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The digital divide: the impact education and in students color/low income in urban communities

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The Digital Divide: The Impact Education and in Students Color/Low Income in Urban Communities

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The Digital Divide in Race and Education

Technology is becoming more and more sophisticated, developing new platforms, formats, and tools that are changing how we interact with the world around us. Thus, it is important to view in greater depth how technology plays a role in our education. Nonetheless, it shouldn't be forgotten that with every new change is followed with skepticism and even defiance. As such, I wish to delve into the Digital Divide in Education, mainly focusing on whether digital technologies such as laptops, software such as Microsoft Word, Excel, internet access, and etc. may be beneficial or not to students of color and the implications involved when exerting the use of digital technologies in public urban classrooms through studies that demonstrate computer availability and interaction with the technology and increases in motivation and enthusiasm. My presumption over digital technology is that it is impactful but if properly enforced and taught properly, otherwise it will not serve to any benefit for anyone. Also, its availability is not yet everywhere, meaning that those who do have the resources to obtain such technologies may have the exposure while students of color in urban settings who do not have that exposure are found at a disadvantage.

We must acknowledge that the current education system lacks congruence and effectivity meaning that not all students have the same learning experience nor the same quality of instructors. Already, this presents a strain to not only students but educators also. Educators find themselves in great scrutiny, as they must be able to prove efficacy and provide results. Therefore, many educators may worry about the more prominent role that technology will have in education and pedagogy. Educators believe that digital technologies may diminish their role as an active instructor or may even replace them entirely. As well, it may or not be necessary for the courses they instruct and can ultimately be more of a burden rather than something beneficial. There is also, of course, the higher amount of work needed to ensure all instructors

are technologically literate and can properly instruct students in navigating these technologies. In addition, there must be staff that can respond to any technical issues that may occur as "by their very nature, newer digital technologies, which are protean, unstable, and opaque, present new challenges to teachers who are struggling to use more technology in their teaching."[1] This does not equate as an impossible task for educators but it does equate to patience and trust for educators.

Even with such skepticism we must consider and remember that traditional technologies have already been part of the education curricula for years. These technologies range from the reliable pencil, microscopes, paper to chalkboards and chalk. These technologies became part of a norm, an "archaic" compliment to the old pedagogy. They have a commonplace in the education of students. Digital technologies are extremely different from the old technology. Digital technologies are not yet entirely in unison or at a commonplace with the education of students as intended. Technologies such as computers, handheld devices (phones, tablets, digital watches), and platforms such as: YouTube, Google are not yet accessible to all nor are they easy to use for which can complicate learning new subjects and ultimately discourage the use of digital technology. This is much more noticeable as many educators were trained and prepared in a generation where technology was different from what it is today. As such, "acquiring a new knowledge base and skill set can be challenging, particularly if it is a time-intensive activity that must fit into a busy schedule. Moreover, this knowledge is unlikely to be used unless teachers can conceive of technology uses that are consistent with their existing pedagogical beliefs."[2] Scheduling constraints, time-sensitivity, and their beliefs in how to teach may find newer technology out of their favor and thus not integral to education. Thus, it seems

[1] Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, 9(1), 61

[2] Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, 9(1), 62

that it is important to have ethical and practical instructors that are willing to step forward and enter the unknown.

It is important to understand the current pedagogy and the role of educators to help ensure digital technologies stand on a firm ground in classrooms. Teachers must be able to stand in leniency and flexibility when instructing students. As described, “Classroom teaching practices are at the core of a teacher’s work. At the beginning of the 21st century, teaching practices based on socio-constructivist theories became popular in educational philosophy. These theories are, to a certain degree, supported by empirical research: instructional methods based on socio constructivist ideas (i.e., examining a learner’s psychological processes within the context of the learning process) – for example, student-oriented practices and cognitive activation –are associated with student motivation and conceptual understanding. However, empirical research also suggests that these factors are not sufficient to foster learning. Cognitive outcomes may also require clear structuring of lessons and good classroom management. Therefore, three dimensions of classroom teaching practices are identified … that reflect all of these aspects: structuring, student orientation and enhanced activities.”[3]

It is clear that previous teaching practices provided a learning that focused on lecturing and constant memorization and did not prove to be beneficial in fostering learning. The older pedagogy did not fully create the sensation of motivation or interaction which ultimately caused classroom settings to push aside many students who could not demonstrate academic proficiency. The “one-dimensional” learning has created the necessity for the surgency of a more student-based focused learning to have students all interact and experience the importance of what they are learning. There is no need to stick with the traditional format of “paper” homework, “paper” quizzes, notetaking, etc. if they have not shown no significant improvement.

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[3] Vieluf S., et al. (2012), Teaching Practices and Pedagogical Innovation: Evidence from TALIS, OECD Publishing.

As such, Digital technology must be able to follow along in a new pedagogy that allows its full exploitation by the students. Maintaining the socio-constructivist ideas in a new pedagogy can potentially produce a community that allows for organization and relationship building which in return builds trust and sharing of ideas. This helps students understand and take things little by little, allowing them to understand subjects a lot better. Nevertheless, the current one-dimensional pedagogy persists and its lack of success is noticeable among the poor results of tests, the disparity of quality of education between states, and graduation rates. It seems all odds are against students of color. But, there may be much greater good that will follow with digital technologies. A pedagogy must be able to make leeway for a very opened and flexible curriculum and must be able to evolve while at the same time not losing its connection with the students.

Much how not all educators are capacitated to digital technologies, not all students are familiarized with digital technologies nor have equal access. There is a stereotyping that the American youth enjoys privileges with technology, being tech savvy but that is not the case. Not all students stand on the same socioeconomic status nor do they all enjoy small classes or schools that are fully equipped with resources. Due to the social status gap in the United States, many students of color will feel the impact on a greater scale than others. As such, technology should not be held as a solution to an issue stemmed in our societal structure but more as a viable secondary teacher or helper that can bring positive results. Also, there is much less skepticism amongst the American youth over technology as many have some sort of understanding of what technologies can do. What can be said is that digital technologies is supplementary and students will be able to see and experience something different with something familiar.

The experience will vary from student to student, influenced not only by the teacher but by how technology engages with the individual. Nonetheless, students will still be required to meet standards set by the school and/or the teacher but should always be under flexible terms.

Chapter 2: Race in Education and Technology

Education in the U.S. is not really perfect and is far from being congruent and fair to all students from all around the country. Some important things to note are the following: The United States ranks seventeenth on tests that assess science and math knowledgeability and lies twentieth on the number of graduate degrees awarded to those who pursued engineering, computer science, and mathematics. This, accompanied with the fact that the US ranks low in public education in comparison to the rest of the world, conveys the much-needed restructuring of public education in the United States. The low performance of schools in the US also adds to the problem of ensuring all students obtain a "fair education." In order to identify how students of color are performing in the public education system, dropout rates must be looked into first. By understanding dropout rates, it will provide a basis on how students of color are not being properly provided with a good quality education and are thus discouraged and destined to fall behind. Furthermore, delving into a systemic view will also help understand why students of color have not been progressing in education.

As of 2016, national current dropout rate was of 5.8%. Based on ethnicity and nativity, "the status dropout rate was 2.0 percent for Asian youth, which was lower than the rates for White youth (4.5 percent) and youth of Two or more races (4.8 percent).The status dropout rates for these three groups were all lower than the rates for Pacific Islander (6.9 percent) and Black youth (7.0 percent), which were, in turn, lower than the rates for Hispanic (9.1 percent) and American Indian/Alaska Native youth (11.0 percent)."[4] This data displays that several marginalized groups are greatly affected and suffer most from the poor quality of education in

[4] U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS), October 2000 through 2016. See Digest of Education Statistics 2017

the United States in comparison to their white peers. There are of course, even disadvantages among ethnic groups, with some experiencing greater disadvantage than others such as Hispanics and Native Americans/Alaskans seeing much more of an impact than their Asian peers. Also, something of note is that these recent statistics have seen a drop but the differences among ethnic groups remains at a stronghold.

As mentioned before, not all individuals have access to technologies, specifically internet and computers, whether the main technologies are laptops or home computers. This is prevalent with children of lower socioeconomic status. The following statistics from The National Center for Education Statistics reveals some eye-opening statistics about data pointing to the number of individuals who have access to internet and computers at home. It is stated that, “94 percent of children ages 3 to 18 had a computer at home and 61 percent of children ages 3 to 18 had internet access at home in 2015. The percentages of children with computer and internet access at home in 2015 were higher for children who were older, those whose parents had higher levels of educational attainment, and those whose families had higher incomes. Also, higher percentages of children who were White (66 percent), Asian (63 percent), and of Two or more races (64 percent) had home internet access in 2015 than did Black (53 percent), Hispanic (52 percent), and American Indian/Alaska Native children (49 percent).”[5] This presents the issue that not all children have availability to things as crucial as computers and internet. Both these crucial technologies have become a staple to the function of our everyday lives, or at least at the institutional level, where they serve to keep records and facilitate the access to information anytime and anywhere.

Similarly, a poll indicates that not all students have access to essential technologies. The following indicates that, “89% of high school students surveyed (Grades 9-12) and 73% of middle school students (Grades 6-8) used smartphones, whereas 66% of both groups had

[5] U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS), October 2000 through 2016. See Digest of Education Statistics 2017

access to laptops... [in] Grades 3 to 5, more than half of the students owned smartphones, and 62% and 58% worked on laptops and tablets, respectively. Even more telling is the finding that in Grades K-2, 21% of children operated smartphones and 41% laptops and/or tablets."[6] Therefore, the effects caused by the lack of access is not only visible at home but also at school, leading certain students to be at a disadvantage and indicating the potential struggle students of color may encounter in their education.

Nonetheless, several factors must be taken into account to explain why several children don't have the same access as their counterparts. Factors such as educational level and socioeconomic position play a role in defining who get to be more privileged. Many students of color come from difficult backgrounds, which of course this does not diminish nor deny the struggle of any white individual with a similar background but it is much more impactful and visible among people of color as they are much more affected. Also, the lack of quality of internet service and the affordability of internet can be attributed to outlandish rates from Internet companies and the poor quality or controlled service of the internet. The price, which ranges from $50-$100/ month in Wi-Fi service can limit any family of low income, becoming a burden to their constrained budget. Thus, many families opt either to discontinue or never get the service, leaving those families in the dark, while others who can afford it reap from the "benefits" of the service.

What, then, can be said of students of color and low income and the schools that educate them? Demographics among schools that are severely underfunded and overcrowded usually serve students who are individuals of color and low-income. A high percentage of students of color and low income "live in socially and economically distressed neighborhoods and are from a racial or ethnic minority group. Nearly a third (30.5 percent) of children ages 5 to 17 living in the 100 largest cities are living in poverty, compared to 22 percent in midsize cities,

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[6] J. Michael Cavanaugh 1, Catherine C. Giapponi 1, and Timothy D. Golden, Digital Technology and Student Cognitive Development: The Neuroscience of the University Classroom, pp.377-378

13.3 percent in suburbs, and 19.3 percent in towns and rural areas."[7] Thus, from its disposition, schools in urban settings seem to have a higher presence of students of low income. This is evident from the following which states, "40 percent of urban students attend high-poverty schools (defined as schools where the poverty concentration is at least 40 percent), compared to only 10 percent of suburban students and 26 percent of rural students."[8] Therefore, it is not an understatement that many of these schools that are failing serve students of low income that attend these schools. This is further supported from the fact that the students who do attend schools in urban areas are "50 to 60 percent of the students are Black or Hispanic, [and] on average at least 60 percent of the students are poor… [and] in schools where at least 80 percent of the students are Black or Hispanic, an average of 80 to 90 percent of the students are poor"[9] which indicates that students of low-income and of color attend urban schools and thus schools that tend to be underfunded tend to serve this demographic.

Therefore, just how the education system fails to provide a viable education to all, it as well fails in properly equipping all schools with digital technologies and properly engaging them with those technologies. There are many educational institutions that reap from greater financial support than those institutions that tend to educate students of color. Thus, it seems that students of color seem to find only hopelessness. This sensation of hopelessness only becomes more exasperated as statistics indicate that "schools with 90 percent or more students of color spend a full $733 less per student per year than schools with 90 percent or more white students… [which signifies that] across the country schools spent $334 more on every white

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[7] National Research Council, Social Sciences and Education, and Institute of Medicine; Board. "Engaging Schools: Fostering High School Students' Motivation to Learn." Fostering High School Students' Motivation to Learn | The National Academies Press. December 02, 2003. Accessed April 19, 2019. https://www.nap.edu/catalog/10421/engaging-schools-fostering-high-school-students-motivation-to-learn.p.23

[8] National Research Council, Social Sciences and Education, and Institute of Medicine; Board. "Engaging Schools: Fostering High School Students' Motivation to Learn." Fostering High School Students' Motivation to Learn | The National Academies Press. December 02, 2003. Accessed April 19, 2019. https://www.nap.edu/catalog/10421/engaging-schools-fostering-high-school-students-motivation-to-learn.p.22

[9] National Research Council, Social Sciences and Education, and Institute of Medicine; Board. "Engaging Schools: Fostering High School Students' Motivation to Learn." Fostering High School Students' Motivation to Learn | The National Academies Press. December 02, 2003. Accessed April 19, 2019. https://www.nap.edu/catalog/10421/engaging-schools-fostering-high-school-students-motivation-to-learn.p.22

student than on every nonwhite student."[10] This contributes the underfunding present in schools that educate students of color and of low-income. This is alarming since "each year, the U.S. spends over $550 billion on public education… while school districts spend an average of $11,066 on each student each year, that number fluctuates drastically from district to district."[11] Although the U.S. spends enormous amounts in education, it seems not all students receive an equal allocation of the funding but why does this occur?

Much of the funding for public education is generated from "local property taxes, thus the funding provided for public education is largely tied to property values and the wealth of a community"[12] therefore those communities of wealth will generate greater monetary collection than communities of low-income individuals thus creating the inequities between high poverty and low-poverty districts. This also signifies that much of the funding stems from the local and state level. Since much of the funding stems from local property taxes, states that are much better off economically will have a greater education service than other states that don't. The following chart demonstrates how about half of the states in the U.S. decreased funding for each student as more students of color became present in the education system.

[13] 24 out of 50 states greatly reduce their spending on education as an increase in students of color

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[10] National Research Council, Social Sciences and Education, and Institute of Medicine; Board. "Engaging Schools: Fostering High School Students' Motivation to Learn." Fostering High School Students' Motivation to Learn | The National Academies Press. December 02, 2003. Accessed April 19, 2019. https://www.nap.edu/catalog/10421/engaging-schools-fostering-high-school-students-motivation-to-learn.p.7

[11] Stephen Q. Cornman and Lei Zhou, U.S. Department of Education, National Center for Education Statistics, "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2013–14 (Fiscal Year 2014)," October 2016, p.2, https://nces.ed.gov/pubs2016/2016301.pdf (hereinafter NCES, "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2013–14").

[12] "U.S. COMMISSION ON CIVIL RIGHTS - Usccr.gov." January 2018. Accessed April 19, 2019. https://www.usccr.gov/pubs/2018/2018-01-10-Education-Inequity.pdf.p.6

[13] National Research Council, Social Sciences and Education, and Institute of Medicine; Board. "Engaging Schools: Fostering High School Students' Motivation to Learn." Fostering High School Students' Motivation to Learn | The National Academies Press. December 02, 2003. Accessed April 19, 2019. https://www.nap.edu/catalog/10421/engaging-schools-fostering-high-school-students-motivation-to-learn.8

TABLE 2

State spending on unequal education

Relationship between school racial composition and dollars spent per pupil

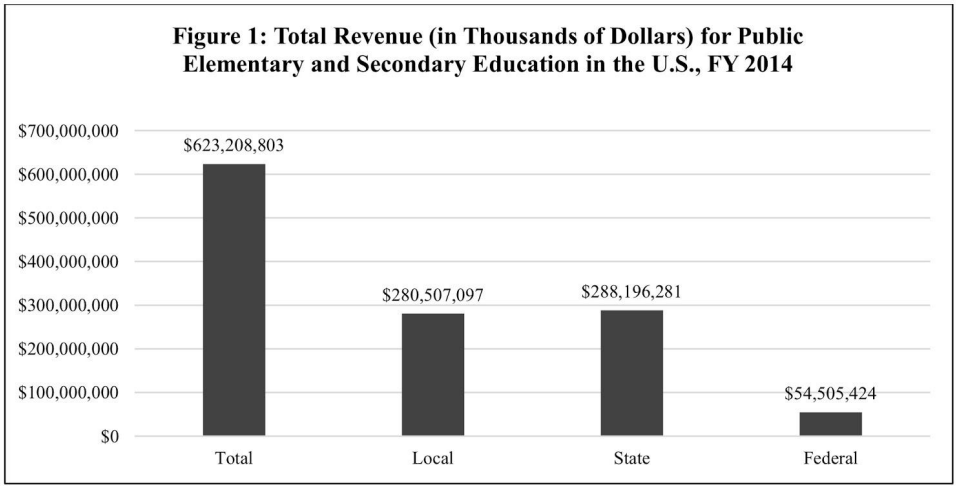
A 10 percentage point increase in students of color is associated with . . .					
A decrease in dollars per pupil in 24 states		No significant spending change in 13 states		An increase in dollars per pupil in 12 states	
Vermont	-$762*	Maine	-$122	Mississippi	$16*
New Hampshire	-$582*	DC	-$117	Virginia	$16**
Nebraska	-$298*	Wyoming	-$108	Louisiana	$29*
Nevada	-$257*	Delaware	-$106	Maryland	$36*
Kansas	-$188*	Michigan	-$4	Missouri	$41*
New Mexico	-$179*	Florida	-$3	Minnesota	$99*
Connecticut	-$151*	Indiana	$2	South Carolina	$118*
Iowa	-$151*	Tennessee	$5	North Dakota	$123*
Colorado	-$145*	Georgia	$7	South Dakota	$140*
West Virginia	-$125*	North Carolina	$12	Ohio	$162*
Idaho	-$120*	Massachusetts	$16	Montana	$180*
Oregon	-$114*	Arkansas	$26	Alaska	$409*
California	-$104*	Utah	$28		
New York	-$104*				
Wisconsin	-$100*				
Texas	-$95*				
Rhode Island	-$78*				
Pennsylvania	-$73*				
Oklahoma	-$53*				
Washington	-$50*				
Illinois	-$42*				
Arizona	-$37**				
Kentucky	-$30**				
Alabama	-$20*				

*p < 0.05, ** p < 0.10

Source: Author's analysis of newly released U.S. Department of Education expenditure data, part of a reporting requirement under the American Recovery and Reinvestment Act, adjusted for regional cost differences.

occurred.

The chart below, instead, demonstrates the reliance on the state to help fund their individual education which in turn conveys how little the federal government allocates towards education and how a system dependent of gathering funds from a local and state level feeds into maintaining schools that are underfunded, underfunded while schools that are not maintain their status. This then influences on which schools can have much more qualified and experienced educators as those who have greater funding can hire such educators while low-income schools must conform to having educators that are novices, fairly competent, or not competent at all.



Source: Compiled by USCCR from U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey (NPEFS)," fiscal year 2014, and NCES, "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2013–14, p. 5, Table 1.

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As the government at all levels fails to address and fix the issue over the underfunding of students of color, another impactful factor towards the education of students of color is their initial introduction to the education system. The early years of a student are critical in keeping them focused and motivated in later years as they may opt to pursue a higher education. But, their socioeconomic status plays a role in how students are introduced and how they progress in the education system. Thus, those who are of a low socioeconomic status "typically start school behind their peers on a host of domains"[15] such as mathematics which is seen as "critical since early math skills are among the strongest predictors of later academic achievement."[16]Many individuals may not be properly prepared due to many having family that only received a minimal education or none at all.

Therefore, when measuring socioeconomic status disparities in early math abilities, there is clear difference of the implications of being at a disadvantage. The disparity affects

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[14] National Research Council, Social Sciences and Education, and Institute of Medicine; Board. "Engaging Schools: Fostering High School Students' Motivation to Learn." Fostering High School Students' Motivation to Learn | The National Academies Press. December 02, 2003. Accessed April 19, 2019. https://www.nap.edu/catalog/10421/engaging-schools-fostering-high-school-students-motivation-to-learn.p.38

[15] Elliott, Leanne, and Heather J. Bachman. "How Do Parents Foster Young Children's Math Skills?" Child Development Perspectives. August 14, 2017. Accessed April 19, 2019. https://onlinelibrary.wiley.com/doi/pdf/10.1111/cdep.12249.

[16] Elliott, Leanne, and Heather J. Bachman. "How Do Parents Foster Young Children's Math Skills?" Child Development Perspectives. August 14, 2017. Accessed April 19, 2019. https://onlinelibrary.wiley.com/doi/pdf/10.1111/cdep.12249.

children in their later pursuit of higher education. The focus of mathematics in early education is important as “it is… that early skill [that] lays the foundation for the more advanced skills that follow and is seen as a huge indicator in distinguishing the interaction in vocation and even the interactions of individuals in real life situations.”[17] If in this domain students find themselves critically lost or behind, the repercussions will be notable as vocations nowadays require proficient mathematical reasoning and struggling to do so may limit the possibilities of job opportunities. The disparities in math skills at school entry that do not fade across development as visible “among a nationally representative sample of children who entered kindergarten in 1998, [there were] dramatic SES (socioeconomic status) disparities in math achievement over time. Comparing the top and bottom 20% of the sample on SES, they found that children in the highest and lowest SES quintiles di ered in their math achievement by 1.34 standard deviations (SDs) on average; by fifth grade, this gap had grown slightly to 1.38 SDs, comparable to those gaps seen in reading achievement (i.e., 1.43 SDs in kindergarten and1.46 SDs in fifth grade).”[18]It is evident that the gap continues to grow, making students of a lower socioeconomic status worse off. Also, if this gap remains, it must be noted that students who do attend with lower financial resources may not have the most expertise educators as those schools who have enough financial resources to do so.

Therefore, those whose parents invest greater time and resources “increase their [children’s] chances of obtaining benefits from instructional practices…[as] academic achievement is influenced by the academic and social abilities that different students bring to schools at entry that are correlated with race and SES.”[19]This then makes disadvantaged

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[17] Elliott, Leanne, and Heather J. Bachman. "How Do Parents Foster Young Children's Math Skills?" Child Development Perspectives. August 14, 2017. Accessed April 19, 2019. https://onlinelibrary.wiley.com/doi/pdf/10.1111/cdep.12249.

[18] Martha Cecilia Bottia, Stephanie Moller, Roslyn Arlin Mickelson and Elizabeth Stearns, Foundations of Mathematics Achievement: Instructional Practices and Diverse Kindergarten Students, The University of Chicago Press, The Elementary School Journal, Vol. 115, No. 1 (September 2014), https://www.jstor.org/stable/10.1086/676950 pp. 124-150,

[19] Martha Cecilia Bottia, Stephanie Moller, Roslyn Arlin Mickelson and Elizabeth Stearns, Foundations of Mathematics Achievement: Instructional Practices and Diverse Kindergarten Students, The University of Chicago

children unequipped to initiate their learning process. This is discouraging, especially for any student of color who attempts to pursue higher forms of education. Children of disadvantaged backgrounds have the motivation necessary but other factors seem to play a critical role in diminishing their sense of determination as “minority children and parents highly value school (particularly during the elementary school years) and have high educational aspirations for their children. However, the many difficulties associated with poverty make these educational aspirations difficult to attain.”[20] In essence, their socioeconomic position also contributes to diminishing the drive the students have at an early stage.

Both parents and children may have the positive outlook and optimism that is needed but they must deal with “several difficult issues not faced by majority adolescents, such as racist prejudicial attitudes, conflict between the values of their group and those of larger society, and scarcity of high-achieving adults in their group to serve as role models. Such difficulties can impede identity formation in these adolescents, leading to identity diffusion or inadequate exploration of different possible identities”[21] which signifies that ultimately these students of color find themselves without any positivism, cultural connection, or a role model that can influence them to maintain their motivation. As mentioned before, schools that are underfunded educate students of color and as such, these schools may not be adequately be prepared to help students of color pursue a higher education or maintain interest in school. Such is noticeable when schools don’t offer “either high-quality remedial services or advanced courses and courses that facilitate the acquisition of higher-order thinking skills and active learning strategies [and thus] may find it difficult to perform well under these educational circumstances.”[22]

Press, The Elementary School Journal , Vol. 115, No. 1 (September 2014), https://www.jstor.org/stable/10.1086/676950 pp. 124-150,p.129

[20] Lerner, Richard M., M. Ann Easterbrooks, and Jayanthi Mistry. "Download Handbook of Child Psychology And Developmental ..." Accessed April 19, 2019. http://www.pm.umd.edu/handbook_of_child_psychology_and_developmental_science_4_volume_set.pdf.p.344

[21] Lerner, Richard M., M. Ann Easterbrooks, and Jayanthi Mistry. "Download Handbook of Child Psychology And Developmental ..." Accessed April 19, 2019. http://www.pm.umd.edu/handbook_of_child_psychology_and_developmental_science_4_volume_set.pdf.p.345

Therefore, the disadvantage they face in education keeps them in a cycle of an demotivational and uninspiring educational pursuit, which then either forces them to drop out entirely or not pursue a higher level education. How, then, can digital technology serve to diminish or decrease this issue? And can it prove to motivate students of color?

[22] Lerner, Richard M., M. Ann Easterbrooks, and Jayanthi Mistry. "Download Handbook Of Child Psychology And Developmental ..." Accessed April 19, 2019. http://www.pm.umd.edu/handbook_of_child_psychology_and_developmental_science_4_volume_set.pdf.p.345

Chapter 3: Interacting and Learning Process

Students must feel at ease in a learning environment where motivation and learning are prioritized. Boredom can easily drag any student down so I suggest that Digital Technologies may provide that necessary experience or strive that produces a positive impact, such that it helps students maintain motivation through positive test scores. In no way are digital technologies the solution but rather they should be seen as an alternative or a complimentary tool in the education of all students, especially for students of color and of low-income. Thus, when analyzing the interaction students have with digital technologies it should be essential to also view even the negative effects that digital technologies may bring to students.

Initiatives of technology integrated teachings will be discussed to provide a sense to how students of color demonstrate any change and whether if it helped them reach a much more desired performance and/or if it helped or created a much more positive attitude towards education. Earlier, the importance of motivation was highlighted as a factor that lead many students to feel education as critical and important for their success in life. But, it seems motivation dwindles among students as “The Gallup Student Poll, an annual survey of students in grades five through 12 representing thousands of public and private schools in the U.S. and Canada, found in 2017 that only 47% of all students are engaged in their schools”[23] meaning that more than half the students find themselves at odds with their education. This is quite alarming as “actively disengaged students are nine times more likely to say they get poor grades at school, twice as likely to say they missed a lot of school last year, and 7.2 times more likely to feel discouraged about the future than are engaged students”[24]thus signifying that these

[23] Gallup, Inc. "Academic Ranking May Motivate Some Students, Alienate Others." Gallup.com. August 09, 2018. Accessed April 22, 2019. https://www.gallup.com/education/239168/academic-ranking-may-motivate-students-alienate-others.aspx?g_source=link_WWWV9&g_medium=TOPIC&g_campaign=item_&g_content=Academic Ranking May Motivate Some Students, Alienate Others

[24] Gallup, Inc. "Academic Ranking May Motivate Some Students, Alienate Others." Gallup.com. August 09, 2018. Accessed April 22, 2019. https://www.gallup.com/education/239168/academic-ranking-may-motivate-students-

students will be more likely to fail to finish their secondary education and thus drop out or simply not pursue a college education. This is evident from the dropout rates provided earlier and as such it can be deduced that students of color are much more unmotivated and remain unmotivated and thus fail to compete academically. It is difficult to maintain students enthusiastic but that stems deeper in how teachers decide to educate their students and how deep of a connection they build. Nonetheless, in comparison to students who do not find themselves engaged, “engaged students… are 4.5 times more likely to be hopeful for the future, 2.5 times more likely to say they get excellent grades and 2.5 times more likely to strongly agree they do well in school than do disengaged students.”[25]If students of color be motivated, then it may close that gap and may make them more hopeful.

As critical as motivation is, what cannot be disregarded is the classroom holds its own issues when attempting to provide a sense of community and connection with students. For example, “although a majority of urban… students hold favorable attitudes toward science careers, only a small percentage (25%) hold favorable attitudes toward classroom science [and that] “science for all” do not consider the multiple realities of many participants, such as students in poverty. Because of this discontinuity between the realities of classroom science and the lives of many science students, it should not be surprising that urban students often do not [find] science to be interesting or relevant to their lives.”[26] It is evident that students do wish to learn and seek opportunities in STEM fields but find themselves discouraged by the disengagement and lack of connection and community with the student. This is due to the relative linear way of educating and the lack of any intention to bring a sense of community to the students. When a

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alienate-others.aspx?g_source=link_WWWV9&g_medium=TOPIC&g_campaign=item_&g_content=Academic Ranking May Motivate Some Students, Alienate Others.

[25] Gallup, Inc. "Academic Ranking May Motivate Some Students, Alienate Others." Gallup.com. August 09, 2018. Accessed April 22, 2019. https://www.gallup.com/education/239168/academic-ranking-may-motivate-students-alienate-others.aspx?g_source=link_WWWV9&g_medium=TOPIC&g_campaign=item_&g_content=Academic Ranking May Motivate Some Students, Alienate Others.

[26] Nancy Butler Songer, Hee-Sun Lee, Rosalind Kam, *Technology-Rich Inquiry Science in Urban Classrooms: What are the Barriers to Inquiry Pedagogy?* (University of Michigan, Ann Arbor, MI, received 18 May 2001; Accepted 6 July 2001), p.129

set of “alternative teaching strategies based on motivation and school-failure theories [was introduced] ... students… followed through activities designed to promote increased responsibility, student choice, and noncompetitive grading, and the results demonstrated successful improvements in both attitudes and performance.”[27]Thus, if seeking a positive result, it is necessary to find a way of teaching that promotes enthusiasm and a sense of community with students so they feel inspired, prepared and ready to venture on.

Digital Technology have their perks that can help create that motivational and communal environment for students. Digital Technologies have been able to unite billions around the globe, connecting our everyday lives and always keeping us just a touch away from discovering new things, making what was once nearly impossible now a simple task. But, digital technologies must not be entirely glorified as they still can be rather harmful or detrimental. Digital Technology can serve to rather distract the student or allow them to daze off in it, leading them delve in the realm of social media or elsewhere which ultimately defeats the purpose of considering them as a complementary tool in the classroom setting. In other words, this virtual reality they may recognize as a second home that can serve to connect them can ironically be its downfall. Nonetheless, if digital technologies are incorporated and correctly managed, the drawback can greatly reduce. Now, how have these digital technologies been used in the classroom settings?

As a first example to introduce and measure the effectivity of a digital technological platform, a program called “The Kids as Global Scientists: Weather” was introduced to arouse interest in science among students who had a negative attitude towards complex sciences. “The Kids as Global Scientists: Weather” (KGS) curriculum “[was] an 8-week… school weather program designed to foster the development of rich explanations and interpretations of complex science phenomena through the development and communication of evidence and

[27] Nancy Butler Songer, Hee-Sun Lee, Rosalind Kam, *Technology-Rich Inquiry Science in Urban Classrooms: What are the Barriers to Inquiry Pedagogy?* (University of Michigan, Ann Arbor, MI, Received 18 May 2001; Accepted 6 July 2001),p.130

investigations of science questions. Student questions are of their own design and … activities include data collection, data comparison and critique, explanation building, communication of ideas, and real-time predictions. The curriculum maintains programmatic coherence through a series of “core activities" that are suggested as guidelines to follow within each of the 200 nationwide classrooms simultaneously enacting the program. In addition, those in each classroom are encouraged to adapt the program to their own learning goals and audiences through interpretation of the core activities combined with extension activities provided at each time point.”[28] The program was meant to provide teachers with the liberty of not only diverging from a “standard” and one-way of teaching but also provide students with the opportunity to interact with each other, to ask questions, and to use their resources available to be able to resolve their dilemma. This, in other words, helped create ties between students and that sense of community. Not only that, they may find a sense of motivation and aspirations that is clearly an important and determining factor that can push students to dream.

How would, then, this open platform be monitored, controlled and measured? The program was created as a computer software that connected the internet and a CD-ROM to help students access the discussion and question board that provided them with their tasks. The KGS CD-ROM has both a “Director-created Web browser for the retrieval and presentation of multiple representations of current weather imagery, and the presentation of archival storms for when Internet connections are unavailable or unreliable. The discussion board is organized and facilitated by the research staff and volunteer scientists, and it organizes students into 10 clusters for more focused discussions with peers their own age and with online scientists.”[29] This software-disk program is quite ample and reliable, permitting students to also participate not

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[28] Nancy Butler Songer, Hee-Sun Lee, Rosalind Kam, *Technology-Rich Inquiry Science in Urban Classrooms: What are the Barriers to Inquiry Pedagogy?* (University of Michigan, Ann Arbor, MI, received 18 May 2001; Accepted 6 July 2001), p.136

[29] Nancy Butler Songer, Hee-Sun Lee, Rosalind Kam, *Technology-Rich Inquiry Science in Urban Classrooms: What are the Barriers to Inquiry Pedagogy?* (University of Michigan, Ann Arbor, MI, received 18 May 2001; Accepted 6 July 2001), 136

only in the classroom setting but also in another reality, a virtual setting that allows students to access on and off from anywhere but that's where lies one essential problem, the access portion that not all students have or had. The reliance of a professional always serves useful but can ultimately be a waste if not everyone relies or access this technology. For the purpose of the study, it was implemented in a way that all students were permitted equal access to it.

Who were the target/s of this program? The KGS weather program was implemented among 258 classrooms in 40 states, concentrating in "urban schools with… minority students and unreliable Internet technology. Within this large participant population, a population of 95% minority students of whom more than 70% are eligible for free or reduced-price lunches [were targeted]. Students in [the] focus schools reflected larger district trends."[30] Variables were indeed included to see the various effects and results teaching methods accompanied with digital technologies would produce. In a more concentrated and select sample size, six classrooms were each allowed one unique variable. In the first classroom, it enjoyed the leisure of curricula freedom and facilitation with the technology by having "people on deck" that would cooperate with aiding in the instruction of teachers when teaching students how to use the program on computers, whenever the program malfunctioned and other tasks related to the program. In this group, the availability of technology for everyone helped provide greater enthusiasm as everyone enjoyed a similar privilege. Among the other groups who were only allowed to either have faculty support or quality technology with no support whatsoever demonstrated some "moderate proficiency" in the use of technology which in return resulted in some increase of enthusiasm. But, the often "crashing" of the internet discouraged the instructor and the student which caused some disappointment between both the instructor and the students and thus created a least favorable attitude towards the activity.

Finally, there was a group that entirely lacked resources to provide all students an

[30] Nancy Butler Songer, Hee-Sun Lee, Rosalind Kam, *Technology-Rich Inquiry Science in Urban Classrooms: What are the Barriers to Inquiry Pedagogy?* (University of Michigan, Ann Arbor, MI, received 18 May 2001; Accepted 6 July 2001), 134

individual computer, a proper support technician, or even an instructor that was well versed or trained in using the software program. With all these factors, it was destined to produce negative results. The lack of training for the instructor and the constant reliance on wit and instinct, alongside with students having to compromise in order to all have an opportunity to use the laptops led to both instructors to feel discouraged. This discouragement then emulated demotivation which continued to feed the negative emotions and disappointment towards the instruction and the technology. This overall result emanated throughout all the various schools the experiment was conducted on. Even much less favorable results came from schools who already were not fairing off so well. Thus, it is not far-fetched to say that "a large proportion of students who already have very poor skills [and] have experienced failure for many years in school, have become seriously alienated from academic work."[31] As mentioned earlier, motivation was a determining factor that either caused a student to continue in education or opt out and release themselves from the "burden caused by education". The study helped demonstrate that if students were adequately monitored and given the necessary tools to successfully interact with new technology, they may begin to present higher signs of motivation and enthusiasm for their education. If this can occur, then much more positive results can occur among students of color. The students who did have their own individual laptops and were properly instructed on how to maneuver and interact with their peers on the program felt much more at ease and felt that they could accomplish a very tedious assignment. Thus, if there were ways to present each individual student with a laptop and a constant training process, then this perfect scenario would highlight the much-desired results families and children alike may seek.

Nevertheless, if there were ways to incorporate or even create institutions that focused on preparing students and well-versing them in digital technologies, then it may be the case that

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[31] Institute of Medicine, National Research Council, Division of Behavioral and Social Sciences and Education, Board on Children, Youth, and Families, Committee on Increasing High School Students' Engagement and Motivation to Learn, ***Engaging Schools: Fostering High School Students' Motivation to Learn,*** 21

much more positive results similar to that seen in the previous discussed study may resonate and influence many more students of color to continue dreaming. On a similar case, there was a study conducted attempting to measure how schools enriched with technology-versed instructions perform and the attitude of students and teachers conveyed in this kind of setting. In other words, the study displayed the effects and implications involved with the integration of a computing system to ensure students are proficient in data analysis reading, knowledge representation, charting, and other roles or skills needed in the sciences. As noted, "[The] study addresses the need for research on technology use in high school science, particularly in schools that are past the first phase of implementation. It examines three high schools that have implemented ubiquitous computing for several years, long enough to have passed through at least one obsolescence/replacement cycle. [It will] examines which technological tools are being used, how the use of such tools contributes to high quality science education, and challenges that still need to be addressed beyond those traditionally studied regarding funds for computers, and installation for wireless."[32] This study seeks to further analyze the impact of technology in the classroom setting over the course of several years and attempt to observe any difference of attitude of students once emerged in such programs in comparison to students who are not.

The study report, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools* focused on three schools, each in different environments and each with different advantages and disadvantages over the other schools. As noted by the report, "[Here] are brief descriptions of the three study schools (names of schools and personnel changed to preserve confidentiality). "Urban Tech High" is a public pilot school with approximately 300 students in a racially and economically diverse neighborhood. The student body is 53% Black or African American, 29%, Hispanic, 9% White, and 8% Asian, and there are twice as many boys as girls. Sixty four percent of students are identified as low

[32] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010, p.6

income. All classes are equipped with Smart Boards; in contrast to the other two schools in this study, there is no probe ware. All students are [leased] a laptop upon entering 9th grade, and this computer… becomes their own upon graduation; thus, are replaced on a 4-year cycle. Laptops are kept in the school building. While in service, the computers are maintained within the school; students are responsible for charging the batteries and bringing the laptops to the help desk when repairs are needed. A laptop coordinator, network coordinator, and student-based technology consulting company all contribute to the care and maintenance of the hardware infrastructure."[33] This school has at its availability a vast majority of resources and primarily educates students of color and students who come from lower socioeconomic backgrounds, although it also educates students of a more affluent background. Also, it enjoys of having a renewal process of its laptops and other utilities, thus keeping their technological resources always up to date and always functioning. Students also do get to keep the laptops they use which ultimately eliminates the hassle and financial burden caused by purchasing a new laptop.

The next school studied ""Rural High," is a public high school that serves "419 students drawn from seven neighboring rural towns. The technology plan was developed as part of the new school's design. The school's population is approximately 98% White; median income is in the lower third for the state, as is the rate of college attendance. The facility has wireless Internet access throughout. Each classroom has a "tower" of 14 laptops, and the district has a program promoting student or family purchase-through-lease of laptops, which can be used in the school, though the small class size means that the class-stationed computers are often enough for one-to-one student use. The school has a technical staff of 3, including the district technology coordinator, plus (during the final year and a half of the study) a technology

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[33] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010,9-10

integration specialist. The district has a 3-year obsolescence plan for its school-owned laptops. All classrooms have interactive whiteboards with projectors, and teachers have laptops."[34] Although this school is not in an urban location, the results displayed from this school are critical in aiding to make future evaluations and forecasts to how a school of this sort may prove to be a better alternative if budget constraints do not permit a school such as that of the "Urban School."

As for the last case study, the school "Private Academy" serves 360 students of which 80% board. Boarding students come from 33 states and 12 countries. About 20% of their students have learning difficulties of some type and the school has developed a special expertise in working with such students. Private Academy has chosen not to install a wireless network but instead has installed 3,000 Ethernet drops around the campus. Every classroom is arranged so that any and all students can connect simultaneously to the Internet. All students purchase eBooks through the school, but the school tries to arrange for replacement in three years. Classrooms have projectors, connected to the teacher's laptop; some classes have an interactive whiteboard. The school has a full-time technical staff of five."[35] This school will be omitted of any further discussion as its focus of students does not coincide with the group I'm discussing about nor does it add any valuable feedback for improving the quality or the motivational level of students of color.

For the first studied institution, The Urban Tech high had established in using computing technology in empowering the students and increasing testing scores. They had believed that under a constant pattern of success in test scores, students would be able to overcome their self-doubt and build some form of enthusiasm which then would put them in a cycle that self feeds and creates the needed motivation many students lose over the course of their

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[34] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010,9-10

[35] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010, p.10

educational experience. The result of having a digitally technological oriented institution such as “The Urban School” helped plant a seed of motivation in students who failed examinations in prior years in order to produce a success rate of “90% [in] the 10th grade MCAS exam, and [having] 59 of 60 seniors… accepted to post-secondary educational institutions.”[36] Through the inclusion of technology that target the visual learning aspect, such as PowerPoint, Smart Boards, and teacher websites, “The Urban School” was able to permit students a free-ranged and community based interaction with what they learned in order to obtain perspectives from various sources. With these technologies, students were able to consult others, visualize ideas and display them visually, along with the technical support available and their own laptops, students felt at ease, always present next to a reliable source. In order to stop misinformation, students were under constant supervision.

There were also recorded experiences that were collected from teacher journals that were kept over the course of the study. The instructors primarily described their encounters and interactions with digital technology, with how students tended to use the technologies to deconstruct complex topics and display them through some visual representations and even with how impactful instruction was with a complementary tool. Teachers saw that they had a greater scope and control and that they were able to cover more ground as students showed greater mastery of the topics studied. This evoked the sensation of satisfaction among educators, making them quite enthusiastic to continue with a new style of instructing. This new style of teaching translated to the reduction of disconnection between students of color and of low income status. They noticed that students presented much more confidence and trust in them, something that had not been noted beforehand in other scenarios where students each found themselves fending off for themselves. A positive impact for students from marginalized backgrounds did occur.

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[36] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010, p.10

Among the most notable journal entry was the following: “a wide variety of software ranging from multimedia tools like Dreamweaver or GarageBand to ArcView and Graphical Analysis … enhance the learning environment by increasing students’ engagement, their investment in investigation of their own questions, and their meaning-making about scientific phenomena. For example, one physics teacher uses a system to capture video of motion and convert visual data to mathematical expression; other uses podcasts to push students to strengthen their reasoning about lab data; a biology teacher introduces her students to the use of professional visualization tools for the study of proteins and other complex biomolecules.”[37] This entry describes how reliant teachers were in these digital technologies. They noticed and discovered that students can learn through methods and tools that are familiar or simply something that explain and help them visualize something that is quite complex. But, not all experiences and attitudes were the same.

There is always a constant necessity to renovate and renew web sources, the need to learn these new technologies, tracking resources, technological compatibility, filtering the unnecessary and even accessing certain data outside the classroom. Such points are mentioned from a teacher’s entry. The instructor says, “I realized that there are so many silly websites that I use, and there’s so much stuff that I go after and pull, and I haven’t kept a very good record of what I have. …If something should happen to a computer of mine, I would lose those favorites. And would I be able to find some of those again if I had to? So that kind of scared me. [The logs we used to report in this study] forced me to think a little bit about whether some of these activities that I was designing or not, or designing with digital or with technology, if they were just to use the stuff and be like a gear weenie, so to speak, or whether they were really effective, you know.”[38] Even if it seems that these technologies can complement, it is not

[37] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010, 25

strange to find the misconception that these technologies are perfect. The fear of losing oneself within these technologies is not uncommon and is rightly justified. There will always be that thought of whether they really do change anything and if it may even benefit students of color. From the cases studied, it seems there were positive changes that may point digital technology as actually helpful but nothing is ever white or black. Digital Technology falls within grey lines.

To feed even more to the fear of deviating from the proper usage of Digital Technologies, we can describe games as either a common enemy or common friend. Whatever the case is, educational games can be key to connecting to the youth and helping them increase their enthusiasm in very tedious subjects. Timez Attack, a computer game used to teach mathematics to students is conveyed in “Game-Based Learning: Based Learning: A Review on the Effectiveness of Educational Games Educational Games” emphasizing the importance of increasing the learning process. For that, an experiment was conducted and gathered “better result for groups that played educational games on posttests measuring their knowledge in comparison to students playing no games.”[39] It was demonstrated that there was “an overall significant effect of game-playing on math performances scores… and concluded a significant improvement on posttest scores of students using educational games. In yet another study… a statistically significant effect for type of intervention on the posttest scores in favor of the game-application group [was seen]. Furthermore, … the experimental group outperformed the control group and that learning with the vocabulary website with word games was more effective than the activity based learning… [indicating] that both classes increased their scores on the spelling and reading posttests, but that the experimental group gained significantly higher scores.”[40] It seems that even when playing with fire, educational oriented games can help

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[38] Brian Drayton, Joni K. Falk, Rena Stroud, Kathryn Hobbs, & James Hammerman, *After Installation: Ubiquitous Computing and High School Science in Three Experienced, High-Technology Schools,* January 2010,39

[39] Vandercruysse, Sylke, Mieke Vandewaetere, and Geraldine Clarebout. "Game-Based Learning." Handbook of Research on Serious Games as Educational, Business and Research Tools, February 2012, 628-47. Accessed April 23, 2019. doi:10.4018/978-1-4666-0149-9.ch032.

produce higher test scores and can then influence students in also becoming more enthusiastic. This does point to positive results, with the learning increase and learning absorption and with how well students performed over several trials. But, nothing is ever what it seems and there is always a dark truth to everything even technology.

[40] Vandercruysse, Sylke, Mieke Vandewaetere, and Geraldine Clarebout. "Game-Based Learning." Handbook of Research on Serious Games as Educational, Business and Research Tools, February 2012, 628-47. Accessed April 23, 2019. doi:10.4018/978-1-4666-0149-9.ch032.

Chapter 4: The Dark Side of Digital Technology

The case studies all presented either some interaction at home or a lot with digital technologies. So, what happens when laptops or digital technologies do fall within grey lines? For example, when implementing a one-to-one laptop program/s, it is needed that every child in a school would receive a laptop for school and home use. This initiative must be taken to provide constant access to computer technology to those students who lack access at home. In "The Challenges of The Emerging Use of Technology in Schools: An Analysis of a Selected Urban School System in Georgia," the importance of having a one-to-one laptop program was intended to "not only provide constant access to computer technology at home and at school, but… also motivate, engage, encourage, and raise expectations for student self-efficacy regarding technology competency."[41]Students must feel enthusiastic and encouraged but also develop technological competency. Often, this skill may be overlooked and undermined as there are misconceptions that all younger generations may be well trained but that is not always the case.

In the impact and utility in the classroom, "computer technology is no different than most other instructional resources available for student use in classrooms; without structure and guidance from teachers, it (computer technology) can be viewed as just another resource (i.e., encyclopedias). Teachers and their technology literacy are of paramount importance in integrating technology into the instructional framework of 21st century learning."[42]Thus, digital

[41]Jackson, Zawadie, Mitchell, Roxanne, THE CHALLENGES OF THE EMERGING USE OF TECHNOLOGY IN SCHOOLS: AN ANALYSIS OF A SELECTED URBAN SCHOOL SYSTEM IN GEORGIA, 2004, http://acumen.lib.ua.edu/u0015/0000001/0001566/u0015_0000001_0001566.pdf

[42] Jackson, Zawadie, Mitchell, Roxanne, THE CHALLENGES OF THE EMERGING USE OF TECHNOLOGY IN SCHOOLS: AN ANALYSIS OF A SELECTED URBAN SCHOOL SYSTEM IN GEORGIA, 2004, http://acumen.lib.ua.edu/u0015/0000001/0001566/u0015_0000001_0001566.pdf

technology must be guided by educators for it to show any significant change and to serve any purpose, if not, it just becomes one dustier book that may never see the light of day. But Digital Technologies have demonstrated that they can change the mindset of students of color not only providing them with a tool that provides them the sense of community but also perpetuating positive academic results, haven't they? They as well have demonstrated that under the right guidance they can be successful. Digital technologies can create that sense of community, a term that has been so often mentioned. But should the sense of community even matter to students? A sense of community among students helps build their cognitive abilities.

When viewing education and cognitive performance, both define "knowledge [as] not only possessed individually but also created by and shared amongst members of communities; and the ways that knowledge is created are shaped by cultural and historical factors. Support for this perspective comes from recent research which suggests that human intelligence is intrinsically social and communicative. An important implication of a sociocultural perspective is that one is encouraged to look for causes of educational success, and failure, in the nature and quality of the social and communicative processes of education rather than simply in the intrinsic capability of individual students, the didactic presentational skills of individual teachers, or the quality of the resources that have been used. This means that the quality of the spoken interactions between students and teachers, and amongst students, can be of crucial educational significance."[43]In essence, knowledge derives from a communal group and that community not only helps you learn from both good and bad experiences but it also resonates on how well both teachers and students may get along. There has been a reliance of a more individualistic approach for students which cannot prove to be in any way successful as students limit themselves from observing other opinions and outside sources. Thus, as seen

[43] Mercer, N., International Journal of Educational Research (2017), http://dx.doi.org/10.1016/j.ijer.2017.08.007

from the study case and a laptop program “Kate’s Choice”, the intentions of the programs are to help these students build confidence and trust among each other.

As the recurring theme of my previous points, “teachers’ uses of technology to foster rich new, multimodal forms of classroom dialogue, outlines our approach to helping teachers to develop their own skills in using dialogue for teaching and learning, incorporating the use of digital tools, and helping their students to become better at using talk to work collaboratively to learn and solve problems”[44] which demonstrates that digital technologies can evoke the sense of community but also highlights the sense of community as it can foster those essential cognitive skills of problem solving, moral choices, memory retention and socialization skills. Activities in the laptop program “Kate’s Choice” are composed of computer-based, literacy-related activities which provide interactive scenarios where children would learn of citizenship and morality. The software presents children with the scenario of a young girl named Kate who is best friends with a child named Robert, who has stolen a box of chocolates from a shop for his mom that is in the hospital. Kate becomes aware of what Robert has done and so Robert begs her not to say anything about what he has done. Further stages in the software then introduce deeper moral dilemmas that slowly push Kate to be unsure. In these stages, students have the opportunity to share ideas and determine what is the correct decision to be make and to learn about the importance of social morality and personal morality. All these skills are essential in the coexistence and interaction with their peers. It seems as digital technologies can do no wrong. But, in fact, digital technologies are double-edged sword.

There have been mentions on how digital technologies may become more of a burden for instructors and students but it can also affect students negative in their health, especially their cognitive skills and can cause lower test scores among children. As presented by the NY Times article, Human Contact Is Now a Luxury Good, “children who spent more than two hours

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[44] Mercer, N., International Journal of Educational Research (2017), http://dx.doi.org/10.1016/j.ijer.2017.08.007

a day looking at a screen got lower scores on thinking and language tests, according to early results of a landmark study on brain development of more than 11,000 children that the National Institutes of Health is supporting. Most disturbingly, the study is finding that the brains of children who spend a lot of time on screens are different. For some kids, there is premature thinning of their cerebral cortex. In adults, one study found an association between screen time and depression."[45]It seems individuals who constantly engage with digital technologies can suffer of the thinning of the cerebral cortex and depression. The thinning of the cerebral cortex among children is quite alarming as that area of the brain is responsible for thinking, perceiving, producing and understanding language. In other words, it is responsible for the process of information coming into the brain. This is detrimental for students as it can ultimately limit their retention capacity and the ability to understand subjects they are studying as well as induce them into a state of depression that can ultimately discourage them from education.

Furthermore, the drawbacks continue to be even more severe as those toddlers who "learn to build with virtual blocks in an iPad game gain no ability to build with actual blocks, according to Dimitri Christakis, a pediatrician at Seattle Children's Hospital and a lead author of the American Academy of Pediatrics' guidelines on screen time."[46] Also, there have been instances when interactions with technologies have not been the most desires as seen "in small towns around Wichita, Kan., in a state where school budgets have been so tight that the State Supreme Court ruled them inadequate, classes have been replaced by software, much of the academic day now spent in silence on a laptop. In Utah, thousands of children do a brief, state-provided preschool program at home via laptop. The poor and the middle class are told that screens are good and important for them and their children. There are fleets of psychologists and neuroscientists on staff at big tech companies working to hook eyes and minds to the

[45] Bowles, Nellie. "Human Contact Is Now a Luxury Good." The New York Times. March 23, 2019. Accessed April 24, 2019. https://www.nytimes.com/2019/03/23/sunday-review/human-contact-luxury-screens.html.
[46] Bowles, Nellie. "Human Contact Is Now a Luxury Good." The New York Times. March 23, 2019. Accessed April 24, 2019. https://www.nytimes.com/2019/03/23/sunday-review/human-contact-luxury-screens.html.

screen as fast as possible and for as long as possible. And so human contact is rare."[47]Not everything seems to fair well especially for the lower classes. It may be that the purpose of digital technology was to serve and improve but the casual disengagement and lack of encouragement from the local governments to have a more social or communal way that encourages students to actually talk and share simply leaves in ridicule the efforts of even implementing digital technologies in education. Indeed, the tool can be used for a greater good but if it is not in constant check and if it deviates from its intended purpose of helping students of color then everything may be all but lost.

[47] Bowles, Nellie. "Human Contact Is Now a Luxury Good." The New York Times. March 23, 2019. Accessed April 24, 2019. https://www.nytimes.com/2019/03/23/sunday-review/human-contact-luxury-screens.html.

Conclusion: Moving Forward

Everything is a mess. The Education System is far from being anywhere near being fixed and in no way should digital technologies be viewed as the savior of our broken system. I do want to note that Digital Technologies can serve to aid educators when dealing with a diverse group of students who all come from distinct backgrounds. I also want to say that those students of color do require more assistance as they may have not been privileged with the same resources others have. The purpose of education may vary between individuals and each one sees to their own goals and satisfactions. But, it cannot be denied that aspiring students do lose interest over the course of the years and become fatigued. That is visible from the alarming drop-out rates but anyhow, why strive in education? Why bother aiming to motivate individuals?

Education serves as a gateway to help many young aspiring minds to participate in society. As we continue to become more technologically advanced and savvy, the world becomes more competitive and more technologically oriented. Thus, it is necessary to include and incorporate the use of digital technologies in classrooms as to help those who do not have that head start but also to equip them to be able to respond to competency with technology. Jobs and careers nowadays require the mastery of some programs, software or technologies thus if any individual seeks to obtain these jobs, it is essential that schools and governments begin to see into incorporating digital technologies in education. Technology is a useful tool to help students learn, to help them interact with others and to help them build experiences. In the classroom setting, each student falls in a community and can build relationships with their fellow peers. In a community, it is essential to be able to communicate ideas, to be able to adapt and to be able to socialize. As such, Education can provide a platform in building social relationships

that will educate each individual about not only school subjects but also of the various cultural backgrounds and cultures. Diversity can exist in classrooms and often does so there may be different races, cultures, backgrounds, beliefs or etc. With technology, each student has the capacity to reduce their prejudices and learn about the various cultures and customs. These social relationships can further be supported by technology by outreaching the local community or communities that are culturally diverse and planning a program that allows interaction with the communities to understand more of those cultures. Yet, the differences of each culture between students should be considered when doing this. This is why building relationships and working together can help each student become tolerant and respectful of diverse experiences. In other words, Technology and Education can serve to diminish ignorance.

Both Technology and Education can help strengthen social ties with new befriended individuals. People can communicate from afar and can share with each other ideas, customs and even memorable events. Connections with friends is essential in our current day and age as we've become globalized and as such, technology can serve and does serve to unite us all together. Technology has shown to increase enthusiasm and motivation which in turn can build up confidence within students. If both education and technology can be paired to produce such results successfully, then maybe a passion for learning can truly be fulfilled. If even accompanied with building social ties, then students may find even greater purpose or role models or even a "competitor" in order to mirror off or strive for success.

What occurs then when technology and education fail to help prepare students for the competitive world? Educators have a responsibility in the classroom to ensure students obtain some sort of support so they don't feel discouraged. As seen from the case studies where technology was implemented, technology was capable to motivate and excite students but only when the instructors too expressed a positive attitude and open-mindedness towards the use of technology with their teaching methods. Educators have to be able to adjust to various forms of teachings that reach out to each student. With digital technologies in teaching plans, students

have a greater platform to display their creativity, each learning the way they find most pleasurable and least stressful. Not only will students be well versed in using technology but they would be skilled enough to quickly solve and visualize schematics that can help them deconstruct complicated problems. These skills become useful in the labor force, of course, based on the presumption that each job would engage in such activities of equal intensity.

Students must be able to feel passionate to feel any sort of commitment but of course you cannot always reach out to all students. There will be those who simply technology cannot reach. This does not mean students should lose faith nor should educators and parents but rather at all ends there should stem support. Students of color do not have that support that many other students do, but nonetheless they should strive to continue to pursue and finish their education. I did mention that role models were simply not present for students of color but for that I do wish to say that they can become that role model they wish to look up to or even their parents who may have not gotten far in their educational prospects, they still can be a motivator that reaches out to them and inspires them. With that said, I would also like to advise that technologies will continue to evolve and that mentioned technologies such as smart boards and software programs may be obsolete in a few years or in decades. Whatever replaces them though will still serve to aid in education if it does become part of the teaching curriculum. But they must still be scrutinized to view what implications they may represent to students, especially those who are marginalized.

Societal factors will continue to influence in the education of students. The disparities between income levels can continue and will continue to affect all individuals regardless of their residency. Those, who do live in wealthier areas, may still enjoy more benefits while others may be continuously be stripped of resources. Schools who already serve students of low income lack sufficient funding to pay their teachers, to purchase new textbooks, to purchase new equipment such as new laptops, and even pay other staff. This presents a problem if there are intentions in supporting these schools in order to push students of color to continue enthusiastic

about their education. Furthermore, from the mentioned NY article, it also explained how individuals of color have been targeted with these “wonderful technological gifts” at school but with a hidden purpose of enriching themselves. All institutions have to precautious when approached by big corporations.

Finally, there have been recent events that point to a new trend of schools switching back to books and a least technological favored environment. Institutions that serve wealthier students have alternated to educate students via books again and limit the usage of technology in their classrooms while schools that serve students of low income have become much more technologically equipped and have begun using technology in their curriculum. Again, I do advise that schools should be careful of the negative health effects involved and that moderation should be practiced. Also, I did not include or mention gender here as I sought after to explore the effects more or less throughout all individuals and that’s why I intended to categorize them all under students of color. I do recognize that women do not fair off well in education and that requires further exploration and another dedicative research.

I have uncovered some important details towards the influence of digital technology to women. In “The Effectiveness of Computer Assisted Instruction in Developmental Mathematics”, a computer math program software was studied in classrooms to measure and compare how well women and men improved in mathematical problem solving. The program included an instant grading feature that allowed the instructor to set control levels and access the program on a 24 hours basis. The teacher did have to be instructed on how to function the program. Also, the program allowed retries if they failed to answer correctly the math problems but did have a limit to how many tries they would have.

This feature would prove to really permit students to stem away disappointment and lead them to continue persevering and provoke a sense of enthusiasm. The study had initially predicted that computer assisted instruction would provide significant change in test and exam scores with both groups but the end result concluded something different. The study did show that under computer assisted instruction, women outscored their male peers during examinations. Thus, if they saw a pattern of academic improvement and achievement, they then would feel motivated and enthusiastic which would be also the case.

The study reports that “there was a statistically significant difference in posttest mean scores of male and female Intermediate Algebra students, when adjusting for the effect of pretest scores. Results reveal that females (M=79.84; SE= 1.768) scored higher on the posttest than males (M=71.26; SE=1.972).”[48]This had quite surprised the researchers. Furthermore, they did also state that “the posttest means for traditional + CAI was higher, but not significantly higher, than the posttest means for traditional instruction. In addition, the covariate of pretest significantly influenced the dependent variable of posttest, F (1,99) =10.52, p=.002. Results reveal the adjusted posttest mean scores after accounting for differences using the pretest scores are not significantly different for traditional (73.51) and traditional + CAI (77.59) methods, with standard errors of 1.862 and 1.888 respectively.”[49] The study demonstrated that the impact for women students was more impactful than on their male counterparts. The difference was indeed minimal between both groups but still significant that it caused people to be surprised.

This is very important as women are highly underrepresented in STEM fields and this can also lead to convince and change the way how instructions are given. Although the study did have students consecutively, the small increases were indeed important to identify. This

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[48] Spradlin, Kathy Dye and Ackerman, Beth, "The Effectiveness of Computer- Assisted Instruction in Developmental Mathematics" (2010). Faculty Publications and Presentations. Paper 195.
http://digitalcommons.liberty.edu/educ_fac_pubs/195

[49] Spradlin, Kathy Dye and Ackerman, Beth, "The Effectiveness of Computer- Assisted Instruction in Developmental Mathematics" (2010). Faculty Publications and Presentations. Paper 195.
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study of course only focused on one subject and was not replicated towards other areas of study. But, this does serve as a starting point, which would help plan out a way to reach out to women students/individuals. There are many other areas of research that can be studied at that will be left yet to be explored.

As for my initial proposal, I did see some sort of evidence that supported my argument but it was based on the conditionality that educators would be proficient and that help would be available. Also, the fear of educators being displaced or fearing that it would not work is also justified. Digital technologies require the utmost care and supervision as well as investment. They can change people's attitudes and can make the situation worse. People's experience as educators and age also do play a role. Those who are older will have less experience with new technologies and can find themselves at odd with digital technologies. Nonetheless, they should be encouraging and open to seeing change. That is, if they do feel that it can change the mindset of their students. As for parents, I'd say continue to support your children and push them forward in pursuing a secondary education. Never lose hope in them.

Attitudes at all levels should change and should still push forward to allowing digitally oriented schools. If it fails to succeed, then it was still worth a try. The examples of provided earlier prove that they can work but there has to be major restructuring of all districts and teaching institutions for it to work. Teachers must have proper training and available staff that helps them deal with malfunctions and glitches. Of course, there will be times where the complete malfunction of the system will render everything useless but that is fine as educators must be able to still instruct. I will say this: If it does see some sort of change it is worth the try.

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