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Technology's Impact on Students in a Virtual Learning Environment

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Abstract

In 2020, a worldwide pandemic ensued as the coronavirus spread throughout the United States. This caused a nationwide shutdown, closing schools. All forms of education went to a virtual learning setting, where all students were expected to learn outside of a classroom. This also meant that there became a heavy reliance on technology. This setting and use of technology began to affect students' learning and development. Through conducted research, three domains of child development are evaluated to determine the effects of this form of learning. The cognitive, physical, and social-emotional domains will be considered.

Keywords: child development, educational uses of technology, virtual learning

Technology's Impact on Students in a Virtual Learning Environment

When the coronavirus made its way into the United States early on in the year of 2020, the education system faced many challenges. As the virus caused all forms of education to move to a virtual setting, the impact of technology was intensified. Though this adjustment affected individuals of all ages and how they participate in their daily living, children were affected in many more ways than can be observed without consideration of a typical child's development. In this paper, the impact of technology on young children ages 4-7 due to the virtual learning environment will be evaluated. As the coronavirus has reformed educational practices for over a year now, it is important that acknowledgement is given to how children's development is being affected. Whether that is for the better or not, the goal of this paper is to inform educators and parents of how their student is being affected and what approaches can be taken to guide students in receiving a quality education while also supporting appropriate developmental practices.

The impact of technology on children ages 4-7 will be evaluated in this paper through the research that was conducted. To define technology for the sake of discussion, the term "technology" used throughout the writing of this paper will refer to computers, tablets, phones, and televisions. The focus will be on the usage and screen-time of each of these pieces of technology. The age group selected for evaluation was chosen due to the experiences children have in these years, years 4 through 7. The experiences that happen within this year span are recognized to affect many areas of development. At this time in their life, children's development can be largely influenced, positively or negatively. The research of this paper will navigate whether technology has been found to hinder or aid development.

Background on Child Development

Developmental Psychology

In the 1970s a model was created that would become one of the most influential

frameworks for child development. Urie Bronfenbrenner created a framework that is called the

Bioecological Model. This model recognizes many aspects of child development. For the

purpose of this study, two aspects will be focused on: environmental influences and children's

perceptions and experience of influences (Follari, 2019). The Bioecological Model emphasizes

the influence of family, communities, settings, and social policies that a child takes part in. It

also emphasizes both the direct and indirect influences. Bronfenbrenner's model supports the

intention for this study because the use of technology and impact of virtual learning are being

examined as influences on child development.

Before discussing how development is being impacted by the use of technology, it is

important that there is an understanding of the several domains considered in a child's

development. There are three major domain areas of a child's development that will be evaluated

throughout this paper. These domains are Cognitive, Physical, and Social-Emotional. The

Cognitive domain refers to intellectual and creative development of a child. Growth and

development of gross and fine motor skills reside in the Physical domain. The last domain that

will be evaluated is the Social-Emotional domain, which is more elaborate in that it includes the

understanding and control of a child's emotions, responses, and attitudes.

Cognitive Domain

The Cognitive domain focuses on a child's intellectual and creative development and

growth. A child's intellectual development is defined by their ability to think and reason.

Creative development is defined by a child's ability to make decisions and explore the world

around them. The Cognitive domain also refers to the child's ability to retain old information and learn new information. This domain also involves a child's ability to problem solve. In a classroom environment, this may look like the student exploring, acting out new roles, building or creating, and solving problems (Connecticut Office of Early Childhood [OEC], 2021).

Physical Domain

There are several areas of development within the Physical Domain. Often times these areas are split into two categories: fine and gross motor skills. Fine motor skills are when smaller muscles are used. This looks like a child being able to hold a pencil in between their fingers and writing, cutting and using other utensils, or playing with small pieces around the classroom. Gross motor skills refer to skills used by large muscles. These include things like running and walking, lifting any object, or sitting and standing. Many things in the classroom encourage development within the Physical Domain. Crafts, dancing, playing, instructional activities that have students move around, etc. are all examples of experiences that advance this domain (OEC, 2021).

Social-Emotional Domain

The Social-Emotional domain refers to a child's ability to acknowledge and identify emotions. With this, they are also about to express and manage them appropriately. This domain encourages children to develop healthy attachments and relationships with their caregivers, adults, and their peers. The Social-Emotional domain does not only cover how children interact with others, but also addresses their self-awareness and self-regulation. This development is fostered in a classroom setting through the teacher prompting a child to reflect, showing interest in what a child is doing or saying, and responding and encouraging them through conversation (OEC, 2021).

Method

Study Design

In the pursuit of this research there were many questions to be considered. Certain questions were intended to help answer how the impact of technology and implementation of virtual learning has been positive or negative. Other questions pertain to how parents and educators can be informed about the impact of technology on their student. The questions considered in the conducted research include:

1. How, if at all, has the use of technology advanced classroom instruction and fostered learning?

2. How, if at all, has screen time hindered children's development?

3. How are children receiving adequate amounts of time away from technology given the current state of learning?

4. How can educators and parents moving forward become more aware of the impact that technology and use of screens is having on their student?

Participants and Procedure

In order to answer these questions, I conducted research in a Kindergarten classroom at an elementary school in Northeast Ohio. This school district is practicing a blended model, where the teachers and students are in the classroom every weekday. When necessary, the setting changes to a remote learning environment. I created a survey that went out to all of the parents of the students in the classroom, which had a variety of questions (see Appendix A). There was a total number of 11 questions, 8 of them being short answer questions. The parents were encouraged to respond with as much input as they were willing to offer in order for me to gain a better understanding of their student's situation and their perspective as the parent. The survey

was sent out during a week that the school was practicing virtual learning in order to give the

parents the opportunity to respond while the students had their issued Chromebooks at home.

The survey was sent out to 22 parents and gained 10 responses.

After the survey, I held a structured interview with Mary (pseudonym), the teacher of the

same classroom. The interview lasted for over an hour, as there were 13 questions that were

answered and discussed in length (see Appendix B). She and I also discussed some of the parent

responses from the survey. In this interview, insight was given into how the school had managed

the coronavirus affecting classroom learning. She was able to give me specific examples of both

positive and negative things that have resulted from the virtual learning environment and the use

of technology.

Results

Parent Surveys

The first set of questions of the survey was intended to gather information about the

group of students and age group that the survey was asking about. Half of the students that were

surveyed about are four years of age, the other half of the students are five years old. Of the ten

students that parents gave responses for, seven of them had attended preschool before the 2020-

2021 school year. This question was asked with the intention of knowing whether or not they had

been affected at the time the coronavirus initiated a state-wide shutdown. Following these

questions, the parents were asked their opinion on a virtual learning option. Figure 1 displays

their responses.

Figure 1

Question 3 of Parent Survey

Has the virtual learning option been convenient as an alternative to your student attending school in person?
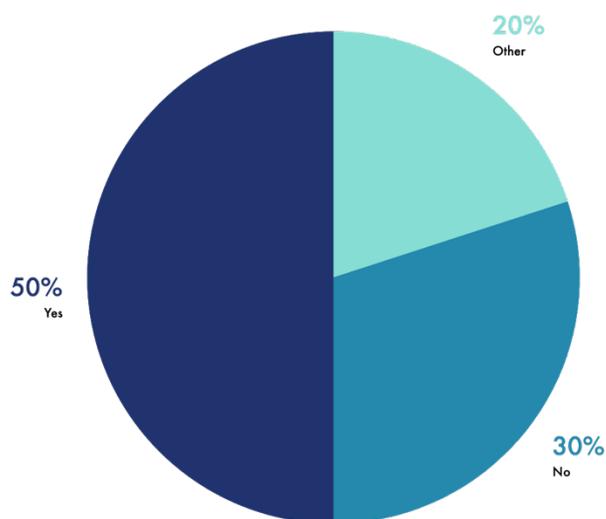
It was evident that there has been some convenience in having this alternative to in-person learning. Half of the parents have found the virtual learning option to be an acceptable alternative, whereas some parents did not. A response that is accounted for in the "Other" option stated that the virtual learning option was not their preference. This parent responded "Yes, to continue learning but no, in person is better for my child."

The last two questions of the first set of questions asked inquired how many hours the students spent on a screen and what the purpose for this screen-time was. The parent responses are shown in Figure 2.

Figure 2

Question 4 of Parent Survey

How many hours per day does your child spend on a screen? This may combine academically and leisurely.

10%
5+ Hours

40%
3-4 Hours

50%
1-2 Hours
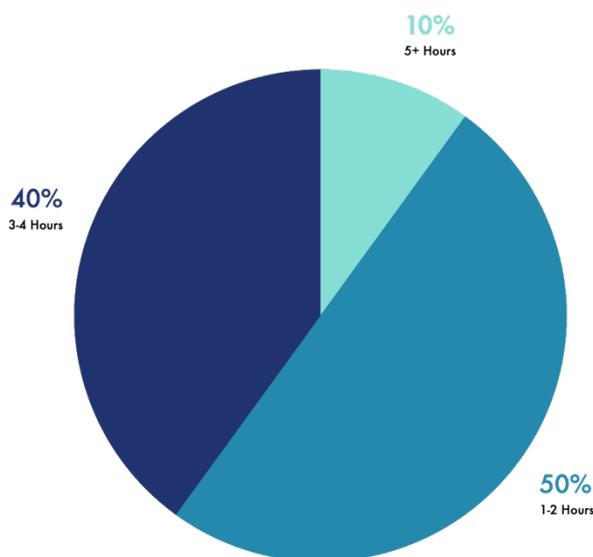
Not specified in this chart is that the question suggested that parents consider the time spent on computers, tablets, phones, televisions, etc. Half of the responses from the parents stated that their child only spends 1-2 hours a day on screens. Four parents responded that their student spends closer to 3-4 hours a day on screens. One parent responded that their student spends closer to 5-6 hours on their screens on any given day. Following this question, parents were asked to specify how these amounts were divided by purpose: academically versus leisurely. The majority of responses stated that regardless of how many hours were spent on a screen, it was evenly split between academics and leisure. One parent responded that it varies, and another responded that screen-time throughout the week is strictly academic and leisurely screen-time is only allowed on weekends.

After this inquiry, the second set of questions that the survey consisted of asked parents to provide more insight into their child's learning experience. These questions were written with

the intention of investigating how the virtual learning experience has played a role in child development, if it has at all. The first question of this set was, "Have you introduced anything within your home to help your child get time away from their screens? If so, what?" Only two parents out of the ten responded that they had not implemented anything new in their home. The other eight responded that they have incorporated things such as more hands on learning, coloring books, painting, book reading, playing outside, playing with siblings, flash cards, games, toys, puzzles, and baking. One parent spoke of how their child is involved in extra-curricular activities outside of the home.

Following this open-ended question were four questions that referred to the three domains of development that are being evaluated in this paper. Each question was phrased "Have you noticed a change in your child's _____ that you believe is a result of virtual learning?" The four questions considered behavior, physical energy, motivation, and self-esteem. In response to any changes in behavior, six of the parents responded no. When responding to any change in physical energy, there was a consensus that there was no change. Some responses specified that any change in physical energy was that their child showed more interest in getting away from their screen. The responses gather about a change in motivation were more varied. Five of the ten responded that there was no change, but a few of the other responses addressed that their child was not as motivated to work when it was virtual. Finally, seven of the parents responded that they had not witnessed a change in their child's self-esteem due to the virtual learning setting. The last question of this section asked the parents if they believe their child's socialization has been hindered due to the current state the educational system is in. Surprisingly, only one parent responded "yes!" and the rest of the responses were no.

Summary

Based upon the parents' responses, there is evidence to support the opposing claims: the use of technology and the virtual learning environment is an acceptable way for children to learn versus it is not an appropriate environment to foster proper learning and development. From a parental perspective, it appears that the majority of parents believe that the virtual learning option has been convenient and has not hindered their child's ability to learn. The parents have not seen significant differences in their child's education and response to learning.

Current Educator Interview

When meeting with the teacher of this classroom, much more insight was given into how the virtual learning alternative is affecting the students, their learning and their development. The majority of the interview consisted of reviewing similar questions that were asked on the parent survey. Other questions were asked to gain information from the educator's perspective. Presented here are a few questions and the received responses:

Me: Do your students involve themselves to the same degree virtually as they do in person? What are major differences?

Mary: Interactions are lacking. Some students the work was done for them or they were told what to do.

Me: Do you believe socialization has been hindered?

Mary: Socialization has not been lacking because it's kindergarten! Four students had speech issues and they were encouraged to participate over virtual meetings such as through show and tell days. I will add that they are *so* happy to see their friends when they come back from a few days of remote learning.

Me: How do you feel at this point in the school year your students have/have not met standards/developmental points?

Mary: My students are pretty on target, due to being in person the majority of the time. The grades above are experiencing lag because they were virtual. 1st grade is struggling because the fourth quarter is huge for kindergarten progress.

Along with these questions, were questions from the survey. These four questions were worded "Have you noticed change in _____?" with the same terms: behavior, physical energy, motivation, and self-esteem. The educator responded that she witnessed no change in behavior and motivation. She did point out that there are times her students clearly want to be done working on computers. In regard to physical energy, she responded more than ever she gets asked "Do we go outside today?" The students' desire to go outside is also amplified by the frustrations they can feel when working on computers. Mary said that irritation and anxiety levels are higher, to the point where the students will just burst out in tears.

Summary

When taking the interview with the current educator into account, it is more definite that the virtual learning environment is not the ideal form for students to be learning. Mary stated that their school has been in person for the majority of the year, which has been helpful all around. She stated that students have learned their limits and get easily frustrated when they feel burnt out. In the interview, there were many points made that support in person learning. There were very few points made that supported a virtual learning option. From an educational standpoint, it was clear that the teacher believes the students are better off in the classroom.

Response

Pertaining to the Cognitive Domain

Out of the three domains discussed in this paper, I believe that the Cognitive Domain is the domain that has been most affected by the pandemic and remote learning. There have been

both positive and negative things that have impacted the Cognitive Domain. Ideally, in person learning opens the door for many more opportunities for the students to learn. In a classroom setting, there is structure and routine that helps establish skills that reside in the Cognitive Domain. Despite this, the virtual learning environment still provides students with the ability to acquire new information and practice their problem-solving abilities, both crucial parts of the domain. When students are in school, they are able to rehearse the skills of the Cognitive Domain more actively. Feedback from a teacher, working with peers, and being given time to concentrate on material are things that lack when the student is forced to work remotely. From the findings of this research, an in person setting appropriately supports the development and growth that is evaluated by the Cognitive Domain (OEC, 2021).

Considering the Physical Domain

Unlike the Cognitive Domain of development, the Physical Domain does not appear to be affected much by a virtual learning setting. Though fine motor skills can lack as the student is not using a pen as much as they are typing or scrolling on a laptop, there are other ways that these skills can be developed at home. Pulling from parent responses, students are still just as active as they were before. Their gross motor skills, walking, running, jumping, standing, etc., have not been put on hold. At such a young age, the students are naturally active. The phrase "they can't sit still" is often associated with children ages 4-7. Based on this idea alone, the children's physical development and growth is not being inhibited by virtual learning (OEC, 2021).

Addressing the Social-Emotional Domain

Based on the findings of the research, the Social-Emotional Domain has not been negatively impacted to a point of concern. Students are still able to practice self-awareness at

home, just as they can in school. Though their interactions with a teacher and their peers have lessened, they are still able to develop skills of the Social-Emotional Domain with their parents, siblings, other caregivers, neighbors, etc. I would venture to say that this is the domain that could be evaluated more accurately once things "return back to normal." Due to students being out of the classroom, they are not as required to sit and follow as many rules or instructions. Once students return to this entirely, I believe that there may be issues of behavior within the Social-Emotional Domain that will need addressed. Beyond this, the teacher interviewed pointed out how stress and anxiety levels are higher. This requires more attention to be given to the Social-Emotional Domain (OEC, 2021).

Conclusion

Overall, students are still progressing in each of the domains discussed in this paper. When evaluating the short-term effects of the virtual learning that the education system, they appear to be manageable and addressable. It is hard to say if there will be any effects or lack of development that will surface in the next coming years from this time of remote learning and heightened use of technology. Concluding, it is a relief for educators and parents that their students are learning and growing despite the inconsistency and unknowns of the past year.

Approaches for Educators

Educators have encountered many challenges since the pandemic hit. As Mary can speak for many, "Last year was very stressful because we weren't very sure of what was expected or what to do…" Despite the challenges, the majority of educators have brainstormed anything they can do to bridge the gap virtual learning creates. Through helping parents and caregivers navigate the use of technology, encouraging their students through creative means, making guidance videos for parents and students, to learning new devices so that they can effectively

communicate, teachers have tried it all. As educators continue in these efforts, they can be given much credit for why the virtual learning setting is not hindering learning and development as much as it was feared it could at the start of all of this.

Advice for Parents and Guardians

Along with the pandemic challenging educators, it has also challenged parents and guardians to step in on behalf of the teachers for their child's education. Credit can be given to each parent, those who have implemented new things in their home, helped students not only with homework but get into class meetings, motivated their children to do classwork, encouraged their students to take a break and play, etc. The pressure has been on both educators and parents to do all they can to help their student achieve success through growth in all areas. It is important that educators and parents alike remain positive for the sake of the child. With an appropriate mindset, learning will be fostered, and development will ensue.

Future Research

As these circumstances are still new to the education system, there is much research that can be conducted moving forward. A recommendation of future research would be for similar research conducted in this study to be done on a school that practiced a different model or blended model. This Northeast Ohio school has been able to continue in person learning for the majority of the 2020-2021 school year. School districts across the state of Ohio have taken a variety of approaches to learning. Studies could be done on districts that were completely remote, entirely in person, or different blended models.

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Appendix A

Parent Survey Questions

1. How old is your student?

2. Did your student attend preschool before this school year?

3. Has the virtual learning option been convenient as an alternative to your student attending school in person?

4. How many hours per day does your child spend on a screen? This may be a computer, tablet, phone, television, etc.

5. How many of these hours are spent academically versus leisurely? Please state both amounts.

6. Have you introduced anything with your home to help your child get time away from their screens? If so, what?

7. Have you noticed a change in your child's BEHAVIOR that you believe is a result of virtual learning?

8. Have you noticed a change in your child's PHYSICAL ENERGY that you believe is a result of virtual learning?

9. Have you noticed a change in your child's MOTIVATION that you believe is a result of virtual learning?

10. Have you noticed a change in your child's SELF-ESTEEM that you believe is a result of virtual learning?

11. Do you believe your child's socialization has been hindered due to the current state the educational system is in? Please explain.

Appendix B

Current Educator Interview Questions

1. What has your classroom looked like so far this year? In person? Virtual?

2. How did the transition to virtual learning affect you?

3. When learning virtually, what approach do you typically take with instruction?

4. Do your students involve themselves to the same degree virtually as they do in person? What are major differences?

5. Do you believe socialization has been hindered?

6. How do you feel at this point in the school year your students have/have not met standards/developmental points?

7. Have you noticed change in BEHAVIOR?

8. Have you noticed change in PHYSICAL ENERGY?

9. Have you noticed change in MOTIVATION?

10. Have you noticed change in SELF-ESTEEM?

11. What has the general response been from students?

12. What has the general response been from parents?

13. Any other general responses or insight for me: