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Preservice Teachers' Perceptions of Using iPads with Students with Learning Disabilities

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Abstract

Preservice teachers reflected on their experiences teaching mathematics to ten students using iPads. The students had learning disabilities and were tutored over 5 consecutive weeks. Teachers reflected weekly for 5 weeks then responded to an online open-ended survey regarding their overall teaching experience. Findings suggest that the experience allowed preservice teachers to gain helpful insight, knowledge, and ideas on how to use iPads as an instructional tool.

Keywords

Students with Special Needs, Learning Disabilities, iPads, Qualitative Research, Preservice Teachers

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Preservice Teachers' Perceptions of Using iPads with Students with Learning Disabilities

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Preservice teachers reflected on their experiences teaching mathematics to ten students using iPads. The students had learning disabilities and were tutored over 5 consecutive weeks. Teachers reflected weekly for 5 weeks then responded to an online open-ended survey regarding their overall teaching experience. Findings suggest that the experience allowed preservice teachers to gain helpful insight, knowledge, and ideas on how to use iPads as an instructional tool. Keywords: Students with Special Needs, Learning Disabilities, iPads, Qualitative Research, Preservice Teachers

Technology has become an integral part of K-12 classrooms in the 21st century. More and more schools are embracing the latest technology such as iPads to inspire teaching and learning. With the increasing use of iPads in education it is important to examine the perceptions of users to gain insight about the value of using this device. Technology integration in the classroom involves two important stakeholders: the teachers and the students, and so it is important to understand their beliefs and views (Li, 2007). To ensure successful integration of any type of technology device for teaching and learning, it is important to make sure that the user is comfortable, has the desire to use technology and has an understanding of how to use the technology; successful integration of iPads would be no different. Understanding how to best integrate rapidly changing technology into instruction requires constant learning (Beglau, 2011) and so we must prepare our preservice teachers to keep up with the change.

Although there has been research related to the effectiveness of using iPads in K-12 classrooms, the research related to preservice teachers' perceptions of using iPads with students with learning disabilities is limited. The purpose of this qualitative study was to understand the value of using iPads to support teaching and learning of students with learning disabilities from the perspectives of preservice teachers. From the data collected from ten preservice teachers involved in this study, four themes were developed that included (a) benefits of using iPads; (b) limitations of using iPads; (c) building relationships; and (d) teaching and learning.

Literature Review

Preservice Teachers, Teacher Education Programs and Technology

Teachers play an important role in helping students learn (Mart, 2013). With the advancements in technology, the ways in which students prefer to learn has changed. Hence, preservice teacher education programs should be able to prepare teachers to teach students growing up in a technologically evolving world (Finger, Jamieson-Proctor & Albion, 2010). Preservice teachers who go through technology-enriched teacher education programs are more likely to integrate technology in their classroom (Lambert & Gong, 2010). Also, providing preservice teachers' access to technology that they will encounter in the schools helps to improve their self-efficacy which is closely linked to attitudes toward technology (Teo, 2009). To meet the learning needs of 21st century students, teachers must know how to integrate 21st century knowledge and skills into their classroom practice to ensure positive learning outcomes for students. Hence, it is important to support them in mastering the competencies of 21st

century knowledge and skills (Greenhill, American Association of Colleges for Teachers, & Partnership for 21st Century, 2010).

Teaching, Learning and iPads

Portability of iPads combined with the features of iPhone and iTouch makes them appealing to K-12 teachers and students (Prensky, 2010). iPads also allow immediate access to information and opportunities for communication, collaboration, creativity, convenience in addition to ease of use, portability, and light weight (Koszalka & Ntloedibe-Kuswani, 2010; Johnson, 2013) which makes them a favorable tool for teaching and learning. Studies related to iPads have been conducted in several areas of education such as Literacy (Beschoner & Hutchison, 2013; Getting & Swainey, 2012; Simpson, Walsh & Rowsell, 2013), special education (Johnson, 2013; O'Malley, Lewis, Donehower, & Stone, 2014; McClanahan, Williams, Kennedy, & Tate, 2012; Flower, 2014) and STEM fields (Aronin & Floyd, 2013; O'Malley et al., 2013; Haydon et al., 2012) to name a few. Researchers have also focused on specific aspects such as motivation, self-expression and independence (Flewitt, Kucirkova, & Messer, 2014; Ciampa, 2014), engagement (Hutchison, Beschoner, & Schmidt-Crawford, 2012), and differentiation (Milman, Carlson-Bancroft, & Boogart 2014; Powell, 2014).

Students with Special Needs and iPads

In the year 2013-2014, about 13% of all public school students between the ages 3-21 received special education services and 35% of them had specific learning disabilities (Kena et al., 2016). Students with special needs often require different accommodations, modifications and assistive technologies in order to access the curriculum. Implementation of iPads has opened up new avenues for all students to interact and explore technology in the classroom. Johnson (2013) surveyed twelve special education teachers and teacher assistants regarding the use of iPads with children with special needs and found that they had positive experiences of using iPads with children with autism, attention deficits and limitations of fine motor skills and frequently used iPads to promote literacy skills. They also reported that the use of iPads enhanced student motivation and had the potential to individualize instruction.

As noted by Spooner, Ahlgrim-Delzell, Kemp-Inman, and Wood (2014) portable devices such as iPads provide easy access to information and are much easier to use with students with disabilities. Neely, Rispoli, Camargo, Davis, and Boles (2013) compared academic instruction delivered using iPad versus traditional teaching methods for two students with autism and found that using iPads helped to reduce behavior problems and increased academic engagement. Also, iPads are considered socially acceptable which makes them less stigmatizing for special needs students (Kagohara et al., 2013).

In contrast to the studies that had positive results regarding increase in participation and concentration, Arthanat, Curtain and Knotak (2012) in their study, found that three out of four students involved in their study showed no change in participation when they were assessed using an iPad. This conflicts with the results of studies which show a definite increase across the board in participation and concentration. However, all four students in this study did progress academically.

Availability of the accessibility features built into the iPads help students with special needs to perform tasks that might not have been possible in the past (Shah, 2011) and these features also help students with communication disorders, cognitive delays, autism, fine motor skills etc. (Cochrane & Welsford, 2011). Watts, Brennan, and Phelps (2012) also believe that iPads have the ability to significantly impact teaching and learning for students with special needs. Haydon et al. (2012) found that students with emotional disturbance benefitted from

using iPads because of the immediate feedback which encouraged them to continue the task improving engagement. O'Malley et al. (2014) found iPad to be an effective instructional tool for students with autism spectrum disorder. The use of iPads increased students' independent productivity and task completion.

Math and iPads

Kiger, Herro, and Prunty (2012) investigated the effects of a nine-week mobile learning intervention for elementary students learning multiplication and found that students that adopted the mobile learning intervention concept outperformed the comparison students on a post-intervention multiplication test. Carr (2012) investigated the impact of iPad use on fifth-grade students' mathematics achievement over the course of one academic quarter and found that the change from pretest to posttest was not significantly different between the experimental and control groups, however, both groups did improve their math performance scores. Kearney and Maher (2013) in their research related to the pre-service math teachers' use of iPads for professional learning found that iPads enhanced their awareness of math in everyday context and prepared them for math activities for the classroom. Haydon et al. (2012) compared the effects of using worksheets versus iPads on math fluency and academic engagement of high school students with emotional disturbance. They found that the students who used iPads solved more math problems and demonstrated higher levels of engagement. O'Malley et al. (2013) researched the effect of using a basic math skill application to increase basic math fluency of students with moderate to severe cognitive disabilities. They found the math app to be effective and it allowed students to make progress toward learning goals and improved their interest.

It is important to note that there is substantial literature regarding the use of iPads with students in general and with students with special needs. However, there is limited research regarding preservice teachers' perceptions of using iPads with students with learning disabilities which supports the need for this study.

Methods

Research Design

Qualitative researchers are interested in understanding the meaning people have constructed and the experiences that they have in the world, rather than testing any existing concept, hypotheses or theories (Merriam, 1998). This qualitative study was conducted to understand how preservice teachers involved in the study perceived the use of iPads in teaching math to students with learning disabilities.

Description and Setting

This research took place over a five-week period during which ten teacher candidates enrolled in undergraduate education programs at a southern university tutored math to ten students at a local high poverty elementary school. At the time of the study, 89% of the students were on free and reduced lunch which qualified the school as a high-poverty school.

The students tutored had specific learning disabilities; they were below grade levels in math and had below average scores on Measures of Academic Progress testing in mathematics. They were tutored at the local school, for two hours each week using ten free math apps that aligned with the math content standards and the abilities of the students. The apps were used in addition to the traditional teaching methods to support their understanding of the math

concepts. During the tutoring sessions, the teacher candidates used apps such as Chalkboard, Division for Kids, Division Wiz, Grade 4 Math, iTooch, Math Animations, Number Frames, OoO Calc, Splash Math, and Y Homework to address the math standards and topics provided by the classroom teacher at the beginning of the project.

Participants

Participants for this study included eight female and two male teacher candidates from a university in the south and ten students from a local elementary school enrolled in a self-contained fourth grade classroom. The selection of the teacher candidates involved in this study was based on their successful completion of a technology course and their enrollment in a math content course to make sure they knew how to use different educational apps with math content.

Ethics and Consent

The project was approved by the university Institutional Review Board. Participants were required to fill out informed consents prior to the beginning of the project. To protect the privacy, confidentiality and anonymity of the participants, no names were required during the data collection process. The weekly reflections were assigned numbers instead of names and the teacher candidates used pseudonyms when referring to their students in the weekly reflections. Informed consents for the students tutored were filled out by their parents.

Data Collection

Data for this study was collected through 5 weekly reflections, 5 weekly lesson plans and an open-ended survey. Teacher candidates were required to create a weekly lesson plan addressing the math topic, the standard and the app that was to be used during the week and the reason for choosing the app. They were also required to reflect on their tutoring experience each week focusing on whether or not the app was effective and if they had to make any changes for the following week. At the end of the five weeks, they completed an open-ended survey regarding their overall teaching experience. The research question that guided this study was: How did the preservice teachers involved in the study perceive the use of iPads in teaching math to the students with learning disability? The following questions were used to obtain data about their perceptions:

1. What are the benefits and limitations of using iPads with students with special needs?
2. What type of problems did you come across if any, when using iPads with the students?
3. What did you learn about yourself as a teacher when using iPads with students?
4. What did you learn about your students when using iPads with them?
5. Share your overall experience of using iPads with students with special needs.

Data Analysis

Data analysis for this study began with reading and rereading the answers to the questions from the survey, weekly reflections and the content of the lesson plans. The lesson plans were analyzed to see how teacher candidates had used different apps in conjunction with math topics and the standards to deliver the content. Data from the reflections and the survey responses was analyzed by looking for common words and phrases that had the same

underlying meaning. The commonalities were then grouped together (Merriam, 1998) under relevant themes. For example, the responses such as “technology can be a great supporting tool” and “allow [allowing] the students to explore math while using the iPad allowed them to take knowledge to a whole other level” were grouped under the theme “Benefits of using iPads.” The process was repeated till all the data was categorized under relevant themes. At the end, the following four themes emerged from the data: benefits of using iPads; limitations of using iPads; building relationships; and teaching and learning

Rigor and Trustworthiness

Lincoln and Guba (1985) suggest concepts of credibility, dependability, confirmability, and transferability as measures to judge the trustworthiness of a qualitative research. Doing so, establishes the consistency, and accuracy of the data and ensures that the findings and conclusions reached are not misinterpreted or reflect researcher’s biases but are supported by the data collected. To ensure trustworthiness, the researcher used three different sources of collecting data, supported the findings with direct quotes from the participants, and maintained an audit trail to document every aspect of the research from start to finish.

Findings

Benefits of using iPads

One of the major benefits of using iPads in this study was the convenience of having all teaching and learning materials in one place on the iPads and the teacher candidates did not have to worry about bringing extra things such as worksheets, manipulatives etc. The immediate feedback feature built into the math apps used during the lessons made it easier for the teacher candidates to individualize instruction as the students were able to rework the problems at their levels step by step by looking at their mistakes. Another benefit was that the iPads provided students an opportunity to work independently with some initial assistance from the teacher candidates which allowed more time to teach and reach all students. As one of the teacher candidate indicated: “The benefits of using the iPad [iPads] were the activities that the apps provided. It allowed the students to find the motivation and do the math” indicating that the students did not have to rely heavily on the teacher to motivate them to solve the math problems because the apps were motivators themselves which in turn allowed teacher candidates more time to help other students.

Limitations of using iPads

One of the major limitations of using iPads in this study was the scarcity of free apps. Since the teacher candidates were required to use free apps only, it was little difficult to find a whole lot of apps that were free. They ended up spending a lot of time searching for free apps and making sure that the apps were related to the math content standards that teacher candidates were required to address. They also found that some of the free apps had a limit on the number of problems that students could solve per day. However, they did find the free apps very useful because they were aligned with the math content standards and helped them teach students the basic math skills such as order of operations, expressions, multiplication and division that they were required to learn. As one teacher candidate commented: “The free version of Splash Math only allows for 20 problems per day, which if you only have a few iPads and more children than they will get used up fast” which supports that the free apps were limited in terms of the number of problems that they offered for free. Among the other limitations indicated by the

teacher candidates were technical issues such as slow internet speed and battery life which at times hindered teaching and learning.

Building Relationships

Teacher candidates noted that regardless of the teaching approach or technology used, the most important thing that helped them to teach the students was building relationships. The best way in which the teacher candidates were able to build relationships with the students was by communicating and providing them opportunities to explain what they were struggling with. Another way in which the teacher candidates were able to build relationships with students was by showing interest in their lives which assured the students that the teachers were not only interested in them knowing the content but they also cared about them as human beings. Being patient with the students, using different ways to explain the content, asking students how they could help them, being more flexible in their teaching approach, making the content more interesting using different types of apps, considering the different learning styles, figuring out why the students were struggling and not giving up on them were among the things that helped the participants teach the students. One of the teacher candidate commented: "I learned how important it is to build relationships with your students. They will trust you and work with you when you do" which confirms that knowing your students and building that connection can make a huge difference and make teaching and learning more comfortable.

Teaching and Learning

Teacher candidates indicated that the implementation of iPads during the tutoring sessions positively impacted student productivity, engagement and excitement. They expressed that the use of different math apps increased student fluency, increased mathematical understanding, critical thinking and problem solving. The iPads acted as an aid to teach a concept which otherwise was harder for them to teach. With the use of iPads in addition to the traditional teaching methods, students were able to learn or re-learn concepts that they previously did not know or understand. The iPads provided an alternative way for teacher candidates to teach the math concepts and reach all types of learners visual, auditory and kinesthetic. Direct instruction using the iPads helped them to provide that one on one instruction that the students needed to master math skills. Teacher candidates took time to notice what each student was struggling with and were able to adjust instruction to cater to the individual student making teaching and learning more productive. As one of the teacher candidate commented: "I think that iPads are very effective in a classroom and should be used as much as possible to supplement lessons" indicating that the use of iPads in addition to the traditional teaching strategies did help with the teaching and learning process. Another teacher candidate commented: "I believe the iPad use and the more individualized instruction is helping them tremendously" which suggests that the use of iPads also provided opportunities to individualize instruction.

Conclusion/Discussion

This research was conducted to understand ten preservice teachers' perceptions of using iPads to teach math to students with learning disabilities. Overall, the participants had a positive and enlightening teaching experience using iPad as a supplement in addition to the traditional teaching methods. Nevertheless, they indicated that regardless of the teaching approach with or without technology, building relationships with the students was an important factor for successful teaching experience. Despite the limitations regarding the availability of free apps,

the participants indicated that the apps that were available did help students with their basic math skills such as order of operations, expressions, multiplication and division. It is important to note that just as any other device, iPad is just a tool to deliver the curriculum, and the success depends on supportive and prepared teachers who use the tool (Keane, Lang, & Pilgrim, 2012). Similar to the results of the study conducted by Kearney and Maher (2013) the participants in this study also indicated that the teaching experience made them feel more prepared and comfortable to use iPads in their future classroom. They believe that technology when combined with effective pedagogy and clear understanding of the learning needs of the students can benefit both the teacher and the student.

Limitations

Although this study has some notable findings there are some limitations. The results only reflect the perceptions of preservice teachers involved in the study. The small sample size and the short duration of this study warn against the generalization of the results. More research with a larger sample size and longer duration is recommended to fully understand the perceptions of preservice teachers regarding the use of iPads with students with learning disabilities. Furthermore, similar studies from the perspectives of in-service special education teachers can shed more light on the effectiveness of using iPads with students with learning disabilities.

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