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Characteristics of High Achieving Schools.

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Technology is supposed to be a good thing. If this is such a grand argument, then why do some researchers argue technology hurts more than it helps? This is certainly getting the public confused. This article will look at their reasoning behind their statements of how technology is not working. Also included will be an analysis and counterarguments to each of their statements. Technology is a tool where education can thrive when used in a meaningful manner in the classroom. This paper will define characteristics from high achieving schools which use technology as a tool.

Key words: technology, computer software, characteristics

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Recent research in technology stems from the seeking of whether computers in the classroom are worth the trouble. Both sides of the argument have their research to validate the reasoning. A group of researchers say technology in classrooms is ineffective and another group of researchers say technology increases student achievement. For the academic world, one usually defends a position based on research and is even skeptical at methodologies used within those studies. This article will critique arguments of technology as being an ineffective tool. We will look at their ideals, research, reasoning, and beliefs which support their arguments. Second, the article will produce counterarguments which validate technology as a tool for student achievement and learning with references to studies and research. Characteristics of high achieving schools will be included to further imply the successful integration of technology.

Several researchers and writers conclude how technology use in the classroom is an ineffective tool. Bogard, Y., Crouch, J., Mestas, J., and Schiff, J. (n.d.) conclude that “instructional technologies inhibit learning because they focus on teaching and learning how to use computers rather than learning education content by using technology” (p. 2). Their argument here stems from those teachers who teach technology classes. They are stating that those teachers who teach technology classes in schools are not necessarily doing their jobs. Instead of teaching content, they are teaching courses on how to use the technology rather than doing something constructive with it. Instructional technology teachers have to show their students methods of using computers and the intricacies of technology. Most of these instructional technology teachers have a curriculum they must follow. They leave the content of

teaching to other teachers of mathematics, science, language arts, etc. Their technology curriculum comes from state or even district standards. Second, perhaps they are teachers who just teach the technology but many others combine the standards of technology juxtaposed with content. Bogard et al. also state how “certain” researchers show who computer technology doesn’t address the needs of learners and their intellectual needs. Their statement of “certain” researchers is quite open to discussion. Who are these “certain” researchers? There is no reference to this statement.

A second argument Bogard et al. make is how technology provided at young ages can hinder their learning processes. Bogard et al. state that introducing children to technology at early ages is not beneficial since The Alliance for Childhood and Huitt say so (Alliance for Childhood; Huitt as cited in Bogard et al.). My own argument would be more than likely those youngsters are already using technology at home. Why not influence them in learning at home as well by providing websites they can use to enhance their skills of reading, math, and spelling for example? Use their motivation to use technology for their benefit. Kids love technology and are interested in what is out there for them. Why not be an advocate for them to use technology rather than take it away from them? They are already interested in computers at a young age. Might as well show them the proper usage of technology at an early age than let them roam the internet and websites unmonitored.

Their third argument stems from how educators are not allowed by technology to effectively implement teaching strategies. By citing Khuen and Cuban, they relate their messages of how technology hinders teachers from effectively teaching their curriculum (Khuen; Cuban as cited in Bogard et al.). Technology is nothing but a tool. Their lack of explanation in

what ways technology suppresses curriculums and teaching is noted. Their failure to show how technology hinders students by the use of the research they are quoting brings puts a hole in their argument. How does technology hinder teachers? Where are the examples? Technology is not a crutch for teachers; but a tool.

Ferguson (2005) states how computers make kids stupid. In her article, published from *Maclean's*, she writes how a school in Canada does not have any computers for their students to use. Instead they learn without them. Ferguson states how “computers and the Internet can also distract kids from homework, encourage superficial and uncritical thinking, replace face-to-face interaction between students and teachers, and lead to compulsive behavior” (p.24). Her reasoning really has nothing to do with schoolwork. It relies heavily on monitoring students when they are kids at home. Whether it is on the computer, playing basketball, or napping, students will find a way to procrastinate their homework. Just because students use computers at home doesn't necessarily mean that technology is at fault. Parents also play a role of monitoring their children and the websites they visit. Chatting and texting has improved America's average writing and reading skills from a 8th grade level to a 9th grade level.

With some references, Ferguson also sites Thomas Fuchs and Ludger Woessmann's study on international studies. Their results show how “information technology is getting in the way of learning” (Ferguson, 2005, p 25). She also states how the researchers found those teenagers who have the most access to the internet and computers had the lowest scores in reading and mathematics (Ferguson, 2005). First of all, there is no data or reasoning behind the low scores. Second, Ferguson does not include the references in the article for others to see the results behind the studies in which she is referring. This study lacks any validation without the

citation for readers to look at the study findings and results themselves. She also mentions Fuchs and Woessmann on their findings of how those students with no computers fare better than those without one. This is still not to say that technology is a fault for the less achievement. Students at home are still affected by outside sources such as chores, homework, playing, activities, and sports. Were these under consideration when the findings were written? What conditions did the study have toward the time spent on computers?

Fergusson does state computers are not all at fault. “Computers don’t on their own, dumb us down,” she states (Fergusson, 2005, p.27). She adds teachers are also at fault for assigning homework which students must use computers to do research. Students, she adds, succumb to game rooms and chat rooms rather than doing their homework. Teachers understand how research is a higher order, critical thinking strategy for students to use in and out of the classroom. Their assignment of research is one of the most important curriculum developments a teacher can use to allow students to begin to take ownership of their learning (Cesar Rossatto, 2009, personal communication). Of course, students are going to lose focus here and there, they’re human. However, teachers should not stop assigning research at home or in school for fear of students losing their direction. Giving students the opportunity to do research is their ability to read and write the world (Cesar Rossatto, 2009, personal communication). It is an opportunity for students to become critical thinkers in their reality. Research allows them to go and produce knowledge on their own. It allows the seeking of truths and situations to dispel certain truths as well.

An argument Ferguson uses to further prove technology is making us dumber is with a survey conducted by Janice Newson. Newson found how one third of one hundred faculty

surveyed from six universities “reported short-term memory problems and difficulties concentrating, which they link to the digital revolution....the overwhelming use of email is affecting their interactions with students and colleagues, making communication more ‘superficial’ and less personal” (Ferguson, 2005, p. 28). The survey may be flawed because we are not shown the data or the type of questions on the survey. Memory loss and distractions may come from older aged faculty who would normally feel these symptoms perhaps. Another argument by Ferguson is how computers dismiss personal interaction between students and teachers. It is agreeable that personal interactions between faculty and students may be at a lesser percentage than before technology; however, interaction is probably higher due to technology and emails. Students and professors now communicate more than before, because emails are asynchronous, both the professor and the student can respond on their own time. This allows a freedom of communication at will.

Another report from the Electronic Education Report (EER) states students who participated in a software program did not raise scores. A United States Department of Education (USDE) study reported students who participated in math and reading software did not have higher scores (EER, 2007). However, the study did find students were more likely to be engaged by the software and teachers were more likely to assist students rather than through lecturing (EER, 2007). The EER also cites critics who say the software was not used with students the minimum percentage of time; therefore, the misinterpretation of the data. Critics also state inadequate training for teachers may also be a factor (EER, 2007). Time spent of training on the software was only 7.5 hours on the average (EER, 2007). Here the critics have pointed out two significant questions. How long were the students on the computers? What kind

of training did the teachers receive? If most students do not meet the necessary number of hours using the software, of course their scores are not going to improve. And second, if teachers do not receive the necessary training to implement the software, this also affects student achievement.

Viadero (2009) also states how software has little effect on scores. After a several million dollar study by the federal government, results showed little significance between learning between students who used reading and math software and those who used other methods (Viadero, 2009). Critics quickly responded by saying the study results and methods were flawed (Dede, as cited in Viadero, 2009). There were also questions about the methodology and size of the study. “These studies are intended to wash out all the variation in school environments, teacher quality, resources---all the things we, in fact, know make a difference when it comes to student learning,” stated Honey (Honey, as cited in Viadero, 2009, p. 8). Large scale studies do tend to misinterpret information and results. The study is so large; it removes other factors which affect student achievement.

Another study by the USDE found the ineffectiveness of software as well (Miners, 2007). The study researched sixteen products and the implementation of the software in schools. Critics were also quick to respond to the study because

The USDE study may not have accounted for that key factor (of proper implementation of education software is essential to success, [parenthesis added]), which could have led to results that ‘do not accurately represent the role and impact of technology in education’” (Miner, 2007, p. 20).

Critics also cited the second year of the study could possibly show better student achievement (Miners, 2007).

There are also researchers and writers who agree technology is an effective tool in education. One for example, is Trotter's (2007) article which indicates how algebra software creates gains in achievement. Data releases in the fall of 2006 states how SimCalc MathWorlds created large gains of student achievement juxtaposed with professional development and a Texas curriculum (Trotter, 2007). Another study of SimCalc by the University of Massachusetts Dartmouth also showed how the software provided gains in student achievement for high school students (Trotter, 2007). The study in Texas comprised of 1,600 seventh graders and 95 teachers in 74 schools during the 2005-06 school year (Trotter, 2007). Second year study results also showed the same results of student gains in achievement. A professor from the University of Buffalo in New York also states how "lining up professional development and curriculum, and embedding the software within a curriculum that is consistent with that software's approach" shows positive features (Clements, as cited in Trotter, 2007, p 10).

Ysseldyke and Bolt (2007) examined how technology and continuous monitoring would enhance math instruction and teacher implementation of the software. They also researched two groups of students; those who used the software and those who did not. Their purpose of the study was to "investigate the effect of teacher of Accelerated Math (AM) to monitor the progress of student in elementary and middle school classrooms and to manage their instruction based on the results of the progress monitoring" (Ysseldyke & Bolt, 2007, p. 457). Their research questions consisted of:

1. Is there significant gains on student achievement with those students who use the software compared to those who do not?
2. How do elementary teachers implement technology different from middle school teachers?
3. How does teacher implementation whether at a low, moderate, or high level affect student achievement?

The methodology and results section shows great detail of their research. Their findings indicate,

Students whose teachers use continuous progress monitoring and instructional management systems significantly outperformed those whose teachers solely use the math curricula being used in their district. Continuous progress monitoring and data-driven-decision-making enhances progress toward meeting standards and results in higher test scores (p.464).

It is quite evident software depending on the delivery style can enhance student achievement. Ysseldyke and Bolt provide enough evidence to validate their argument in which software can improve student success in the classroom. They are just a few of many researchers who argue for the use of technology to increase student attainment.

Barnes (2007) also adds how technology can enhance learning. Barnes (2007) argues for the proper implementation of technology in order to benefit teaching and learning. Technology is the solution when carefully planning takes place (Barnes, 2007). With proper planning and

successful implementation of the software, all students can succeed. Administrators must provide time for teachers to plan with their colleagues in order to find successful strategies (Means, 2010). Also important is the fact of teachers receiving proper training for the software. When teachers receive training, the software is more advantageous for students. Teachers can access specific data provided by the software in order to enhance the delivery of lessons. The software may also include data which can assist teachers in the assessments and progress of their students.

Means (2010) also looked at schools which had major gains in achievement by using software and those schools which had below-average gains. Teachers and students are using technology more outside of the classroom than in the classroom (Means, 2010). She also states how most teachers are conservatives and pragmatics. This however, can hinder the use of software in the classroom. Teachers will not use computers if they are not comfortable with them. Means (2010) supplies her readers with a vast table of references for various prior research. The research includes: technology use integrated with school visions, technology aligned with curriculum, teachers trained in technology integration, teachers trained in implementation of software innovation, professional development, professional development for teachers to design learning activities, computers/internet in classrooms, access to technology, technological support for teachers; integration of technology, frequent use of technology, teacher facilitation when technology is used, teacher review of software reports, efficient routines for classroom management, and student to computer ratios (Means, 2010). The table also includes the name of the researcher and year of the study if the reader wishes to view their findings. This table is very uniquely placed together in a fashion to help support a literature review.

Means (2010) also finds technology as a tool for change. She states,

To make technology an agent of education change, the field needs to understand the kinds of learning outcomes that technology can enhance and the circumstances under which that enhancement will be realized in practice. Sound guidance on how to implement technology in ways that produce student learning gains is integral to efforts to use technology as a lever for education change (p. 287).

Technology is an agent of educational change. If technology is used in a practice where student learning is increasing, then technology is a tool for social and educational change. Those proponents who state technology and the use of computers are ineffective do not understand the potential of students working with innovative software. It is not news that technology, when implemented in a successful way, students learn and achieve. However, as pointed out before, successful implementation is the key. When students have access to technology and teachers have access to professional development then achievement can take place.

Other factors also contribute to the success of technology. For instance, Powell, Aeby, and Carpenter-Abey found when teachers are present while students are using computer software and teachers review reports given by the software, student achieve at higher levels (Powell et al. as cited in Means, 2010). They are urging schools to implement technology with little or no guidance to assist students in their achievement gains. However, Means (2010) also recognizes how studies have shown no significant

gains in student achievement depending on whether schools used computer software or not. She explains “despite the existence and extensive dissemination of conventional wisdom concerning how technology should be implemented, the evidence base for recommending particular practices is neither deep nor internally consistent” (p. 288). It is understandable to see the wide range of research and their findings of whether technology is applicable in schools or not. This discussion will never have an end as long as research shows both technologies as effective and ineffective. Means understands this all too well. Now we will look at the methodology of her study.

Means’ study concentrated on two central questions. First, what classroom-level practices are associated with higher achievement gains in classroom using reading or math software (Means, 2010)? Second, what school-level practices are associated with higher achievement gains in classroom using reading or math software (Means, 2010)? So the focus of the study remains in two central ideologies; the classroom and school levels of higher achievement gains. She wants to see what is happening on the ground level, the classroom, and the global level, the school. Fourteen schools were chosen for the study based on “the congressionally mandated national experiment on the Effectiveness of Education Technology Interventions (EETI), which examined the effects of reading software for students in grades 1 and 4 and of mathematics software for students in grade 6 and algebra classes” (Dynarski et al. as cited in Means, 2010, p. 288). These schools were asked to participate in a follow up study conducted by observations and interviews. The schools were chosen by those who had shown above average gains and those schools which showed below average gains in student achievement (Means,

2010). The two sets of schools differed in achievement gains (0.77 for the higher group and -0.70 for the low end schools)(Means, 2010). The results of the study will be further analyzed next.

The results of the study show patterns in the behavior of the two groups of schools. The first major implication is the level of software use. Means found schools who had higher achievement started the software earlier in the school year (the 4.5 week of school)(Means, 2010). For the lower end schools, she found that their beginning implementation of their software began much later (the 7.7 week of school)(Means, 2010). She also found the annual number of hours students were on the software. For the high achieving schools, their number of hours was 23.1 on the average (Means, 2010). For the low gaining schools, their number of hours was a little higher at 23.3 hours on the average (Means, 2010). This significant difference showed no implications on student achievement. This may be due to how the teachers differed in their teaching or implementation of the software.

Other factors such as classroom management and facilitation during software usage may have influenced achievement (Means, 2010). Means found that those schools who had better classroom management seemed to far better in the implementation of the software. Instead of spending lots of time on the logistics of the software, teachers had constructive ways to provide students with the in and outs of the software (Means, 2010). Teachers who also facilitated during the classroom instruction by helping students and walking around the room, fared better than those teachers who were grading homework or working on other things during the software usage. Both the low gain and the high

gain school teachers facilitated learning during the instructional time. None of the classes used the software exclusively. Other lessons were used as the starting point of the context and the software was used as supplementary material. Teachers who used the data reports suggested by the software found it helpful. Those teachers who made significant gains in student achievement were often using the reports as data. Seventy five percent of teachers in the high achieving schools said to have been using the reports compared to only seventeen percent of the teachers in the low performing schools (Means, 2010).

The second level of the research involved the school level implementation of practices. Schools which had a consistent instructional vision were mostly in the high achieving schools. Four of the seven high achieving schools had a consistent vision compared to only two of the six low achieving schools (Means, 2010). This may be an indication of the administrator's importance to a school environment where the teachers and students buy into such ideals. A vision ensures the school understands the importance of technology as a role in the school and its value toward student achievement and learning. In addition to the vision, principals in high achieving schools also supported the software implementation (five out of seven) (Means, 2010). In comparison, only two out of six principals in the low achieving schools supported the implementation of software (Means, 2010).

Teacher collaboration was also a main factor in the high achieving schools success. All seven of the high achieving schools said teachers were collaboratively working on the software and supported each other (Means, 2010). Of the six low

achieving schools, only two said to have reported this type of collaboration. Those teachers who feel they are not on an island and receive support, are more than likely to use technology. Those who view themselves as a community adopt technology (Frank, Zhao, & Borman; Strudler & Herrington as cited by Mears, 2010).

Technical support was also a key factor in the achievement of the high performing schools. Six out of seven high achieving schools had an on-site technical support compared to only three of six of the low performing schools (Mears, 2010). Teachers will facilitate software if there is support for them. Along with collaboration, if teachers feel they are alone to integrate the software, more than likely they will not. Furthermore, if teachers received additional training and support, they were more than likely integrated the software (Means, 2010). Of the seven high achieving schools, five received face-to-face technical support compared to three out of six of the low performing schools (Means, 2010).

In conclusion, there are certain differences in the thinking of technology as an effective tool and an ineffective tool. Some researchers state technology is an ineffective tool because it draws students away from using their mind. This argument is not well founded even though some research shows how technology does not make a difference. However, other characteristics outside of technology can assist in this process. Those high achieving schools which Mears (2010) studied, show a great number of characteristics such as teacher collaboration, principal support, technical support, and a vision to guide them. These characteristics can enhance technology use on campuses across the world.

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