Student Achievement: Mobile Devices in the Classroom Setting?

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Abstract

The purpose of the study was to determine if there was is a significant difference in student achievement between students who use mobile devices and students who do not use mobile devices in district classroom settings. The findings of this study will be used to help shape district policy regarding the use of mobile devices by students in the classroom setting. The study uses the School District composite ACT scores from graduating seniors during the school years of 2011-2015 were used to determine where or not student achievement is declining due to the increased use of mobile devices by students. The data for this study was obtained from the DESE archives. The data was separated by students where were allowed to use mobile devices and students who were not allowed to use mobile devices and a t-test was conducted to see if there was a significant difference in student achievement. The study concluded that there was a slight increase in composite ACT test scores among students that were allowed to use mobile devices in district classrooms settings, however, the increase is not statistically significant.

Introduction

Background, Issues and Concerns

The use of personal mobile devices such as cell phones, laptops, and various types of tablets has grown exponentially across the world. This technology has reached and is being used by nearly every age group from toddlers to the senior citizens. The most widespread use of personal mobile devices comes from today's youth who are especially tech savvy are constantly plugged in to global networking. Texting, social media, gaming from these devices are just a small part of how these devices can be used. If used correctly in a school setting these devices would make it possible to have every type of information at students and teachers fingertips and could be used in the classroom to reinforce learning. In order for mobile devices to be a viable learning resource in the classroom, additional education for teachers and students on acceptable use will be needed.   A study was conducted at a school district to see whether the uses of mobile devices affected the ACT scores of graduating classes in the school years 2011-2015. District policy allowed the use of personal mobile devices in district buildings the years 2011-2012 and 2012-2013 and banned the use of personal mobile devices 2013-2014 and 2014-2015. This study will show whether or not personal mobile devices in a school setting affects student achievement and whether or not teachers and students see personal mobile devices as a good learning resource in the classroom. The study concluded that there was a negative effect on the outcome of average composite (comprehensive math, ELA, science, and reading) ACT scores in the district.

Practice under Investigation

The practice under investigation will be the school district's policy on banning the use of personal mobile devices and whether or not it affects student achievement. Prior policies allowed the use of personal mobile devices in district buildings by students. An investigation will be performed to see if there is a direct correlation between the uses of personal mobile devices and student achievement and whether or not students and teachers find personal mobile devices as a viable educational tool that could be used to enhance student learning.

School Policy to be Informed by Study

Finding an acceptable use of personal mobile devices in schools as a meaningful and practical educational resource is an important step teaching students in today's technology driven society. In addition it is important for teachers and students alike to have the proper education to use personal mobile devices efficiently in the classroom to improve student achievement. Revamping the District's policy on the professional development of teachers to improve their use of technology such as personal mobile devices in their classrooms would help students learn to properly use technology as an educational tool instead of being a distraction from learning.

Conceptual Underpinning

Student achievement is an issue which is at the forefront of every district. Limiting unneeded and undesirable distractions would lead to better behaviors and student achievement

in classroom. Banning personal mobile devices in school is not a feasible task in today's technological society. Instead educators need to embrace the technology that most students possess and use it to their benefit to help stimulate the intellect and imagination that technology can create. By teaching students the proper way to use technology to their educational advantage we can help them develop, grow, and expand the skills that they will need to be successful in the 21st century. The success of personal mobile devices in the classroom will be determined by the training of the teachers and their willingness to accept it into their classroom. In theory, personal mobile devices, with the proper guidance from the teacher will increase student achievement and prepare them to enter into higher educational institutions or the work force with a better understanding of the global technology community.

Statement of the Problem

If the use of personal mobile devices negatively affects student achievement in schools, district administration and teachers need to improve classroom management and teaching techniques through professional development to help students develop proper use of personal mobile devices as an educational tool. Most students have access to mobile devices throughout the day; teachers need to be able to guide students into acceptable use of these mobile devices for educational purposes.

Purpose of the study

The purpose of this study is to determine if allowing mobile device usage in schools affects student achievement. This information will be presented to district administration to present to the school board to determine the acceptable use of mobile devices in the school district.

Research questions

RQ#1: Is there a significant difference in student achievement between students who use mobile devices and students who do not use mobile devices?

Null hypothesis

Ho: There is no significant difference in student achievement between students who use mobile devices and students who do not use mobile devices.

The results of this study will help school administrators and school board members determine the acceptable use of personal mobile devices in the district's educational setting. By eliminating possibly distracting personal mobile device practices teachers and administrators could raise student achievement in the district.

Definition of Terms

- DESE – Department of Secondary and Elementary Education - This is the governing body for K-12 education in Missouri.

- GPA – Grade Point Average – a measure of scholastic attainment computed by dividing the total number of grade points received by the total number o credits or hors of course work taken.

- Mobile Device – defined as a portable computing device such as a Smartphone or tablet computer.

- ACT – The ACT is a national college admissions examination that consists of subject area tests in: English, Mathematics, Science, and Reading.

- DESE – Department of Elementary and Secondary Education

- Hyperconntectivity - is a term invented by Canadian social scientists Anabel Quan-Haase and Barry Wellman, arising from their studies of person-to-person and person-to-machine communication in networked organizations and networked societies.

Student Achievement: Mobile Devices in the Classroom Setting

Summary

A study was conducted to determine if student achievement is affected by district policy that allows students to carry personal mobile devices in the classroom. If the study concludes that personal mobile devices affect student achievement then possible solutions to raise student achievement with the use of personal mobile devices will be presented to the administration. Many students in the district own and carry personal mobile devices so there needs to be clear and concise policy instituted on acceptable use of technology. Possible solution could range from banishment to improving Professional Development of district staff in order to better utilized technology in their perspective fields. Through developing better classroom management and teaching techniques educator raise student achievement and better prepare students for success in a society driven by technology.

Student Achievement: Mobile Devices in the Classroom Setting

Review of Literature

One of the great struggles in education today is the implementation of technology in the classroom. School districts are limited by the amount of technology they can provide teachers with in their classrooms. Some of the reasons for this are because of lack of technological infrastructure, cost of technology (i.e. IPad, Smartboards, Computers, etc.), and lack of professional development for teachers to use technology in classrooms. A large percentage of students own their own personal mobile devices and have the knowledge to use them better than most educators. Should students be able to use their mobile devices to facilitate their learning in the classroom or does the distraction they mobile devices cause outweigh their potential benefits? Does the distraction they cause have a negative effect on student achievement or through professional development of educators can we teach student how to properly use these devices to aide in their education? These questions are just a few that educators face with an ever growing increase in personal mobile devices.

District policy in has recently changed to a banishment of personal mobile devices on school grounds from 7:30 a.m. - 4:00 p.m. due to an increase in undesirable student behaviors using these personal mobile devices. "One of the more difficult rules to negotiate in schools is that of appropriate use of technological devices, particularly mobile devices such as cell phones, smart phones, and "wired" mp3 devices." (Charles 2012, p. 2) When setting district policy for the use of such mobile devices it is important to take into consideration the viewpoints of all stakeholders in the educational community. Instead of instructing teachers on how to best use mobile technology in their classrooms it has become the norm to completely remove this valuable instructional tool altogether.

Student Achievement: Mobile Devices in the Classroom Setting

Professional development on the proper use and management of mobile technology in the classroom is one of the biggest barriers. Teachers need to be trained on how to use mobile technology at their disposal because it is almost certain that the students have a better grasp on the capabilities of mobile devices than classroom teachers. "Previous researchers have indicated that school districts offered insufficient professional development to ensure meaningful technology integration." (Grant 2015, p. 39) Teaching students to properly use personal mobile devices should start early in students educational process. Students are starting to get mobile devices that connect them with internet access and social media at an early age. "In 2012, Project Tomorrow, which surveys and tracks student ownership and use of mobile computing devices, reported that 18% to 49% of all school-aged children in kindergarten through 12th grade, respectively, owned cell phones with no Internet access and another 17% to 50% owned smart phones with Internet access." (Grant 2015, p. 32) If professional development targeted students in an early age educators could start teaching the educational advantages that mobile computing devices offer.

Early intervention into the proper uses of mobile technology in schools is imperative to successful integration of technology in schools. Most teachers view mobile devices as a distraction to the educational process so they steer their instruction involving technology toward a teacher driven approach that allows little creative freedom. "Another aspect of this barrier appears to be the enduring image of what successful technology us by teachers is – which is linked to an information delivery approach, versus a student centered, assessment for leaning approach." (Daniels, Jacobsen, Varnhagen, & Friesen 2013, p. 4) Advancements in mobile technology has given student unlimited potential for creative thinking if used properly.

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In order to get the professional development that teachers need to fully implement the use of mobile technology in their classrooms, they need to have the backing of the district administration. This includes sending teachers to professional development trainings, school in-service training, up-to-date technology, acceptable use policies, and a competent technology infrastructure. This seems like a tall order with all of the adversity that most districts face, but this can be a process that is put in place over time. "Typically, these barriers are described in terms of the types of resources (e.g., equipment, time, training, support) that are either missing or inadequately provided."(Grant 2015, p. 33) Most schools cannot afford to put a one-on-one student to device ratio in place all at once which is why it is so important to teach students the proper way to use personal mobile devices for learning in classrooms. Educational tools such as Study Island, Edmodo, and Renaissance Place are just few examples of relatively cheap academic software programs that run on many types of mobile devices to engage young students through game based social learning. Once a technology program is in place and the teachers think that the students have learned to properly use the technology and have a basic rules and expectations set by the teachers, the teachers should slowly let students work more independently on mobile devices. In later years in the student's education this will lead to better student/teacher trust working with mobile devices in the classroom. "By using mobile learning, the educator can promote three different types of literacy…first is understanding information access, second is understanding the new sense of space, and the third is understanding hyper connectivity." (Skiba 2011, p. 195)

Students should be included in the conversation when it comes to making rules concerning the use of mobile devices in classrooms. If student thoughts and considerations are taken into account when policies are made about the use of mobile devices they are more likely

to follow the rules that they help make and the more likely they will correct students that are breaking the rules. If these rules are put in place at a young age in lower elementary school it would give students a better understanding of digital social standards. "Agency, self-directed action, occurs within relations of power, discordant or dissimilar groups of people (such as, adults and teen) can often work together to find consensus." (Charles 2012, p. 3) If rules are to be made by all stakeholders they need to be clear and concise with equal and fair consequences for everyone. This also helps out the teachers and helps to develop a mutual respect in overall classroom management.

Even with continuous oversight from teachers there is still a need for supervision when it comes to mobile device use in classrooms especially in upper grades. Social networking, chatting, and gaming are just a few of the concerns that teachers face when students are using their own personal devices. Social media can lead to a plethora of problems, both legal and emotional, if not kept in check. "Instructional technology, as its name implies, serve the purpose of instruction; whereas social media is open to the public, and can start a wildfire if used inappropriately." (Wang 2013, p. 3) This is where district oversight comes into play. Building Wi-Fi ran by the district Informational Technology Director with built in firewalls to prevent students from accessing social media and gaming sites can go a long way in combating undesirable behaviors from causing educational distractions. The main problem with students using school Wi-Fi is making sure their mobile devices are connected to it and not to their personal data plans. Providing teachers professional development to plan, implement, and manage mobile devices in the classroom, it would help alleviate the potential distraction that mobile devices may cause.

Research Design

A correlation study was conducted to see if school policy allowing students to carry personal mobile devices in schools lead to a decrease in student achievement. The independent variable was if the student used a mobile device or not during learning sessions. The dependent variable was student achievement. If it is found that the use of personal mobile devices negatively affects student achievement then administration will be informed and given possible alternatives to alleviate the decline in student achievement.

Study Group Description

The senior class student records from the District were used from the last four school years 2011-2015 to determine if the change in student achievement once personal mobile devices were allowed to be carried by students. Students who attended the District in the school years of 2011-2012 and 2012-2013 were allowed to carry mobile devices in district building throughout the school day. Students from 2013-2014 and 2014-2015 were not allowed to carry mobile devices. The district has a free or reduced-price lunch rate in the range of 50% per year. Ethnicity is predominantly white averaging around 97% with the remaining 3% being a mix of various ethnicities.

Data Collection and Instrumentation

District report cards archived with Department of Elementary and Secondary Education from the school years 2011-2015 were used to determine the overall change in composite ACT scores.

Statistical Analysis Methods

Microsoft Excel and ASP was just to analyze the data obtained from the District Report Card form the DESE website to determine if there was a significant change in the overall student achievement from years where mobile devices were allowed in district buildings to years where mobile devices were banned from district buildings. A t-test was used to conduct descriptive analysis of the variables.

A t test was conducted to see if a there was a performance difference on the ACT from the years of 2011-2015. This study would help to determine the research question, "Is there a significant difference in student achievement between students who use mobile devices and students who do not use mobile devices?" The following charts will show the findings of the test and to illustrate the raw data collected from the DESE archives in 2011-2015.

Figure 1

t-Test Analysis Results for 2011-15 ACT Scores w/ and w/o Mobile Devices

| Source	Mean	Mean D	*t*-test	df	*p*-value
Devices (51)	21.15				
No Devices (67)	20.45	.7	.41	2	.72

Note: Significant when p<=0.25

Senior class ACT test scores from the years of 2011-12, 2012-13, 2013-14, and 2014-15 were taken from the DESE website to determine if there was a difference in scores from the years of 2011-12 and 2012-13 when the students were allowed to have mobile devices in district buildings and 2013-14 and 2014-15 when students were not allowed to carry mobile devices. The dependent variable is the ACT test scores and the independent variable is the use

of mobile devices. The Mean X (scores of students not allowed to carry mobile devices) - Mean Y (scores of students allowed to carry mobile devices) for the ACT Scores was 0.7. The t-Test was 0.41, the degrees of freedom was 2. The null hypothesis states that there is no significant difference in student achievement between students who use mobile devices and students who do not use mobile devices. The null hypothesis was not rejected because the p-value, 0.7, is higher than the alpha level, 0.25. There was an increase in student achievement; however, the increase is not statistically significant and may be due to varying academic achievement between classes.

Figure 2

Composite ACT Scores
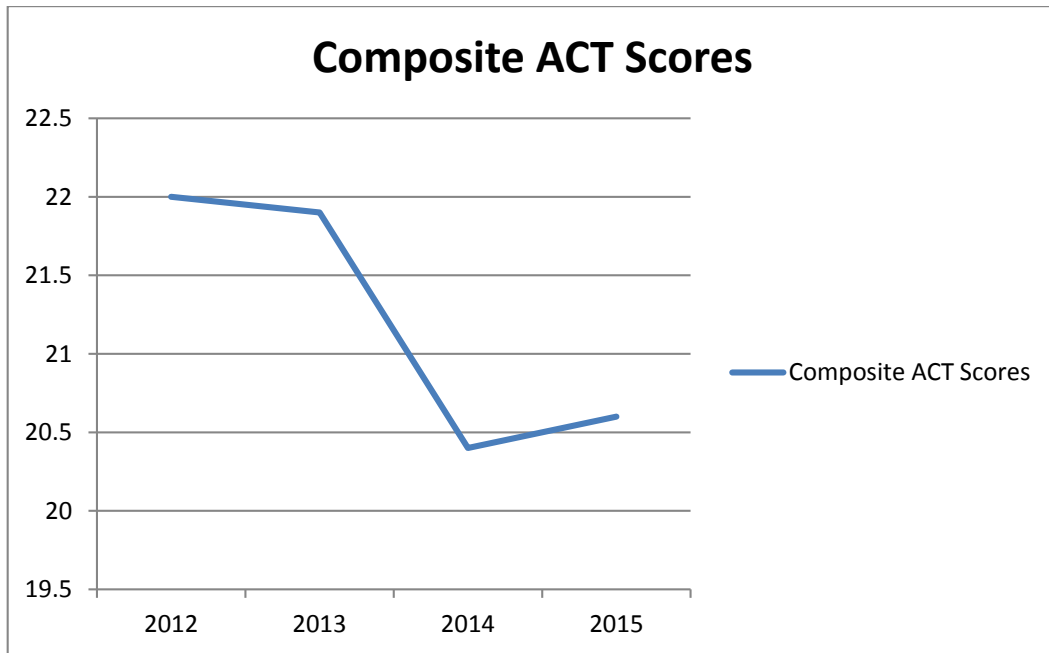
This chart shows the improvement in Composite ACT scores for the district school years 2012 to 2015. Graduating seniors in the school years 2012 and 2013 were at or above the State of Missouri average Composite ACT Scores. The improvements in Composite ACT scores for the following two years were at least one full higher than the Missouri average Composite ACT Scores. All students in the graduating classes of the Districts High School are required to take the ACT as a graduation requirement.

Conclusions and Recommendations

This study was conducted to find out if there was a significant difference in student achievement between students who use mobile devices and students who do not use mobile devices. The findings of this study show that there is a slight increase in student achievement among students that are allowed to use mobile technology in district classrooms settings. .However the findings of this study is only based on the scores from one standardized national test. District MAP and EOC scores could also be used to compare data, but only selected grades such as 8th, 9th and 12th take MAP and EOC tests and only in certain subjects. These tests did not give a big enough sample size to determine if the use of technology had an effect on student achievement so the Composite ACT Scores were used instead. Though the t-Test showed an increase in student achievement \we cannot conclude that the use of mobile devices has a great effect on student achievement. There are many variables that could lead to a drop in standardized testing scores such as new testing formats (i.e. computer based tests v. hand written tests, class academic achievement levels, ect.)

The conceptual underpinning stated that personal mobile devices, with the proper guidance from the teacher will increase student achievement and prepare them to enter into higher educational institutions or the work force with a better understanding of the global technology community. Teachers need to continue their professional development to better understand how to use mobile devices in the classrooms to raise student achievement. Banning mobile devices is not the answer, today's society is technology driven and students need to have a firm grasp on technology to be competitive in today's job markets. By teaching students to better understand the capabilities of mobile devices to enhance their lives and teaching them

the implications of how improper or undesirable uses of technology can have negative long lasting effects on their lives we can help them to be better prepared to handle the challenges that are ahead of them.

The only way to have successful integration of technology in the classrooms is with the combined effort of administration, staff, and students who have a mutual respect and desire to learn how to use mobile technology together to create a more cohesive and positive technology culture. To do this teachers need the provided professional development that is required to incorporate positive technology use in their classrooms with the clear and concise guidance from policies created by all stakeholders. Mobile technology is going to continue to evolve and we need to be prepared to evolve with it to help us increase student achievement and improve the chances that students are prepared to be able to compete in a global learning community.

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