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Using Technology to Engage Learners

With the twenty-first century well underway, schools must provide adequate access to technology to best prepare students to work in a global society. School systems understand the importance of preparing their students for the modern world, but they face challenges that often stand in the way of fully achieving the benefits of technology. Financing of the technology, continued support for curriculum integration and teacher training, and eliciting teacher enthusiasm for using technology are just a few of the challenges modern schools must overcome. Nonetheless, when school systems successfully orchestrate a strategy for acquiring new pieces of technology, provide teachers with frequent training, and help teachers integrate technology into the existing curriculum, technology can have an impact on student learning. Atticus High School* is just one example of a small school working to engage learners through technology.

BACKGROUND

Located in a rural town of 8,500 in northeast Indiana, Atticus High School faces many of the same challenges as other high schools its size. With a declining enrollment and increased state and federal demands, the school system has had to make rather substantial budgetary cuts over the past four years. Fortunately for the 548 students attending the $9 - 12^{th}$ grade high school, technology falls under the capital projects budget, and because the school system has not invested money in large building projects, the high school as well as the rest of the school system has been able to maintain its spending on technology, giving students multiple opportunities to use technology in diverse settings.

A relatively heterogeneous school, Atticus has few minority students. In fact, during the 2004-2005 school year, 95% of the student population was white while multiracial students made

up 2%, Asian students comprised 1% of the school population, with the remaining 1% of students coming from Hispanic families (IDOE, "School Profile," 2005). Eighteen percent of these high school students received free lunches while 8% of the school population received reduced lunches (IDOE, "School Profile"). With a small liberal arts college in the town, a pleasant mixture of blue and white collar workers inhabit the small community. The school culture places an emphasis on post-graduate training which may account for the percentage of students attending college steadily increasing from 61% to 74% in that same time period (IDOE, "School Profile").

CLASSROOM USE OF TECHNOLOGY

Mrs. Radley, Atticus' technology assistant, reported that every administrator, classroom teacher, and staff member has a computer on his/her desk. While the custodial staff does not have individual computers assigned to them, they do have access to computers throughout the building. With such access, almost 100% of teachers and staff use their computers. Historically, the teachers have used their computers primarily for word processing and research, but approximately 25 percent use the computer for other classroom uses such as brochures, electronic grade book, or PowerPoint presentations; a smaller number use more innovative forms of technology to create web sites, design graphic art, and run science modules. However, Mrs. Radley indicated that beginning with the 2005-2006 school year, all teachers in the corporation must keep their grades on Power School, a web based student management system to which the schools have moved. With this technological tool, parents can access their children's grades as soon as the teacher records them. Equally as important, parents can check children's attendance as well. While she realizes the success of technology relies on the people who use it, Mrs. Radley hopes moving to Power School will encourage teachers to make a habit of using the computers, but in an administrative way. She also hopes it will encourage communication between schools and homes as parents will have better access to their children's progress.

CURRICULAR INTEGRATION OF TECHNOLOGY

According to the formal corporation Technology Plan (2004), the administration has outlined the integration of technology in teaching and learning. The Technology Plan indicates "as curriculum chairmen plan their curriculum in order to meet all the standards and benchmarks set by the state for their subject area, they carefully note those areas in which the use of technology would facilitate the meeting of the standard" (p. 3). Furthermore, the technology assistants and coordinator "are available to help faculty members brainstorm projects that will bring technology into the curriculum in such areas in a way that will be meaningful and appropriate" (p. 3). As a result of this corporation focus on integration, many of Atticus' teachers have made efforts to integrate technology into their curriculums. While many do so at a minimum level, a few teachers integrate technology weekly. In fact, the science department just adopted textbooks that come with dvds so their rooms will each be outfitted with mounted LCD projectors as well as dvd players. Those teachers using technology at a minimum level include the band teacher who has his students use the free downloaded Finale Notepad to write their own music. The choir director has done a similar project using the Music Maestro. In order to bring real life situations into the classroom, the business department occasionally engages students in looking up car prices in the online Blue Book, figuring loan prices, interest, and payment schedules. Other teachers integrate technology much more frequently. Technology teachers like Mr. Eberly have students create iMovies. In fact, one of his students recently created a video of his brother and new sister-in-law's lives that debuted at the wedding reception. Another example of a teacher who frequently integrates technology is art teacher Ms. Dubois, In her graphic art classes, students create their own cd label designs as well as use Photoshop to manipulate pictures and create other graphic art projects. Her students also work in partnership with English students who write children's stories as part of a writing unit. After the English students finish their stories, the art students use a computer graphic tablet to illustrate the stories. However, Mrs. Radley and Mrs. Deniston, the principal, both identified the life science

teacher Mr. Clark as the one teacher who makes the most effort to integrate technology into his curriculum. This outstanding young teacher has students create brochures using the computer, presents information via a PowerPoint, maintains a web site through which his students even access their final exam, and creates modules for bird identification. While less than one-fourth of the faculty actually have embedded their curriculum with technology, more and more are beginning to show an interest. In fact, Mrs. Deniston mentioned that the world history teacher implemented computer generated brochures into one of his projects once he saw how easily Mr. Clark's students created their infectious diseases brochures for a biology class.

IMPACT ON INSTRUCTIONAL PEDAGOGY

As schools such as Atticus High School begin to integrate more and more technology, teaching methods will ultimately need to change. Mathematician and internationally known expert on how technology can change learning, Seymour Papert (1998) writes in "Technology in Schools: To Support the System or Render it Obsolete," "if the way we think of change is limited by imagining things very much like the ones we know, or by confining ourselves to doing what we know how to implement, then we deprive ourselves of participation in the evolution of the future. It will creep up on us and take us unawares. This is not a personal criticism of any individual: everyone working in the field of education inherits a timidity that has been inherent in the culture of the field." He goes on to comment that children must have power in their learning; they must "become a driving force for educational change instead of being passive recipients." Atticus High School has obviously taken the first step in making the shift in pedagogy by including the idea of engaged learners in the Technology Plan. Accordingly, then, a shift of how teachers approach their role in the classroom will need to follow. With only 20-25% of the teachers fully embracing technology, the technology assistant at the high school worries that not everyone is interested in making this important pedagogical shift. She commented that many of the older teachers wrongly assume they are too old or untalented to adapt to the new technology. As a result, they do not use

the technology to its fullest potential nor do they make attempts to learn how to use the equipment they have available. These teachers also struggle with the shift from students as passive learners to students as the driving force in their learning, active learners.

Younger teachers like Mr. Clark, who have themselves experienced the benefits of technology already, have adopted a pedagogy that embraces the constructivist approach to learning. Students in his classroom are the center of learning and play an active role; technology plays an important role in that independence. Interestingly, research shows that constructivist teachers are "twice as likely to have their students use computers on a weekly basis" than non-constructivist teachers (Becker, 2001, p. 20). As a result of his philosophy of teaching, students in his science classroom have opportunities to investigate on the web, view PowerPoints, create projects on the computer, and review different types of birds without ever leaving the classroom. As teachers like Mr. Clark experiment more with technology and find success in engaging learners, more teachers may begin to implement the technology in their classrooms as well.

STUDENT GAINS IN LEARNING

With a focus on students, the Technology Plan (2004) states "students will be encouraged to be engaged learners, using technology tools throughout their school experience starting from their first visit at Kindergarten Roundup where they have an opportunity to draw pictures or explore mathematical concepts, through their final video presentation at graduation showing highlights of their high school experience" (p. 3). Teachers like Mr. Clark report a positive learning environment and few discipline problems in his classroom. He attributes this to creating technology-driven, student-centered learning activities. Because the students are engaged, he explains, "students excitedly focus on their learning. Discipline problems rarely enter the equation" (Personal interview, 6 June 2005). Unfortunately, though, Atticus High School has not made an organized effort to distinguish the benefits of technology on student learning. Researchers have, however, underscored the importance of following technology's impact on learner; in fact,

McMillian Culp and her colleagues (Oct. 2003) urge researchers to go beyond comparative research designs to "the systematic examination of new technologies as one among many elements in the educational environment…studying the inter-relationships among new technologies and other factors such as instructional style, content, and social interactions within the classroom" (p. 15). Currently, Atticus High School simply makes technology available to its teachers, assuming that the use of technology produces positive results on student learning. Both the principal and the technology assistant indicated an increased use of funding and implementation of technology in the classrooms, but that even formal documentation of teachers attending training sessions doesn't occur.

Because of state and federal mandates to follow student gains in learning, the Indiana Department of Education web site does document yearly progress in ISTEP scores. When looking at the records for the past four years, ISTEP passing scores have steadily decreased from 81.4% in 2000-01 to 68.9%. ("School Profile"). If one only looks at the passing rates of Atticus' students as the sole indicator of technology's impact on student learning, one might wrongly assume that technology use has actually decreased student learning. However, other factors influence this dip in student performance. Researchers cannot simply look at standardized test scores to measure technology's influence on learning. Instead, schools such as Atticus High School must pose guiding questions when examining the impact. These questions might include "what is the impact of computer and Internet use on the way teachers teach and students learn, and what is the impact more broadly on educational reform" or "what are the effects of different types of technology applications on particular types of students (e.g., limited English proficient, special education, gifted and talented?" (McMillian Culp et al., Oct. 2003, p. 17). Because they do not have a formal way of distinguishing technology's direct impact on student learning, Ms. Deniston showed a great interest in hearing how other school's her size document such impact.

INITIAL AND ON-GOING STAFF DEVELOPMENT

Support for the use of technology at Atticus comes on several levels, formally and informally. First of all, the School Board and superintendent have a history of making technology a priority in the budget. As a result, the high school has a variety of technological tools such as LCD players, Autocad programs, high tech graphing calculators, as well as computers that are completely replaced every five years. Secondly, the administration encourages teachers to use technology in as many ways as they can. They do not mandate the use of it, however, adopting a more laissez-faire approach to encouraging teacher use of technology. More importantly, the technology director, Ms. Messer, and Mrs. Radley introduce a new technology at faculty meetings; furthermore, they do a survey of teacher interests and needs each fall. From this information, the technology support staff develops training sessions offered to all teachers. While only a fraction of the teachers actually take advantage of these opportunities, at least one-fourth of the teachers do attend these workshops and are better prepared to integrate the technology in their curriculum. On a different level, the corporation has adopted a three-year technology plan that formally outlines the corporation's commitment to technology. This plan describes each building's general plan, but specifically the individual course uses of technology at Atticus High School. These include courses such as health that has students research topics on the Internet and math that asks students create spreadsheets (Technology Plan, 2004). With an anticipated 2005 technology budget of $229,000, the school corporation has made Atticus High School's and the other three other schools' technology a priority (Technology Plan). Fortunately for Atticus, they have a specific plan firmly established that will enable smooth transitions between each fiscal year.

ACCEPTABLE USE POLICY

All school systems that have students using school computers and other forms of technology must have a way to monitor the student use of the equipment. Because they receive federal grants for excellent Internet rates, Atticus must have software to filter out questionable Internet sites.

Another important step the high school has taken is to implement the corporation acceptable use policy called the Network and Internet Access Agreement for Students (2003). At registration in the fall, each student who registers for school must sign and have his/her parent sign a sheet indicating his/her intention to abide by the policy. Once s/he has returned the permission slip, s/he is assigned a computer account number. The three page policy requires students to acknowledge that using the Network "is a privilege which may be revoked by the School at any time and for any appropriate reason" (Network Agreement, p. 2). It also gives Atticus High School the right "to any material stored in files which are generally accessible to others" and if a student misuses the account the misuses "will result in suspension of the account privileges and/or any other disciplinary action determined by the School" (pp. 2-3). While they have had to enforce the policy with students on a few occasions by suspending students from computer use, Mrs. Radley commented that most students follow the acceptable use rules; even those who have been suspended from use have not committed what she would call flagrant deviations from the policy. As a final and important step in monitoring student use, in the fall of 2005, Mrs. Radley explained that the school will be implementing OSIO which will enable a teacher or technology assistant to monitor one or all of the computers in a lab. This added protection should keep ensuring that students are using the technology in appropriate manners. Currently, teachers in Atticus are not monitored for their use of the computers. In order to fully encourage computer use, the administration has taken a rather laid back approach to managing appropriate teacher use of the technology, adopting a non-intrusive reputation.

CONCLUSION

Overall, Atticus High School is much like other small rural schools in northeast Indiana. While they face budget cuts at both the state and federal levels, they must still ensure that their students are adequately prepared to enter a global society, whether that entails immediately walking into the work force or that entails spending several more years at a post-graduate school.

Integrating technology into their curriculum, one-fourth of the teachers at Atticus have found major benefits in engaging students. Even though the majority of teachers have been slow in embracing technology, they have begun the shift in pedagogy that will take them from being the dispensers of knowledge to the facilitators of learning. As more teachers adopt this constructivist philosophy of teaching, more of these teachers will integrate technology throughout their curriculum. With the support of administration and a clear technology plan, Atticus High School is poised to make a difference in student learning through technology.

*All names used in this paper are pseudonyms. They are completely fictional and any correlation to people with these real names is purely coincidental.

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