

Teaching with Technology:
How can we enrich students' learning and
increase motivation?

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SECTION A : BACKGROUND INFORMATION

Teaching Context and the Reasoning behind the Topic

Room 88 is comprised of twenty-three of the most amazing people I've ever met. My students have such different ability levels, but each brings something new to our environment. We have many social and academic leaders, but just as many quiet achievers who are content to do wonderful work out of the spotlight. Likewise, we also have a significant number of children who succeed when given extra attention and adaptations. Our students have been very open to new ideas this year, and were thrilled when we became the only fifth-grade class in the district to receive permission to have our own school-sponsored email accounts. As a result of this enthusiasm and my desire to help some of our quieter and less confident students participate more in class, I decided to create an inquiry project that explored the idea of technology as a motivator.

I knew that I could not monitor every student's participation level, so I chose five students, four of whom I believed needed to participate more. *Carrie* is a very motivated student and a positive leader in our class. She is helpful to other students, and is a wonderful volunteer during lessons. Carrie provides insightful comments and questions, and I wondered if technology would bring even more participation from her. *Jane* is another strong student, especially in writing; however, her participation is not where it could be. Her comments in the computer lab and her emails to me show that Jane spends a good deal of time at home using her computer. Incidentally, she was the first student in our class to complete the fifth grade level of Type To Learn (an instructional typing program). I wanted to pique Jane's interest with technology in hopes that she would increase the number of times she volunteered answers or offered thoughts, both of which she does well when prompted. *Bob* is another student I focused

on during the project. Throughout the year, his attitude has wavered, and by January, he had become pretty unenthusiastic about much of school. Though he works well with small groups, his participation in large group work is mediocre at best. Like Jane, Bob demonstrated interest and experience with technology. Often before dismissal, I noticed that Bob enjoyed playing on KidPix (a Macintosh program similar to Microsoft paint), and I hoped that technology would draw him in to the large group discussions. Next, I chose to look at *Brian* and his level of participation. He has some wonderful and creative ideas, especially in math, but seems reluctant to participate. He has the habit of calling out often, and when asked to raise his hand or repeat his answer, he often refuses. I sought to increase Brian's overall comfort level with participation in large group instruction. I wanted to do the same for *Andy*, the final student in my data sample. Andy is often pulled out of the room for learning support services, and I noticed that when he was in the room, he was reluctant to participate. I hoped to use technology to not only help him understand lessons, but also to make him feel like a part of the lessons even though he was not always in the classroom.

What the Experts Say

Technology is an extremely important aspect of our lives because it has revolutionized the way we communicate and learn. In our schools, high-level technology is constantly changing the way we plan and write lessons as well as the way that students are absorbing the information. Gone are the days of mere chalkboards and posters; now, students seem to crave PowerPoint presentations and flashy iMovies. Though many lessons in a variety of classrooms and schools use some form of "low" technology, such as an overhead projector, it has become increasingly important in this day and age to explore the effects of using high technology, such as computers, SMART boards, the Internet, and various software. Experts agree that utilizing technology not

only builds students' confidence with using technology, but also enhances learning, saves paper and time, and keeps students engaged (Chin 5). Technology is an absolute buzzword in education, as grants and proposals for more technology in the classroom are written and approved everyday.

However, it is important to note that the use of a computer in a lesson does not mean that technology has been used effectively; "E-learning involves improving teaching and learning using instructional strategies *enhanced* by technology" (Waterhouse 3). For example, many educators criticize the use of lectures while teaching younger students, claiming that it is too teacher-centered and thus does not promote engagement. However, using technology in conjunction with a lecture can increase its engagement level. Low-tech overhead projectors allow teachers to use "visual aids to back up a lecture," while high-tech PowerPoint presentations and interactive white boards "constitute a vital part of the method itself" (Ellington, Percival, Race 72). Ellington, Percival, and Race also stress that "it is important that audiovisual media should be carefully chosen for use in . . . teaching . . . because of their suitability and not merely because they 'happen to be available'" (72). There is no substitute for good teaching, but technology provides a strong base for enrichment.

Technology can also provide the opportunity for all students to succeed. Cook and Finlayson concur that special needs children benefit from "the use of technology . . . [because it] can provide a safe educational context for their self-directed work" (79-80). Likewise, "The use of technology for students with disabilities is well grounded in legislation [especially Public Law 19-942 and the Individuals with Disabilities Education Act, or IDEA] and professional standards" (Tomei 274). Each day, eleven of my twenty-three students receive some form of learning support, Title I services, or other services dictated by their Individualized Education

Plans (IEPs), and research supports that technology could help those student succeed. I have also personally seen technology help students, especially when it comes to writing. During parent-teacher conferences, one parent remarked that her son (who has a learning disability involving language and processing) has “mastered [Microsoft] Word; he can right-click to get the spelling . . . [and Word] is a good way for him to go back and change things.” Likewise, the State College Middle School (as well as other secondary schools around the country) heavily relies on typewritten work instead of cursive, and students of all abilities can benefit from technology skills.

Initial Wonderings

As I began this inquiry process, I initially wondered: how can I use technology to motivate my students to learn and participate more? I also had many subwonderings and questions that arose as I developed my project topic: Does technology work best in certain subjects and tasks? What technology tools (hardware and software) work best to motivate students? How much technology can students use independently? Does technology help students stay on task? Will technology consistently motivate students, or quickly become another routine for them? I was excited to begin the inquiry process, and I found that it was relatively easy to bring lots of technology to my students.

SECTION B : INQUIRY PLAN

The Inquiry Process

Initially, I believed that using more technology, especially the SMART Board (an interactive white board), would help my students increase their participation. Each week, I worked to integrate technology into my lessons. When I lectured, I often used PowerPoint

presentations with appropriate pictures and Internet links that displayed interactive programs, allowing students to become more engaged in the lecture. For example, when teaching students about earthquakes, I found a website that displayed a virtual earthquake; the user(s) could select the type of building structure and environment as well as the strength of the earthquake, then watch the effects. I also often relied on PowerPoint when working the computer lab because it displayed directions for a given activity clearly and efficiently.

In addition to PowerPoint, I sought to use the SMART Board in various lessons. My first lesson using this interactive white board (and one of the lessons that led me to this project topic) involved introducing the figures of speech to the students. It was mid-January, and my mentor had not asked for anything specific, giving me the freedom and opportunity to develop a PowerPoint slide show that could benefit from the use of the SMART Board. Instead of just reading poems or sharing examples with students, I created a slide show that allowed students to use the tools of the SMART Board to underline words, write in examples, and play an online hangman game that reviewed what we had learned. Additionally, I used the SMART Board to give instructions for the computer lab if timing was an issue. In one instance, I had tried to schedule an hour in the computer lab, but only a half hour was available. Instead of changing the lesson, I merely wheeled the SMART Board to our room and we had guided instruction in the class. This was actually more engaging than previous labs when I had shown students procedures in the lab using the teacher station (which has an LCD projector connected to the teacher computer). Using the SMART Board instead to give instructions for the computer lab allowed students to touch the screen and actually practice the lesson rather than just watch as I demonstrated.

Throughout the months of inquiry, I was able to use PowerPoint and the SMART Board myself quite a bit. However, I also turned technology over to the students. For our science unit about animals, a major part of assessment came with the group phylum presentations. Groups of three or four students created PowerPoint presentations about an assigned animal phylum, then orally presented the information to the rest of the class. Over the weeks of this PowerPoint project, students learned the basics of the program, as well as how to use bulleted lists and pictures in the slide shows. Students also used technology themselves in the computer lab as they participated in webquests (teacher-generated questions whose answers were found on various given websites) and in the typing program Type To Learn. Finally, our fifth grade students have used school-sponsored email throughout the year; they utilized the service to send projects or parts of projects from the computer lab at school to themselves at home, thus increasing the continuity between schoolwork and homework. Overall, integrating technology into the curriculum has been an easy and enjoyable part of my inquiry project as well as my teaching. Sample technology-based lessons are available in Appendix C.

Data Collection and the Process of Analysis

Throughout the inquiry project, I collected data from a variety of sources. One major source of data was a form that helped me monitor the participation of my five focus students. The standard sheet allowed my mentor, my PDA, and myself to collect the similar data throughout various lessons. A sample sheet is provided in Appendix A.

The data sheet I originally used changed to the final version in Appendix A. I found that the time of the day often affected the students' general participation level (everyone seemed more attentive early in the morning), especially considering that many students are often in and out of our room for services, lessons, and special events. Students' placement in the room (on

the rug, at their seats, etc.) very much affected the level of distraction or off-task behavior. I also wanted to take note of questioning and volunteering from the students because I was seeking to use technology to increase participation quantity; we could work on quality once we had more students volunteering!

During the data collection process, I also used my weekly reflective journals to record the general atmosphere of the classroom that week, as well as the technology used. In addition, I looked back at my anecdotal records, weekly schedule, and general classroom notes to look for patterns in my teaching, the students' motivation, and the overall participation of the students (especially those whom I was targeting). I also took a survey in January, though the results were incomplete because many of the students were absent or out of the room. However, I was able to use these surveys to analyze my students' interest in technology by looking at how often they used computers at home as well as how much they wanted to use them in school.

Finally, a major way to collect data from my students was to look at samples of their work. When the students created their own PowerPoint presentations, I not only observed their participation within the small groups, but also their proficiency with the technology itself. This proved to be beneficial because even though the content and technology were complex for fifth graders (PowerPoint is a technology standard for eighth graders in the State College Area School District), I found that all of the students were motivated, and as a result, the PowerPoint slide shows turned out beautifully! I collected data during lessons, which allowed me to see how students reacted to the technology used, but looking at the students' end product also helped me analyze their overall engagement in a given lesson or project (see Appendix D for samples).

When analyzing my data, I often used my weekly journals as times to reflect on the last week and the technology used in those lessons. I also looked a great deal at the numerical data,

such as the number of times my target students volunteered in technology-based lessons versus lessons without technology, as well as the number of times they served as a distraction during a lesson with or without technology. Finally, I looked back at anecdotal records to see genuine feedback from my students. In my notes, I found snippets of conversations between students (“I wish we could go to computer lab today!”), comments they had made to me, and the general atmosphere of the classroom. Anecdotal records are in Appendix A, and reflective journals are in Appendix B. Since my inquiry was a major part of in my everyday classroom environment, I found it relatively easy to analyze the outcomes of the project because I had been doing so all along!

SECTION C : CLAIMS AND EVIDENCE

Claim 1: Integrating technology into the classroom increases participation in students.

I often hear my students talk about their favorite website or their AOL Instant Messenger conversations. This led me to believe that technology would work well for my students, since so many of them indicate that they enjoy it. When I took my pre-inquiry survey, I received responses from sixteen of my twenty-three students. Fourteen of the sixteen students requested more computer lab time (of the other two students, one wanted less computer lab time, while the other thought it should stay the same), indicating that the interest was there before I began implementing more technology in the classroom. All of these sixteen students also said that they had computers at home, and they used them at least one or two times per week. Unfortunately, only two of my five targeted students completed surveys, but both said they wanted more computer lab time. My students were definitely interested in and comfortable with technology, and I was eager to see their response to it in lessons.

When I used technology in my lessons, I found that two of my target students increased their levels of participation, two stayed the same, and one decreased. I monitored this progress by making tally marks when a student volunteered for an answer, and a question mark when the student asked a relevant question during the lesson. Carrie, one of the most frequent participators in the class, almost doubled the number of times she volunteered answers during lessons with technology. She also asked more questions in lessons involving technology. For example, when working with an overhead projector during writing, Carrie only volunteered answers twice within a twenty minute period. However, when we discussed amoebas and other microscopic creatures using a PowerPoint presentation featuring video clips and Internet links, Carrie volunteered twelve times in one hour! In the same two lessons Bob, a struggling participator, was off-task twice during the twenty minutes of writing, but also volunteered twelve times during the technology-based lesson. Overall, Bob increased the number of times he raised his hand when we used a lesson with technology. I also found that he began moving his seat so that he could either see the projection more clearly or avoid distracting students who would have talked to him. By doing so, Bob became much more involved in the lesson; even if he wasn't raising his hand, he was not distracting others, and that qualifies as better engagement and participation.

Though Andy did not increase his level of participation by raising his hand more often, I did find that he was less distracted during lessons involving technology than those not involving technology. When I used a PowerPoint presentation to share notes with the class, he was more likely to pay attention than in weeks past, when I had verbally presented notes. Though Andy's participation was not always active, the decrease in distracting behavior was an improvement in

the type of participation (he was no longer negatively participating by acting as a distraction) in the lesson.

Unfortunately, two of my students neither increased their participation levels nor decreased the number of times they were distracting to the class. Jane's participation level stayed the same, and documentation shows that she talked more to friends or neighbors when technology was used. Brian decreased the number of times he raised his hand when a lesson was based around some sort of technology, and he was also off-task more often. However, data could have been skewed for any number of reasons, from the content material to the weather. Experts point out that "Computer-based learning systems . . . can be highly attractive to use . . . people *enjoy* working with such learning resources" (Ellington, Percival, and Race 179). Even though my targeted students did not all increase their levels of participation, I still felt that my class has shown an increase in their overall participation levels.

Throughout my inquiry project, I found that the general atmosphere of my classroom became more enthusiastic. When I began this project, I had just taken over teaching science, and so it was there that I began to integrate technology the most. I used websites and video clips to share visual information with the students, and many responded very positively. One student asked: "Miss Tumbas, when's the next time we're going to computer lab?"

"Friday," I answered.

"Darn it!" she said.

"Hey, Friday is tomorrow!"

"Ohhh," she replied. "Yay!"

The very next day, this same student offered to erase the board at the end of the day. After the students left, I noticed that she had not erased our schedule, but instead modified it to her liking. It now read:

Recess

Recess Science

Recess

Lunch

Recess

Recess

Though the science may have been added as an afterthought, I was absolutely thrilled that this student would rank a school subject as high as she would rate recess and lunch. I believe that part of this was due to the fact that so much technology had been integrated into our science work; it was a novelty, and it motivated the students to learn. Especially in the early weeks of the project, when technology was something fresh and unique, I noticed that the students cheered (“Yessss!”) when I announced that it was time for science. During one lesson, in which I shared video clips of microscopic organisms, the students exclaimed, “Cool!” “Wow!” “Look how fast it’s going!” as they watched a paramecium dart across the screen. That same day as we lined up for lunch, one of my students said, “Wow, science is over already? It really flew!” This particular student does well in school, but is at times reluctant with his enthusiasm. He (somewhat jokingly) approaches me at least once a day, complaining of boredom, so his excitement was well-appreciated.

Other students have asked me many questions throughout the project, mainly “Are we going back to the computer lab today?” and “Are we using the SMART Board for this?” The

computer cart has become a familiar part of our room, and watching the students respond to it (and my lessons) has made me feel that this inquiry project has been really worthwhile. Tomei says that “Most educators are willing to try new technologies, especially when they see that they can advance student learning” (110). I have seen my students’ advances firsthand; integrating technology into my classroom has made learning more exciting, and students are bringing more ideas, questions, and enthusiasm to our discussions.

Claim 2: Technology is more engaging for students when they are using the technology themselves.

My inquiry project began with a teacher-centered approach; I created PowerPoint presentations or found websites, then shared them with my students. The SMART Board allowed my lessons to become more student-centered because they fostered active engagement as the students touched or wrote on the SMART Board. The biggest step for student engagement, however, came when I decided to allow the students to create their own PowerPoint presentations for their invertebrate animal phyla projects. I began looking at participation in a different way; instead of monitoring how many times my students raised their hands, I would be watching for their participation in the creation and presentation of these slide shows.

My target students had some great results. Carrie became a leader in this project, helping the others in her group by dividing work as well as doing research for the project. I also saw Jane really shine with this project; her background experience with technology and PowerPoint was an asset to her group, and I saw her doing great work to increase the attractive format of her group’s presentation. Andy was also a member of Jane’s group, and I saw some good results for him. Though he was out of the room for many periods of work time, he was often on-task, searching for pictures on the Internet. Andy’s group members reported that he “didn’t find much

info[rmation]” and he “wasn’t there a lot.” Experts point out that challenged students can benefit from technology: “Technological support can empower these pupils by allowing them to take a full part in the learning activities of the rest of the class” (Cook and Finlayson, 109). Though this was not the case with Andy, it was definitely the case with Bob.

I was somewhat concerned with Bob as we began this project, because he has had some fine motor skills problems. In earlier grades, he participated in adaptive physical education, and this year, he has vocally expressed struggles with writing cursive and typing on the computer. After the first session, I was worried that he would not positively participate in his group work, but instead complain to whomever was around to listen. In spite of my initial worry, though, Bob really triumphed in this project. In the first two documented work sessions, Bob was only listed as a “searcher” (person who surfed the Internet for pictures). However, in the remaining sessions, he worked at a number of jobs for the project: researcher (reading the provided booklets for information), editor (checking spelling, grammar, etc.), and even typist! I was thrilled to see Bob become a part of the group, and though both of his fellow group members mentioned some behavior issues during the project, their evaluation sheets rated his work quality as a four out of five. Technology played a major role in helping Bob succeed with this project. His interest may have been initially captured by the ability to surf the Internet for pictures, but by the end of the project, he had participated in many different areas. I could not have been prouder!

Unfortunately, not every single student had the success that Bob found with this project. Brian had some personal struggles with his group members, and that negatively affected his ability to really utilize the technology involved. There were a few other students who did not work well with their group members due to personal conflict, but that of course cannot be

prevented. I saw the vast majority of my students working really well together, and my PDA commented after watching the students in a work session: “Do you know how amazing this is?” I understood what she meant after she explained that in the State College district, PowerPoint technology standards are not present until the eighth grade, and here were my students, whizzing through the program in fifth grade! “The energy created by children purposefully engaged with challenging tasks is a powerful force for learning” (Cook and Finlayson, 107). PowerPoint was a challenge for many of my students, but I saw everyone trying and for the most part, truly excelling.

Watching the students create these presentations was so rewarding, but watching them present the slide shows was one of the most exciting class times to date. The kids were very impressive, and I noted that many of them sought to maintain eye contact with the audience and subsequently avoid reading the slides word for word. The presentations blew me away because they showed that the students had not just learned the basics of PowerPoint, but also the basics of some very difficult content material! Technology became a tool of assessment as well as one of engagement; students who had strong participation in the project were able to not only present the information well, but also answer questions that other students or teachers posed.



Students can be involved in technology by participating in Webquests, in which they find answers to questions by surfing provided websites, or by watching a slideshow or visiting an Internet site. However, it is when the students are using the technology as a vehicle for creation that it becomes the most powerful. “Some widely accepted best practices [with technology application in the classroom] include teaching that is student-centered . . . collaborative . . . [and] constructivist” (Tomei 28). When students work together to create a project using high-level technology, they are all challenged. In this case, I saw struggling students master tasks such as typing or adding slides to a show. For more advanced students, experimenting with font color and combining slides emailed to them by other group members proved to be plenty challenging for them. Carrie summed her experiences up when she approached me after the second day in the project and said, “Now I love doing this!” Ultimately, giving Carrie and everyone else the opportunity to construct their own knowledge based on technology was the most successful part of this project because it showed me just how much learning and technology can work in cooperation to engage my students.

Claim 3: Technology can be integrated into any subject.

When I began the process of inquiry, my main focus was integrating technology into science. I was able to successfully do so because I was teaching so much of it and because so much science technology is readily available. I created many PowerPoint presentations, especially in science. However, a great deal of them integrated language arts skills. For example, when students presented their animal phyla PowerPoint shows, I supplemented their information between presentations and gave time for students to take notes. I noticed that many of them struggled with just how to “take notes.” Some frantically copied every word on the slide, while others wrote two words or so, then shut their books with a satisfying grin. When I

created the slideshow that would supplement material between the students' animal phylum presentations, I wanted to integrate the important language arts skill of note taking. I created this particular presentation with that very purpose in mind. An example slide looked something like this:

Cnidaria

- **Characteristics:** *sac-like bodies*, radial symmetry, stinging cells. *Cells are organized into tissues that perform the same jobs.*
- **Habitat:** Live in *oceans, freshwater streams and ponds*. May attach themselves to *plants*.
- **Life cycle:** reproduce by growing buds or by fertilizing egg with sperm (*sexual reproduction*)
- **Movement:** *some don't move*, others *pump water*
- **Food:** *use stingers* to sting prey, then use *barbs on tentacles* to grab and drag it
- **Interesting facts:**
- **Examples:** jellyfish, hydra, sea anemone, coral

Changing the font color helped foster note-taking skills for students by pointing out the most important words on the slide. I used this technique for the first few slides of the presentation, but by the end, all of the font was one color. As the slide was projected on the screen, I watched students take notes, and found that many of them were more successful.

In addition to integrating technology into science content and language arts skills, I also used it in social studies to create a Civil War trivia game. There will be future opportunities to not only play this game with the students, but also to send them on a cooperative learning Webquest that puts them in the shoes of a soldier, drummer boy, nurse, or general of the Civil War. I also strongly believe that technology can be fully integrated with math lessons. My students have done activities involving creating pie graphs using the spreadsheet function of Appleworks. In addition, I plan to teach my students about tessellations (repeating shapes) using various functions in Appleworks.

Though much of my technology integration came into play during science class, I found that all of my technology integrations in the curriculum were successful to some degree. The focus of my inquiry has been on high technology, but there are countless examples of successful “low technology” integration with overhead projectors and special tools such as protractors. Technology is a vital part of education today because it prepares students for the rest of their lives. “A major reason for using [technology], however, is because the students expect it” (Chin 5). Students see computers as a part of their everyday lives, and we as educators must take advantage of this opportunity and appeal to students in exciting ways.

SECTION D : CONCLUSIONS AND FUTURE DIRECTIONS

Implications for the future

Overall, I found that technology worked as a wonderful motivator for many of my students. Between January and the present time, the overall participation in our classroom has increased. I found that of the four students I targeted for major participation increase, two of them made great improvements in their participation in both large and small group activities. The other two students are continuing to make progress as well, and overall, my students have exhibited more interest and participation now than ever. My findings have indicated a positive correlation between technology and student motivation, engagement, and participation, and as a result, I definitely plan to continue utilizing technology in the future. I would like to expand the scope of my technology uses to include more with email; for example, could students email assignments to me instead of writing them on paper? I know that the class I had this year was very responsive to technology, and I can only hope that my future classes feel the same way. I am confident that even if students do not love technology, however, I will have changed their

minds by the end of the year after exposing them to the wonders of PowerPoint, interactive white boards, email, and even KidPix!

I know there is a possibility that I will find myself in a school without the latest technology. If this is the case, I will begin by working with what I was given; if there is only one computer available to my class, I will gather students around it and proceed with the lesson. My next step would be to talk to my principal and administration to work on a grant to obtain more technology. Educators must see the importance of technology in their schools, and I feel confident enough in the evidence and expert opinions I have compiled here to present this information to persuade others that students absolutely benefit from technology in school!

New Wonderings

Though this inquiry project has come to an end due to time, I feel that this will be an ongoing process in my teaching career. I am still wondering: how much technology is too much; that is, when, if ever, does it lose its effectiveness? I also wonder how teachers could effectively share their ideas about technology. If a district were to set up a teacher forum in which they posted lesson plans and ideas, would people actually take the time to do it? I found that during my inquiry project, I often struggled to find the time to properly reflect on ideas. Part of this may have been because I am an intern who is balancing job searches and coursework in addition to teaching and inquiry, but teachers always lack enough time to do everything they want. What is the priority that we as teachers place on technology? At the end of this particular phase of inquiry, I've concluded that technology will be a major part of my future classroom, and I cannot wait to begin!

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