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Fall 2013 First Prize Essay

A WARPED TEENAGE BRAIN: THE IMPACT OF TECHNOLOGY IN THE CLASSROOM

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Cell phones, laptops, and high-definition televisions are nothing new to the current generation. In fact, technology is lurking around every corner these days. From automated vacuum cleaners to video game consoles, to GPS, and iDevices, technology's prevalence has been well-noted by many. Several schools are now turning towards technological integration in the classroom to facilitate learning. School Districts such as Elizabeth Forward near Pittsburgh, Pennsylvania and Ridley near Philadelphia, Pennsylvania have adopted the "iPad classroom," where every student, kindergarten through twelfth grade, is provided with an iPad to enhance learning. It is evident that society is being impacted by technology, but is it possible that technology is actually hindering learning? According to Dr. Jay Giedd, a child psychologist, "[the] ease and immediacy of information, and the increasing propensity among teens toward multitasking, may promote 'mile wide, inch deep' thinking and a resistance to patience and persistence required for in-depth scholarship" (Giedd 102). Giedd, among many other psychologists, has evidence suggesting that technology is having a huge [negative] impact on the developing adolescent brain. Because technology is affecting the teenage brain, teachers and administrators alike in Pennsylvania should ease their reliance on technology and promote more creative thinking by engaging students in the classroom.

Educators should gear their teachings to foster growth in the classroom because adolescence is such a complex period of development where the brain, as well as the body, is undergoing many alterations. During the later pubescent years, the brain does not increase in size, rather, it grows more specialized (Giedd 106). Also, "the brain is especially susceptible and vulnerable to environmental input and to the formation of irreversible pathways and networks" (Choudhury 196). Suparna Choudhury, a professor at McGill University who studies cognitive neuroscience states that the human brain is "neuroplastic," or easily shaped in response to environmental stimuli (Choudhury 194). As adolescents mature, their prefrontal cortex and frontal lobes continue to develop; it will take several years for this region of the brain to fully develop. Up until puberty, brain cells increase their connections as the brain grows larger. Then, during adolescence, unused neurons and connections are eliminated; the brain loses gray matter. "If a teen is doing music or sports or academics, those are the cells and connections that will be hardwired. If they're lying on the couch or playing video games or watching MTV, those are the cells and connections that are going to survive" (Spinks). Teenagers are incapable of thinking rationally because their brains are not mature enough. For this reason, students must be encouraged by adult influences to engage in the coursework as well as in extra-curricular activities which are conducive to learning instead of playing games on devices, even if they are for educational purposes.

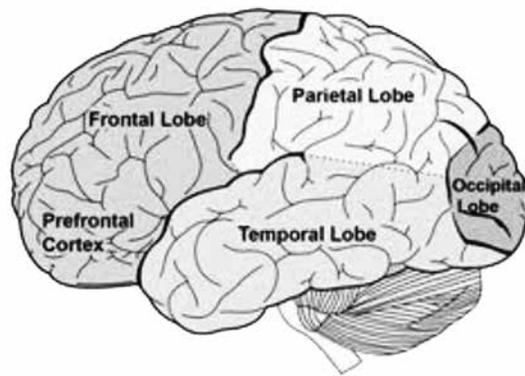


Fig. 1. An image of the adolescent brain (Ramowski 1).

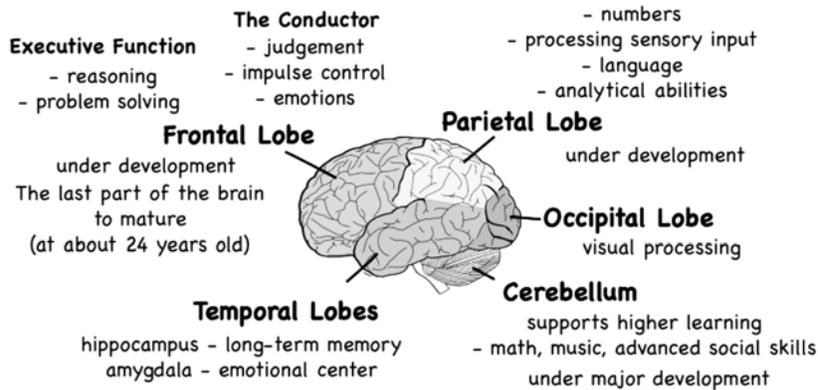


Fig 2. Functioning of the adolescent brain (Lensyl 2).

Susan Greenfield, a neuroscientist, states: “if we were to scan the brains of young people who spend a lot of time playing computer games...we would find that the prefrontal cortex is damaged, underdeveloped or underactive—just as it is in gamblers, schizophrenics, or the obese (qtd. in Giedd). Parents and teachers alike are feeding an epidemic. A study by Gary Small and Gigi Vorgan further claims “Internet use exacerbates existing natural cognitive deficits and proneness for instant gratification and risk orientation in adolescents, impairing social and reasoning abilities by stunting development of the prefrontal cortex” (qtd. in Choudhury). If the prefrontal cortex is in control of executive tasks such as judgment, reasoning, and emotions, then damage to this portion of the brain could lead to adolescence remaining in a child-like state, never able to attain the skills and functioning needed for adulthood.

One of the biggest downfalls to technology is what has been dubbed “mile wide, inch deep” thinking. Everybody has access to hundreds upon thousands of research documents and web pages, but there is little context to the information. Beth Stafford, a school counselor, makes a claim that students are having a lot of trouble validating their own arguments: “Academic research involves three steps: finding relevant information, assessing the quality of that information, then using appropriate information either to try to conclude something, uncover something, or to argue something. The Internet is useful for the first step, somewhat useful for the second, and not at all useful for the third” (qtd. in Brabazon). Essentially, the World Wide Web merely provides information. It does not teach how the information should be used. Jerrid Kruse, a student studying education at Drake University, explains why technology may be more harmful than we realize:

While the technical limitations might be easily addressed with technological improvements, the metaphysical and epistemic limitations require teachers and learners to wrestle with deeper issues, such as how using assistive mobile devices, such as an Apple iPhone or iPad, might change students' conceptions of learning; how assistive mobile devices might undermine reflective thought; or how decisions regarding the use of assistive mobile devices might serve to maintain the status quo in education. (Kruse 44)

These devices are referred to as "assistive," but technology is used in such a fashion that changes how one processes information.

While there is data pinpointing the ills of technology, some studies suggest that technology may bring more good than bad. Nick Sauers of Iowa State University believes that there are three primary benefits of classroom technology: access to information, collaboration, and engagement (Sauers 39). Smartphones and tablets are useful tools for quickly looking up information and communicating with others, whether peers or teachers, about school content. The Internet itself supports inquiry learning. "With the strategic use of computers, students can learn to locate their own resources, access content in flexible ways, and engage with a wide variety of information presented in multiple formats" (Castek 212). Using computers and other devices allows students to perform research themselves and offers the opportunity to expose students to a large array of sources with differing views on any given subject.

As an alumnus of Elizabeth Forward, I can attest to the fact that technology is more of a distraction than an aid.

Because there is such an extensive amount of research available, and much of the information is skewed, I decided to conduct my own study. I contacted several current students from high schools which have integrated technology in the classrooms, and asked if they found technology to impact the classroom positively or negatively. The results were overwhelmingly unanimous. All of the [40] students concluded that technology was a hindrance in the classroom and offered many opportunities for distractions (Studvick). Many of the students agreed that the *idea* of technological integration seemed positive because it could provide exposure to a plethora of information with differing views, but in practice, the wide array of high-tech gadgets proved ultimately useless. One freshman at Elizabeth Forward High School stated "It's convenient to have access to a lot of information, but the only reason I use my iPad is to play games" (Studvick). A senior added, "More class time is wasted trying to get the technology to work in the first place. I think technology is beneficial as an addition, but we still need teachers" (Studvick). A sophomore from Ridley expressed, "I like being able to type on Word and look up information on my iPad, but it is really distracting. Even my graphing calculator has games on it" (Studvick). All of these devices are not filtered. The available games are providing more entertainment and taking away from the learning environment.

As an alumnus of Elizabeth Forward, I can attest to the fact that technology is more of a distraction than an aid. Many of the teachers are not properly trained in handling the equipment, and they are simply not capable of using it discriminately. Several teachers converted to technology and have completely disregarded other teaching methods. One, teacher, though, refused to rely on technology. (He did not even own a cell phone until 2013). I can affirm that his class was the most rewarding and beneficial to my future endeavors because he ensured that each and every student comprehended all of his [verbal] teachings. He constantly asked students to provide real-life examples rather than simply reading about a given topic, and he knew each person on an interpersonal level which made for a comfortable environment. Dr. Bundick, a professor of adolescent education at Duquesne University, claims that the idea that connectedness between the teacher and students is the most effective method for delivering information

(Personal Interview). Teachers should be staying in touch with students and actually explaining concepts rather than urging a reliance on high-tech gadgets. Elizabeth Forward's library was recently renovated into a "multimedia" center where many books were given away to make space for the new computers, iPads, and big screen televisions. The library was no longer a safe haven for studying or a hideaway for academic students to further their knowledge, rather a gathering of computer addicts. This type of environment was not conducive to learning because there were no teachers to leverage the information students were granted access to. Mindlessly scrolling through data is not the same as comprehending real-life implications (Hawkins 71).

While these devices are being integrated into the classroom to facilitate learning, teachers must still be present to educate students and help them fully understand the information they have access to.

One might ask, "If students are able to learn everything online, then what is the purpose of schools?" According to B. R. McCandless, a school psychologist. "The maintenance-actualization task of the school is to help the child toward happiness, self-acceptance, realistic self-esteem, and pride in himself" (qtd. in Berzonsky). If the purpose of the school is to help the child, then why put them at risk? Money. After speaking to Dr. Bart Rocco, I learned that the school received around 2700 devices for \$550,000 per year. While this price may seem outrageous, in the long run, it will supposedly be more cost-effective by offsetting the cost of textbooks and even ink and paper for the printers (Personal Interview). Are the savings really worth the cost of health? Many researchers actually think that there is no cost difference at all, and some feel that iPads are more expensive (Conor 4). "Lee Wilson, tech watcher and President & CEO of PCI Education, calculated that once you consider the training, network costs, and software costs, iPads cost school districts 552 percent more than those old-school textbooks" (quoted in Tyre). If iPads are equal to if not more expensive than traditional textbooks, and they can be damaging to health, then administration should ease their focus on technology and work towards building students' self-esteem and pride.

With the prevalence of technology being inescapable, there seems to be only one solution to effectively manage this growing problem. Schools should mandate creative thinking in a less electronically-stimulating environment and focus on engaging with students. In a study by J. Brooks, he lists percentages that represent the average amount of information retained using various learning methods ("Teaching"):

1. Lecture = 5%
2. Reading = 10%
3. Audiovisual = 20%
4. Demonstration = 30%
5. Discussion Group = 50%
6. Practice by doing = 75%
7. Teach others / immediate use of learning = 90%

Many teachers spend countless hours creating PowerPoint presentations, and students spend just as much if not more time reading and educating themselves on certain topics. While the iPad may allow students to look up anything they may please, information is only retained when their knowledge is put into practice. Nearly every school mandates Internet use for research at the least, but no school mandates how much time is spent searching for resources. "Once a student is on the computer, it is easy for him or her to wander astray" (Personal Interview). Teachers need to focus less on technology and more on each student individually. This is not to say that all technology should be eliminated, but

it should work in accordance with teachers rather than instead of teachers. “Technology is beneficial when used appropriately to facilitate learning, but it most often becomes a distraction. When teachers utilize technology to further connect with students, such as ‘PollEverywhere’ to gauge if the students are actually understanding information, then it is an irreplaceable tool” (Personal Interview). Unfortunately, many educators, even those who are not technologically savvy, rely on technology simply because it is the newest method. In reality, students need to be engaged in the topic at hand. Group discussions/work, regularly shifting teaching methods, and connecting content to relevant topics in pop culture and of the like are the most practical ways to teach.

Tara Brabazon, a professor of media in the United Kingdom as well as the director of the Popular Culture Collective at the University of Brighton, devoted a book, *The University of Google*, to exploring technology in the [college] classroom. She does not criticize technology, per se, but deplores the consequences of funding technology instead of teachers (Brabazon 1). A primary focus of her book is discussing how Google has impacted student learning:

Google is an outstanding search engine, with problems that all search engines reveal. Their addition of Google Scholar and Google Book Search is important, even though many of the articles cannot be read in full text...But being able to digitize a book does not confirm that it will be read. Access does not confirm use...Finding a website does not equate with understanding it. (Brabazon 219)

While these devices are being integrated into the classroom to facilitate learning, teachers must still be present to educate students and help them fully understand the information they have access to. Think of what would happen if doctors were educated and trained using only technology. Publishing a book and creating an app on brain surgery does not mean that anyone can perform an operation.

Technology, even as early as the printing press, has been created with one goal in mind: facilitating a given aspect of life for the sake of convenience (sometimes for the better and other times for sheer laziness). Many parents purchase the latest gadgets for their children with the intention of bettering their futures. Tablets for research, laptops for homework, and iPhones for staying in touch. In reality, parents are seemingly coerced into buying these technologies because schools are becoming more and more dependent on such advancements. While technology is not “bad” necessarily, it must be used properly by teachers to engage students, not to replace traditional forms of learning. Technology can be an acceptable resource in the classroom, but only when teachers are guiding its use and continuing to promote non-technologically influenced creative thinking.

My brother, a freshman at Elizabeth Forward, came to visit me at school one weekend. With him came his iPad. I was eagerly looking forward to spending quality time with him, but this new *toy* was attached to him like a parasite. Rather than tour the city of Pittsburgh or experience college life, my brother opted to play “Flow” on his *school-issued* device. It occurred to me that my brother, amongst others within a similar age range, are actually deprived of culture and experience, even though iDevices are meant to provide more depth and understanding. The current generation will not be able to feel the pages of a book or have any need to go out and explore the world because they have hundreds upon thousands of resources readily at their disposal. The kids of today as well as of future generations are at risk for knowing nothing other than iDevices.

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