaborate with each other to create a digital glossary on Moodle to keep track of important key terms from the curriculum we explore. This would allow them to work together to define the terms in their own ways and make them more meaningful. I would

also like to measure the impact of utilizing Moodle's online discussion forums to allow students to build their learning socially to see if Dougiamas's rationale in designing the platform is valid. From Terry Cameron's and Mark Meredith's student data, I can confidently conclude that platforms like Moodle are beneficial for students to use, as long as they have the proper incorporation and teacher support. If I was to expand my use of Moodle or a similar online platform in my classes, I would be sure to provide the proper support to ensure my students did not experience the same frustrations the students in this study did. I would probably use some of the same surveys I gave this year to see how the students' views have changed, if at all. I would suspect that faculty support will grow, as will student confidence. My research already suggests that frequent communications using educational technology are both beneficial to a student's preparation for class and viewed favorably by said student. I believe if I could approach Moodle from that angle, as a way to stay in communication outside of class and for students to be able to address their concerns about class or the curriculum in a private way, thus getting around the social stigma that many students seem to face, then the students would be more amiable to utilizing an online learning platform. As faculty support and student confidence grows, we could innovate even more ways to incorporate modern technology into education.

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APPENDICES

APPENDIX A
IRB EXEMPTION FORM



INSTITUTIONAL REVIEW BOARD
For the Protection of Human Subjects
FWA 00000165

960 Technology Blvd. Room 127
 c/o Immunology & Infectious Diseases
 Montana State University
 Bozeman, MT 59718
 Telephone: 406-994-6783
 FAX: 406-994-4303
 E-mail: cherylj@montana.edu

Chair: Mark Quinn
 406-994-5721
 mquinn@montana.edu
Administrator:
 Cheryl Johnson
 406-994-6783
 cherylj@montana.edu

MEMORANDUM

TO: Joshua Duncan and Walt Woolbaugh
FROM: Mark Quinn, Chair *Mark Quinn CJ*
DATE: November 4, 2013

RE: "Measuring the Impact of Increased Use of Technology on Student Learning" [JD110413-EX]

The above research, described in your submission of November 4, 2013, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

- X (b) (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- X (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.
- _____ (b) (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- _____ (b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.
- _____ (b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- _____ (b) (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.

APPENDIX B

IRB ADMINISTRATION APPROVAL

Administrator Approval

I, Margaret Robinson, Principal of Atkins High School, verify that I
approve of the classroom research conducted by Chance Duncan.

Margaret Robinson Principal
(Signed Name, Title of Position)

Margaret Robinson
(Printed Name)

10-30-13
(Date)

APPENDIX C

IRB EXEMPTION INFORMED CONSENT

Exemption Regarding Informed Consent

I, Margaret Robinson, Principal of Atkins High School, verify that the classroom research conducted by Joshua Chance Duncan is in accordance with established or commonly accepted educational settings involving normal educational practices. To maintain the established culture of our school and not cause disruption to our school climate, I have granted an exemption to Joshua Chance Duncan regarding informed consent.


(Signed Name)

Margaret Robinson
(Printed Name)

10-7-13
(Date)

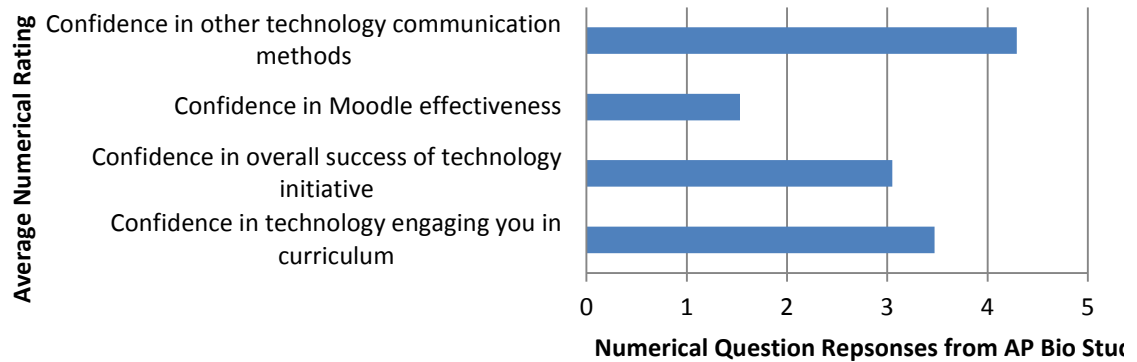
APPENDIX D
SENIOR SURVEY QUANTITATIVE DATA

Confidence in technology engaging you in curriculum	Confidence in overall success of technology initiative	Confidence in Moodle effectiveness	Confidence in other technology communication methods
3.47	3.05	1.53	4.29
N=17	N=17	N=17	N=17
5	5	3	1
4	4	2	1
4	4	4	3
4	4	4	1
3	3	3	5
1	1	2	1
3	3	2	2
3	3	4	1
3	3	2	1
4	4	3	2
3	3	3	1
3	3	4	1
3	3	4	1
5	5	4	2
3	3	2	1
5	5	3	1

3.47058824

3.05882353

1.52941176



APPENDIX E
SENIOR SURVEY QUALITATIVE DATA

Senior Survey Qualitative Data

Question 2 (Explain ranking of technology helping with curriculum)

It's helpful but I never use it unless I have to.

We have a way to look up stuff we are unsure about.

It explains better than what the teacher can sometimes.

Technology is a great way to get a closer look and more understanding of an assignment. However, there are difficulties – freezing up, no WiFi/Internet, etc.

It's good, but too much reliance.

I don't have to worry about books and stuff, but I'm distracted because of the internet.

I learn better by writing it down and actually learning than seeing a video/image for a few minutes and being expected to retain it.

This world is technology based so it is important for it to be involved, but education should not be completely technology based.

Technology helps, but I also like paper.

I feel too much can go wrong with technology. Ex: forgotten passwords, not saving.

Technology helps me – personally – to learn rather than just lecture (also a “1” because I get very distracted on the internet).

I like the use of technology. It helps me to understand a few things, but personally I have to be able to write down notes to remember things well, and with the use of technology a lot of times I am not able to do that.

Sometimes technology just seems to make things more confusing than they should be. Taking notes is my best way to learn. Being able to look things up is helpful but I don't always completely understand when I just look up answers.

I love taking notes (it helps my learning and betters my understanding) but I also enjoy doing the PDQ's and GRF's in this class so I can also teach myself. I like having some technology in classes but too much can become annoying and not effective in learning.

Instant access to the sum-total of human knowledge is helpful.

It's not doing a whole lot toward education but it seems helpful.

The videos explaining are detailed enough and down to our level to understand them.

Question 4 (Explain ranking of overall success of technology initiative)

They need to alternate with book work...too much technology.

The computers have a lot of problems and our WiFi is slow. Some teachers do not use computers.

Half the time it doesn't work, we're blocked, or the teacher doesn't know how to use it (Moodle).

The same reasoning as #2.

It's okay, not perfect. Internet messes up.

People aren't always doing what they're supposed to be because internet is at their fingertips.

Most teachers can't use computers very well themselves, others are overwhelming with too much.

Our technology is not of the best quality. We've had more problems with it rather than success.

There is a lot of technology at the school now, and it seems to have helped.

We don't have a lot of technology.

Atkins is not tech savvy (Duncan, Farmer, Wygal do a good job of using technology).

Technology has helped a lot of people and makes it easier to turn homework and projects in and is a big help with being able to work on them at home, but when it messes up (which can be quite often) it creates a big problem.

Some teachers use the technology really well to make things better but other teachers do not.

Some teachers only use it for a few projects but some are putting it to good use. To many pointless things are blocked which holds learning back.

It is wider utilized in some classes.

It hasn't done anything but makes things harder.

It still doesn't work a lot of the time.

Question 7 (Explain ranking of Moodle efficacy)

All of my teachers tell me what's due and when so I don't need Moodle.

We created an account and haven't used it since.

We don't know how to use it.

It's difficult to maneuver through. But it's a good place for information.

I have never used it. I find it unmeaningful, quite useless, really.

College is all online.

Moodle is difficult to use and doesn't list out assignments, etc as other technology does.

Most people are unable to.

I don't really use it.

My teachers had us log on once but we never actually used it.

I can't stand it. Our school WiFi is unreliable and sometimes I can't do my Moodle work because it's on the internet.

I haven't ever really used it, but whenever I have tried, it would work for me.

We do not actually use Moodle...

The teachers are forced to use Moodle so we at least have to log in, but they hate it just as much as students do.

Rarely check the website.

It just puts it all in one place.

It's not really good for anything.

Question 10(Explain ranking of other technology communication systems)

Gives reminder or lets you know when there is going to be a quiz if the text comes through.

Mr. Duncan always reminds us when we have something important going on.

I like being reminded about what I need to do.

It makes it easier to find assignments, etc. However, like normal technology, there can be communication/various problems.

Great research tools.

I can remember when biology is due and all.

If it would be used more often it could be very effective. However, 3 classes using it and 5 not makes it difficult to immerse and learn it.

It is not an efficient way of learning. I am not a fan of technology.

The Remind101 is really effective for me.

Using cell phones to look things up is helpful.

I prefer Remind101 because I use my phone to check things...not Moodle (DO NOT LIKE MOODLE).

It's great to be able to ask questions and get reminders about important projects or tasks.

Being reminded really helps me because I forget sometimes. Blackboard makes tests and homework easy to do/turn in.

These other communication systems are very easy to use and helpful (especially for upcoming events, assignments, etc.).

Much more helpful.

It reminds me to do homework.

I think the texting thing would be more of our generation.

Question 11 (Thoughts about how ASD could improve use of technology)

Make it more fun!

Require all teachers to use computers, get better WiFi, teach people what all they can do with technology.

Teach the technology before the teacher is required to use it.

Fair policies, etc. Maybe let the teachers make a list of sites okay for students to be on and unblock them.

Don't only rely on computers for scheduling. Electricity goes out at home/school.

I don't really think it needs improvement.

All teachers need to use it, not just a few.

Focus more on education rather than improving unnecessary aspects.

Allow a little more leniency with websites.

Get more of it, better laptops.

They could improve the quality, so it doesn't mess up like it does quite often.

Teachers sometimes try too hard to use technology and give us stupid assignments just for us to use it. Other teachers get everything off the internet and I'm not sure if I like that or not.

Improve quality. Less blocking sites.

To get a person that actually uses it and enforce it.

Make sure it works most of the time.

Question 12 (Other thoughts on how technology impacts your education)

It helps keep up with my schoolwork better. It makes research more available.

It is very helpful, but when you have to rely on something, it doesn't work most of the time. To do research, you need the internet. To see what you're doing in class you need the internet. I would prefer, sometimes, hard copies. But the advantage with a laptop is that you can store information and stay organized. I personally don't think phones should be allowed because people take advantage of that while "researching."

It cuts back on our actual discovery because we just get it all off the internet and have no actual exploration of nature and the natural world.

Doesn't help me learn like a book and paper does, which is why I write my PDQ's.

I almost believe technology can inhibit healthy thinking ways.

I personally don't enjoy the way some teachers use technology as a teacher instead of teaching themselves.

Having technology is a good thing, but taking notes should still be part of class. I remember things easier when I actually take notes on things. In my college World Civ class, Mr. Skaggs actually lectures and we take notes and I do well with that but turning in things online and

typing homework is easier to do (sometimes). I'm not a big technology person, overall. I'm not good at using technology unless it is basic Word document stuff.

Technology makes me feel a lot more responsible for my learning and my assignments. It helps, by using sites like Blackboard, to prepare for college and the future.

When used as a tool it is helpful, it should not replace lecture.

APPENDIX F

SENIOR STUDENT INTERVIEW 1

1. Do you have Internet access at home or only at school?

-At home and at school.

Do you have WiFi access in both places?

-Yes

2. Over the past 4 years, what technology changes have you seen here at Atkins High School?

-There's been a lot more computer labs and everything that have come up and of course the laptops. I've noticed the teachers are starting to do more PowerPoints than writing notes on the board than they did when I was in 9th grade. The math classes are online this year so now even the homework is starting to be online. In Mr. Traylor's class we do Schoology, or Moodle now, to turn everything in. So every year we've been getting more and more technology.

Can you elaborate a little more on the math technology. Such as, is that a good thing?

-In certain cases yes, like I'm in AP Statistics this year and we use MathXL, so whenever we were learning about the normal model all you do is type stuff in your calculator and enter in your answer and it's yes or no. But one of my friends is using MathXL in a harder math class and some of the questions it doesn't explain how to do it like the teachers would explain how to do it. So it's teaching you two different ways how to do it and some of them take longer than others. It gets really confusing. We had to do matrices when I was helping Kelsey with her homework, and the way it described it was really blunt and it did not tell you how to do it at all. It shows pictures but sometimes that isn't enough. So, overall I prefer doing homework on paper because it helps me retain it more, but I know some people retain it just as well typing as writing it down. But me personally, if I don't write it down I won't remember it.

So you would say these math programs you use can't be used solely on their own. They have to be used with a live teacher to explain further and to illustrate how you do these processes?

-I think some people could do it on their own. We have a math class now, Math Modeling, that it's completely on your own. You have the teacher maybe twice a week, and they answer questions but it's the entire class so you might not even get to ask your question. So, I think that it should be used in conjunction with a teacher, but I think it could be used on its own and that might help with not having two different ways to do it. It might just help with having that one way to learn how to do it.

3. How have those changes affected the quality of education?

-I think that it helps a lot because it's easier to do a PowerPoint during the class period than have the teacher hand write notes throughout the entire class period. So, you can get through a PowerPoint and take pictures of the PowerPoint and write it down later so you can speed up in class. I think that it lets people go faster. I take pictures of graphs when they're on the board or models when they're on the board and put them into my OneNote

on my tablet. Now, whenever I need to go back into the model all I have to do is type in the first word of the model and it pulls it up. So I don't have to waste time, and it helps me get my homework done faster. So it helps me more than just notes.

Do any teachers other than myself have a website from which they get their material that you can also access, such as the Prezis that I use, you can pull those up during class. Do any other teachers do that?

-No all of our other teachers have them downloaded to their own computer, and they don't e-mail them to you. The biology stuff on the biologyalive helps a lot because I can be at home and I can pull up the Prezi and I can pull it up and see it right there and it's the same thing we learned in class. And I don't have to worry about losing my paper because if I lose it I can print it out or type it again. So I think it helps a lot with teaching responsibility because you have to remember what folder you saved it in.

4. Cite specific examples from your own experience.

5. How have technology changes we've made here at Atkins affected your preparation for college?

-10th and 11th grade is when I really started to see technology start to make a move into Atkins. I'm in the college classes this year and we use BlackBoard and we use Moodle and last year was whenever everyone started trying to start with Schoology and Edmodo. I think that it helped a lot, because in BlackBoard in Comp, which is the same course that people take at Tech, it's all online. Every test we take, every paper we turn in, everything is on that computer. So even when we're taking a test, if you minimize your screen it shows the instructor that this student's screen is minimized. So I think it eliminates cheating, it helps the teachers keep up with things. So a student can't say they turned something in and the teacher can't say they lost it. It helps that you have to turn it in on the computer. I have a college teacher that if an assignment is due at 11:30 and you try to turn it in after that time, you can't.

6. How have technology changes we've made here at Atkins affected your preparation for a career?

-I think that we've made a lot of...we do a whole lot more research papers now because of the technology, because everybody has a laptop. So you don't have to worry about the hassle of reserving a computer lab, you don't have to take time out of class to do it. We do the research papers on our own at home because now everybody has Internet pretty much, and we have Internet at school. So, the research papers allow me to cite anything, APA, MLA, book, periodical, anything, because of the technology and doing the research papers. I had three research papers due just last week. I think the citing and finding genuine sources would help because you have to do presentations in business, especially international business, because you have to do a lot of business presentations for people that are higher up than you. You want to make sure you have credible sources so you know what you're talking about. We've done a whole lot more presentations this year.

Even in here we've had the evolution presentation and we're doing the cancer essay right now. The public speaking part of using the integration with the technology is helping with business because I used to have stage fright and now I can get up and talk in front of anybody.

7. What other comments or insight do you have about our technology initiative here at Atkins?

-I think that a lot more teachers need to participate in it. I don't think that 3 teachers in the high school should use Moodle and do the websites online, and the other teachers just don't. If you're going to do it you need to go all in with it. You have certain classes where you don't use technology and other classes that you do, so if you're going to actually get a student involved in it it needs to be all immersed.

APPENDIX G
SENIOR STUDENT INTERVIEW 2

1. Do you have Internet access at home or only at school?

-I have it at home and school.

Do you have WiFi access both places?

-Yes.

2. Over the past 4 years, what technology changes have you seen here at Atkins High School?

-I've seen everyone having laptops and being able to use those and phones during class for studying purposes and research.

-We are able to use the phones for research purposes during class if we don't have laptops with us.

How is that different from how it's been before with the phones?

-We weren't allowed to get our phones out that much at all. At least certain teachers wouldn't let you.

So would you say we've relaxed our rules about cell phones in conjunction with how we're trying to increase technology?

-Yes, I would say so.

3. How have those changes affected the quality of education?

-Well, it makes it kind of hard if the Internet goes out because you can't really study if the Internet goes out. You can go to the library, but sometimes during class people won't let you go to the library.

Has it improved education in any way?

-I think it has in a way, but it shouldn't really be relied on because of the fact that so many things are recorded online for classes. I prefer the traditional paper and pens.

4. Cite specific examples from your own experience.

-Well, it has definitely been able to help with it because of the fact that you can research things without needing a specific book.

Can you give a specific example that you've done this year?

-For assignments in AP Biology, I'm able to research things and be able to use PowerPoint and Prezi for it.

5. How have technology changes we've made here at Atkins affected your preparation for college?

-It's helped a lot because BlackBoard is one of the things at college that they use to turn in assignments, so it has helped because I know I will have to do that. If I choose to do online classes, I'll be able to know what I have to do.

Ok, so you would say the experience you've had here using some distance learning things like BlackBoard, or have you used Moodle in some classes?

-Seldomly.

So would you say those experiences have given you some practice ahead of going into college and using them?

-Yes.

6. How have technology changes we've made here at Atkins affected your preparation for a career? What are you thinking of doing?

-I want to do digital art.

So how would technology play a role in that career?

-Well I will probably have to use a tablet to draw things, and because digital art is technology based, not really pencil and paper it's painting with technology, it's definitely needed.

So you would say there's no way you could do that without technology?

-Right, because there are so many things pointing to technology. It's not because we're trying to change things, it's just that instead of traditional animation they're doing computerized animation.

7. What other comments or insight do you have about our technology initiative here at Atkins?

-I think getting laptops for every student is a good thing because some people can't afford it. But the thing is some people don't have WiFi at home, and I have kind of mixed feelings about it sometimes. And because electricity goes out sometimes and you can't do your work on the computer.

So are you saying that we might be relying too heavily on technology in some instances?

-Yes.

So is it worth the money that we spent to do this initiative? We spent approximately \$186,000 to buy all the computers and the servers, and of our that money comes from tax money. Do you see it as being a worthwhile investment?

-I think so, on some aspects I guess. I think it was a good investment.

APPENDIX H
SENIOR STUDENT INTERVIEW 3

1. Do you have Internet access at home or only at school?

-I have it at home and school.

Do you have WiFi access in both places?

-Yes

2. Over the past 4 years, what technology changes have you seen here at Atkins High School?

-The biggest one was whenever they introduced the laptops to our school this year. It was very different, very new, and very confused, but they're slowly figuring it out.

So this being April, and your comment is that they're still figuring this out, do you see it as still a work in progress?

-Yes.

3. How have those changes affected the quality of education?

-I think it's gotten better because the teachers can use the technology to interact with the students so they can do better teaching.

4. Cite specific examples from your own experience.

-Like whenever you use the Prezis and we can also use the Prezis with our laptops so we don't have to strain to see the presentation.

Ok, so that's because I pull those off of a specific website. Are there any other teachers who use resources like that so you can access those resources while they're using them?

-No, none of mine.

5. How have technology changes we've made here at Atkins affected your preparation for college?

-If I were in a college class then it would help me a lot, because then I would be able to interact with an actual college teacher and get started with BlackBoard like Tech uses.

But since I'm with Upward Bound it doesn't really matter.

Do you use any communication technology in Upward Bound?

-No not really, nothing like text messages and Moodle.

6. How have technology changes we've made here at Atkins affected your preparation for a career?

-They've kind of helped and hindered in a way. I'm planning to do graphic design, so it's helped because it helps me interact with different kinds of computers. But it's also hindered me because the teachers don't know the administrator's password so if I want a safe font that is free I can't really get it.

7. What role do you see technology playing in your future career?

-Everything involves technology, like with the little drawing tablets where you can draw and see your screen at the same time. Everything in graphic design is going to involve using technology.

Do you have any particular kind of graphic design you're wanting to work with?

-I really like advertising and making posters and stuff. But I'm also interested in the

graphic design part and interior design.

Would you say that it would not be possible for you to do either version of that career without the use of technology?

-I could do it but it would be very hard, because obviously they've done it in the past, but it took them longer.

8. What other comments or insight do you have about our technology initiative here at Atkins?

-It's a good try as a start. It could be a lot better.

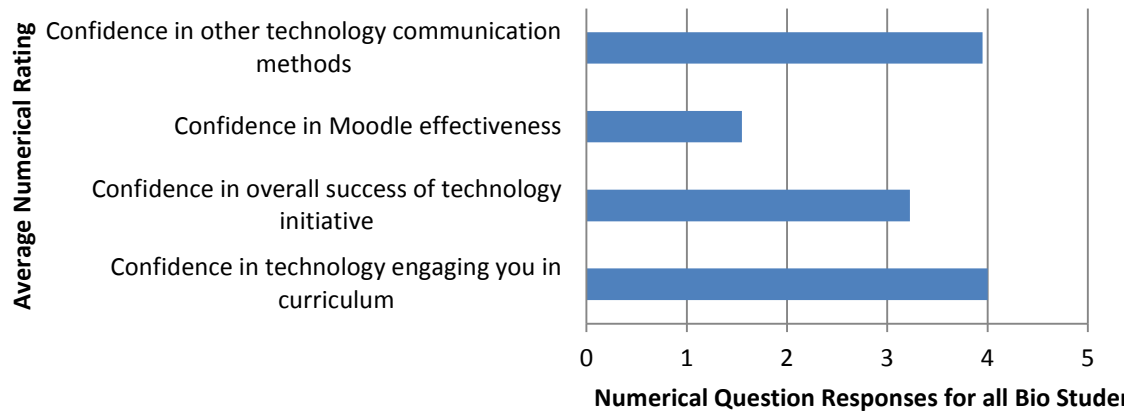
How?

-They could incorporate...because lots of teachers are willing to work with it, but because some of them aren't they're kind of set in stone with the old things, so I really think that the technology could be a lot more involving with the students and the teachers.

APPENDIX I

SOPHOMORE SURVEY QUANTITATIVE DATA

Confidence in technology engaging you in curriculum	Confidence in overall success of technology initiative	Confidence in Moodle effectiveness	Confidence in other technology communication methods
4	3.225	1.55	3.95



APPENDIX J
SOPHOMORE SURVEY QUALITATIVE DATA

Question 2(Explain ranking of technology helping with curriculum)

If it's working correctly it's a 5, but it never works correctly.

I like how fast you can get things done, but there's temptation to do other things.

If I need something or I need to know more about something I can look it up.

I enjoy the technology. Everyone has a right to a good education with the right resources.

It has helped many who couldn't afford it.

I can look up things I need to know.

Easy access to knowledge.

New technology provides many new sources of information.

It helps us do our homework and take notes.

Good is a life saver.

Because it makes it easier to keep up with things.

It helps with my organization but it is not quite perfect.

It's good for looking up things on the internet rather than books, but it sometimes makes things more complicated. Good for taking notes!

Lots of difficulties: computer breaking, not charged, no WiFi. It's just hard to maneuver.

Technology helps keep things efficient and saves a significant amount of time on a regular basis.

Technology is very helpful unless you have errors or the documents you save disappear.

I would like to use paper and pencil. I'm more of a hands on learner.

Sometimes technology is difficult.

It helps a lot but what's the point of having computers and new technology if we still do book work?

You have more accessible research.

Question 4 (Explain ranking of overall success of technology initiative)

Moodle is horrible and so are our computers.

It's got kids to do more but other things (games, etc) have slowed the intake of knowledge.

I like it but I think we're still expanding.

I really enjoy having technology but it's just that you can't rely on just technology because there will be errors in that.

We still use paper. Using both is difficult and horrible.

I wish they wouldn't watch us.

We have had a few problems with converting to new technology, but overall the teachers have made it easy.

Too many were broken.

Atkins technology crashes.

It works.

They still have some problems to deal with for this, some students don't want to even use them.

It has helped a lot but as always there are problems that come with technology.

We've been getting better at using the technology.

Some teachers are not taking it seriously.

Atkins is not used to the new laptops so there is a lot of adjusting and learning.

I'm not really sure.

Because we are getting more technology.

Our computers are awful.

We have gotten a lot of new technology but many teachers hardly use it and sometimes it doesn't work.

We haven't done much with it.

Question 7 (Explain ranking of Moodle efficacy)

It's never worked correctly and always is messing up.

We don't do much on it. Just get our work and do it in Word.

Moodle isn't that great.

Moodle isn't great at all. It's cheap, badly designed and very confusing. I hate that we have to use it when nobody wants it.

It is horrible. No one likes it.

Not used, too hard to use.

It is very organized. I would give Moodle a 5, if not for it crashing.

I hate Moodle – Schoology was more simple.

We barely even use it.

Because Moodle does not always work.

I am not a fan of Moodle. I don't really like it at all.

There has been a lot of issues with Moodle in the past and I personally don't like it.

Thought it does give us a place to go and click on the assignment, I have to log in every time and it's a tad confusing.

Moodle is not user-friendly and often glitches – which is obviously very inconvenient.

Moodle does not really help. It is just used for online assignments occasionally.

I hate using Moodle.

Helps me know about things a little more but I like Schoology better.

It's confusing and everyone complains in class.

I really just don't understand it, and many people don't know either.

It's too complicated.

Question 10(Explain ranking of other technology communication systems)

They can get into greater depth and you can understand better.

They are useful reminding and getting work done on time.

It helps with homework or to let us know about a test.

I really like it, I just wish we had more resources to use.

I can look up things on Google.

They remind me when I have a test.

While helpful, it isn't used frequently.

It's helpful but it's slow and not as great.

I like being texted and reminded about assignments.

They explain more.

It helps me remember to do my work.

I've only used one of those programs, Remind101, and it has been very useful.

The Remind101 has saved me from forgetting an assignment or two.

Very simple way to communicate. Practical, and pretty effective, with me anyway.

It helps remind when I have a test or project due or something I might need.

They don't help me at all.

I always have my cell phone on me and that reminds me.

I like to be on my phone.

It works sometimes and other times it doesn't.

It's giving access to "hands on" work.

Question 11 (Thoughts about how ASD could improve use of technology)

Use better technology.

It needs to work out the bugs in certain areas.

Better websites to use.

Better technology.

Well, it would be nice if they would only use computers and not both computers and paper.

Giving students more freedom, like YouTube, to watch informational videos.

By providing new programs that we use more often.

Make it have good systems.

Get better technology to begin with, not Thinkpads because all they do is crash.

Well my opinion is that if we added more tech classes it's be easier.

I think that they should get slightly better laptops, and use something else besides Moodle.

No, Moodle is just a hassle in my opinion. Better laptops! Hector has Macbooks!

Although I almost like a hard copy more, I would love to be able to see my grade on Moodle and see what I've made on each assignment (similar to Schoology). I don't want to get on Edline everytime.

They could educate their employees on how to actually use the technology. There also should have been a better set-up before they just jumped into this situation – with computer ignorance. If used properly, this would be very effective.

Educate the students and teachers on how to use it.

Lift some bans on websites. It's hard to try to do work if a website containing info I need is blocked.

Having more teachers using it and explaining it more.

Make our computers better.

Either go full technology or full books and paper.

Teachers need to know how to use it better.

Question 12 (Other thoughts on how technology impacts your education)

Can be easier to turn in homework and get help from friends or teachers.

I think it can be more organized.

It really helps. I love it. But I don't appreciate the website blocking plugins. Sometimes kids try to get on totally appropriate websites but it is blocked for false reasons. I also think that it should be completely removed.

Computers are easier to work with than paper.

It is helpful. I'd like if in grade school we prepared more for technology.

It helps us know what to do and if we need to look up things. Google helps but I hate Moodle.

Again Google is a life saver and Moodle sucks.

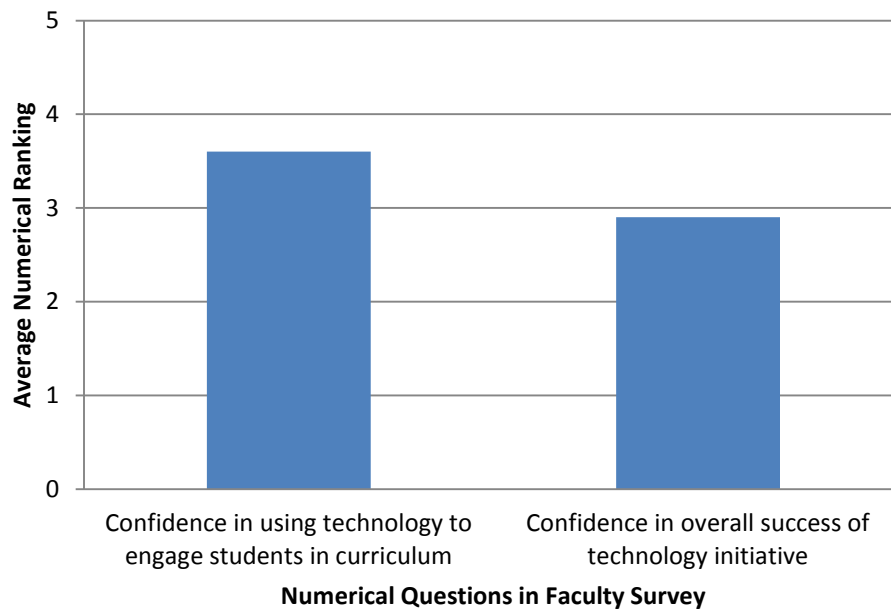
It helps me keep track of what I have and what I don't.

Technology is very beneficial but it does need improvements like computers being slow or missing documents. It does help take notes faster and allows us to search any knowledge we need to know through the Internet.

I just think that if we are going to go all tech savvy we should not use books or paper. Go full tech savvy or full books and paper, don't go half and half.

APPENDIX K
FACULTY SURVEY QUANTITATIVE DATA

Confidence in using technology to engage students in curriculum	Confidence in overall success of technology initiative
3	2
4	3
3	2
3	3
3	3
4	4
4	3
3	3
5	3
4	3
3.6	2.9



APPENDIX L
FACULTY SURVEY QUALITATIVE DATA

Question 2 (Explain ranking of technology engaging students in curriculum)

If used correctly, technology can engage students. Many students, unfortunately, use technology during class to do non-academic things.

It is engaging students when they bring them to class.

Typing notes. Doing homework. Can't print. Don't like math on computer.

Things don't always work or you are denied access or students not bringing laptops to class or not charged laptops.

It helps that they can use their computers at home to work on assignment and aren't tied to the computers at school for completion.

Students are more engaged and responsible for their learning. More students take notes.

Technology can be very effective for engaging students, but they don't seem to respond well to it at times. I think reliability of the network and laptops sometimes discourages them.

The teachers that have embraced technology are using it effectively to engage students. I see students using technology to take notes, communicate, develop presentations, and research on a daily basis. Implementation is a process and it takes some teachers more time to work through what it "looks like" in their class. The potential for effectiveness is a 5! Technology skills are necessary for student success in the future whether it be on the job or on to higher education.

The reason I would give question #1 a "4" is because today's students love technology! Students today are very confident using technology such as cell phones, computers, etc. and when technology is incorporated with education, it becomes a powerful learning platform. The reason I did not choose "5" is because there are some students who seem to be adverse to using technology. These particular students, interestingly, seem to do better with hands-on curriculum.

Kids get technology, they are basically born with a device in their hand. If you don't get technology and understand how to engage them with it you have already lost.

Question 5 (Explain ranking of overall success of technology initiative)

Inconsistent implementation by teachers.

Students don't always bring them to class. Students not taking proper care of their laptops, etc.

Students say they have just now started using their laptops (4th 9 weeks April).

Not all using. Need to have one set of rules so students are always accountable.

We still have issues with students not being able to login and access what they need to.

All students at the high school have a computer. Students use their e-mail more.

I think it's a wonderful thing but due to problems with stuff breaking down or students having trouble, it sometimes causes more headache than facilitating things. It really is important though and I think it's moving in the right direction.

I base this on the success of every teacher meeting the expectation of technology project every quarter. All teachers continue to increase the use of technology as they learn new ways to incorporate it into lessons. As I said before, this implementation process is slow and teachers have to work through the "how". I am disappointed with the incorporation of a learning management platform (Moodle) due to technical problems beyond our control (server crashing). Once the server got replaced and training began, teachers are using the system more often. We are desperately lacking in effective training for our staff on Moodle which slowed the implementation process quite a bit. I hope to resolve this for next year. Implementation of technology without proper training for teachers definitely was an issue. Despite the slow process of change, I believe it is important to push forward with technology integration. Our kids do not have time to wait for teachers to become comfortable with technology. We need to balance the need for technology with the needs of teachers to receive proper training. I believe it is important to let teacher run with the process as they can.... Coach up the rest of them!

The implementation of technology has been challenging, but rewarding.

The early problem with our platform of Moodle was very frustrating in the early going. And, because of the frustration, many students have remained skeptical of the technology incorporation. I believe that if things had gone smoother with our implementation, perhaps I could have given us a higher score. In time, I believe that we can regain the confidence of the students and convince them that technology is a powerful tool for us in our educational endeavors.

I think we are moving in the right direction but overall I believe we have not reached our goals. Engaging students with technology does not mean have them do a powerpoint and show it in front of the class. We have too many teachers who are pushing back instead of embracing this initiative. Doing the bare minimum technology requirement of the principal is not good enough.

Question 5 (Other thoughts on how technology impacts education)

Too many things blocked. Make it to where we can print. Some people do not have internet at home, and must do work at school. Students said they have been told to go sit

at McDonald's and use their free WiFi or sit in the parking lot and do their work after school.

I think it is wonderful and can't wait to get all bugs worked out.

Technology and education go hand-in-hand in today's world. It is amazing what our students (and we as teachers) have at our fingertips on the internet. One of the most annoying things about technology integration, however, is the over-sensitive internet filtering. It limits creativity, curiosity and learning; and quite often for things that have no reason to be filtered. I understand its purpose, but do not always enjoy the thoroughness of the filter.

WiFi – some students don't have WiFi at home.

I think if students understood the value of technology and we had a solid accountability plan for having laptops in class, then it might cut down on some problems.

Technology is impacting education across the board P-16.... Kids are coming to us with more and more skill and access to technology. Public education must keep up! Colleges are using learning management platforms for all classes and students must learn how to use these platforms. Jobs of the future will require technology skills as well. Access to information is out there for everyone... we must teach students how to access it and how to differentiate the good information from the bad. Blended learning is a key for the future. Learning is no longer confined to the brick and mortar classrooms. We must plan for and incorporate a blended model for students.

I am excited about the introduction of technology into our schools. I do wish we had the financial ability to add more technology resources for us to use. The first thing on my wish list would be for our students to have access to the use of printers. I have my workload doubled when I have to personally print things for our students. I would also love to see every teacher with a SmartBoard in their classroom. I would love to see us have access to scanners, etc. ad infinitum. So, to sum up my answer to the above question: If we have more resources, we can have better educational results. The impact could be greater if we had more technology.

How technology impacts education... First thing that comes to mind is, if you are not moving forward you are moving backward.

APPENDIX M

MARK MEREDITH'S STUDENT INFORMATION

Student Responses to Moodle Questionnaire

Mark Meredith

April 8, 2014

How do you feel that biology assignments on Moodle have affected the way you learn the material being presented in class?

“They have helped to reinforce what has already been presented in class, as well as build on the material.”

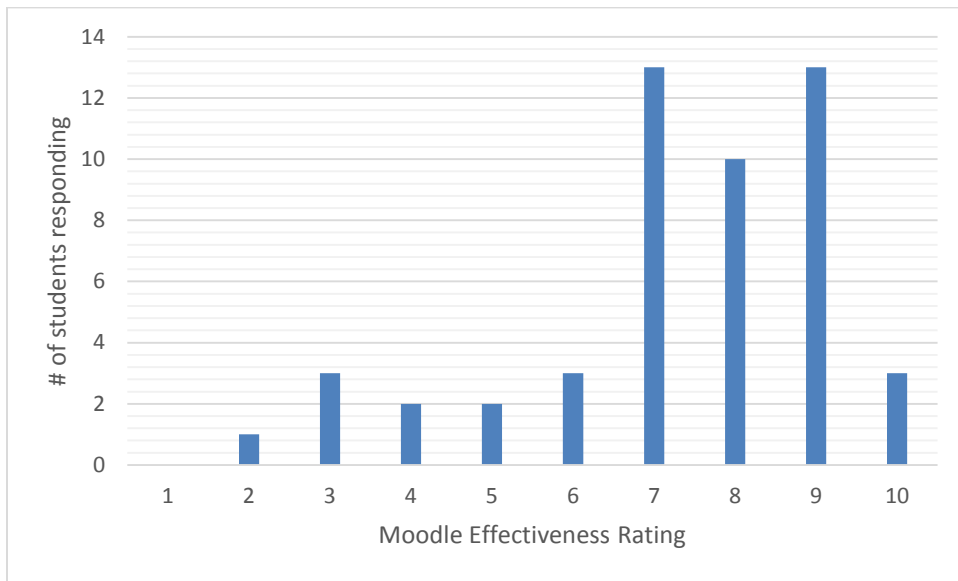
“I do feel like the Moodle assignments help me better learn the material. These assignments give a better understanding of the curriculum we are learning. I do not like it whenever there are too many assignments on Moodle. Then, it can become overwhelming.”

“I enjoy Moodle and our assignments we complete. I think Moodle assignments have encouraged me to dig deeper in thoughts and to really evaluate questions.”

“I think it has helped because with the quizzes, you get to see what you missed immediately, and so you can make a mental note in your head on what you missed and what the correct answer is. I don't feel that the forums are always necessary. Sometimes, they can be helpful and they are necessary, but not all the time.”

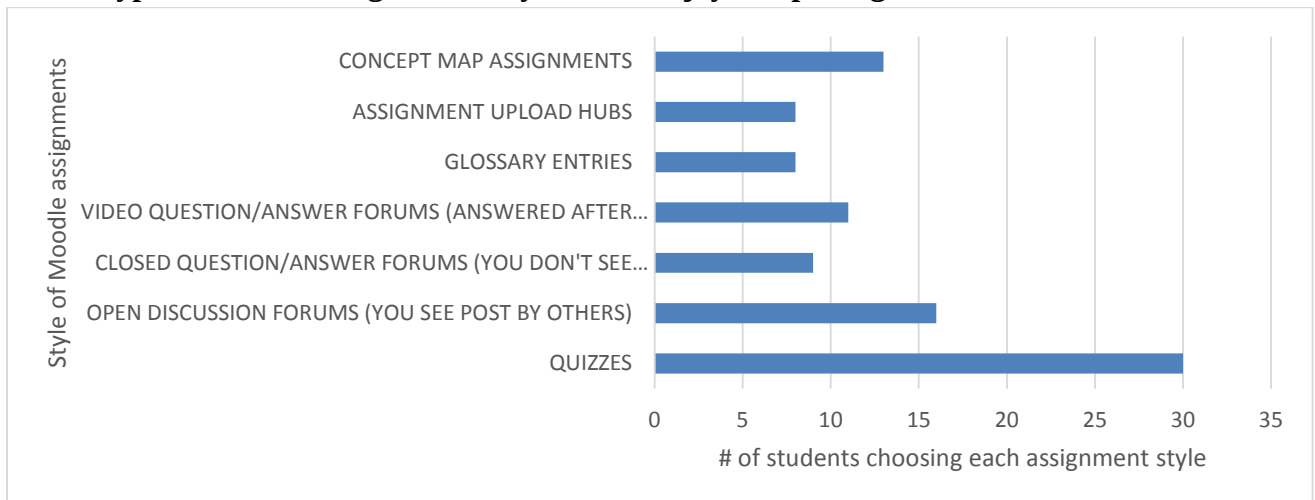
“I feel like the videos and assignments we have to participate in help me to understand the material. It goes more in depth, and if it doesn't it might explain things in a different way that I might understand better than I did with the lesson.”

On a scale from 1 to 10 with 1 being the least and 10 being the most, how would you rate the effectiveness of the overall Moodle experience in helping you learn?



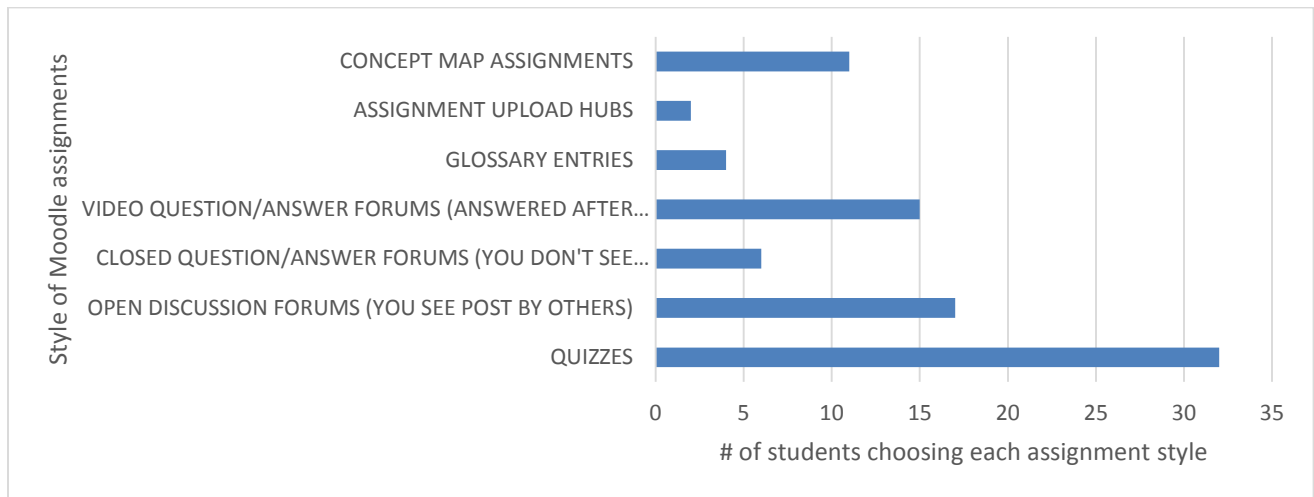
Student ratings on the effectiveness of the Moodle experience contributing to learning with 10 being the largest measure of contribution (N = 46).

Which type of Moodle assignment do you most enjoy completing?



Student ratings on how enjoyable each assignment style is to complete, multiple choices possible from each student (N = 46).

Which type of Moodle assignment do you feel best helps you gain a better understanding of the course's content?



Student ratings on how each assignment style is perceived to help better understand course content, multiple choices possible from each student (N = 46).

Do you have any suggestions for using Moodle in ways not seen in this course?

“Maybe team projects over google docs or something? I feel that there should be a little more working with people and Moodle seems like a good way to so it.”

“Maybe a live chat or post interesting new scientific discoveries/articles on the side (weekly/monthly).”

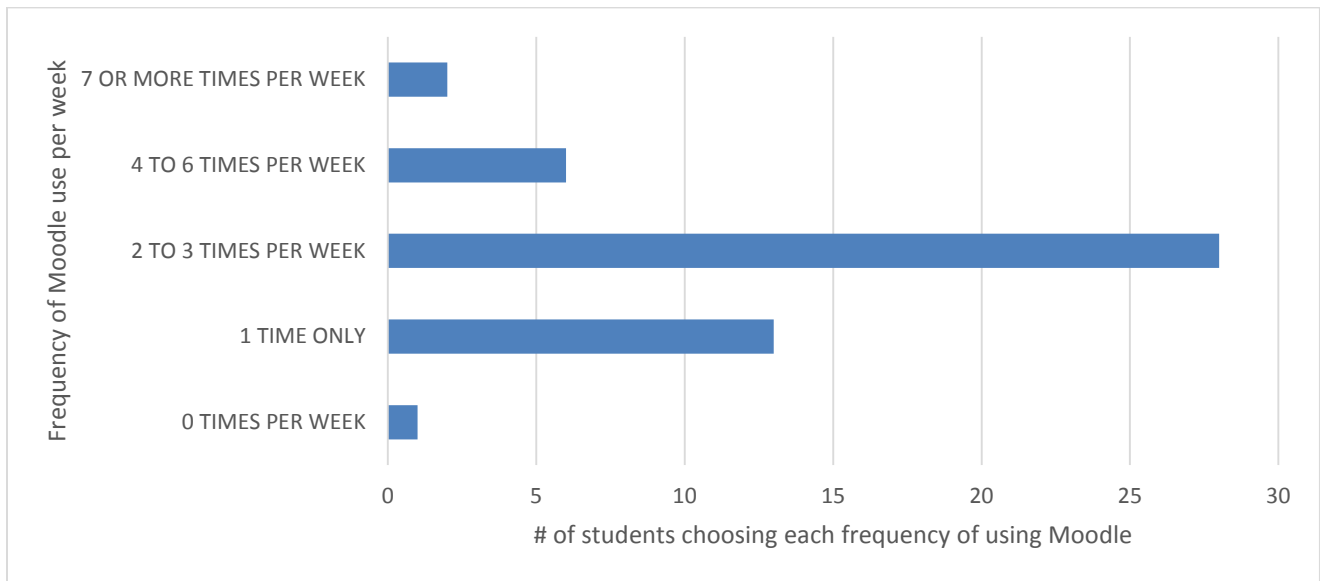
“I really would like to see DISCUSSIONS introduced. Like, actual discussions. That would help benefit us because we would have to know our material, be able to effectively and clearly state our findings, and let us see the situation from different perspectives.”

“I'm not sure of the scope of everything Moodle has to offer, but being as its open-source, I could see implementations of Moodle in different things like peer-to-peer communication being implemented into the sites.”

“Maybe there could be a small group project and it has to all be done in Moodle.”

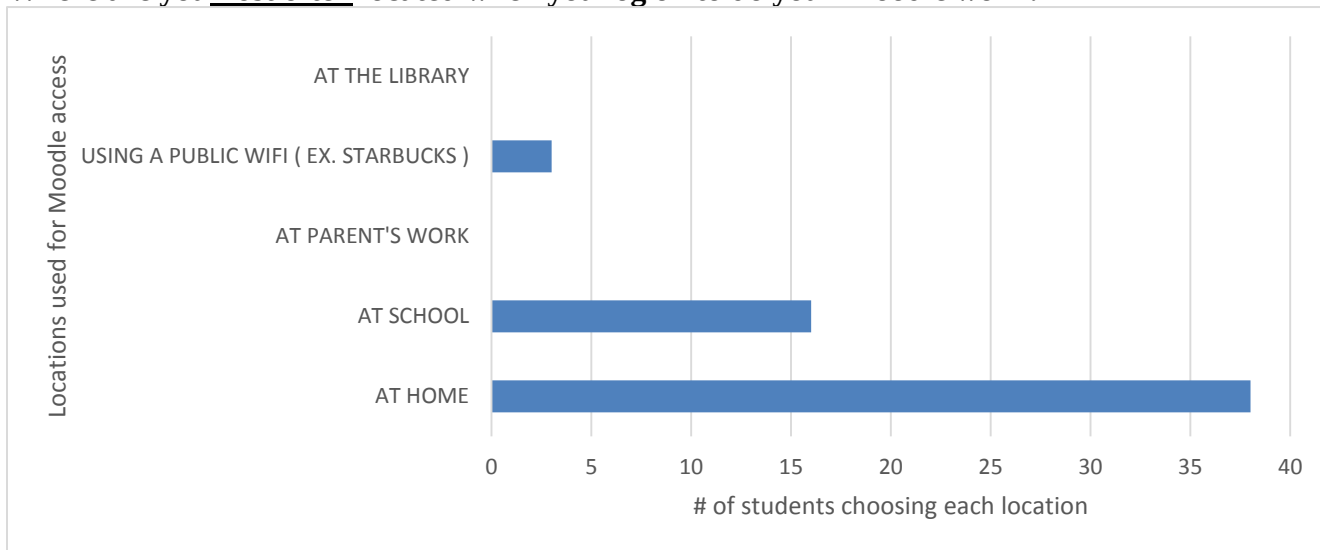
“I think that creating a study guide booklet assignment would help. Things would be organized and easier to study because of the way they are presented. The booklet could have pictures, maybe even diagrams, and be easier to view.”

How many times on average would you say you log into Moodle per week?



Reported weekly frequency of student access to Moodle (N = 46).

Where are you most often located when you log on to do your Moodle work?



Reported location for where students are most often located when accessing Moodle, with some students choosing multiple locations (N = 46).

APPENDIX N

TERRY CAMERON'S STUDENT INFORMATION

April 22, 2014

RE: Capstone Survey

The Capstone survey questions thus far have been about how effective the implementation of technology is at engaging students in the curriculum. However, the following information and statistics will be in regard to the increase/decrease in student scores since implementing technology in the classroom. The correlation between technology and student scores will reveal that when students use technology, their grades for the most part will improve. Of course, more information needs to be gathered to find out the true validity of the improvement in student grades. The following statistics (students from the 10th and 11th grade) shows the upward improvement. Out of 90 students, 63 showed improvement in scores. The first 9 weeks scores (2014) were without the use of technology, and the 2nd 9 weeks scores were with the students using technology most every day. The overall scores for the first 9 weeks were 73.701 and the overall score for the 2nd 9 weeks was 81.115. The common denominator for improved student scores in my opinion would be the use of technology. Technology is an environment that most of my students feel very comfortable in which translates into improved student educational production. Obviously, there needs to be much more study and gathering of data to be able to validate my theory of technology being the reason why student scores have improved. There will be questions such as “what other external factors may have been involved with student improvement?” that will need to be explored to fully comprehend the impact technology has on student score improvement.

Submitted by:

Terry Cameron

English II, III, AP

APPENDIX O

MARGARET ROBINSON'S SURVEY DATA

Technology Survey for Students: 1:1 Initiative at Atkins High School

Please assist us in evaluating the success of the 1:1 initiative (technology incorporating) for this school year by answering the following questions with honesty. We really appreciate your feedback! Circle the appropriate response. $N = 142$

1. In your opinion, rate the success of the implementation of the 1:1 initiative at Atkins High School.
Not successful (21%) Somewhat successful (66%) Very successful (13%)
2. How well did your teachers implement the use of technology?
I never used the laptop (7%) I used the laptop on a few occasions (35%)
I used the laptop frequently (33%) I used the laptop daily (25%)
3. Did you enjoy having the laptop as a tool for learning?
I do not like using technology (27%) I like using technology occasionally (43%)
I like using technology frequently (22%) I wish all of my classes were online (8%)
4. Do you think technology is used enough?
Too much use of technology (26%) Right amount of use (54%) Not enough use (20%)
5. Did the device (Lenovo X131E) meet your needs as a student?
Yes (16%) No (46%) Somewhat (38%)
6. How effective is the laptop as a tool for learning/education?
No effect (19%) Somewhat effective (40%) Effective (34%) Highly effective (7%)
7. Should all teachers use the same learning management system for their classes? (BlackBoard, Moodle, Edmodo, etc...)
Yes, all teachers should use the same one (44%) No, let them decide the one to use (56%)

List: Strengths of 1:1

Weaknesses of 1:1

Other comments we need to know (use the back if needed).

Qualifying commentary mainly consisted of students saying they did not like using Moodle or testing online. They found it more difficult to answer the questions. Some students preferred a faster, more durable laptop. A few students commented that they hardly ever used the laptop or only used it in certain classes. Also, many students were frustrated that news websites were commonly blocked. A few students indicated that they did not like technology at all and preferred paper.

APPENDIX P
COPY OF STUDENT SURVEY

Participation in this survey is completely voluntary and will not impact your grade or standing in this course in any way.

1. On a scale of 1 to 5, with 1 being the least helpful and 5 being the most helpful, rank how effective the implementation of technology is at engaging you in the curriculum.
2. Explain your ranking.
3. On a scale of 1 to 5, with 1 being the least effective and 5 being the most effective, rank the overall success so far of Atkins' technology initiative.
4. Explain your ranking.
5. How many of your daily classes have implemented the use of Moodle in some way?
6. On a scale of 1 to 5, with 1 being the least helpful and 5 being the most helpful, how would you rank Moodle's effectiveness in helping with those classes?
7. Explain your ranking.
8. How many of your daily classes use other technology communication systems, such as Remind101, BlackBoard, cell phone texting, etc?
9. On a scale of 1 to 5, with 1 being least helpful and 5 being most helpful, how would you rank these other technology communication systems in helping you with the curriculum in some way?
10. Explain your ranking.
11. Share your thoughts, if any, about how the Atkins School District could improve the use of technology to help education.
12. Is there anything else you would like me to know about how technology impacts your education?

APPENDIX Q
COPY OF FACULTY SURVEY

Faculty Survey

Please complete the questions below and place them into Chance Duncan's box. This data is for graduate class research.

1. On a scale of 1 to 5, with 1 being the least helpful and 5 being the most helpful, rank how effective the implementation of technology is at engaging students in the curriculum.
2. Explain your ranking.
3. On a scale of 1 to 5, with 1 being the least effective and 5 being the most effective, rank the overall success so far of Atkins' technology initiative.
4. Explain your ranking.
5. Is there anything else you would like me to know about how technology impacts education?

APPENDIX R

CHI-SQUARE ANALYSIS OF QUANTITATIVE RESPONSES

Chi-Square Test of Faculty-Senior-Sophomore Quantitative Data

$$X^2 = \sum (o-e)^2 / e$$

χ^2 Analysis based on H_0 - no statistical preference one way or another for the technology

Faculty-Sr-Soph

1. Engage in curriculum

$$\frac{(3.6-3)^2}{3} + \frac{(3.47-3)^2}{3} + \frac{(4-3)^2}{3} = 0.12 + 0.0736 + 0.3333 = 0.5269 \text{ Matches } H_0$$

2. Overall Success

$$\frac{(2.9-3)^2}{3} + \frac{(3.05-3)^2}{3} + \frac{(3.22-3)^2}{3} = 0.0033 + 0.0008 + 0.0161 = 0.0202 \text{ Matches } H_0$$

Sr-Soph

1. Engage in curriculum

$$\frac{(3.47-3)^2}{3} + \frac{(4-3)^2}{3} = 0.0736 + 0.3333 = 0.4069 \text{ Matches } H_0$$

2. Overall Success

$$\frac{(3.05-3)^2}{3} + \frac{(3.22-3)^2}{3} = 0.0008 + 0.0161 = 0.0169 \text{ Matches } H_0$$

3. Moodle Efficacy

$$\frac{(1.53-3)^2}{3} + \frac{(1.55-3)^2}{3} = 0.7203 + 0.7008 = 1.4211 \text{ Matches } H_0$$

4. Other tech communication

$$\frac{(4.29-3)^2}{3} + \frac{(3.95-3)^2}{3} = 0.5547 + 0.3008 = 0.8555 \text{ Matches } H_0$$