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Using Interactive Lessons through Technology to Improve Students' Academic Performance

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Abstract

Many after school programs aim to have an effective instructional component with time for learning and practice. This ABAB study examined the effects of use of SAS Curriculum Pathways and traditional white board instruction for three students who attend an after school program and struggle in certain aspects of school. Grammar topics were taught throughout the study and students were assessed by a 10-question quiz. A functional relation was demonstrated and indicates that the use of SAS Curriculum Pathways might be beneficial for students to learn grammatical topics. Future research could include using the SAS Curriculum Pathways with other populations or other school subjects.

Keywords: after school program, SAS Curriculum Pathways, grammar

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Literature Review

Technology has changed significantly in the past few decades. The proliferation of technology has altered the way educators teach, how students learn, and has become an effective way for teachers to communicate with their students (Gilgore, 2015). Technology added to daily curriculum can be helpful in many ways. It increases motivation and self-esteem, and changes the student and teacher roles by transforming the teacher into an encourager and coach, and the student into an independent learner. It also improves students' technical skills leading to an increased use of outside resources (Pellegrino & Quellmalz, 2010).

Technology as part of or as the delivery of a curriculum has been building throughout the years. In 1994, three percent of public school instructional rooms had Internet access, compared with 93 percent in 2003 (North Central Regional Educational Laboratory, 2005). Now, technology has become incorporated into nearly every part of our lives. Technology has transformed how educators engage students, deliver content, and facilitate the traditional classroom. Technology use through interactive lessons in the classroom has slowly, but undisputedly changed education today by acting as a gateway for teachers to access information and facilitate an easier and more interesting way of learning.

More educators are using technological devices in the curriculum to enhance learning outcomes. Recent changes in the use of technology in the classroom are also linked to the changes in educational policy and law. For example, the Common Core State Standards (CCSS) were adopted in CA and infuse technology into the standards. Furthermore, students are required to take the Smarter Balance Assessment in grades 3 – 8 and grade 11.

The incorporation of technology in the classroom for the purpose of learning language arts can be quite useful, as the use of virtual environments for collaboration and learning can result in unprecedented flow of ideas, leading to higher levels of productivity (Postman, 2008). Students' performance in the classroom relies on how well they know the material. The gap is getting students to know the material in the most creative and enjoyable ways possible. One way to do this is through the implementation of interactive lesson plans. Through technology these lesson plans can increase student achievement levels, increase family involvement in the learning process, and improve teacher's competency and effective utilization of technology.

Technology use through interactive lessons in the classroom not only enhances learning, but it creates a more personal and creative atmosphere to the classroom. Abbott and Shaikh (2005) found that employing creative ways of learning grammar across the curriculum using digital technology facilitated greater pupil motivation and achievement. Independence and pride connected to their work provides students with a sense of ownership to the learning process. This sense of ownership increases motivation and enables students to take a more active role in their own learning (Thurlow & Lengel, 2004). Furthermore, using technology, or more specifically, computer assisted instruction (CAI), is a way to actively involve students in the decision-making process and can lead to students taking responsibility for their own learning (Abbott & Shaikh, 2005).

CAI refers to the use of computers in education and has been in the literature for decades. Originally, it was thought that if computers were placed in the classroom, students would learn. However, it was quickly seen that the computer is just a tool for learning (Nair, 2001). This phenomenon was seen in Wenglinksy's (1998) study that examined the relationship between different uses of educational technology and various educational outcomes amongst eighth

graders in language arts. The evidence from this study suggested that effectiveness of school computers depended on how they were used. Students who utilized an online learning platform for educational purposes improved their academic performance and school climate. However, students that did not use the computers for educational purposes did not benefit academically. That is, just by having the technology is not what improves academic performance. Rather it is the type of instruction that incorporates the technology that makes the difference.

While implementing the use of interactive lesson plans in the classroom for the purpose of learning language arts, it is important to balance the creativity factor along with the information that is being taught. Klein (2010) emphasizes that the method of delivery and incorporation of technology can change the way the information is absorbed and how much of the information is retained. For example, positive educational advancements could occur if technology was used in the classroom along with supportive pedagogy and creativity. Using technological devices to teach by making it interesting without out adding too many creative touches causing distractions is the fine balance Klein (2010) discusses.

Although technology use stimulates learning, students themselves are the ones who are in charge of learning. This feeling of entitlement to learning increases motivation, and facilitates a more active student role in the learning process (Dror, 2008). Students cannot use cognitive tools without thinking deeply about the content that they are learning, and second, if they choose to use these tools to help them learn, the tools will facilitate the learning process (Jonassen, 1994). Tomic (2008) believes that students learn from thinking and reasoning.

Additionally, intertwining technology and interactive lessons with learning language arts and grammar skills will help students prepare for their future careers, which will inevitably

include the use of wire technology. Technology converts a classroom into a place where students take control of their studies and are able to do more authentic and engaging tasks (Gilgore, 2015). The overall goal is to add technological use to the daily curriculum to produce a better outcome of interest, which will lead to a successful grade in the class, and aid in the student's' future development.

Kozma (2003) believes that before implementation of any type of technology into the curriculum for the use of learning grammar, students and educators need to keep in mind why the technology is being used, and how it will meet academic goals. SAS Curriculum Pathways is an Internet based platform that provides interactive lessons in a variety of academic content areas. Additionally, it is emphasized that the technology is not the ultimate fix; that it is a multistep process in engaging students in learning and allowing for academic success. SAS is directly aligned with state and national standards by using a standards database and alignment system provided by Academic Benchmarks, curriculum specialists employ a three-step process to align their resources. By incorporating the use of SAS Curriculum Pathways on electronic devices for instruction through interactive lesson plans, students' learning needs are met by having their own individual learning experience tailored to their learning style and learning pace.

In sum, a review of the literature has suggested that technology can be used in the classroom in a variety of ways to enhance the performance of students. The overarching purpose of this study was to assess the effectiveness of interactive lessons presented on the iPad to increase independent task completion, improve performance of students, and increase their knowledge in grammar.

Methods

Research Question

Does adding interactive lesson plans through electronic devices improve instruction and contribute to students' academic performance?

Setting and Participants

Three students (Gavin, Denise, and Laurel) were recruited because they had a grade point average between the 2.1-2.3 range, and similar IEP goals. Gavin was a 12-year old African American male who attended the sixth grade. Denise was a 13-year old Hispanic female who attended seventh grade. Denise also struggles immensely with reading and writing. She exhibits traits of dyslexia and had a difficult time accomplishing assignments. Lastly, Laurel was an 11-year old Caucasian female who attended the fifth grade.

This study was conducted at an after school program in Monterey County that serves students who struggle with reading and writing. The classroom used in this study included a teacher, an assistant teacher, and one classroom aide. Prior to the implementation of the class wide intervention, parents were informed of the academic intervention that would assist in their students learning of grammar.

Procedure

Multiple topics of grammar were taught during this study (see Table 1). During baseline, students were taught using only a white board for instruction and a pencil and paper for quizzes. During intervention, participants used SAS Curriculum Pathways to supplement their instruction through the use of iPad's.

Independent Variable

SAS Curriculum Pathways is an online intervention that develops interactive resources that utilize technology to create learning environments that are otherwise difficult to achieve in the classroom setting. SAS is effective because often time's students need to work at their own pace. SAS allows individualized learning the tailors to the students' needs. It is also intended to supplement instruction to engage students in meaningful learning experiences that foster a deep understanding of concepts.

Students could choose to watch, listen, or read the grammar tutorial. Once the tutorial was completed, the students completed an online learning activity that refreshed the subject the tutorial was on. After the online activity, the students participated in a 10-question online quiz. SAS Curriculum Pathways was accessed through iPads and included in both intervention phases. Each student had access to an iPad, and was trained how to utilize SAS by instructors. The training took approximately 20 minutes over a period of 3 days. Additionally, students were able to ask any questions or express concerns they may have had before beginning use of the SAS application. Once all participants felt comfortable navigating SAS Curriculum Pathways, they could enter intervention.

Dependent Variable

The students participated in a short 10-question quiz that consisted of multiple choice and fill in the blank questions, and was directly related to the topic learned that session. The quizzes did not take any longer than 15 minutes to complete. Quizzes were given directly after instruction, and were based on the grammatical content of that particular day. The quizzes measured the amount of knowledge that was obtained from the grammatical topic that was taught, either through interactive lessons or traditional white board lessons. During phases 1 and

3, the quizzes were taken with pencil and paper, and during phases 2 and 4, it was taken online. All results from the quizzes were collected, assessed, and recorded daily.

Design

An ABAB design was used to examine the impact of interactive lessons on academic achievement. Once each participant had stable baseline over five sessions, they entered the first intervention phase. While participants were in the first intervention, they had to increase their assessment score by 15% or higher to be able to return to baseline. During the second baseline, the participants were stable, they moved into the final intervention phase.

Procedural Fidelity

A 5-item fidelity checklist was developed and completed by a teacher to determine efficacy of treatment. These include: proving each student with an iPad, locating and launching the app SAS Curriculum Pathways, selecting the grammar skill set, monitoring the students participation, and ensuring the student completed the online activity. Dividing the number of steps checked by the total steps listed and multiplying by 100 calculated fidelity. The range of the procedural fidelity after this study was conducted was 90%.

Social validity

A seven-question survey was completed by the participants to evaluate the intervention's need for classroom instruction. Six items used a Likert-type scale to indicate their level of agreement from 1 (strongly disagree) to 5 (strongly agree). The last item was an open-ended question to allow the opportunity to provide advice and recommendations for improvement.

Results

Figures 1, 2, and 3 include an x-axis of sessions and a y-axis of assessment scores. Figure 1 shows Gavin's assessment results as he progressed through the four phases of this study Gavin's initial baseline assessment scores in phase 1 ranged from 30-90 with an average of 60%.

The range for the first intervention phase was 70-90 with an average of 80%. During baseline 2, Gavin's range was 35-100 with an average of 70%. For the second intervention phase, Gavin's range was 44- 132 and he averaged 88%. Gavin's PND for this study was 90%.

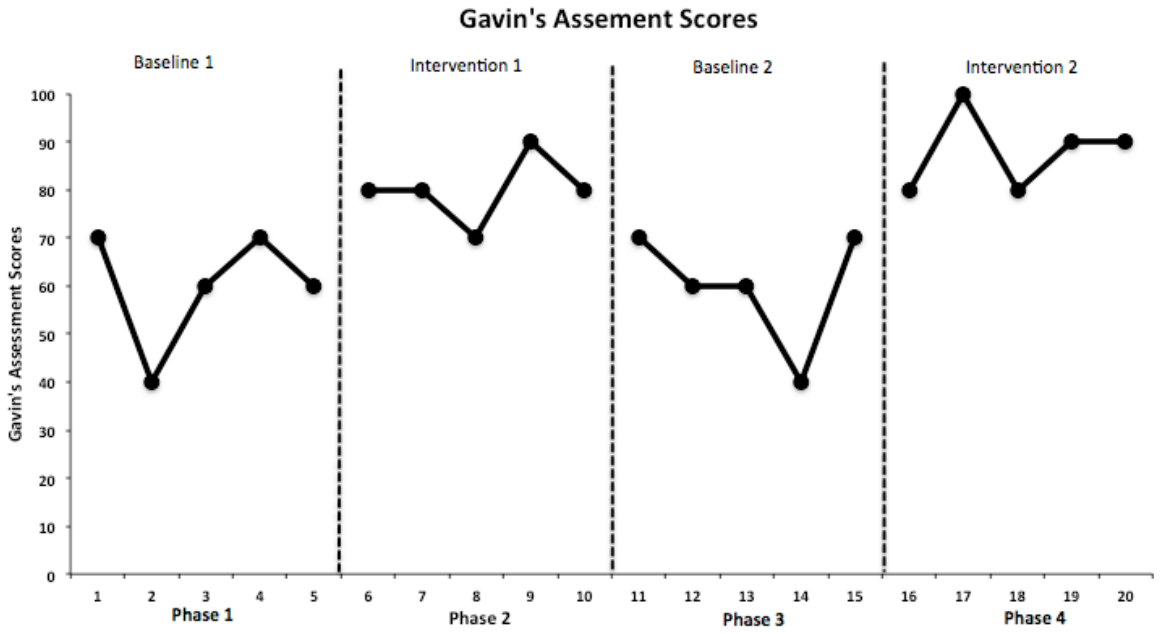

Figure 1. Gavin's assessment scores for traditional whiteboard instruction and SAS Curriculum Pathways.

Figure 2 shows Denis's assessment results as she progressed through the four phases of this study. Denise's initial baseline assessment scores in phase 1 ranged from 35-70 with an average of 70%. The range for the first intervention phase was 44-132 with an average of 88%. During baseline 2, Denise's range was 35-105 with an average of 70%. For the second intervention phase, Denise's range was 44-132 and she averaged 88%. Denise's PND for this study was 60%.

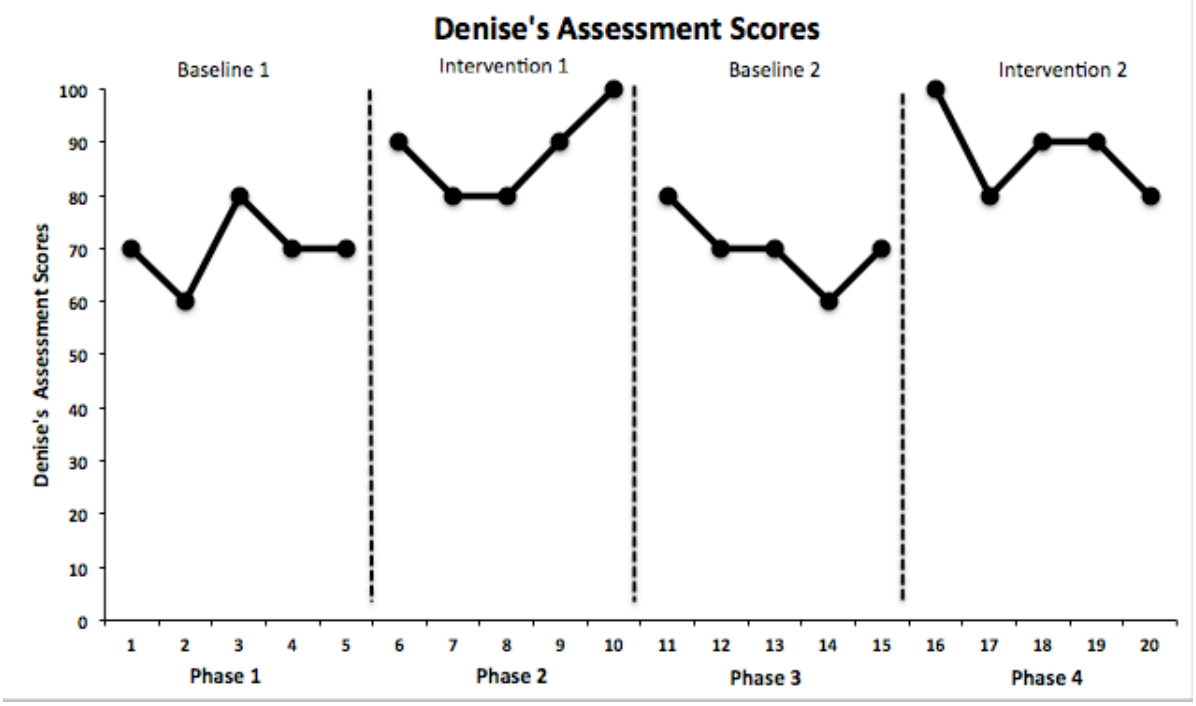

Figure 2. Denise's assessment scores for traditional whiteboard instruction and SAS Curriculum Pathways.

Figure 3 shows Laurel's assessment scores as she progressed through the four phases of this study. Laurel's initial baseline assessment scores in phase 1 ranged from 43-129 with an average of 86%. The range for the first intervention phase was 43-129 with an average of 86%. During baseline 2, Laurel's range was 36-108 with an average of 70%. For the second intervention phase, Laurel's range was 46-138 and she averaged 92%. Laurel's PND was 30%.

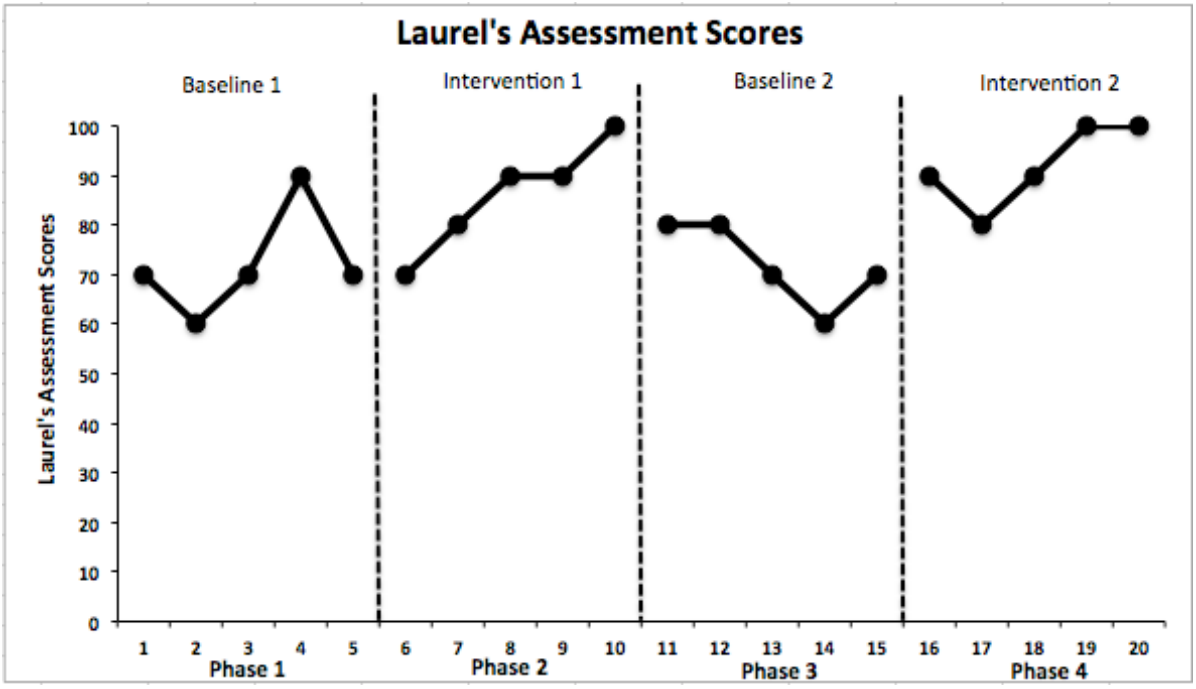

Figure 3. Laurel's assessment scores for traditional whiteboard instruction and SAS Curriculum Pathways.

Discussion

The outcomes from this study were derived from using an ABAB design that monitored students through traditional white board learning, and interactive lesson learning through the use of iPads. A functional relation was demonstrated, and results in traditional white board learning to interactive iPad learning were noted. The ABAB design provided evidence through a comprehensive analysis of individual performance. The non-overlapping data points for Gavin and Denise indicated that this intervention was effective. Results for Laurels' non-overlapping data points were not as high as Gavin and Denise. Although the PND's for each participants vary, the participants in this study employed superior independent task completion when using the iPads than when participating in traditional instruction. Overall, participants in this study improved their assessment scores from traditional instruction to interactive instruction by 18.8%.

Gavin's scores show the steadiest data point movements from baselines to intervention phases. Additionally, Gavin's assessment scores reflect the largest increase from baselines to intervention phases. During baseline phases, Gavin remains relatively stable with an average of 65% for baselines 1 and 2. Gavin's first and second intervention phase scores combined are an average of 84%. Gavin improved his assessment scores by an average of 30.7% when the interactive lesson plans were implemented.

Denise's assessment scores show how easily effected the results may be due to potential limitations. Denise's baselines are fairly stable with an average total of 70%. The average total of Denise's first and second intervention phases is 88%. Denise's assessment scores increased by 25.7% while using the iPad. During the second intervention phase (session 19), Denise's iPad shut off due to a low battery. She was moved to a different desk that was located near a wall outlet to charge the device. The device remained shut off for a total of 5 minutes. During this time, Denise was distracted by her classmates. Once the device turned on, Denise had a difficult time staying on task and completing the interactive lesson plan. During session 20 in the second intervention phase, the signs of a low battery on the device interrupted Denise again. She was moved again to another seat near the wall, and again, had a difficult time staying on task to complete the online assignment.

Lastly, Laurel's assessment scores reflected a steady pattern during the intervention phases. The total average of baseline's 1 and 2 is 72%. The average total for Laurel's first and second intervention phases is 89%. Laurel's assessment scores increased 23.6% from baseline phases to intervention phases. Laurel's increased scores in intervention phases was substantial compared to her baseline assessment scores.

Results showed that teachers found the intervention to be socially valid. Teachers observed the academic intervention to have a constructive impact on student engagement, interest in content, and independence. This study has similar findings to Abbott and Shaikh (2005), which concluded that implementing digital technology into the curriculum facilitates greater inspiration and achievement. It was proven that by adding interactive lessons to the curriculum, students learned better and at their own pace. Upon completion of this study, teachers conveyed a keen interest for expanded use of the iPads in classroom instruction.

Limitations

One limitation was that the findings might not be generalizable for a student with minor learning disabilities. The second participant in this study, Denise, suffers from dyslexia. She is extremely intelligent, but struggles with reading. Although she had assistance when reading the online tutorials, her dyslexia appeared to impede her confidence, resulting in a decrease in her assessment scores. Denise stated the online tutorials consisted of too much reading, and asked if she could listen to the audio version as an alternative. Since SAS Curriculum Pathways offers an audio version of the lessons, Denise was able to pursue that route. However, when it came time for Denise to answer the questions on the assessment, she showed signs of frustration and defeat.

Another limitation was the setting where the study took place imposed logistical challenges. The room where the study was conducted had few wall outlets to charge the iPads. Students whose electronic device was running low on battery had to sit very close to one another while their device was charging. It appeared that by moving them to a different seat that was located near a wall outlet distracted their concentration. These results are especially visible during Laurel's second intervention phase. However, educators properly ensuring each device has a full battery charge prior to the students' engagement may resolve this limitation.

Aside from the limitations, the outcomes have educational implications. The iPads are easily modified to adapt to individual student needs. By varying the instructional and application format of SAS Curriculum Pathways, a student will be able to gain independence and familiarity with the technological device. Such independence is what Dror, (2008) states when he discusses how independence can increase the confidence of students. If students are engaged with a device in a positive way, it may extend the student's willingness to use the device in other areas of study. Therefore, not only may the student be more motivated and engaged, it may serve to provide the same incentives for the teacher.

Results of the study suggest that the intervention was a useful and effective process for refining instruction and contributing to students' overall academic performance, and improving several aspects of the learning environment. The findings from this study merit future investigations into the implementation of interactive lesson plans (like SAS) through iPads into instructional activities. Future research should consider longer baselines to allow more time for stable data points, and decreasing the intervention assessment score (depending on range of students) to lower than 15%, and lastly, examine using iPads across the curriculum in other content areas, age ranges, and settings.

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