Technology in and out of the Classroom: A Mixed Method Study on Elementary Student

Relationships with Technology

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The peer review process of this research paper was done done by peers in my AP Research class. We all would constantly exchange papers and provide constructive criticism. We were supervised by a trained teacher and all had expert advisors from the field of study we were working with, in my case education and technology.

ABSTRACT

Students are becoming more exposed to technology at wide volume sooner than ever before. Elementary schools are finding ways to implement technology throughout the school day and students are using technological devices inside and outside of the classroom. It is important to study both the relationship students are forming with technology and the relationship between home and school technology use as technology is transforming into a necessity in the modern world. Students need to be forming a healthy relationship with technology from the start in order maintain these healthy habits into adulthood. In a mixed method study consisting of a parent survey and teacher interviews, the question of 'to what extent is the increased use of technology in elementary schools increasing student use at home' is addressed. Background research was studied covering 3 subsections: how technology is used in the classroom, behavioral problems, and how technology is used outside of the classroom. The variety of sources illustrated how technology is allowing children to take their learning into their own hands but also serves as a distraction that is correlated with behavioral issues. A mixed method study allowed for data to be collected from a child's main influencers at this stage in their development, their parents and teachers. When examining both sets of data, it was seen that there is often a disconnect between how parents are teachers are promoting technology use. Parents are more likely to place

restrictions on technology while teachers find ways to expand its use in the classroom; this can cause confusion for the student as their two main influencers are not interacting cohesively. It was found that a gap was missing in this field of study as many research focuses solely on school technology use or home technology use, not how they affect one another.

INTRODUCTION

Children are becoming more exposed to technology than ever before, lending to a strong dependence on it. Technology has found its way in becoming a critical tool in elementary schools. Writer Susan Frey from EdSource explains that "Mixing academic software programs with traditional classroom instruction – often referred to as blended learning – is moving from high schools and middle schools to the early grades, even reaching some 4-year-olds in transitional kindergarten" (Frey 2015). Teachers are finding ways to incorporate technological devices into classroom activities in order to engage students in learning. Elementary students are also having more opportunities to use technology outside of school, usually for entertainment purposes. Television shows and captivating games are now becoming portable for students to have easier access to. Because most elementary students are being exposed to technology in more ways than one, it is necessary to examine whether the increased use of technology in schools is having an effect on students´ use at home. I believe that elementary schools are causing students to increase their use of technology at home as students are becoming used to having access to a multitude of devices during the school day; this may cause them to expect and want the same amount of access at home. Many sources have examined the multiple ways elementary students are interacting with technology and the effects it may have, including classroom use, associated behavioral problems, and home use. With the world continually

becoming more and more technologically advanced, it is important to study how technology is affecting younger generations on a wide scale.

LITERATURE REVIEW

The use of technology is rapidly increasing and is becoming an important tool in the classroom with a large number of parents and teachers agreeing. When surveying parents and teachers on their views on technology, a response that often came back was "technology is our future," enhancing the concept that it should be introduced to children at a young age (Zabatiero, Straker, Mantilla, Danby, and Edwards 2018). It is important to examine whether this concept is truly beneficial to students as it can affect their social development. The following three sections are important factors regarding current technology use and its effects on students.

How Technology is Used in the Classroom

With children being exposed to technology earlier than ever before, it is important to understand the different ways students use it. Research surrounding technology in elementary schools has found numerous of positive correlations between implementing technology and student's understanding of the topic at hand (Ntuli and Kyei-Blankson 2012, Yukselturk, Altiok, and Baser 2018).

Technology has become a beneficial tool in increasing student engagement in lessons; it has broadened what can be be accomplished in the classroom. Kinetic technology is an

interactive resource that allows for game-based learning, a learning technique that integrates games into the lesson (Yukselturk, Altoik, and Baser 2018). In 2018, these authors conducted a study that examined the results of Turkish university students using game based technology to learn English. This source is a good representation of schools utilizing current technology techniques that are becoming increasingly popular today. Researchers found that the technology was able to contextualize the lesson which enhanced their speaking and listening skills. (Yukselturk, Altoik, and Baser 2018). Including game-based learning activities facilitated interaction between students and made them more involved with the learning process. It set up real world situations behind a screen for students to experience and strengthen their communication skills.

Teachers have made technology a daily tool in the classroom. Early childhood education teachers were surveyed in a 2012 study to find out how they assess student learning when using technology (Ntuli and Kyei-Blankson 2012). Researchers found that similarly to the Yukselturk study, these elementary school teachers are also utilizing game-based technology frequently. Around " a little over half of the teachers (52%) reported that the most frequent technology-related activities students engaged in the early childhood classrooms were educational games, specifically math and literacy-related games" (Ntuli and Kyei-Blankson 2012). This source was able to recognize and examine both the positive and negatives that come with technological use. While these games engage students, many teachers are not taking the time to assess student learning after they play them. When the games are implemented, they are seen as more as a 'fun' activity rather than strictly educational causing them to slip by without any kind of assessment. Assessments are important part of lessons as they allow for the teacher

to analyze if their students are understanding the topic or skill at hand. When teachers are not assessing what the student's have grasped after playing these games, it can lead to an uncertainty of what the students have learned.

The southeastern elementary school studied in my own research through the use of interviews has students engage in technology on a daily basis. The school is 1:1 meaning that each student has their own technological device at the school. With 1:1 iPads and Chromebooks, students often participate in similar games that are discussed in both studies. While game based technology engages students in both studies, a gap is ultimately found when it comes to assessing student growth. This relationship with technology that is forming at school can parallel into how students utilize and interact with technology at home.

Behavioral Problems Related to Technology

With a recent spike in behavior issues including ADHD in children, researchers have pinpointed a possible cause to technology. On the other hand, there is evidence that technology is able to engage students with behavioral and attentional problems. A 2013 study examined how technology was able to allow children with ADHD or some other form of learning disability to become more involved in the classroom.

Wells and Sheehey conducted a longitudinal study in 2013 that followed three children who had been diagnosed with either some form of learning disability or ADHD. These children had difficulty in a traditional classroom setting, so technology was integrated into their learning in order to see if it was beneficial for them. The study was a success as on-task behavior increased from the baseline scores of 10%, 12.5%, and 20% to 90%, 90%, and 93.3% (Wells

and Sheehey 2013). Technology was able to allow these three students to engage themselves into

their learning similarly to the Turkish university students when introduced to game-based

learning. Technology is used as tool to involve students in their own learning and make them feel

more connected to the lesson.

How Technology is Used Outside the Classroom

A majority of students continue to use technological devices when coming home from

school. With the increased availability of mobile devices, there has been question whether this is

a link to behavioral problems in children (Hosokawa and Katsura 2018).

Hosokawa and Katsura conducted a longitudinal study to examine the relationship of 5

year old children with technology. They analyzed and reported any kind of technology use,

educational or not. Surveys after every year concluded that the purposes for technology use in

what they call 'regular users' included 77.8% for watching videos, 71.7% for playing games ,

and 18.3% for educational applications (Hosokawa and Katsura 2018). The findings also

showed that the increased use of technology for non-educational purposes has been linked with

behavioral problems including hyperactivity and difficulty in socializing.

This finding differs from what was discovered in Wells and Sheehey's study. Inside the

classroom, technology was a helpful tool for students, but in their own homes, it was linked as a

cause for behavioral issues. As children generally use technology for entertainment more than

education, it is seen that the purpose of technology use matters for how children are affected by

it. The time of these studies also has to be examined as Hosokawa and Katsura's was more recent and had a wider body of information regarding technology to be studied than Wells and Sheehey's as research regarding technology has increased rapidly in the past couple of years.

Looking at these three categories, it is apparent that technology is a big part of elementary aged students' lives. A majority of the sources analyzed have recognized students playing games and using technology for entertainment purposes, but generally there are more positive effects when technology is implemented into classrooms rather than children using technology alone at their homes. Behavioral issues were also a common theme, however, mixed results were found. While studies have been done analyzing how technology is used in multiple scenarios, there seems to be a gap in how technology in and out of the classroom influence each other. Whether frequent use of technology in school has affected the amount of technology used outside of school has not been properly or fully addressed.

METHODS

Research Design and Participant Selection

In order to gain multiple perspectives on my question, a mixed method research style was seen as the best fit for my study. A mixed method approach combines both subjective and statistical information by analyzing qualitative and quantitative data. This research design allows for information and data to come from multiple influencers of an elementary student's life, their parents and their teacher. Combining both of this data helps come to a more informative answer to the original research question as it is analyzing more than one aspect of the student's relationship with technology. A mixed method study aligns with how students are creating their

relationship with technology as it compares and contrasts some of the main influences a child faces on a daily basis which help to ultimately shape their views and relationship with technology.

  The first phase of the research analyzes quantitative data that is coming from from a survey that has a mix of two multiple choice questions, two likert scale questions, and two short answer questions. A spot for an electronic signature was included at the end of the survey for the participants to sign stating that they consented to take the survey. A survey does not require too much work or time from participants but yields beneficial results for the study by getting data from a larger and diverse group which makes it a beneficial tool. The survey was posted on a local parent's facebook group with the qualifications that the participant had to be a parent or guardian of a child enrolled in an elementary school in the district I was studying. 32 participants that fit all of this criteria responded. Similar porticol to a study that researched the association of mobile technology and children was taken with the surveys as the "parents did not need to be the target child's biological parents; however, they did need to reside with the child" (Hosokawa and Katsura 2018). The survey did not require any kind of student participation.

  For the second phase, I have interviewed 4 teachers all from a local elementary school in the county studied. The interview consisted of 4 open-ended questions that all left room for further conversations. The audio of the interview was recorded in order to transcribe later. Every teacher interviewed had to sign a letter of consent stating that they consented to the interview and they felt comfortable being recorded.

  Once both sets have data were collected, I have carefully analyzed the results and found patterns and similarities throughout to come to a conclusion on how elementary schooler's

relationship with technology is being influenced . I chose to have my survey open to any parent

or guardian of an elementary school student rather than parents from a certain school as it offered

me diverse response from across the county. I then got a more specialized look from my

interviews as all of the teachers are from the same school.

The students themselves were not studied to avoid any ethical problems or construed

information. Teachers and parents were chosen because they are one of the largest adult figures

in the student's lives and can provide accurate information as well as a unique insight.

Limitations

A limitation that occurs is that there is no way to ensure every student has equal access to

technology once they come home. Some students may have their own technological devices

while others may share with siblings or not have any at all. This greatly influences how much

screen time each student participates in and causes varying results in the data.

Both parents and teachers can skip any question on the survey or interview which can

cause a lack of information if most of them skip the same question. The likert scale question

regarding screen time on the survey to the parents is an important aspect of my qualitative data,

so it would hurt the overall data if not many responses are recorded. Some parents may also not

know about the screen time function on most Apple products or not have a good estimate on how

much time their child spends using technology at home. This could cause inaccurate data to be

recorded.

RESULTS

The first step of the inquiry process was the parent survey (Figure 1). In order to fill out the survey, the parent must have a child enrolled in an elementary school in the southeastern school district. 32 parents met these qualifications and were willing to fill the survey out. All of the students were in the grades varying from kindergarten through 5th grade. 26 out of the 32 students all had some form of technological device that they own. When asked if their child's technology use at home was mainly for entertainment purposes, a majority (13) strongly agreed with a mean answer of 2.31[1](Figure 2). Parents had the space to elaborate more on their child's relationship with technology in the short answer question I included at the bottom of the survey. Many used this as an opportunity to express that they choose to limit the amount of time their child can spend on technology at home; limiting is shown in the data as the most common amount of screen time that parents observe is 0-1 hours with 14 participants responding with this(Figure 3). One parent noted that "My child gets very frustrated when it is time to put the device down and they always want more, so I try to limit the days/time they are allowed to have it so they do not become fully addicted" (Parent.17[2] 2019). Technology affecting the child's mood and behavior was a common theme throughout the short answer responses. When asking if parents believe that technology use in school is affecting how much their child uses it at home, split opinions were received with 11 choosing one of the agree options and 15 choosing a disgaree option, making the mean response 3.28 (Figure 4). It it interesting to note that most of

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[1] My likert scale ranged from 1 being strongly agree to 5 being strongly disagree.
[2] All participants will be numbered based on their relation to the student (parent or teacher) and the chronological order of when their data was received.

the parents would write about similar situations they have observed with their child and

technology, but they were divided when trying to attribute the source of their child's high

technology use.

To further examine how school is affecting technology use, I conducted interviews with 4

teachers at an elementary school in the same southeastern school district and asked the same 4

questions to each teacher (Figure 5). This elementary school is a 1:1 school meaning each child

has their own technology device at the school. All teachers noted that technology is used

multiple times a day, everyday as a way to "expand the horizons of my students" as Teacher.1

described it. Technology is often integrated into the classroom as a way to make students feel

more engaged. Teacher.4 discussed how she uses QuickTime, a multimedia player that allows

her to record herself and her computer screen. This teacher will film herself walking through the

steps children will need to take to do an assignment. Teacher.4 found that if she uses QuickTime

and posts it on Google Classroom rather than giving verbal instructions,"they [their students] are

going to sit there and watch it and be totally focused on my directions in that form [QuickTime],

but then if they're sitting on the carpet and I'm doing the exact same thing, half of them are not

going to know what to do." Technology has become a crucial tool in the classroom for both the

students and the teacher. These helpful devices however do come with a downside. Every teacher

touched on how they have observed addictive qualities in their students when dealing with

technology. Teacher.3 stated that her students love technology so much that they "rush through

their work to get on the Chromebooks." Despite these flaws technology has presented itself to be

a very beneficial tool for every classroom. Across the board, the four teachers said that they have

seen a growth in their students because of their exposure to technology on a daily basis. Problem

solving and cooperation skills are being developed faster than they once were. Teacher.2 has observed that the students are more willing to help each other while Teacher.3 has seen a growth in independence as the students are no longer asking her all of their questions, instead, they are turning to technology to figure it out on their own. Similarly to parents, teachers are constantly trying to find the right balance for technology use.
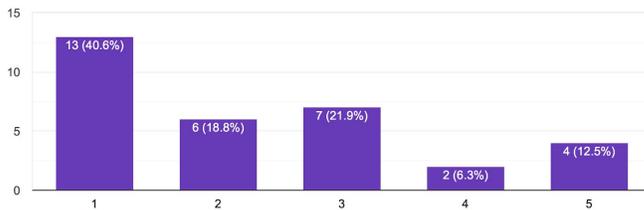

Figure 1

Figure 2

On average, how much time does your child spend on any kind of technological device at home a day?
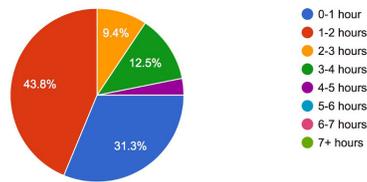32 responses

Figure 3

My child has increased their technology use at home because of their use of technology at school.
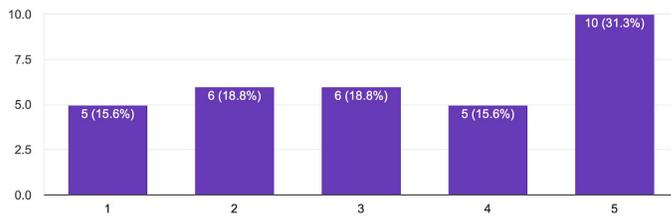32 responses

Figure 4

Interview Questions
1. What is the main purpose for technology in your classroom?
2. What are the most used technological devices in the classroom? How often do you use it/them?
3. How do your students typically respond to using technology?
4. Is there anything interesting you have noticed about how you students interact with technology? If so, what?

Figure 5

DISCUSSION

The parent survey and teacher interviews revealed two sets of information that were not always cohesive. It was a common theme for parents to limit the screen time of their child as 11 parents specifically noted they put some kind of restrictions on technology in the home. On the other hand, teachers noted that a large portion of the school day revolves around the use of technology with Teacher.4 noting that around "half of the day" her students are accessing technology (2019). This drastic change in views of technology throughout a single day can create a sense of confusion about technology for children. Students are becoming accustomed to having access to technology throughout the day as devices like iPads and Chromebooks, some common technological devices at the school studied, are used as a productive, educational tools at school to get the students engaged in their work. Once they come home, many students experience their parents putting restrictions on technology, something that was seen as a positive earlier that day at school. Jacquelynne S. Eccles, professor of in multiple topics including education, groups children ages 6-10, an age range that is accounts for a large portion of elementary students, into a category called middle ages. Eccles describes this stage of life as "a time when children move from home into wider social contexts [school] that strongly influence their development" (1999). Although both parents and teachers have logical reasoning for how they are using technology in their respective environment, a student's main influencers during this time of development are disconnected; this can lead to dysfunction in the development of a healthy relationship with technology. Studies before have focused either primarily on technology use in the classroom or in the home, meaning the relationship was not studied by looking through the lenses of the multiple influences on the student. Looking at this relationship from both perspectives is

important as it is how students are experiencing it, therefore allowing for a deeper understanding on the relationship.

When revisiting the original research question of "Is the increased use of technology in elementary schools increasing students' use of technology at home?", my data can neither confirm nor deny this. While parent responses led me to believe that technology use in school has had some increase on home use as technology is often used for students to complete their homework, I found that school is not the only variable that influences the student's relationship. Instead, my results give a deeper look into how the use of technology in each environment is affecting one another. My data poses another question: how can parents and teachers create a connection in how they implement technology with elementary aged children? It is important for both parents and teachers to make a distinct divide on the multiple ways technology can be used and the multiple effects it can have. 19 out of 32 parents agreed that their child mainly uses technology for entertainment purposes when they are home (2019). This is the opposite for teachers as their goal is to use technology to further the education of the their students.

Having teachers in each grade hold technology nights at the school can address the distinction of home technology use and school use to the students while properly inform parents how their child will be using technology during the school day. Technology nights can inspire conversation with parents and students about how technology can be balanced in the home. Making a logical distinction between different purposes of technology for students can give them insight to why they are increasingly using it in schools but not necessarily in their home. This can also lead to some positive implications in the elementary schools. Making sure parents,

teachers, and students are all aware of how technology is being used at school can help foster

positive and healthy relationships with technology from the start.

LIMITATIONS

Limitations are evident in this research. For this study, it was to be assumed that each

student has some access to technology at home. If a child does not have any technology usage at

home, their relationship with technology is almost entirely influenced by their exposure at

school; this lends students to associating technology with educational reasons. This study was

also done in a school that has 1:1 technology and is located in a wealthier part of the southeastern

school district. Data may not be applicable to schools that don't have as wide of an access to

technology on a daily basis. Knowing this, clear cut solutions could not be found only based on

my evidence since there are a multitude of actors that affect these student relationships with

technology. However, my survey results are a fair representation of the elementary students in

the county studied as students are different ages and come from differing backgrounds and

schools.

Elementary students are starting to really develop their relationship with technology

during this stage in their life, so it is important they are offered support at both school and home.

The quantitative and qualitative data collected throughout the inquiry process showed a

disconnect between how technology is handed with parents and with teachers. While limiting

technology can be a beneficial tool for parents, it needs to be addressed with the child that the

purpose of technology in school differs from traditional entertainment purposes at home. Making

the fostering of healthy relationships with technology a priority at school through the use of

informational technology nights can be a beneficial tool for both teachers and parents.

Technology is becoming a growing part of today's society, so it is crucial to provide children

with the skills and knowledge they needs to excel while using these devices.

CONCLUSION

        After evaluating how school technology use influences how elementary students use

technology at home, it was discovered that there is a disconnect between how parents and

teachers handle technology. While my initial hypothesis that schools are increasing a child's

technology use could not fully be determined, my data led me to finding patterns that will impact

the field of study as a whole. The quantitative data from the parent survey and qualitative data

from the teacher interviews showed how students may struggle to develop a healthy relationship

with technology because parents and teachers in the southeastern county studied are not cohesive

in how they implement it in their different environments. My data from the county residents can

help elementary schools find a way to make their parents more aware about how the school and

their students use technology everyday. This idea can be reflected on a more universal level as it

is important to evaluate how an elementary students' main influencers, parents and teachers, are

interacting to make sure similar ideas are being shared at home and in the classroom. A level of

consistency is important in a child's life in order to reinforce and emphasize ideas about how to

uphold healthy relationships, in this case with technology. I have suggested that each grade

holds a technology night at the beginning of the year to inform parents how their child will be

using technology in the classroom and discuss ways they can support their student on their

technological journey at home. It is important to keep studying how both school and home

technology use influences students during this crucial developmental time in their life. In order

to push the research forward, I suggest evaluating different online educational programs a school

uses and finding similarities and differences they have to popular games or programs children

use at home. This could show why children are drawn to, and maybe even addicted, to certain

games at home if they are exposed to a similar programs at school all day. While technology is

becoming a growing part of today's society, it is crucial to research its implications and provide

children with the skills and knowledge they needs to excel while using these devices.

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