

Reading Fluency for the iGeneration: A Longitudinal Analysis of the Impact of MP3 Use and Teacher Experience

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Abstract Reading fluency has been identified as an essential skill in early readers. The technological boom to which students in the iGeneration have been exposed, has produced many potential tools for developing reading fluency. This study investigated reading fluency and technology. The design of the study presented here allowed the researchers to ask two questions related to the development of reading fluency in 2nd graders. First, did the use of MP3 players as an at-home tool increase reading fluency in 2nd graders? Second, did teacher experience increase the reading fluency of these 2nd graders? The results indicated that the use of MP3 players as an at-home tool did not have a statistically significant impact on reading fluency. However, teacher experience did have a statistically significant impact on reading fluency. Several explanations for these results are discussed including the, perhaps, outdated choice of the MP3 player as the technological tool utilized in the study. In addition, questions are raised about the efficacy of using the MP3 player as a homework-type of assignment. While the importance of establishing a solid home-school connection is noted, schools may need to rethink the most beneficial methods for building that connection with ALL parents/families. Teacher experience is, not surprisingly, connected to student achievement. This result highlighted the need for schools to develop an environment for beginning teachers to grow and find support. Keeping teachers in the classroom is of utmost importance to student achievement.

Keywords: reading fluency, home-school connection, technology, MP3 players, teacher experience

Cite This Article: Amy Barnhill, and Rachel Martinez, "Reading Fluency for the iGeneration: A Longitudinal Analysis of the Impact of MP3 Use and Teacher Experience." *American Journal of Educational Research*, vol. 5, no. 2 (2017): 207-213. doi: 10.12691/education-5-2-16.

1. Introduction

Educators in the United States, and the rest of the world, struggle to keep up with the explosion of technology in educational settings [36,38,39]. While some motivated teachers are already incorporating technology and social media into their teaching and students' learning, this is not something that happens in all classrooms [27]. Current integration of communications technology into education often occurs in a haphazard or non-systematic fashion. Inconsistent use may be partially blamed on the speed with which new technologies are invented. Equally to blame, however, may be that many teachers lag behind their students in terms of their knowledge of technology. Frequently, students who have experience with new and novel technological devices are put in the position of instructing their teachers how to use devices such as computers, cell phones with Internet capability, and MP3 players [34]. Regardless of the underlying reason, more emphasis on the use of current technology must be explored given the advent of the iGeneration.

A new generation of technologically literate students has been identified as the "iGeneration" [36]. The

iGeneration generally includes children born after the year 2000, or in other words, current elementary and middle school age children. This term is derived from the multiple tools and devices with Internet (or "i") capability available to the latest generation of students such as the iPhone, iPod, or iPad.

The iGeneration is distinct from the "Net Generation" and earlier identified "generations." An iGeneration student has "developed superior multitasking skills, a virtual lifestyle, a penchant for creating media content, and a brand new communication repertoire...they learn through technologies that didn't exist just a decade ago," ([36], p. 5). Current members of this group also embrace technology much earlier than the typical member of the "Net Generation" [35]. As of 2009, handheld and mobile devices were being used by over two billion people worldwide [14]. As communication facilitated by technology becomes increasingly more common, the integration of mobile and handheld devices into social interaction is part of the everyday life of a member of the iGeneration. Given their proficiency with, and acceptance of technology, a student of the iGeneration can easily adapt their skills and apply them for educational purposes.

The use of technology, for the iGeneration, is essential to keep students engaged in school [36]. When everything

outside of academics revolves around technology, its absence in the classroom renders the student's view of the educational system as antiquated and boring. Such perception leads to a reduction in both student engagement with learning and achievement of desired learning outcomes [5]. As always, educators must search for meaningful ways to help students connect to the content of their curriculum with current tools. Accomplishing this goal today includes augmenting the technological literacy that educators have, as well as promoting specialist-level expertise in the design of interventions that rely in whole, or in part, on the use of handheld and mobile devices such as MP3 players.

Outside of academia, the Federal government has already recognized the need for infusing classrooms with technology. President Obama's economic stimulus plan for 2009 included \$650 million targeted at boosting educational technology programs and providing families and schools with broadband capabilities [3]. Individual states have embraced and mirrored the national initiative with respect to the use of technology in the classroom. California replaced high school science and math textbooks with free, online versions; Michigan required public high school graduates to take an online course [40].

1.1. Federal Guidelines

Educators in the United States are striving to meet even higher educational standards as a result of the federal law No Child Left Behind (NCLB) of 2001. NCLB, was enacted "to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging State academic achievement standards and state academic assessments." (Title 1, Part A. U.S.C.§101) Embedded in this law is the goal of providing high quality, scientifically-based instruction and interventions which hold schools accountable for the progress of all students in meeting state grade level standards.

To meet its goals, NCLB set in motion several mandatory initiatives for schools.

Reading was an area of particular focus and, accordingly, NCLB requires that school districts and individual schools use effective research-based reading remediation programs so all children are reading at grade level by the end of third grade (20 U.S.C.§ 6361). As a result of NCLB, districts are in the position of implementing interventions for students who struggle in reading. Incorporating the family into the intervention process is also a component of NCLB as research shows that students who are struggling may benefit from interventions that continue when they are at home [28]. Therefore, focus on interventions must extend beyond the classroom and into the family home.

It is the increased accountability, standards, and focus on reading fluency that have forged an intersection for classrooms and current technology. New technology offers more tools than ever for meeting the more rigorous federal mandates that include clear guidelines for increased transparency, accountability, and productivity from teachers for the outcomes they facilitate on behalf of their technologically-literate students.

1.2. Reading Fluency

In this study, the researchers investigated a specific technological tool, MP3 players, and its uses' influence on the growth of reading fluency. As discussed earlier, NCLB identifies reading fluency as one of five pillars being advocated as essential in early reading instruction. To this end, schools are teaching and assessing reading fluency explicitly, not just as a happy result from lots of reading, but as a skill to be developed, noted, and assessed.

Reading fluency is most often defined as 1) accurate reading of connected text, 2) reading at a conversational rate, and 3) reading with appropriate phrasing, intonation, and prosody [2,20,32]. Beginning readers develop fluency as they hear fluent readers read aloud and then practice reading themselves. Teachers have taught reading fluency explicitly by asking students to read a passage or book over and over in order to gain more fluency. The teachers assess reading fluency by counting how many correct words a student reads from a passage or book in one minute (CWPM), which becomes the student's fluency score. It goes without saying that the process of reading the same thing over and over is monotonous for any person.

One strategy utilized over the past few decades to build fluency involves the incorporation of recorded texts. In implementing this strategy, texts were recorded on tapes or CDs. Students listened to a fluent reader reading connected, meaningful text on a cassette tape or CD while the student read along with the text. "The key to the success of this strategy is that students listen to the oral rendition of a text while reading the same text simultaneously. Research has shown that this strategy enables students to increase their comprehension, overall fluency, and word identification abilities," ([29], p.76).

For members of the iGeneration, previous employed fluency building strategies are akin to using slide rulers in place of the calculator on their cell phones to solve math problems. To keep students engaged, educators need to produce new and motivating strategies to get children practicing texts in order to build fluency that capitalize on the iGeneration's experience and self-motivation for learning with technology.

In this study, teachers incorporated handheld listening devices (MP3 players), rather than tapes or CDs, to encourage students to listen to a fluent reader. In addition, this study took the listening-while-reading intervention outside the classroom to the home where students were required to listen to the passages as a part of their weekly homework.

1.3. Teaching Experience

The introduction of MP3 players into a classroom of iGeneration students may motivate a student to listen to and practice a text repeatedly, as was suggested in a pilot study conducted by (Martinez, R. & Barnhill, A., 2013), but the use of technology alone is not the only factor influencing student achievement. Another key factor, as found in this study, is the level of teacher experience in the classroom.

Teaching effectiveness has been studied by examining many areas such as the link between teachers' scores on

certification examinations and teacher effectiveness [7,16]; or by examining the relationship between content knowledge (i.e. college major) and effectiveness [1,17], but these results have been inconsistent. Importantly, according to Rockoff, Jacob, Kane & Staiger [33], “teaching experience is perhaps the only characteristic that has consistently been found related to teacher effectiveness (p.1)”. This factor has already been recognized in several ways by school administration. For example, in school districts across the nation, a teacher is awarded pay increases based on the number of years teaching. Put simply, teacher experience has become an established indicator of teacher effectiveness.

The correlation between teacher experience and effectiveness is not only recognized by research and local educators, but also by the Federal government. Teaching experience, as an indicator of assumed teaching effectiveness, and its impact on student achievement is another aspect of NCLB that has received significant attention. NCLB includes an important provision that schools must have “highly qualified” teachers in place to teach all core subjects. This decision is based on research showing the correlation between student achievement and teacher quality [43]. In addition to the NCLB law, more recent Federal administration initiatives include a contest titled “Race to the Top” in which states compete to earn funding from the federal government. The contest aims to inspire innovation and educational reform. One of the threads of competition is the area of annual performance evaluations for teachers and principals. The goal is to inspire new ideas and practices for evaluating educators in the hope that the evaluation process would increase teaching effectiveness. States are also asked to look at factors, other than time on the job, which might influence a teacher’s effectiveness. Some school districts, as a result of “Race to the Top”, have explored the idea of awarding salary increases based on teacher and student performance, not time on the job [9,25].

As teaching effectiveness continues to be 1) an area that the federal government identifies as important to student achievement and encourages research that addresses that issue, and 2) past research suggests that the time a teacher has taught in the classroom is indicative of effectiveness [22,33], and 3) because further research has shown that each additional year a teacher teaches (up to 20 years) correlates to direct positive impact on student achievement [7,19], this study measured teaching effectiveness by using time on the job.

2. Methodology

2.1. Research Questions

This study is influenced by a study conducted in 2011-2012 which indicated that the use of MP3 players have the potential to positively impact reading fluency [4]. The results of the 2011-2012 study inspired the researchers to further explore the uses of MP3 players with a larger group of participants. The 2011-2012 study included 31 participants while this study included 63 students. In addition, the researchers decided to introduce teaching experience as another factor to investigate in this study.

The research questions for the present study are: Did the use of MP3 players in a listening-while-reading method for increasing reading fluency produce a statistically significant result in 2nd grade readers? Did the teaching experience of the teacher make a difference in the reading fluency of students using the MP3 players?

2.2. Participants

This study was conducted in a rural elementary school in Southeast Texas. During school year 2011-2012, approximately 63 second grade students participated in this study. These students were part of a convenience sample, since the teachers volunteered their classes to be part of the research project. The 4 second grade classroom teachers who participated in this study were women who had between 1 to 23 years of teaching experience. Two of the teachers had between 1 and 5 years of teaching experience and were classified as “new teachers”. One of the “new teachers” participated in the MP3 listening-while-reading intervention. The “new teacher” who did not was the control. The remaining two teachers had over 20 years of teaching experience and were classified as “experienced teachers”. Like their “new teacher” counterparts, one of the “experienced teachers” participated in the intervention and the other “experienced teacher” served as the control.

2.3. Procedures

Two classrooms utilized MP3 players with 2nd grade students as part of the regular reading instruction by introducing the MP3 players to the students. The two intervention classroom teachers (Ms. K-experienced and Ms. L-new) then sent the devices with digitally recorded passages home with students as part of their homework. In both of the intervention classrooms every student was provided the same type-written story; the stories were changed on a weekly basis. All the students in the intervention classrooms listened to the MP3 player at home while following along on the written passage two times in a sitting, three nights a week. Teachers sent home parent signature sheets to assure homework was completed. In the control classrooms (Ms. D-experienced and Ms. H-new) students did not have access to the MP3 players and therefore, did not bring the players home.

2.4. Data Analysis

The researchers compared the growth of fluency scores as measured on the TPRI (Texas Primary Reading Inventory) between middle-of-year and end-of-year administrations of this assessment tool during the 2011-2012 school year. The classroom teachers also administered “cold reads” of the students reading fluency two additional times during the school year, immediately prior to each of the TPRI formal assessments. “Cold reads” are reading passages that are novel to the students; the students had never seen those passages before the cold read. All of the teachers agreed on the same passages, which came from their district adopted textbooks, and used the correct words per minute procedure to get a fluency score on each student.

3. Results

To partially address the research question of whether use of MP3 recordings improved fluency scores, compared to the effect of time and teacher experience, a 2 x 2 x 4 factorial analysis of variance (ANOVA) was conducted. Data were screened for normality, collinearity effects, and homogeneity of variance assumptions; data conformed to expected parameters. This included determining if fluency scores were related to the method by which the scores were collected (TPRI vs. Cold Read). No collinearity effects for method of score collection were noted. Therefore, since the data screening revealed that TPRI scores were not statistically different from cold read scores, the analysis was based on the full set of scores for both the TPRI and the cold reads.

The between-group factor of MP3 use was coded into two levels (MP3 use = 1 vs. control = 0). Teacher experience was also coded as two levels, with 5 years or less experience being coded as 0 for new, and 5 years or more being coded as 1 for experienced. Time was coded into 4 levels, with Time1 representing students' fluency scores assessed through a cold read at the middle of the year, Time 2 representing the first set of TPRI scores collected in the middle of the year, Time 3 representing a second cold read set of scores from the end of the year, and Time4 representing a second set of TPRI scores collected at the end of the term. An a priori alpha level of .05 was selected to interpret the significance of results.

The factorial ANOVA revealed a significant main effect at the .05 level for teacher experience, with $F(1, 236) = 9.2, p = .003$. The strength of association between teacher experience and fluency, calculated as partial $\eta^2 = .037$, indicates a weak to moderate effect [15] for teacher experience. A significant main effect for time was also identified, $F(3, 236) = 3.2, p = .024$, with partial $\eta^2 = .039$. This also indicates that the effect of time on fluency, though significant at the .05 level, was weak to moderate [15]. In addition, no main effect for MP3 use, or any significant interaction effects, was noted. The main research hypothesis, that MP3 use would significantly improve fluency scores, was therefore rejected. The implications for these results are discussed further below. For the full list of means and standard deviations of fluency scores by MP3 use, teacher experience, and time, see Table 1.

4. Discussion

Previous research indicated that listening-while-reading increased a student's reading fluency [31]. This study did not support those results. The results of this study indicate that use of the MP3 players had no significant effect as an

intervention for reading fluency. The methodology of this study was slightly different from traditional, yet foundational, studies published by Samuels [37] and Chomsky [6] that investigated the impact of repeated readings on fluency. In the current study the 2nd grade students took their MP3 players and typed text home for practice. In both studies by Samuels and Chomsky, the students performed the listening-while-reading approach in a controlled, educational setting. The teacher's intention was for students to receive reinforcement of reading fluency at home. Even though the teachers required signatures from the parents to indicate completion of the homework, it is impossible to verify that the homework was being completed according to the teacher's instructions. As the students brought the MP3 players home for use, they may not have had adequate parental support using this tool. Therefore, implementation of the intervention may not have occurred which, in turn, could affect the accuracy of the results of this study.

Even though the home-school connection was not an initially intended factor to be investigated in this study, it certainly became important as the researchers analyzed the data. The home-school connection has been proven to have a significant impact on student achievement. In 2002, Anne Henderson and Karen Mapp wrote a report that looked at findings from 51 studies on the relationship between school, family and community engagement and how those connections influence student achievement. The report included overall findings that described how school, family and community partnerships can work to improve student learning. When it came to home and school connections, they found that positive relationships between the two benefited students of all economic, racial/ethnic and educational backgrounds. They note that students whose families are involved in their learning earn better grades, enroll in higher-level programs, have higher graduation rates and are more likely to enroll in postsecondary education studies. They also note that the most effective programs and interventions are those that engage families in supporting their student's learning at home.

It was made clear to the researchers, based on comparing the positive results of the initial pilot study [4], that there was some disconnect between school and home setting in employing the proposed strategy. The current study included all children from grade 2 in this elementary school, good readers and poor readers. Therefore, it included all types of family situations including engaged parents and parents without either the time or knowledge to help their child. While some readers may have support from home, other readers may not be receiving the extra encouragement and practice. This could have been one reason for the insignificant result in the current study regarding the use of MP3 players and reading fluency.

Table 1. Fluency scores by teacher experience, MP3 use, and time

Experience	MP3	<i>n</i>	Time1 M (SD)	Time2 M (SD)	Time3 M (SD)	Time4 M (SD)
Experienced	Control	15	90.3 (16.9)	84.9 (20.6)	93.1 (22.9)	94.1 (21.9)
New	Control	18	101.6 (25.9)	91.7 (28.3)	106.2 (23.3)	98.4 (27.9)
Experienced	MP3	14	85.1 (24.3)	77.4 (24.7)	89.9 (28.2)	86.3 (28.8)
New	MP3	16	80.5 (23.6)	92.9 (24.4)	108.0 (26.0)	98.4 (24.8)

There is an inherent difficulty in monitoring work completed at home. Many of the studies that recommend homework as a means of increasing student achievement depend on students or parents to tell the researchers how much homework they complete [11]. Some of the difficulty in monitoring homework completion can be attributed to an inconsistent estimate on the amount of time spent on homework. It was observed by Cooper, et al. that what a parent reported as time spent on homework completion was uncorrelated with the student self reported time spent on homework. It is even more revealing to note that when Cooper, et al. looked at studies in which the time spent on homework was reported by students, and then compared them with studies where time spent on homework was reported by their parents, the results were that there was no consistent measurable gain on student performance. In other words, regardless of the amount of time spent on homework (as reported by parents or reported by students) there did not appear to be an increase in student performance on tasks. So, while schools may hope to foster a home school connection through homework completion, student time logs or the like, that may not be the best way to actually increase the family connection or student achievement. Schools might consider instead, increasing family engagement in a student's learning by having sponsored events at school where families and students work together on the campus. The home-school connection has been, and continues to be, an unsolved problem for schools. If schools can figure out how to engage ALL parents from all walks of life in their child's education, many children would benefit academically.

The results of this study also add to the literature regarding student use of technology in the classroom and at home [41]. Perhaps not all students in the iGeneration will be motivated to use any kind of technology. The iGeneration, "values change, as evidenced by how they flock to any new innovation at lightning speed. Remember, this is the generation that took YouTube from zero to 50 million in a single year," ([36], p.48). These students crave newness and change. A possible explanation for the insignificant effect of the chosen technology is that the MP3 players used during this study were not quite as "flashy" as newer touch-screen smart mobile devices, and students were not motivated to use an "older" form of technology. Additionally, these students had participated in the pilot study the previous year in which they participated in a very similar listening-while-reading intervention with MP3 players. The use of the MP3 players was not new to these students. The luster of using this new strategy might have worn off for both students and parents.

Additionally, the results of this study indicate that teaching experience is very important to a student's reading fluency achievement. In fact, teaching experience was more influential to the growth of students' reading fluency scores than the listening-while-reading MP3 intervention. These results add to current research addressing teaching effectiveness [22,33]. Teaching experience, or number of years teaching, is a valid measure of a teacher's effectiveness, as shown by the correlation between number of years teaching and growth in reading fluency in this study. Even though this

measurement criterion is not particularly innovative, it is accurate. Future policy makers should not disregard a measure that has been proven to work while searching for methods to supplement the overall picture of each teacher's effectiveness.

Finally, while the current study did increase participants compared to the pilot study, 63 participants from one elementary school is not enough to make true, generalized conclusions. The researchers recognize that this was a limit of the study. However, the study did achieve its purpose of allowing the researchers to explore factors related to increasing reading fluency in young children.

4.1. Educational Implications

Technology as a tool to improve student performance has been shown to have inconsistent results [27,42,44]. One suggested reason for the lack of consistent results is that technology changes rapidly and thus teachers have not been taught to use the technological devices effectively. Another reason is that lack of consistent use by students may contribute to the failure to demonstrate measurable gains [27]. The latter reason may have affected the results in this study. In this study, students used the devices throughout the week while at home; however, they were not used at school. As previously discussed, this fact makes it difficult to verify that they were used as intended. It is important for schools to have a plan in place when introducing technology to students that incorporates teacher training on the use of devices, that stays innovative with new technology, and that has students consistently use the technology in an environment where they can have knowledgeable feedback.

With regard to our findings about the impact of teacher experience in the classroom, educators should make teacher retention, development, and growth a priority. Jumping into a classroom and being expected to master classroom management, curriculum, administration, parents, etc. is a huge task. Richard Ingersoll [21], working with the National Commission on Teaching and America's Future (NCTAF), has noted that keeping new teachers in the field long enough for them to develop the skills to become 'experienced' teachers should be a primary concern for everyone. Recognizing this difficulty, most school districts now provide a mentoring program for new teachers to provide support in their first few years of teaching. The Texas Legislature has followed this line of thinking as evidenced by their emphasis on mentoring teachers (19 TAC Chapter 153, § BB). This policy has also received financial encouragement by creating a grant to Texas school districts that participate in a beginning teacher mentoring program (Texas Education Code, §21.458). While the type of support may differ from state to state and district to district, the goal is the same – to support new teachers as they spend time in the classroom developing their expertise.

5. Conclusion

Educators have always struggled with the problem of extending learning beyond the classroom walls. Even though the teachers and researchers expected the students

to jump at the chance to bring MP3 players home and, therefore, motivate the students to complete their homework, the results of the study did not support that hypothesis. Teachers should keep in mind the importance of the home situation of each individual child in their classroom as sending technology home to complete homework may not be embraced by parents for one reason or another. If the homework is not truly being completed according to the established protocols, academic progress can be slowed.

Additionally, prior research indicates that in order to reach students of the iGeneration, teachers must understand how this class of student thinks and learns. "Newness" is an important component of what motivates these students. A suggestion to incorporate newness and motivate current students might be to ask students to demonstrate or teach a new technology tool. Further, if the students and parents have some input into the technology tool employed, perhaps they will be motivated to consistently use it in the classroom and at home.

An additional result of this study provides yet more research supporting the value of teacher experience. The study results suggest that an experienced classroom teacher cannot be replaced by technology. However, in searching for ways to improve the effectiveness of all teachers, regardless of experience, the use of technology may not be dismissed, lest we risk losing the iGeneration. Some teachers may have tried to ignore the technology boom, but should now realize that they must adapt or lose their students. It is not essential to stay ahead of technology trends as that is nearly impossible for educators who are (or are not) naturally inclined to use current technology in their classrooms, but educators must stay current with what their students are doing. Ignoring the benefit of using current technology as a means to engage students and motivate them towards more participation in their education is tantamount to saying, "why do we need to write on paper when these stone tablets are working just fine?"

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