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Audience: Pro-technologic Integration into Classrooms

Technology in the Classroom: Too Much of a Good Thing?

Within the past 60 years, technology has improved from an enormous machine used for decoding German messages during World War II to devices in the shape of hand-held phones with as much capability as present day computers plus the ability to call and text. In a survey facilitated by the US Census Bureau, 83.8% of American households owned computers in 2013 (File 2) while the Department of Education reports that 97% of teachers possess at least one computer in their classrooms as of 2009 (Gray 1). Today, those percentages are even larger as technology becomes even more rooted in the grains of modern culture. In order to keep up with the quickly developing world of technology, today’s educational system over-integrates and over-relies on the vast array of technological and electronic devices available without considering the possible long-term neurological and social developmental effects on the students, and the impact it might have on fundamental motor skills through the decreasing emphasis on handwriting.

Although technology, such as computers, phones, and iPads, has greatly influenced the efficiency of life and communication, it also produces tendencies towards multitasking; therefore training the human brain to develop more in terms of speed and short bursts instead of being able to endure long bouts of thinking. Multitasking involves the unconscious training of the brain to concentrate on several different things for short amounts of time; it develops as a muscle built for speed and not endurance. In a study done by Time Incorporated at Innerscope Research in 2013, digital natives, those who have been surrounded by technology their entire lives, would change their focus to another media platform approximately every few minutes, which was as soon as they grew bored. Today, for example, people pride themselves on their ability to multitask, whether it’s watching TV while writing a paper, checking Twitter while working on physics homework, or even messing around with the computer settings during class when researching sources. Multitasking is a common practice. In a poll taken by Katherine DeWeese, a student at the Dominican University of California, as part of her research on *The Social and Emotional Costs of Technology on the Adolescent Brain*, 90% of the 41 students studied at a California high school reported that they “[use] multiple technologies at various degrees at the same time” (DeWeese 32). Figure 1 shows the data that DeWeese collected from her study in regards students’ tendencies towards multitasking with technology. As can be seen from this figure, multitasking comes naturally with the use of technology. However, students’ tendencies of doing multiple things at once can actually have some serious consequences.

 In her research, DeWeese discusses how the tendency of people today to spend several hours completing a variety of different tasks simultaneously can have serious repercussions in terms of brain capacity and long-term consequences. She states “We are training our brain for bursts of energy and not the contemplative long haul of life in a global world” (DeWeese 12). With the continued presence of technology in the classroom as a primary material and resource, students are experiencing long intervals of time during which the potential is there for their brains to be over-stimulated and distracted. This ultimately contributes to an overall change in the brain’s ability to think and process information over long periods of time. Furthermore Gary Small and Gigi Vorgan, a leading neuroscientist and psychologist respectively and co-authors of *iBrain*, state “our brains instinctively signal… stress hormones to boost energy levels and augment memory, but over time they actually impair cognition, lead to depression, and alter neural circuitry” in several sections of the brain (DeWeese 17-18). Because they are a product of their environment, students struggle in school where they are expected to focus on one topic for the entirety of that specific class seven times a day. Their brains are wired to focus on many different things for short amounts of time according to interest and boredom.

Aside from potential neurological effects, technology has the potentiality of impacting the social and emotional construct of students. Outside of school, students are bombarded by various social media sites, such as Twitter, Instagram, Snapchat, and even Facebook, as well as other forms of the Internet. As these adolescents engage in their quest to find their sense of self, they often rely on technology as a primary tool and means of communication in order to accomplish this. Howard Gardner, a renowned developmental psychologist, and Katie Davis, assistant professor at University of Washington School, in their article *The App Generation: How Today’s Youth Navigate Identity, Intimacy, and Imagination in a Digital World*, present the idea that “Despite their many electronic connections to one another, many young people today paradoxically have a sense of isolation” (DeWeese 47). Although younger generations are increasingly more invested and dependent on online communication and relationships, they are shutting themselves off from the real world where face-to-face conversations take place without any technological or social media aid. How does this pertain to the classroom? With a growing reliance on technology for group projects and online participation in class, the case for some students is that they are being required less and less to engage in in-class discussion and collaborative work. According to Jay, an anonymous art teacher with 14 years of experience, “They [the students] are losing the skill of taking turns. When it’s your turn to talk, eye contact, nodding, to attentively listen. You don’t need to attentively listen if you’re virtually collaborating” (DeWeese 47-48). Often times, communication and collaboration on group projects takes place via texting and emailing instead of working together at the same time, in the same place. DeWeese describes this as the “battle between real versus digital” (DeWeese 42). In addition to the change in forms of collaboration, teachers in DeWeese’s study showed concern for their students’ addiction to their phones and other devices, which has been linked to the development of several psychological disorders, such as anxiety and depression (DeWeese 21). Not only is technology affecting students’ abilities to become fully functioning members of society away from their digital worlds, it can cause an ongoing dependency and reliance on itself that leaves younger minds unable to cope with its absence. This can manifest itself in the form of the *phantom vibration syndrome* or even the “51% [of] the iGeneration [who] feel highly anxious if they can’t check in with their text messages as often as they’d like” (DeWeese 21). Therefore, as much as technology allows students to connect to the world beyond the classroom and access a multitude of different resources, there should be concern when looking at the loss of communication and interpersonal skills in these younger generations as well as the emotional stress and anxiety that can result from this online world.

The impact technology has on students extends beyond just their neurological and socio-emotional development and into the realm of basic motor skills. As computers become more common in the everyday classroom, serious consideration needs to be given to the impact that replacing handwriting with typing will have on a student’s motor and composition skills. Handwriting features a more convoluted form of motor skills because it involves “the integration of visual-perceptual and motor skills with cognition” (Stevenson 51). The sense of touch is especially important to mastering handwriting as it is “central to motor control because we need to hold and manipulate the object.” However, according to Megan Watkins from the Centre for Cultural Research at the University of Western Sydney, true mastery does not come until the absence, or loss of awareness, of the sense of touch (Watkins 505-506). Comparatively, keyboarding is comprised of “linear finger movements to specific keys rather than letter strokes” (Stevenson 51). The importance of handwriting goes beyond just putting words down on paper and extends into the students’ awareness and physical control over the writing instrument, thus allowing them to benefit from the process of forming each and every word. In a study done by German scientists at the Leibniz-Research Centre for Working Environment and Human Factors, it was concluded that the test participants who primarily used keyboards over handwriting showed slower performance and precision than those who had relied more on handwriting (Sulzenbruck 250). The study consisted of 5 subtests: one for steadiness, line tracing, aiming, pegboard, and tapping. It was in the line tracing test that there was the most significant difference between the two experimenting groups, keyboarders and hand-writers. The participants who primarily used keyboards completed the task 36% slower and with less accuracy than those who mainly hand-wrote things (Sulzenbruck 248-249). As was concluded from the study, relying more heavily on typing can lead to under-developed fine motor skills thus reaffirming the importance of continuing the practice of handwriting in school despite the movement toward reliance on iPads and computers.

Despite its role in altering the capability of cognitive processes, hindering face-to-face communication, and under-developing fine motor skills, technology is not a bad thing. In fact, it has redefined and improved daily lives so that communication is more efficient, resources are more accessible, and people are better equipped to reach and impact the world around them. However, despite the integral part it plays in today’s world, technology must be utilized in moderation and not at the expense of fundamental areas of one’s development. It is not realistic nor recommended that all technology and electronic devices be banned from the classroom and denied to students. Nevertheless, the potential long-term effects on the brain, social development, and motor skills must be fully explored and recognized as technological integration becomes even more common and more dominant in today’s school systems.

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