The **OHIO** Journal of Teacher Education

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Teacher Education

Dr. D. Mark Meyers, Xavier University
EDITOR

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Welcome from the The OHIO Journal of Teacher Education Editorial Team. We are honored and privileged to shepherd this journal for the educational community of Ohio

The OHIO Journal of Teacher Education (OJTE) is an online journal We invite all forms of article formats, as seen in the publication and manuscript guidelines included inside the journal. However, we do invite authors to utilize the online format. The use of links and other interactive devices will allow the online journal to be more than simply a pdf of articles that you can print at your own workstation. In the future, the hope of the editorial team is to develop a truly functional online journal experience which can open the world of practice to our readership.

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Dr. Mark Meyers, Editor

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Dr. Mark Meyers at
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We look forward to hearing from you.

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Grit and Brain Education: The Impact of Teaching About the Brain on Students' Grit

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Abstract:

In order to help k-12 student's achieve academically it has been noted that students should have a growth mindset. Following that line of reasoning, the graduate student leading this action research project wanted to test this method with 113 eighth grade students in a suburban middle school. A pre and post-test design was used to determine if a student's grit score could change if students learned about the brain's ability to change and grow. The findings suggest that learning about the brain did impact a student's grit score.

Introduction

Many think that cognitive ability and IQ are the greatest predictors of success, but most teachers can attest to the fact that one needs to be more than just "smart" to be successful. In a typical classroom, teachers encounter students who are very bright, yet don't apply themselves consistently and fail multiple classes. Conversely, teachers also encounter students who sometimes struggle cognitively, but maintain their highest efforts, resulting in more success in the classroom. The question of why this happens obviously comes down to more than cognitive ability and inherent talent. Those who are successful may possess a common personal quality: grit

Angela Lee Duckworth, a pioneer in grit research, and her fellow researchers define grit as "perseverance and passion for long term goals," (Duckworth, Peterson, Matthews, & Kelly, 2007, p. 1087). Those who are gritty don't let failure, adversity, and challenges get in the way of their goals.

They maintain effort and interest over a long period of time, approaching "achievement as a marathon,"(Duckworth et al, 2007, p. 1088). In short Duckworth has concluded that grit is a significant predictor of success, above social intelligence, physical health, and IQ (Duckworth, 2013).

In recent years, educating a student's character has taken a backseat to educating students to do well on a standardized test. Teaching students to be gritty is just as essential, if not more essential, than focusing solely on academic competencies. This need to teach students' grit is evident in the achievement gap. While educational policy has had a strong focus on a student's cognitive skills, non-cognitive skills, such as grit, tenacity, self-control, and perseverance, have largely been overlooked (Laursen, 2015).

Educators implicitly recognize that these non-cognitive skills are important to a student's success, however knowledge on how to explicitly teach students these skills is limited. With research vastly supporting the importance of grit to a student's success, educators need strategies that they can use in the classroom to build students' characters and prepare them for the challenges of the 21st century. These strategies need to be integrated across the curriculum to develop gritty and resilient students, poised and ready to reach their goals of success. This study specifically investigated the strategy of teaching students about the brain and its ability to change and grow. The study sought to answer the question: How does learning about the brain impact a student's grit score?

Review of Selected Literature

Mechanisms of Grit

The importance of cognitive talent, or IQ, is well established in literature, however less is known about the importance of non-cognitive talents in predicting academic success. Duckworth and her team of researchers (2007) set out to investigate the mechanisms of one specific non-cognitive skill: grit. They collected data in multiple settings with a range of participants to investigate the relationships between the amount of grit an individual possesses and their age, educational attainment, number of career changes, undergraduate Grade Point Average (GPA) at the University of Pennsylvania, ranking in the National Spelling Bee, and retention at West Point Academy (Duckworth, Peterson, Matthews, & Kelly, 2007).

Throughout their data collection, Duckworth, Peterson, Matthews, and Kelly (2007), found that grit was most often unrelated to cognitive ability and IQ. In the case of the undergraduate psychology students at the University of Pennsylvania, grit was a better predictor of academic achievement than cognitive ability.

The definition of grit is "passion and perseverance for long-term goals," (Duckworth et al, 2007, p. 1087). In order for one to be passionate for their goals, one must possess self-discipline. Angela Duckworth and her fellow researcher Martin Seligman (2005) performed a study assessing the relationships between one's self-discipline, IQ, and academic performance. Duckworth and Seligman (2005) completed two studies using eighth grade students from a diverse magnet public school that admits students in the fifth grade based on their academic achievement.

Through their research, Duckworth and Seligman (2005) found that those who were highly self-disciplined outperformed their more impulsive peers on every academic performance variable. Those who were highly self-disciplined also started their homework earlier and spent more time on it, watching less television per day.

With such strong relationships between self-discipline and academic success, the researchers also found that "the correlation between self-discipline and most achievement indicators were significantly higher than and at least twice the size of the correlations between IQ and the same outcomes," (Duckworth & Seligman, 2005, p. 941). These findings suggest that self-discipline has a much greater effect on academic performance than cognitive ability and talent (Duckworth et al, 2005).

Building Grit in Students

It is conventional belief that intelligence is fixed, especially when looking at IQ scores over time. However, many teachers know that there is more that contributes to academic success than just IQ. It has been concluded in studies (Duckworth et al, 2007, Duckworth & Seligman, 2005) that grit and self-discipline also play a significant role in academic success. In this next study, consider that intelligence is measured by both these factors: IQ as well as grit and self-discipline.

Due to the prevalent amount of previous research on intelligence as only measured by IQ, many think intelligence is fixed (entity theory), while others believe that intelligence can be grown and developed (incremental theory). Blackwell, Trzesnieweski, and Dweck (2007) performed both a longitudinal study and an intervention to explore this concept more in depth using four successive seventh grade mathematics classes at a diverse public school.

In the longitudinal portion of their study, the researchers found that students with more of an incremental theory of intelligence positively confirmed learning goals more strongly, had higher effort, and lower helpless attributions than those with a more entity theory of intelligence. Additionally students with more of incremental theory of intelligence were less likely to attribute failure to their abilities and more likely to attribute failure to the fact that they could have invested more effort or changed the strategy they used in response than those students with an entity theory (Blackwell et al, 2007).

In the intervention portion of their study, the researchers wanted to know if an intervention could be performed that would teach students that intelligence is incremental and hopefully increase student motivation and thus increase achievement. To study this, Blackwell, Trzesniewski, and Dweck (2007) divided the students into an experimental group (48 students) and a control group (43 students) with regard to the fact that there was no significant difference in their academic achievement at that time. Students in both groups were given a pretest assessing their theory of intelligence and participated in a similarly structured workshop that taught students about the brain and its mechanisms. The groups differed, however, in that those in the experimental group were also taught that intelligence can be developed, while students in the control group were taught about memory.

To collect data on the effectiveness of the intervention, students were again given the theory of intelligence questionnaire (post test) and the math teacher was asked to cite individual students who had shown a change in motivation. The teacher's comments were then coded. Both groups were also assessed on the common portions learned in the workshops. As expected, student results on the common portions of the workshops were similar for both groups.

Looking at both the longitudinal and intervention data, the research confirms that students who endorse a more incremental theory of intelligence, believing that intelligence can grow and develop, are more successful in mathematics than those who believe in an entity theory of intelligence, believing that intelligence is fixed. The research by Blackwell, Trzesniewski, and Dweck (2007) show that there is more to being successful than just one's set IQ. The belief that intelligence can be grown and developed has implications for increasing grit and self-discipline in students, especially when findings from their studies show that interventions can teach an incremental theory of intelligence.

Blackwell, Trzesniewski, and Dweck (2007) discussed how students with incremental theories of intelligence tend to choose more positive, effort based strategies in response to failure. Duckworth, Grant, Loew, Oettingen, and Gollwitzer (2011) investigated two self-regulation strategies that can be taught to students who adopt an incremental theory of intelligence. These strategies are self-regulation strategies that students can use to avoid repeating past failures and planning for possible future failures: mental contrasting and implementation intentions. The goal of teaching students these strategies was to see if self-discipline would improve in adolescents. Since self- discipline and grit go hand in hand, this also can be viewed as a tool to give students meaningful strategies to increase their grit.

Using a control and experimental group the researchers did not find a distinction in students' mental contrasting. The measurements from the expectations for success and incentive valence were consistent between the two groups. The researchers noted that the students in the control group had marginally higher grade point averages, but this difference did not hold significance. Researchers also noted that, in general, girls completed more questions than boys. The researchers chose to control this variable using a regression model. After controlling this, students in the experimental group completed an average of 140 practice questions and the control group completed an average of 84 practice questions. This shows that the experimental group completed 60% more practice questions than those in the control group, and these self-regulation strategies are effective for developing self-discipline in adolescents (Duckworth et al, 2011).

After reviewing the above studies (Blackwell et al, 2007, Duckworth et al, 2011), a consistent theme emerged about the obvious importance of grit and self-discipline in determining a student's academic success, more so than IQ. Therefore, it was clear to the researcher, that there should be education on grit and its importance using interventions teaching the incremental theory of intelligence. The need for this to be taught was so that students learn that their probability of success is not a fixed value according to their IQ, but instead a developing value according to how they react to failure, a direct indicator of grit. For those students who respond to failure, they need to utilize self-regulation strategies to build self-discipline toward reaching their goals.

Methodology

Participants and Setting

The participants in this research project were eighth grade students at a suburban public school located in southwestern Ohio. Prior research (Duckworth and Seligman , 2005) has focused on students in the eighth grade and seventh grade (Blackwell et al, 2007). For this research, a total of 128 students were initially included in the study, but only 113 (88%) participated due to student absences throughout the intervention. Only students who were present 100% of the time throughout the intervention were counted in the study. Of the participants, 65 were male and 48 were female. According to the demographic data from 2015-2016 school year, 18.9% of students at the school were considered economically disadvantaged. The setting in which this study was conducted was an eighth grade science classroom.

Intervention

The intervention used in this study was a unit on the nervous system, the incremental theory of intelligence, grit, and neuroplasticity that culminated with student projects on those topics. Previous research has supported the idea that effectively teaching students the incremental theory of intelligence (belief that intelligence can grow and develop) increases effort and goal attainment in students (Blackwell et al, 2007).

At the beginning of the unit, all eighth graders in this study took the ten item grit scale developed by Angela Duckworth and her team of researchers (2007). They also answered questions that assessed their theories of intelligence (entity versus incremental), similar to the assessment used in Blackwell, Trzesniewski, and Dweck's (2007) study. Participants were also surveyed on how much time they devoted to schoolwork outside of school or after school activities such as athletics or clubs.

The intervention unit began with students learning the basics of the nervous system. A large portion of this focused specifically on neurons; their structure and how they communicate voluntarily or involuntarily using the central and peripheral nervous systems. This knowledge later tied in with how the brain can grow and develop based on the incremental theory of intelligence. After learning the basics of the nervous system, students completed a webquest that consisted of videos, readings, and pictures that taught them the latest research about grit, the incremental theory of intelligence, and neuroplasticity. Throughout the webquest, students also completed a worksheet to demonstrate that they were on task and completed checkpoints for class and small group discussion.

Students engaged in a group project in which they had to visually display their learning on a poster that followed the criteria of the rubric they were given. As students finished their posters, they were hung on the classroom walls, and students independently viewed each other's posters. Once the entire project was completed, students took the post test to see if their grit had been impacted through their studies of the brain.

Data Analysis

Multiple t-tests were run to compare the pre- and post- grit scores. Additionally comparisons were also made between male and female participants on the pre and post scores as well as the pre and post theories of intelligence assessments (perceptions of success and failure). Using an ANOVA, pre and post grit scores were compared to student involvement in after school athletics or clubs and school work.

Results

Pair sample t-tests were run to determine the difference between pre and post assessments of students on: student grit scores, student perceptions on if success depends on talent, student perceptions on if success depends on perseverance, student perceptions on if failure is due to lack of talent, and student perceptions on if failure is due to lack of effort. The analysis failed to detect a significant differences for male versus female pre grit scores, male versus female post grit scores, student perceptions on if success depends on perseverance and student perceptions on if failure is due to lack of talent. Significant differences were detected for three of the pairs: student grit scores (pre and post), student perceptions on if success depends on talent, (pre and post) and student perceptions on if failure is due to effort (pre and post).

The first pair results were as follows: the pre grit score ($M=3.34$, $SD=0.53$) and the post grit score ($M=3.53$, $SD=0.60$), $t(112)=4.63$, $p<0.05$. This shows that simply introducing and teaching students the latest research on how the brain works and its ability to change, increased student grit scores. This occurred despite the fact that students had yet to apply what they learned in the long term.

The second pair results were: student perceptions on if success depends on talent choice pre test ($M=2.46$, $SD=0.73$) and student perceptions on if success depends on talent choice post test ($M=1.99$, $SD=0.73$), $t(112)=6.05$, $p<0.05$. This showed that student perceptions on their success depending on talent moved from disagree towards strongly disagree.

The third pair results were: student perceptions on if failure is due to effort choice pre test (M=2.88, SD=0.79) and student perceptions on if failure is due to effort choice post test (M=1.82, SD=0.75), t(112)=9.56, p<0.05. This shows that student perceptions went from disagreeing that failure is due to their effort to strongly disagreeing that failure is due to their effort. The ANOVA failed to detect a significant difference for student involved in after school athletics or clubs.

Discussion

The question investigated in this graduate action research project was how does learning about the brain (mechanisms, incremental theory of intelligence, neuroplasticity) impact grit. Based on the results of the study, grit scores were positively impacted by the intervention. The first significant pair, the pre and post grit scores, illustrates that teaching students about the brain increases their grittiness. Previous research has shown that students with a more incremental theory of intelligence were more likely to believe in positive effort beliefs, goals, and strategies (Blackwell et al, 2007).

The other two significant pairs looked at student perceptions that are perceptions common to grittier people. The second significant pair, that student perceptions on if success depends on talent were also positively impacted by the intervention. Students went from disagreeing with this perception to leaning toward strongly disagreeing with their perception. Disagreeing that success depends on talent is a characteristic of grittier people. Gritty people are more self-disciplined than less grittier people, putting forth more effort into their goals. Simply believing that success depends on your talent or

intelligence would reflect a person who has an entity theory of intelligence, as compared to a person with an incremental theory of intelligence. An incremental theory of intelligence is a strong characteristic of gritty people. Therefore, the intervention positively affected this student perception, that is a perception gritty people possess.

In contrast to the second significant pair, the third significant pair, student perceptions on if failure is due to effort, was negatively impacted by the intervention. Student perceptions went from disagreeing that failure is due to their effort to strongly disagreeing that failure is due to their effort. The perception that failure is due to effort more strongly correlates with someone who has an incremental theory of intelligence. The perception that failure is not due to effort, implying that failure is due to talent, is a perception that is common to a person with an entity theory of intelligence. Since having an incremental theory of intelligence is a characteristic of gritty people, the intervention negatively affected this student perception.

Conclusion

Current research available supports that teaching students about the brain will help to increase their incremental theory of intelligence, thus improving their grit. This research project further maintains this assertion. By learning about how the brain works, students were subconsciously thinking more like a grittier person. This is interesting to note as the grit scale has statements that apply primarily to the long term, rather than the short term. Considering that students only engaged in this study for a limited time, it is highly unlikely that they had suddenly become better at achieving long-term goals. Therefore, this research project showed that when students have learned about the brain for a short period of time, they already are thinking like a grittier person, even

though they have not had enough time to apply what they have learned to long term goals. It is justified that a longer term study should to be conducted to see if just thinking like a grittier person translates to actually being grittier.

Certain perceptions of success and failure were also significantly changed by students in this research project. After the intervention, students more strongly disagreed with the idea that their success is due to their talent, which implies that students are more likely to attribute their success to their effort. Another student perception of failure contradicted this perception of success. Students more strongly disagreed with the perception that failure is due to effort, implying that failure is more closely linked to a lack of talent. This discrepancy is interesting to note, because students with more of an incremental theory of intelligence are less likely to attribute failure to their abilities and more likely to attribute failure to the fact that they could have invested more effort (Blackwell et al, 2007). This is what grittier people do. It is possible that the intervention did not focus enough on failure to positively impact student perceptions of failure as it aimed. It is also possible that students could have misread or misunderstood the question since other aspects of having an incremental theory of intelligence were positively impacted. Further clarification would be needed to determine this.

Anticipated Action

Due to the effect on grit in ~~just~~ this short term study, the researcher plans to continue to use the language of a growth mindset, praising student effort and pushing students to persevere in response to failure. Therefore, she will encourage students to redo work a second time, or to finish incomplete or missing work past the due date to teach students the importance of persevering in reaching goals. The researcher would

also like to use the strategies of mental contrasting and implementation intentions in student project planning, to help students see that they can realistically achieve their goals in a project.

The researcher plans to share her findings with her school's culture and climate team, which is a team of teachers striving to improve the culture and climate among students at the school. These findings would provide helpful information for teachers on how to create a culture where teachers care about students and genuinely want them to succeed. This research could impact teachers to positively reform the way they approach feedback and to give students second chances to improve. It is the researcher's hope that the other educators in the building find value in the research in forming their own policies.

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An Analysis of the Decision Making of Novice Teachers in Ohio Concerning Literacy Instruction and Assessment: A Longitudinal Collective Case Study

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Abstract:

Novice teachers encounter and negotiate many influences when making decisions concerning teaching and assessing reading. Often, as a result, many novice teachers, abandon, limit or modify much of what they learned regarding teaching and assessing reading from their teacher education programs. This is a longitudinal collective case study, using data collected through interviews, observations, and documents, examines the decision making of novice teachers across three settings the first year and two stings the second year, regarding literacy instruction and assessment and considers how teachers negotiate the misalignment that often occurs as they teach and assess reading. Findings suggest that the environment in which the teachers instructed had the largest impact on the decisions teachers made regarding reading instruction and assessment.

Several studies have demonstrated that beginning teachers' decisions regarding assessments and instruction are the result of a complex combination of influences, as they draw on various personal, professional, and practical funds of knowledge to inform their instruction (Goldstein, 2008). These include teacher training programs and their current teaching environment (Flores & Day, 2006), access to mentors (Achinstein, 2012), personalized professional development (Anderson & Olsen, 2006), professional learning communities (Coburn, 2001), and alternative forms of assessment (Kuh & Nelson, 2014).

As beginning teachers consider these influences and make decisions concerning instruction and assessments, they must negotiate a misalignment that often occurs with policy and teacher education program outcomes (DeLuca & Bellara, 2013). How they negotiate their educational programs, their years of experience, and the political contexts in which they operate may influence these challenges.

Teacher educators have long recognized that the pre-service teachers who enter their programs bring with them preconceptions about what good teaching is, many of which are based on childhood experiences with school (Bramald, Hardman, & Leat, 1995; Holt-Reynolds, 1992; Pajares, 1992). Lortie (1974) perhaps best captured this phenomenon with his concept of the "apprenticeship of observation." The thousands of hours children spend in school leave a defining mark regarding what school is and what teaching looks like. Researchers have found that these preexisting beliefs pre-service teachers hold are largely traditional in nature (Asselin, 2000; Nettle, 1998; Pajares, 1992) with many pre-service teachers viewing teaching as a transmission of knowledge rather than a process of actively constructing one's own understandings. In terms of literacy instruction, these traditional preconceptions are often translated into teaching literacy as an isolated hierarchy of skills with struggling students being drilled on identified weaknesses (Asselin, 2000; Gray, 1984).

These beliefs gained prior to participation in a teacher education program have been found to be very difficult to change (Asselin, 2000; Nettle, 1998) and greatly dictate the decisions first year teachers make after they graduate (Pajares, 1992). Zeichner and Tabachnick (1981) described a typical scenario many teacher educators have experienced in which pre-service teachers enter teacher education programs with largely conservative pedagogical beliefs, and although they appear to experience a more progressive shift while at the university, any progressive changes are quickly "washed out" (p. 7) when these students graduate and reenter the conservative arena of k-12 public education. It is worth noting that Zeichner and Tabachnick (1981) acknowledged that this scenario assumes that k-12 public schools are always conservative pedagogically, an assumption that may be problematic. In fact, more recent research has challenged this very assumption. Smagorinsky and Barnes (2014), for example, found that the

teachers in their study identified a variety of influential teachers (both conservative and progressive) from their past, but claimed that the constructivist teachers from their childhoods were who they most wanted to emulate.

For this study, we followed recent graduates from our teacher preparation programs into their first and then second year of teaching to investigate the influences that impact their decision making concerning teaching and assessing reading. In addition we wanted to examine how novice teachers negotiated such influences and to what extent they would be willing to negate their personal beliefs and what they had learned about teaching and assessing reading. Furthermore, we were interested to learn if the influences that made a difference in the decision making of novice teachers in one state would be similar in another. This is a longitudinal collective case study that includes an analysis of novice teachers in Alaska, Texas and Ohio the first year and Texas and Ohio the second year. We explored the following research questions: How do new teachers make decisions about the literacy assessment and instructional practices they use in their classrooms? To what extent do new teachers implement the assessment and instructional practices they learned about in their teacher education programs?

Methods

This is a longitudinal qualitative collective case study that was conducted by three researchers from different states Texas, Alaska and Ohio the first year and Texas and Ohio the second year. Collective case studies include multiple participants (at least three), often from different locations that explore a common phenomenon for a long period of time such as a year or longer. Additionally, collective case studies are typically qualitative and employ the same research questions and methods of data collection. The underlying tenant for conducting a collective case study is to research cross case correlations and identify generalizations from all the participants to interpret a phenomenon in depth from a multitude of perspectives (Goddard,

2010). Thus a collective case study provides a deeper investigation, analysis and understanding of circumstances.

Participant Selection

There were twelve first or second year teachers that participated in this study the first year and 7 in the second year. Each of the participants were Early Childhood through Grade Six majors that had graduated from our teacher education programs. This included five participants from Texas in both years, three from Alaska in year one and four from Ohio in year one and two in year two. In the first year most of the participants had graduated in December or May and were hired to begin teaching in the following August. In addition, participants who obtained teaching jobs within easy driving distance of our universities and who expressed an interest in participating in the study were recruited. Instructional leaders such as the school principal, served, as participants as well to help us better understand any school, district, state, and/or federal policies that inform the literacy assessment and instruction required in the schools in which the participants teach.

Data Collection

We collected data in three forms: interviews, observations, and documents. Each teacher participant was interviewed 3-4 times throughout the school years using semi-structured life world interviews (Kvale & Brinkmann, 2008). Several of the administrators were interviewed once. The interviews were approximately an hour in length and were audio recorded and transcribed in their entirety. Additionally, we observed each teacher's reading instruction and assessment 3-4 times throughout the both school years. Field notes were taken at each observation.

In addition to interviews and observations, we collected a variety of documents pertinent to our research questions (McCulloch, 2004). This included items such as lesson plans, assessments, policy statements, etc. Lastly, most teachers in the study kept a journal throughout the year that they wrote in on a monthly basis. The journals included some suggested prompts as well as free writing.

Data Analysis

Data analysis consisted of a number of steps. Each of us began by thoroughly reading and rereading the data as we collected it. We then individually coded the data we collected regarding our own graduates for recurring themes using the constant comparative method (Charmaz, 2006). This consisted of inductively labeling the interview transcripts, field notes, and documents we collected. This initial coding helped us determine what additional data to collect as we continued our interviews and observations. After initial coding, we defined and collapsed our codes into more focused categories and wrote memos in which we fleshed out, reflected on, and provided examples of our most significant and recurring categories. We created a Google Drive folder in which we shared our initial findings from each of our three settings along with information regarding our participants, details concerning our universities including the reading and assessment courses that we instruct and quotes from the participants. After the data from each round of interviews and observations was coded we conferred together to compare similarities and differences among our findings. We then defined and collapsed our individual categories into four overall categories that best represented our collective findings: environment, support, knowledge, and uncertainty.

Settings

The participants in this study were first, second and third year teachers in Texas, Alaska and Ohio. The participants in Texas instructed in kindergarten through grade five buildings, with the exception of one of the participants who taught in a school that solely housed grades prekindergarten through fourth grade students. The participants consisted of a kindergarten, first, second, third, and fourth grade teacher. Four of the teachers taught in the same semi-rural school district, while one taught in a smaller rural district. The demographics of the schools varied as well. Two of the schools in the semi-rural district were majority White with just over 40% of the students economically disadvantaged while the other two schools were majority Hispanic with just over 80% of the students economically disadvantaged. The rural school was majority White with fewer than 20% of the students economically disadvantaged.

In Alaska the participants were from the two most populous districts, one of which would be considered urban and the other, rural. The first district serves a total of 48,500, spread across 2,000 square miles and is very diverse, serving students who speak over 100 different languages. One participant observed in this district taught in a special education preschool in a PreK-5 building; the second taught in a fifth grade classroom in a PreK-8 building. Both schools serve up to three hundred students. The third participant taught kindergarten in a district that serves 18,800 students, spread across 25,000 square miles; at a PreK-2 school that serves just over 500 students.

The participants in Ohio all taught in pre-kindergarten through grade 6 buildings located in the rural Midwest. The student population was not diverse. Most students were Caucasian and a small percentage of students were Asian and African American. Two of the buildings facilitated around four hundred students. The other two buildings facilitated one hundred to one

hundred and twenty students. In the buildings that facilitated around four hundred students there were three sections of students per most grade levels. In the less populated buildings there was only one section of students per grade level.

Findings

As previously stated this is a qualitative longitudinal collective case study that includes participants from Texas, Alaska and Ohio the first year and Texas and Ohio the second year. Though the findings are similar across the states, this article will focus on the findings from the participants in Ohio.

Environment Year 1

The environment in which the teachers' instructed appeared to have the largest impact on the decisions these teachers made regarding reading instruction and assessment (Mullins, Ohle & Huddleston, 2016). Most of the school administrators emphasized the need for district requirements to ensure that all of their teachers were "doing the same thing" and speaking the "same language". However, the approach in which the districts sought to keep "everyone on the same page" and their understanding of what "speaking the same language" meant varied.

The first year teachers were required to implement a balanced literacy framework and follow a curriculum map that had been created by the grade level team before they were hired. The curriculum map is a schedule indicating which standards would be instructed on specific dates. This ensures the administration that all standards will be instructed and some standards will be instructed on multiple dates. Bridgette explained, "It is important that we are teaching the standards, the standards are what all of our instruction is based off of." The first year teachers implemented the balanced literacy framework with ease as they found a parallel with this approach to literacy instruction and what they had experienced in their teacher preparation

program. However, they had minimal exposure to curriculum maps but seemed to accept the requirement without reservation.

One participant, Arlene expressed her frustration and indicated that the reading program that she was required to instruct did not align with her teaching philosophy and what she was taught in her undergraduate program. She often asked the principal about elements such as fluency and independent reading that were not part of the required curriculum, and she was instructed to follow the school-adopted program. In addition, her principal would come into her classroom and rearrange desks back into rows and take down graphic organizers that did not align with the district's programs. When Arlene would inquire about elements of the reading program the principal stated, "You need to stick with what we are doing here. No questions asked." This participant followed the district's literacy program but implemented addition elements that aligned with her teaching philosophy and what she had learned in her teacher preparation program. This participant served in a charter school and was fired before the end of the academic year. In her final interview this first year teacher indicated that her contract was terminated because she did not follow the school adopted reading program with fidelity as she tried to include elements that were missing and make the lessons more engaging.

Another recurring theme that emerged regarding the powerful influence of the environment was team planning (Mullins, Ohle & Huddleston, 2016). Most of the teacher participants in this study engaged in grade level team planning. Team planning involved much more than collaborating for lesson ideas. Sometimes, it consisted of the teachers dividing up the subjects to plan for everyone else.

Support Year 1

The participants in our study drew on various sources of support when making decisions about literacy instruction and assessment. Unique to Ohio, first year teachers participate in the Resident Educator Summative Assessment (RESA) program. The RESA program includes two years of mentoring, one year of assessment and one year of leadership exploration. The first three years are required to obtain licensure, but the fourth year is optional. Once a first year teacher is hired the principal assigns the teacher a state certified instructional mentor that is a classroom teacher in the building. The mentor must be a state certified instructional mentor but does not need to be a teacher at the same grade level. For example, Arlene a participant taught pre-kindergarten and was assigned a sixth grade teacher. She explained, "My mentor and I meet every once in a while and he gives me advice but he really does not have any idea of what I do here in pre-kindergarten (Arlene's mentor teaches 5th grade)." Also, as part of RESA novice teachers participate in professional development. "Last year I missed four days of school since I was pulled out for meetings for RESA. It was kind of frustrating being pulled from the classroom making substitute plans and going there for that," explained Kim.

Novice teachers suggested that they had access to and relied somewhat on literacy coaches to assist them in implemented reading strategies that were expected in their districts that they were not confident in implementing (Mullins, Ohle & Huddleston, 2016). One participant indicated that she communicated with her literacy coach once a month and the literacy coach would come into her classroom and observe her teaching and offer suggestions. Furthermore, the literacy coach had a web site that teachers could refer to for resources.

Knowledge Year 1

Although not one of the most predominant themes, our participants did reference their Teacher Preparation programs as an influence in their decision-making (Mullins, Ohle & Huddleston, 2016). They mentioned a variety of concepts and readings they learned in their program and how they have drawn on them. Several participants noted still having many of their books from their program and periodically referencing them. For example, Bridgette was frustrated with the reading curriculum that was provided by her district because she felt that it was not engaging enough and did not provide her students with enough support to learn their letters. "We can't keep doing what is required from the reading series because it is not engaging enough. I can't keep doing this all year long or these kids are not going to know their letters." By April, Bridgette had implemented the Phonics Dance to assist her students in learning letter names and letter sounds to help supplement the resources provided by her district.

Although at times it was apparent that they had forgotten some of what they learned, they were able to reference concepts and/or tools learned in their teacher preparation program and they now implement them, even serving as a resource for other teachers at their school who were just now learning what the graduates had learned in program.

Uncertainty Year 1

Another recurring theme that emerged was the notion of uncertainty concerning what was required of the first year teachers and how to fit it all in (Mullins, Ohle & Huddleston, 2016). One participant indicated that she did not want to ask the principal for help because she was not sure what she was supposed to be doing in the first place. Others commented about not knowing whom to ask or finding that those they did ask, did not have time to help or support them.

Additionally, participants felt pressure trying to fit it all in. Katy stated, "I'm still trying to work out my schedule and fit everything in."

Environment Year 2

In year two of the study environment continued to have a large impact on the decision making of the novice teachers concerning reading instruction and assessment. Alike the first year teachers were still required to implement a balanced literacy framework that was adopted by the district. In addition, they were expected to continue to follow curriculum maps and "do the same thing" and "speak the same language." However, participants indicated that they felt more confident and had a sense of what was expected and how to fit in additional resources and assessments. For example, one participant explained, " Yeah we still have our curriculum from last year. And I told you last year that I didn't like it was not that great for preschool and I showed you the book. But I did it anyway, because especially as a first year I felt I had to do this. But this year, when I'm picking books based on the letter of the week I'll pull some form the series but that isn't all that I use. I'm doing more creative curriculum based. But using the book as a reference on what order to go in."

Similar to the first year of the study second year teachers continued to collaborate with their grade level peers to create lesson plans and discuss other aspects of teaching. "We talk everyday at lunch about different plans and then we have one formal planning period each day. We all do the same themes and normally the same lessons. We might tweak a few things here and there," explained a participant. However, the teachers indicated that they enjoyed time collaborating with their peers as they learned and were able to share.

Support Year 2

Comparable to the first year in their second year teachers continued to expressed much frustration concerning required participate in RESA. The second year of RESA includes continued goal setting, mentoring and professional development. "I feel like I'm in college again. I already did this. I already learned how to do this and make goals like these. Why am I doing it again, you know? Especially with Ed TPA, I think it's very similar to all that stuff we had to do with student teaching and I feel like I did this already," explained Katy. The novice teachers suggested that RESA was a hindrance to their teaching, as it required much time that they could devote to creating lessons. One participant suggested, "I'm hoping eventually people don't have to do all of this. You know even though I had to go through it, but for new teachers it's hard to learn the ropes and learn all of this."

Though second year teachers did not consult their literacy coaches as much as they did in their first year literacy coaches were still available and employed in the second year. Arlene explained, "I feel more confident this year. Last year I would ask the literacy coach questions usually once a month and this year it is a lot less frequent."

Knowledge Year 2

While knowledge was not the predominant finding in this study it was apparent that participants continued to draw some knowledge from their teacher preparation programs, as they were able to infuse more of what they learned into their craft of teaching. "You are constantly learning stuff but this year I feel like I know a little bit more about the school and how it operates, more about just teaching in general, I know what works and what doesn't work. I know I don't have to follow this curriculum to a tee," explained Arlene. The novice teachers continued

to reference some concepts/tools learned in their teacher preparation programs and suggested that they implemented some and served as a resource for peers that were not familiar.

Uncertainty Year 2

In their second year of teaching the participants expressed a sense of confidence in that the uncertainty that they had felt the first year concerning how to fit it all in was fading. "We've changed center time. So centers are all in the afternoon now, so I just started guided reading so I'm not sure of how that will affect guided reading. It's the same instruction I've added a few extras," explained Katy. Since the participants had completed one year of teaching and assessing reading they had a better sense of the whole picture and added more concerning reading instruction and assessment.

In addition to fitting it all in second year teachers began to take on more roles outside the classroom. For example, one of the participants took on more of coaching role with the cheerleaders planning their workouts and choreographing. Another participant indicated that she was working with the positive addiction committee to help students develop positive additions such as running, reading and eating healthy food. As a researcher observing the participants I noticed for graphic organizer, furniture and centers to support learning. See Figure 1.
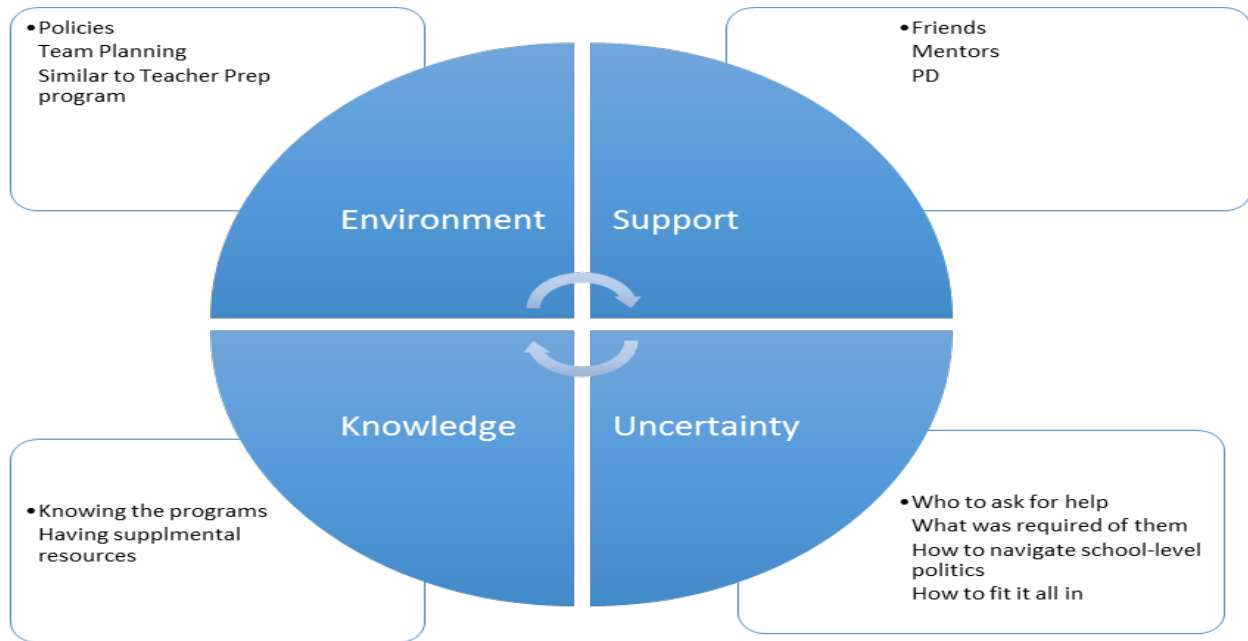
Figure 1. The influences that novice teacher negotiate

Discussion

Understanding the influences and how novice teachers are making decisions about literacy instruction and assessment provides some insight regarding what role teacher education may or may not play in their decision-making. As previously stated this study suggests that environment has a large influence concerning literacy instruction and assessment decision making of novice teachers as they must negotiate district mandates and expectations among other factors. In addition to the environment novice teachers must mitigate additional influences such as sources of support, knowledge from their teacher preparation programs, and the uncertainty of not knowing what to expect during the first year as a classroom teacher. This study indicates that as teachers enter their second year they build confidence as all the participants repeatedly suggested that they were more confident and were able to negotiate the influences and implement more strategies and assessments that were congruent with their teaching philosophes. However,

there is little that I teacher preparation program can do to alleviate the influences that novice

teachers face concerning teaching and assessing reading. Perhaps some good advice is to be

particular and ask key questions when interviewing for that first teaching position.

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The Relationship Between Teacher Perception and African American Male Students' IEP Referral Rates

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Abstract:

This study used surveys and teacher case studies to evaluate the relationship between teacher perception and African American male students' IEP referral rates. A demographic survey, Rosanna Bakari's Teaching African American Students Survey (TAASS), and an open- ended questionnaire were completed by 24 Ohio teachers. The study's hypothesis was that teachers' negative perceptions of African American students was related to and a predictor of African American male students' high IEP referral rates. The study did not have enough data to support the hypothesis; however, it provides suggestions on how to train pre-service teachers to be more culturally responsive.

African American students ages 6 through 21 are 2.08 and 2.22 times more likely to be labeled with emotional disturbance and intellectual disabilities than any other ethnic group in that age range. (U.S. Department of Education, 2016). African American students ages 6 through 21 also have a higher risk ratio than other ethnic groups of being represented in every other disability category except for autism (U.S. Department of Education). This disproportionality is disturbing as Cartledge and Dukes (2009) point out that teachers tend to lower their expectations of students with IEPs, which results in unchallenging coursework and a stagnation in intellectual achievement. According to Jordan (2005), students misdiagnosed for a disability begin to show symptoms of that disability after consistently dealing with the expectations of their surrounding teachers. Despite the persistent disproportionality of African American males in Special Education, few studies have been done on the relationship between teachers' perceptions and the IEP referral rates of African American male students.

The current study sought to determine if teachers' perceptions predict the IEP referral rates of African American male students. The authors used online survey questions to collect data from Ohio teachers to determine if there was a correlation between teacher perception and African American male students' IEP referral rates.

Background of IEP Rates for African American Males

Historical factors. The overrepresentation of African American males in special education services stems from the racial segregation of the 1950's when African Americans attended segregated public schools and were seen as intellectually inferior by the Caucasian community (Wilson, 1993). Those African American students who were considered "slow" were quickly diagnosed as mentally disabled and were sent to special classes that further separated them from their white peers (Jordan, 2005). Intelligence Quotient (IQ) tests were regularly used to assess African American students' intelligence levels, but these tests were later determined to be culturally biased and were a poor predictor of African American students' intelligence (Jordan).

More than 60 years later, African American students are still segregated in poor school districts, tested and taught with culturally unresponsive methods, and still seen as intellectually inferior by their teachers and American society (Codrington & Fairchild, 2012; Jordan, 2005; Wilson, 1993). African American students are academically disadvantaged because teachers are not adequately prepared to teach diverse students, and the diversity training that they do receive does little to change teachers' perceptions of their students (Blanchett, 2006). These perceptions and biases then influence the teacher's teaching method and the student's academic performance (Blanchett).

Environmental factors. The overrepresentation of African American males in special education services should be examined through both the historical and the environmental context (Codrington & Fairchild, 2012). Due to racial housing segregation, lack of education, and a history of institutionalized racism, many African Americans are living in poverty today (Khalifa, 2010; Wilson, 1993). Poverty has been linked to high IEP referral rates, but it does not completely explain disproportionality because African American males are overrepresented in special education services at all economic levels (Skiba et al., 2005). Poverty also does not explain the differing levels of IEP referrals for various minority groups living in poverty (Jordan, 2005). In order to truly understand African American males' IEP disproportionality rates, one must begin with understanding how teachers' perception of their students influences the referral process.

Teachers' Attitudes towards African American Males' Performance in School

Teachers' cultural bias towards African American male students. According to Jordan (2005), more than 80% of students who receive special education services were referred to these services by their teachers. Studies have found that teachers have cultural biases and stereotypes that influence their decisions to refer students to special education services (Cartledge & Dukes, 2009; Fletcher, 2014). These teacher referrals are crucial because most of the students referred for an IEP end up in special education services regardless of whether or not they have a disability (Cartledge & Dukes, 2009). According to Lynn, Bacon, Totten, Bridges, and Jennings (2010), teachers often stereotype African American male students as being unmotivated and defiant regardless of whether or not the teacher shares the student's ethnic background. This is partly due to the fact that African American stereotypes are so ingrained into American culture that no one is completely immune to their influences (Lynn et al.).

Even though teachers have been shown to have cultural biases and stereotypes toward their students, many teachers refuse to talk about race and prefer to adopt a view of colorblindness (Castro-Atwater, 2008; Skiba et al., 2005). This colorblindness is actually more harmful to teachers' ethnically diverse students because it does not take into account their students' cultural differences, and it ignores any implicit cultural biases that the teacher might have (Castro-Atwater). In Irvine's (1985) study, she discovered that teachers made more negative comments about African American male students' behavior than any other student minority group. Negative behavior comments were defined as statements chastising the student for breaking a rule like not sitting in his seat or interrupting the teacher. This negative view of African American male students' behavior adversely influenced the teachers' perception of these students' academic performance (Irvine). Irvine also found that regardless of the African American male students' level of academic performance, teachers still saw these students as lazy, unmotivated, and argumentative. This perception of African American male students is a contributing factor to the high emotional disturbance and intellectual disability rates for these students (Jordan, 2005).

Cultural misunderstandings in the referral process. In addition to teacher bias, cultural misunderstandings have also been identified as a predictor of African American male students' IEP disproportionality rates (Henderson, 2008; Ford, 2002). Wilson (1993) believed that teachers mislabeled students with IEPs because they were unable to distinguish between African American cultural differences and disabilities defined by European cultural standards. These cultural differences were seen as deficiencies that needed to be fixed in order to align with white norms (Hilliard, 1980). An example of difference that is often seen as a deficiency is Ebonics (Fairchild& Edwards-Evans, 1990). Ebonics is an African American dialect that

teachers often mistake for poor English (Fairchild & Edwards-Evans). Even though African

American students usually know how to speak Ebonics and standard American English, teachers

often try to correct these students when they speak Ebonics (Fairchild & Edwards-Evans). These

teachers then might perceive the student as unintelligent and in need of an IEP referral (Fairchild

& Edwards-Evans). More efficient culturally diverse teacher training programs are needed in

order to help teachers better understand these cultural differences (Bleicher, 2011).

Methods

Research Design and Procedure

This qualitative research was a case study of teachers' beliefs about African American

male students' overrepresentation in special education. Ohio school principals and

superintendents were emailed fliers asking them for permission to recruit their teachers as survey

participants. Teachers indicated their desire to participate in the study by continuing to take the

survey. No tangible reward was given for participation. Permission was obtained from the

Human Subjects Review Board (HSRB) through the Office of Research Compliance before

sending out the survey.

Measurement

Participants took three Qualtrics surveys that approximately took 15 to 30 minutes of

their time. The first survey was a demographic survey. The second survey was Rosenna Bakari's

Teaching African American Students Survey (TAAS), which is a measure of teachers' cultural

attitudes towards African American students (2003). However, the sample size was not large

enough to obtain any reliable data. The TAAS scale is made up of two subscales called the

Willingness to Teach African American Students (WTAAS) and the Cultural Sensitivity Toward

Teaching African American Students (CSTAAS) subscale. The survey has 14 items that includes statements such as "I would feel excited about teaching in a predominantly African American school" and "African American students are no longer African" (Bakari, 2003). The first author changed the scale to a 7-point Likert scale in order to provide participants with more accurate options for their level of agreement. The Likert scale ranges from 1-7 with 1= strongly agree, 2=agree, 3=somewhat agree, 4=neutral, 5= somewhat disagree, 6 disagree, 7= strongly disagree. The WTAAS subscale has a reliability of .87, while the CSTAAS subscale has a reliability of .58 (Bakari, 2003). The last survey was a mix of multiple choice questions and an open-ended questionnaire (Palmer, 2010; Fletcher, 2014; Henderson, 2008; Jordan, 2006). This survey gathered information on teachers' attitudes toward African American students and their reasoning as to why African American male students are referred for special education services.

Participants

Special education and general education teachers were selected for this survey because of their involvement in the IEP referral process. Twenty- four Northwest Ohio teachers participated in the study. Ten elementary education teachers, 11 high school teachers, two special education teachers, and a teacher in charge of student services participated. The age range was between 23 and 63, and the average age was 38.96 (SD=12.002). Only six out of 24 teachers were male. Their teaching experience range was between one and 40 years, and the average was 14.35 years (SD=10.734). Most teachers were Caucasians except one African American and three mixed race teachers. Five teachers were teaching in rural areas, nine were teaching in suburban, and 10 other teachers were teaching in urban areas. Fifteen of the teachers reported that their students were predominantly Caucasian, and four teachers reported that their students were predominantly African American.

Results and Discussion

The purpose of this study was to determine if teachers' negative perceptions of African American students was related to and a predictor of African American male students' high IEP referral rates. Due to a small sample size of 24 participants, no statistically significant results were found between teacher perception and African American male students' IEP referral rates. Teachers' perception of African American students could not be supported as an indicator for African American students IEP referral rates. There was a relationship between the TAASS survey and the teachers' reasoning for why African American students are referred for IEPs; however, the ANOVA test and the regression did not show the correlation.

TAASS Survey

The mean TAASS survey was 4.41 out of 7 which means that most people were neutral or somewhat agreed with the survey statements. The teachers' responses showed that most of them felt like they could challenge African American students academically, would enjoy motivating African American students, and would treat African American students with respect. When asked "What do you think is the main cause of the high IEP referral rate for African American male students?" nine people chose environmental factors such as poverty and lack of strong parenting, two people chose African American male students' attitude and lack of motivation, and two people believed that schools fail to relate to and teach African American urban students. Only one person believed that teacher bias was a contributing factor. It makes sense that these teachers' perception of themselves as being nonbiased and helpful towards their African American students would lead them to choose environmental factors as being the main cause of African American students' high IEP referrals. Believing that environmental factors like poverty are the main cause of this issue allows teachers to place the blame on factors that are

outside of their control, and it helps teachers avoid evaluating their own biases and teaching effectiveness. Poverty is not a valid excuse for African American students' high referral rate because as mentioned previously, African American students are overrepresented in special education at all economic levels (Skiba et. al, 2005).

Reasons for High Referral Rate of African American Male Students

Teachers tend to view African American students' low academics and behavior problems as the reasons for their high IEP referral rate. According to the open-ended survey, 10 teachers referred African American students to special education services. Seven of the teachers referred these students because they were behind grade level and had learning difficulties, and one person referred a student because of the students' lack of motivation and disengagement with education. When asked, "What type of student behaviors or characteristics exhibited by African American male students most influences teachers' decisions to make IEP referrals?" thirteen people chose students' long term poor academic performance and four people chose student behavior problems. Multiple participants mentioned African American students' poor academics throughout the open-ended survey, which is not surprising because low academic performance is a strong indicator of a disability (Palmer, 2010).

Schools should evaluate students who have consistently low grades for a disability, but intervention such as tutoring or small group instruction is needed before the student is labeled with a disability (Cartledge and Dukes, 2009; Henderson, 2008; Lynn et al, 2010). Two participants believed that the IEP referral process would be less biased if teachers analyzed their students' academic performance data after targeted interventions. Twelve teachers discussed collecting data or using Response to Intervention (RTI) before referring a child to special education. If the students were still performing poorly after these interventions, teachers could

evaluate those students for an IEP. It is important to note that multiple factors discussed in the introduction affect African American students' academic ability, so these factors should be considered when evaluating African American students' academic performance.

African American students' behavior was also mentioned throughout the open-ended survey. When asked, "How do teacher perceptions and expectations have a role in the overrepresentation of African American male students in special education services?" seven people chose that students may be referred for IEPs if they show behavioral problems in the classroom. Teachers define whether or not a behavior problem signifies a disability, and they may be more likely to notice behavior problems from African American students if they expect them to behave badly (Fletcher, 2014). One of the teachers mentioned that some of the African American students in her class behaved badly because they were so behind in school that they lost motivation and stopped caring about academics. This situation shows that there is a reason behind students' behavior and this reason should first be addressed before labeling a child with a disability. Other teachers believed that their students got their bad behavior and attitudes from their parents and the surrounding neighborhood.

Researchers (i.e., Codrington & Fairchild, 2012; Lynn et al., 2010) also found that their participants frequently mentioned their students' parents and neighborhoods as the source of their students' bad behavior. Teachers do not have control over what may influence a students' behavior outside of the classroom, but they do have control over how they address the students' behavior in the classroom. Teachers should use positive behavior supports and implement classroom management techniques before placing a child in special education (Lynn et al.).

Some of the participants were hesitant to discuss African American students' ethnicity as a factor in their IEP referrals. Two participants did not believe that ethnicity had anything to do

with IEP referrals, and one person did not believe that African American students were overrepresented in special education. These participants' responses support Castro-Atwater's (2008) research about how some teachers prefer to support the idea of colorblindness in an attempt to promote fairness and equality among their students. It is important to note that 20 of the 24 participants identified themselves as Caucasian. According to Castro-Atwater (2008), Caucasian teachers are more likely to support a view of colorblindness. Even though the U.S. Department of Education (2016) acknowledges that African American male students are overrepresented in special education services, some teachers will deny that fact because it requires them to think about race. Race is a difficult topic to discuss but it is a discussion that teachers must have nonetheless. Three participants felt like they did not know about the topic of disproportionality enough to answer some of the questions. Teachers should be taught about disproportionality and should be able to have an open conversation about what factors influence that disproportionality.

Conclusions and Implications

Many researchers propose that quality diversity teacher training programs are needed in order to improve teachers' perceptions of African American male students (Bakari, 2003; Bleicher, 2011; Henderson, 2008; Ford, 1992). Researchers claim that increased teaching experiences of African American students, training in diverse teaching methods, and an understanding of cultural differences and misconceptions can help lower the overrepresentation of African American male students in special education services (Bleicher, 2011; Ford, 1992; Jordan, 2005). In order to be effective, these trainings must be continuous and should allow teachers to evaluate their own bias and attitudes towards African American students (Ford, 1992). Recruiting ethnically diverse teacher candidates may expose pre-service teachers to

diversity and will make teachers more representative of the population (Bleicher, 2011). Lynn et al. (2010) said that it is important to note that implicit bias can also be held by African American teachers; therefore, all pre-service teachers should learn culturally responsive teaching methods.

Teachers should adopt a holistic view of their African American students by recognizing the historical, cultural, environmental, and socio-economic factors that affect their academic and behavioral performance (Lynn et al., 2010; Scott et al., 2014). Successful teachers of African American students increase student motivation by using hands on activities and real-life examples from the students' community (Lynn et al. Scott et al., 2014). These teachers also have high expectations of their students, talk about their students' interests and daily lives, treat parents as educational partners, and are quick to praise students (Lynn et al.). School-wide mentoring programs that focus on helping African American students with their academic, social, and emotional needs have also been linked to African American students' academic success (Scott et al., 2014). Unfortunately, some teachers are afraid to suggest diversity centered programs because they feel that these programs would not be supported by their administration, and they would be labeled as being too controversial or progressive (Lynn et al.). Castro-Atwater (2008) believed that teachers and administration need to overcome their color-blind ideologies in order to freely discuss and find solutions to racially influenced issues such as the overrepresentation of African American males in special education services.

The case study was not able to demonstrate that teachers' negative perceptions of African American students was related to and a predictor of African American male students' high IEP referral rates, but it did bring awareness to an important issue that has often been ignored in the field of education. The quantitative research was able to support the data of previous researchers on this topic. For example, several of this study's survey participants said that they did not

believe that a student's race had any bearing on the IEP referral process. One participant believed that African American males were not overrepresented in special education services. Fletcher (2014) also found that some teachers refuse to acknowledge the role race plays in African American male students' IEP referral rates even though numerous researchers have shown a link between race and African American students overrepresentation in special education services (Jordan, 2005; Lynn et al.,2010; Skiba et al., 2005). These teachers' denial of the role of race in African American students' IEP referrals and their dismissal of the disproportionality issue shows the prevalence of the color-blind ideology that Castro-Atwater (2008) warns against. Eleven of the survey participants believed that African American male students' IEP disproportionality rates were caused by environmental factors such as poverty and poor parenting or behavioral factors such as disruptive attitudes and lack of motivation. Fletcher (2014) and Lynn et al. (2010) found that teachers often blame parents, poverty, and the students' lack of motivation as the reason for African American males' overrepresentation in special education services. Blaming the disproportionality issues on environmental factors allows to teachers to ignore their own biases and culturally unresponsive teaching methods (Fletcher,2014; Lynn et al.,2010). In order to lower the IEP rates for African American male students, the cycle of negative teacher perception and the internalization of this perception needs to end.

Limitations and Directions for Future Research

Although this case study provided preliminary information regarding some teachers' perceptions of African American males and referrals to special education, it did include some limitations, namely, the number and lack of diversity of participants. There was also a lack of African American male students in the participants' classes. This case study cannot be generalized to other parts of the United States or be generalized to all parts of Ohio.

Administrators, school psychologists, and other professionals that may have a role in the IEP process were not included in this study. Also, participants may not have given truthful answers on the survey if their answers are generally not seen as socially acceptable.

This study should be repeated in the future with more participants. More participants will allow for researchers to obtain better data and will encourage more quantitative research. If possible, teachers should receive some compensation or gift to increase interest in participation. Areas with high populations of African American students should be targeted in order to obtain more relevant results. More research needs to be done on the relationship between poverty and African American students' IEP referrals. More research should also be done on the relationship between teacher perception and African American students' self-efficacy. Other factors such as teacher training programs, teachers' self-efficacy, and African American students' self-efficacy should also be explored in order to have a more comprehensive understanding of the relationship between teachers and African American students' IEP referral rates. More studies comparing the reasons for IEP referrals of African American suburban, rural, and urban students should also be completed in order to better understand what roles location and socio-economic status play in this issue.

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Foster Resilience in Children of Incarcerated Parents: Home -School Connection

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Abstract:

Parent engagement has long been recognized as contributing to the success of student success in the school setting. While various opportunities exist for students living in a stable environment with parents or caregivers, the experiences of children whose parents are incarcerated have not been afforded as much attention or concern. The following article identifies challenges these children face daily and suggests individualized and holistic strategies that may be adapted to meet the needs of this unique population.

The significant benefits of parent involvement in the educational process are recognized by varied professional educational organizations. The National Association for the Education of Young Children (NAEYC), the Council for Exceptional Children (CEC), the National Board for Professional Teaching Standards (NBPTS), Interstate Teacher Assessment and Support Consortium (InTASC), and the Council for the Accreditation of Educator Preparation (CAEP) have all identified knowledge, skills and dispositions related to parent involvement in their standards for professional practice. Legislation such as the Individuals with Disabilities Act (2004) and the Every Student Succeeds Act (2016) also recognize the importance of parent involvement in the education of children and adolescents. Specifically, measurable differences have been credited to parental involvement in the areas of students' academic achievement (Karbach, 2012), attendance, school persistence, and behavior (Henderson & Mapp, 2002, Banks, 1997; Hatch, 1998; Wang, Hartel &Walberg, 1995).

Because parent engagement has been identified as important for student success (Wang & Sheikh-Khalil, 2014), schools have developed a number of opportunities for parents to engage with the educators. At minimum, there are parent/teacher conferences during which teachers review the child's progress with the parent. If the student is receiving special education services, the parent is an important part of the special education team. Informally, there are room mothers, PTA's and a variety of seasonal programs that parents may attend. For some students, athletics is very important and parent attendance at games and awards ceremonies are also opportunities for parent participation. Most schools now have electronic grade postings so that parents are able to follow their child's progress on a day to day or week to week basis. Email offers another mechanism for increased school and parent communication.

From the perspective of educators, districts and administrators believe this parent engagement to be instrumental for student success. From the students' perspective, awareness of parent involvement contributes to a number of positive outcomes such as increased motivation to succeed. Conversely, the absence of the parent, especially due to stigmatizing circumstances such as incarceration, has the potential for significant negative impact (Miller, 2006).

It can be disheartening when a student recognizes that the parents of his/her peers attend these events, but their parent(s) do not. Not only are the parent(s) unable to attend, but the child may have been removed from the home resulting in residential changes. This then results in further detachment from old friendships and support networks. Thus, there may well have been a number of significant stressors in the life of the child.

Depending upon the events leading up to the incarceration, there may be a long history of traumatizing events and/or a single traumatizing event that the child may have witnessed. The

student may be embarrassed by the situation and teachers may not be aware of what has happened or not know how to help the child adjust (Miller, 2006). Additionally, the educational setting itself may be an additional stressor for the child offering an on-going reminder of the differences between students who have a stable and supportive family and those who do not. The entire constellation of events has the potential to adversely impact the child in a number of different ways.

Miller (2006) noted that there is a 3.8% annual increase in prison population. This increase indicates that the number of students with incarcerated parents is increasing. This suggests that there is an increasing number of students experiencing stressors and disruptions to the educational process due to parents who have been incarcerated. Thus, the likelihood that educators will need to address the needs of these children in their classroom settings is increasingly likely. The needs will likely be multifaceted and include emotional support, academic support and support for grandparents or foster providers who are now assuming the role of parent.

Students with parents who are incarcerated

Statistics reveal that a great many children and youth have at least one incarcerated parent and the number is rising (Miller, 2006). According to Glaze and Maruschak (2008 p.1), "….52% of state inmates and 63% of federal inmates reported having one or more minor children". Further, they report that in midyear 2007, the children of these inmates accounted for , "…1,706,600 minor children, accounting for 2.3% of the U.S. resident population under age 18". Of this population, Glaze and Maruschak report that 25% of the children were aged four or younger. In addition, they report that the number of children under the age of 18 with a mother in prison is more than two times what it was in 1991. This data reflects only those parents

incarcerated in state or federal prisons and does not include those who are jailed locally. Miller, Perryman, Markovitz, Franzen, Cochran and Brown (2013) indicate that even children whose parents are jailed locally and on a short term basis may experience significant family disruption.

Further, Glaze and Maruschak (2008) reported that just under half of the prisoners in the state prisons had lived with their children just prior to, or at the time of, arrest or incarceration. This reveals that over half of the cases, the parent had already been absent from the home and parenting responsibilities for some amount of time. The mothers additionally reported homelessness as well as medical and mental health problems relative to the incarcerated fathers. Therefore, although the arrest, trial and incarceration may have constituted a single traumatic event, there were likely a number of precipitating factors that occurred for a significant length of time prior to the arrest and incarceration that impacted the parent child bond and engagement as a parent.

The experiences of children and adolescents of incarcerated parents are varied and a function of the child's or adolescent's age, long-term events prior to the incarceration and the event that resulted in the incarceration. For example, an infant or very young child whose mother has been incarcerated may experience significant disruption of attachment as well as the development of fears associated with visits to the correctional facility (Dallaire, 2007). In addition, given the likelihood of prior maternal pathology, poverty, substance abuse and homelessness (Glaze and Maruschak, 2008), the infant or young child may already be predisposed to or experiencing significant adjustment problems over and above any resulting from separation due to incarceration. Depending upon the situation prior to the arrest and incarceration, there may also be health needs that have received limited attention. Once the

period of incarceration is over, the mother or father may need to reestablish attachments and bonding with the child.

As the child grows older, the child is better able to understand and remember prior events as well as the event leading to incarceration. In some cases, the child may have witnessed an act of violence and/or the parent being removed from the home by law enforcement. The child may also be aware of news and publicity surrounding the event. It is impossible to determine the reaction of peers and even educational staff to these events, including those that are high profile. These experiences then may result in on-going additional stressors and emotional issues for the child. Therefore, the experiences are not discreet but rather on-going as events unfold.

For children whose parents have been incarcerated, a number of experiences that may elicit feelings of anxiety, abandonment, anger or other negative responses in the home and in the school setting. Perhaps the experiences are directly related to the event or perhaps they are indirect such as the parent's absence at school events or conferences. With so many children living in alternative settings and with alternative caregivers, the school and teacher may not be aware of what the child has experienced or is currently experiencing. In addition, Dallaire (2007 p. 19) reports that there may be a "conspiracy of silence" in which family members do not share the circumstances surrounding the parental absence with the child. Specifically, they may develop a socially acceptable explanation such as that the parent is "…away in the military" or "…visiting a distant relative." It is possible that the teacher may be unaware of the exact reasons for the parent's lack of involvement. Taken in total, the student whose parentis incarcerated is at significant risk. According to Bush-Baskette and Patino (2004), children of incarcerated mothers are among the most vulnerable and at risk populations and require multiple and simultaneous types of service provision.

While the impact of parent incarceration on children varies as a function of numerous variables such as age, prior events, reasons for incarceration and current support network, research indicates that internalized behaviors such as depression, anxiety and attachment problems, or externalized behaviors such as aggression and other maladaptive behaviors may be demonstrated (Gabel, 1992; Miller, 2006). Among the additional myriad psychological, emotional and social factors impacting children of incarcerated parents is shame (Dallaire, 2007) and perhaps isolation as they try to keep the incarceration a secret. In a studies conducted by Kampfner (1995) and Miller (2006), approximately 75% of children of incarcerated parents reported symptoms associated with trauma-related stress which included little or no emotional supports to discuss their parents' incarceration. Theses behavioral and emotional problems may then have a direct impact on academic performance and self-esteem (Mapson, 2013).

Home and school displacements are also disruptive for children of parents who are incarcerated. According to research conducted by George and LaLonde (2002), while mothers may have spent less than a year in prison, the home and school life of their children were displaced twice, once when they left and again when they returned. This lack of stability further exacerbates the impact of the incarceration on children and contributes to the negative impact on school participation (Dallaire, 2007).

Incarceration of parents and the events leading up to the incarceration can have significant and adverse impacts across all areas of a child's life. Among these areas of impact is the students' academic achievement and social functioning in the school setting. Therefore, it is

important for educators to identify a child that is at risk and provide strategies that will facilitate improved adjustment.

<div align="center">Identification and Intervention in the Schools</div>

School-wide assessments and intervention strategies for children of incarcerated parents must consider both environmental and internal issues that impact school performance. Environmentally, they are more likely to be living in poverty, exposure to adverse behaviors in the home, and changes in caregivers as well as residential changes. Internally, they may have behavior and emotional problems that existed prior to the incarceration or are the result of the parent incarceration. This then may result in a constellation of behavior problems such as school truancy, poor academic performance, substance-abuse, school drop-out and low self-esteem (Mapson, 2013). Therefore, when a child or youth is demonstrating behavior that is inhibiting academic performance, it is critical to include longitudinal and multiple sources of information in any form of systemic assessment and intervention. These sources include caregiver reports, observations, review of school records and, if necessary, a formal referral of a multi-factored evaluation.

The student may come to the attention of the educational personnel due to a change in behavior or academic performance that is first noted by the classroom teacher. At that point, the origin of the behavioral or academic change may be unknown and the district wide strategies such as Response to Intervention or pre-referral teams may be initiated. It is also possible that the caregiver or foster provider will share the circumstances, especially if there has been a change in residence and there are other agencies involved. Lastly, the child may also come to the attention

of the school due to the high profile nature of the event that resulted in incarceration of the parent. In this case, school personnel may or may not understand the need for next steps and proactive strategies. It is conceivable that some educators may feel uncomfortable addressing the situation and simply ignore it, especially if the child seems to be coping relatively well. At this stage, and throughout the students' school experience, close communication should be developed and maintained with all stakeholders. Caregivers such as grandparents should feel comfortable sharing information with the educational staff and educational staff should strive to develop and maintain rapport. Identification of caregiver and family strengths and what they can contribute may assist in reframing the situation away from a deficit model (Dettmer, Knackendoffel and Thurston, 2013). If the child is being provided with outside counseling, communication with the therapist may be helpful provided necessary permissions are obtained.

In each case, it is important for the school personnel to be aware of the child's circumstances so that teachers or administrators do not jump to erroneous conclusions or react to behavior in a manner that is counterproductive. Because parental incarceration is a sensitive area, it is important to include a number of various mental health professionals such as school counselor and school psychologist in planning meetings. Proactively, this issue could be discussed prior to any specific event and general strategies may be discussed as well as team members identified as is done for crisis situations.

For individual situations, a more specific assessment strategy may be necessary. An initial step should be a review of background history and records in order to determine if problems may have existed prior to the incarceration and to obtain a level of baseline

functioning. Various assessment techniques such as checklists, observation or standardized testing may provide valuable and objective information regarding learning and social emotional needs. Behavioral data may be helpful for addressing behavioral trends. For example, if the child is permitted visitations with the parent, it is possible that anticipation or post-visit stress may result in acting out behavior in the school setting. Holidays or school events may also elicit internalizing or externalizing behaviors in the child.

Once individualized needs are identified, the goal of school based assessment and intervention is to strengthen the environmental supports available to the student and, if possible, maintain the student in regular education. Because the student of incarcerated parents has complex and multifaceted needs, it is critical to consider wraparound services that provide comprehensive supports across all environments (home, school and community) and address the student's needs from a social, emotional and cultural context. The focus of wraparound services are building constructive relationships through unique teams which are focused on a student's success (Burchard, Bruns, & Burchard, 2002; Eber, 2005). The student of incarcerated parents then has a team of support staff who are charged with the oversight of her school success. While it is not possible to replace the emotional role of the parent in the life of the child, having a team of individuals nonetheless communicates to the child that she is not alone. In addition, caregivers also become aware of various resources that are available to support the child and the caregiver. Hopefully this will encourage the caregiver to become more engaged with the school and attend the various meetings and activities available to all students.

Wraparound services

The Response to Intervention (RtI) model currently in place may be best suited for wraparound services if the child is not eligible for special education. RtI is a multi-tiered framework that matches supports and intervention to student needs and could be a proactive problem solving approach for social, emotional and environmental factors which negatively impact school performance (Kerr & Nelson, 2010). The three Tiers in RtI indicate levels of student need and levels of support as they remain within the regular education setting.

Tier 1 is a system wide intervention designed for the general school population. Within this tier, schools must emphasize strategies that assist teachers in understanding the impact of parent incarceration on children and build safe learning environments that promote a positive future for children and adolescents. This is especially important for students who may feel embarrassment due to the circumstances surrounding the incarceration. In addition, there are likely other students who are residing with relatives or foster providers and do not have the benefit of parents who attend conferences, school activities and athletic events. A district wide initiative that addresses bullying and provides alternative supports in some manner for students who lack parental engagement may be particularly useful as a Tier 1 strategy.

The emphasis at Tier 1 is on a set of positive expectations that are taught and consistently reinforced and are found in strategies such as Positive Behavioral Interventions and Supports (Positive Behavioral Interventions and Supports, OSEP Technical Assistance Center, n.d.). Schools must address feelings of isolation, rejection for all students and make attempts to reframe the students' perception of the future as positive without the direct association to their parent incarceration. They should establish positive rapport such that they may discuss issues and

make necessary referrals. While it is possible that these strategies alone will lead to increased positive attitudes, if teachers become aware the students in their classroom are still at risk, children may be moved to Tier 2 or Tier 3 levels where additional supports are provided to succeed (Sorrells, Rieth & Sindelar, 2004).

Tier 2 interventions focus upon small group social skill instruction, small group counseling or mentoring programs which are evidence based and closely monitored to meet specific student needs (Debnam, Pas, & Bradshaw, 2013). When, during these interventions, particular concerns unique to children with incarcerated parents emerge, teachers should be able to refer to the school counselor or school psychologist so that small groups who can focus on their specific needs.

Tier 3 of RtI is focused upon intensive interventions for high risk students of incarcerated parents. It emphasizes individualized and comprehensive services that address social and emotional domains across home, school and community and are flexible enough to meet the unique needs of the student and family (Eber, 2003). Sometimes this necessitates the implementation of a behavior plan which teaches and promotes appropriate replacement behaviors (Ingram, Lewis-Palmer, & Sugai, 2005).

Fundamental to the successful implementation of all levels of RtI, is the recognition that behaviors serve a function and are often triggered as a direct result of the students' history and interactions with the environment. It offers positive behavioral interventions and supports systematically applied to students based on their needs (Wheeler & Richey, 2010).

In the event that the student is continuing to demonstrate significant learning or behavioral problems, it may be necessary for the child to be referred for an individualized multi-factored evaluation for possible special education services. This evaluation is particularly useful in identifying learning or behavioral needs that are a function of the parental incarceration or needs/disabilities that may have existed independently or prior to the parental absence.

The Need for Collaboration, Consultation and Communication

Collaboration

Once the student has been identified and needs have been assessed, all stakeholders must work together to assist the student with adjustment. Whether in regular education or special education, the optimum form of service addresses the holistic needs of children in positive and supportive environments. Collaboration between educators, administrators, psychologists and counsellors should be an ongoing process where they share their expertise to develop a continuum of services which promote effective prevention, assessment and intervention for students of parents who are incarcerated. Miller (2006) stresses the need for intervention that takes into account a number of variables including culture, gender and development; however, most models have historically been developed from a social work or mental health perspective. It does not appear that sufficient attention has been paid to the preparation of school personnel to address the unique needs of these children. Therefore, the school must develop a multidisciplinary approach which includes facilitating access to services through consultation, communication and professional competencies. In addition to addressing the needs of individual

student, this approach is beneficial for RtI Tier 1 or large scale strategies to promote improved support.

Interdisciplinary participation is critical to effective interventions. Mutual trust, respect and honesty between educators, psychologists and school counsellors enhance professional partnerships. When professionals shed their preconceived notions and are willing to exchange information and listen to each other without focusing on the rigid boundaries of the roles they play, they increase the opportunities for optimal interventions (Turnbull, Turnbull, Erwin, Soodak & Shogren, 2011; Green, 2008).

School-based Consultation

School based consultations where personnel, such as psychologists, school counsellors and educators collaborate professionally to address concerns of students are increasing. While in traditional settings, psychologists may work directly with children of incarcerated parents, in a school-based consultation, psychologists work primarily with educators, school counsellors and caregivers who are in direct contact with the children and play an important role in the intervention (Sheridan & Cowen, 2004). The psychologists as a consultant is more likely to participate indirectly by suggesting strategies during consults or team meetings.

For some children, individual psychiatric or psychological services may also be beneficial. Therapy can be used to target internalized or externalized behaviors negatively impacting the child, and improve her academic and social competencies. This however, would be more effective when done in the cultural context of schools and their expectations.

Communication

The interdisciplinary nature of schools necessitates communications where professionals share expertise to make team decisions. While educators are generally responsible for collecting and sharing information, as well as planning and monitoring the effectiveness of interventions implemented in schools, psychologists and school counsellors should participate actively to identify the problems associated with parent incarceration, and guide the behavior intervention plan focusing on specific behaviors and alternate intervention strategies. Assistance may be provided to educators both formally through materials and resources and informally through phone calls and school visits (Sheridan & Cowan, 2004).

Children of incarcerated parents often have complex needs such as depression, eating disorders, or delinquency. Often the risk for team members and test interpretation is placing an emphasis on these complex issues in isolation rather than regarding the whole child and the context within which the behavior is observed. Team members must carefully review and share explanations of all the environmental aspects impacting the child, pace meetings, and frequently check with all team members for the need for clarification and questions. (Welton, Vakil & Carasea, 2004; Green 2008).

Summary

Parent engagement has long been recognized as contributing to the success of student success in the school setting. While various opportunities exist for students living in a stable environment with parents or caregivers, the experiences of children whose parents are incarcerated have not been afforded as much attention or concern. Nonetheless, these children are at significant risk for a myriad of challenges including mental health issues, addictions, poor academic achievement and dropping out of school. Their unique circumstances warrant

recognition on the part of educational personnel for the need of individualized and holistic strategies to be implemented. A number of strategies currently exist in the school setting that can be adapted to meet the needs of this population; however, it is imperative that the needs of these children are recognized and acknowledged.

Specifically, these strategies may include:

1. District or building level awareness that there are specific needs for students whose parents have been incarcerated and proactive or "crisis" policies can be accessed as needed.

2. Establishment and maintenance of rapport with caregivers and the student so that sensitive information is freely shared.

3. Educators who are astute observers and aware of changes in academic performance or social/emotional functioning and respond quickly by consulting with the appropriate educational staff for further evaluation.

4. A referral for more individualized evaluation and strategies may be implemented should the need be demonstrated. On-going collaboration, consultation and communication with all stakeholders so that appropriate support can be provided for as long as necessary.

It is hoped that with awareness and individualized and wrap-around services, the student of incarcerated parents will be increasingly likely to succeed and the effects of the trauma of parental incarceration can be minimized.

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Outcome of EETT on Computer Skills and Use of Ohio Students and Teachers

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Abstract:

EETT (Enhancing Education Through Technology), an Ohio Department of Education initiative, whose purpose was to enhance students learning by integration of technology in the curriculum, was implemented in Ohio Local Education Agencies (LEAs) through ODE and e-Tech Ohio, in 2006-2008. In 2007-2008, a study was conducted by collecting quantitative data through two self-constructed survey questionnaires (student and teacher), to determine student technology literacy & teachers' and administrators' technology literacy in 75 participating schools in Ohio. The present study entails a comprehensive investigation of the two SPSS data sets generated though the questionnaires: EETT Overall Student 6-8 variables and EETT Overall Teacher Variables K-8, on the outcomes of EETT initiative, on two constructs namely: Computer Skills (of 6-8 students, of K-8 teachers and of 6-8 students as assessed by their 6-8 teachers) and Computer Use (of teachers and administrators). The findings identify the demographic characteristics of participating teachers and students. It recognizes the difference in the Total Computer Skills scores of the students and teachers, from winter 2007 to spring 2008 and its variance among different grades and among genders of teachers and students. The result also distinguished the difference in Teacher's Computer Use and their assessment of their Student's Computer Skills due to the intervention.

Enhancing Education Through Technology (EETT) was an Ohio Department of Education initiative whose purpose was to enhance students learning by integration of technology in the curriculum. In 2007-2008, a study was conducted by collecting data through self-constructed surveys to determine student technology literacy and teachers' technology use for instructional purposes. Thousands of students and teachers of 75 participating schools were surveyed for this project. A part of this collected data, was in the form of two EETT datasets: *EETT Overall Student 6-8 variables* and *EETT Overall Teacher Variables K-8;* which included variables for only grades 6-8 for students and K-8 teachers and administrators respectively for the two datasets. Two waves of data-winter 2007 and spring-2008 were collected.

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The purpose of collecting two waves of data was to capture the changes from the beginning to the end of the initiative (EETT, 2007). Teachers were surveyed to understand their skills, usages of technology for instruction and their assessment of their students' technology skills. As a decision maker, it is necessary to frame agenda and reframe it from time to time to make informed decisions based on such analysis (Liang, 2016). This Master's project- entails a comprehensive analysis of the outcomes of EETT initiative on the teachers and students' technology literacy. It seeks to recognize the overall outcome on the computer skills of students and technology skills and use of teachers of 75 participating schools of Ohio in 2007-08.

Program Background

On January 8, 2002, President Bush signed the *No Child Left Behind Act - NCLB (P.L.107-110)*; the legislation which reauthorized the Elementary and Secondary Education Act of 1965 (ESEA). It provided increased flexibility and local control to states and school districts, emphasized strong accountability for results, offered expanded options for parents and supported teaching methods that had a solid scientific research foundation. *NCLB* pursued to ratify strong use of technology for learning through the integration of technology, throughout all educational programs, education technology related professional development, flexible use of funds, and strong evaluation and research. Through these commitments, the law strived to promote:

1. Student academic achievement through the use of technology in schools

2. Student technology literacy by the end of eighth grade and

3. Effective integration of technology with teacher training and curriculum development to establish successful research-based, instructional methods.

To address these commitments and goals, US Department of Education and states jointly created *The State* EETT. The U.S. Department of Education established State grants under the EETT program. Like *NCLB*, this program was designed to assist students in crossing the digital divide by ensuring that every student was technologically literate by the end of eighth grade by encouraging effective integration of technology with teacher training and curriculum development.

The Ohio Department of Education, in collaboration with e-Tech Ohio, administered the *EETT* State Grant Program. ODE disseminated the two-year formula grants to eligible Local Education Agencies (LEAs) that had submitted applications through their *Comprehensive Continuous Improvement Plans (CCIP)* through *No Child Left Behind*. Each state was allocated education technology funds that are awarded to schools through two different mechanisms. The first method was by funding formula, based on low socioeconomic status and school demographics; the second was a statewide competitive process for eligible school districts. The State EETT program described above and whose outcome has been analyzed herein was the State's competitive portion of the program. The program had been implemented since 2006 and participating schools were awarded funding on a yearly basis, for up to two years. In 2007-2008 School Year, Seventy-five (75) schools were awarded funding through "*The State EETT program*" (ODE, 2007).

Purposes and Research Questions

The overarching drive of this study was, to thoroughly yet systematically analyze the outcomes of EETT initiative on the computer skills and use of teachers (K-8) and middle school students of 6-8 grade, of 75 Ohio schools, who had participated in the initiative.

Purposes

The purposes of this project were to:

1. Identify the demographic characteristics of the teachers and the students who participated in the EETT Initiative, during the year 2007-2008.

2. Examine, if Ohio teachers integrating technology, have an abundant amount of experience in teaching and imparting a new form of teaching practice (integrating technology) for enhancement of learning with respect to the national average.

3. Examine, if, due to integration of technology through EETT, there has been a statistically significant improvement in the Total Computer Skills of the students, from winter 2007 to spring 2008 or not.

4. Examine, if there has been a statistically significant improvement in Total Computer Skills in them, then, whether this improvement differs between the genders (boys and girls) as well as among different grades (6th, 7th, 8th and special education) of students.

5. Examine whether, there has been a statistically significant improvement in the a) Total Computer Skills of the teachers & administrators (K-8) b) Their Computer Use scores and c) Students' (6-8) Total Computer Skills as assessed by their teachers (6-8), from winter 2007 to spring 2008 or not.

6. Find out if, after implementation of EETT intervention, the differences in a) Students' and teachers' Total Computer Skills are statistically significantly different between the genders (males and females) as well as among different groups grade-wise.

7. Finally, to disseminate the information, so obtained through sound interpretation of data analysis, in the form of conclusion and recommendations. If the findings are stated clearly in a simple report form, the State Department of Education, its teachers, administrators and

parents, other comparable and similar programs, comparable inner city school districts and students with similar demographics, all can benefit through informed decisions.

Research Questions

1. What are the demographic characteristics of the teachers and the students of Ohio who participated in the EETT Initiative, during the year 2007-2008?

2. Is the teaching experience of teachers, in Ohio in 2008 at parity with the national average**?**

3. On an average, is there an improvement in Total Computer Skills score of Ohio 6-8 grade students in spring 2008 compared to winter 2007?

4. On an average, is the difference in Total Computer Skills score for 6-8 graders for spring 2008, between the genders and among different grade levels statistically significant?

5. On an average, is there a statistically significant improvement in a) Total Computer Skills Score and b) Computer Use of teachers and administrators and c) Students' Skills Score- 6-8 grade (as assessed by their teachers) in 2008 compared to 2007?

6. On an average, is the difference in a) Total Computer Skills Score of teachers and administrators in 2008, between the genders and among different groups statistically significant?

EETT Dataset & Computer Skills and Uses

Data on student's improvement in computer skills and use is important as it will reveal the importance of usefulness of technology integration as an intervention- as a reform effort on the part of School, School District and Board of Education. Data on *EETT* program outcome, that is academic tests, computer skills and use among teachers and students, falls under the category of *"School achievement"* data. Student's academic performance and computer literacy falls under the category of "*student learning*" data, due to integration of that technology (Bernhardt,

2007, p. 21). Thus, integration of technology through EETT would be a part of the school process or reform efforts to improve overall student learning.

Since the program has already been conducted, here the data analysis and usage of the analysis results serve different purpose instead of a direct one. It is more summative and informative to ongoing and future program design and implementation at school level. If schools and school districts are righteous consumers of such data, their students will be more successful, as they make sustained efforts to gather and analyze previous data and remain more focused in improving such programs during implementation and monitoring rather than those schools or districts who do not analyze collected data. Again, if schools use data to make informed decisions, they "understand the effectiveness of their reform efforts" (Bernhardt, 2007, p. 2).

Through *EETT*, integration of technology was presented afresh as a reform movement to the participating teachers and students. If the participating teacher's self-efficacy and self-beliefs was previously worthy, it might have helped them as well as the students with this new program integration. Teacher experience holds important, as research reveals that among experienced teachers, for whom an abundance of mastery experiences were available, contextual factors (which is the introduction of new instructional method- technology integration) played far less important a role in their self-efficacy beliefs and hence boosted student performance (Moran, 2007). At this conjecture, it is important to note, that among experienced teachers, for whom mastery experiences were available, circumstantial factors (which is the introduction of technology) played fewer important a role in their self-efficacy beliefs and hence heightened student performance (Moran, 2007). Second, research studies have explored the relationship between "teacher quality" and "teaching effectiveness" as perceived by students. A study found that "the correlation between them is positive ($r = 0.87$) and significant ($p < .001$), which means

they are highly positively correlated" (Ruilin Lin, *et. al.* 2010, p. 167). Therefore, the correlation between the teacher experience (teacher quality) and effectiveness is positive and significant. –

Based on the purposes of the project, research questions were framed and collected secondary data was analyzed to obtain results and make recommendations. The methods section of this project will provide a background of the data collection methods used, the tools employed, and the data sources studied and types of statistical analysis employed. Additionally, description of the relevant context for each variable analyzed will be outlined along with results. The final discussion or conclusion and recommendation part of the report will provide a summary of the data analyses results, amplified by new interrogations and recommendations for imminent survey endorsements in future analytical endeavors.

Methods

To provide the Ohio Department of Education with data that can be utilized to make informed decisions, the *EETT* evaluators conceptualized and administered self-reporting surveys to the target sample of teachers and students of the sampling frame. Only quantitative data was obtained through the suitable data collection instrument- two self-constructed questionnaires; for a purely quantitative methodological approach of evaluating the program. This project utilizes the quantitative data so obtained for detailed analysis and informed recommendations.

Population and Target Sample

The population of study include all the teachers and administrators, in USA (Target sample being only Ohio public schools K-8 teachers and administrators) at different levels of experience in the academic year 2007-2008. Population of the students involved would be all the students who are enrolled in different schools in entire US in the academic year 2007-2008 (Sample targeted are students of Ohio middle schools - who participated and received funding from Tittle 2 grant

allocated by Ohio Department of Education- funded through Federal funding). The students ranged from 6th to 8th grades including special education students. The survey instrument was administered to students and their teachers from representative schools. (*N =1799 students, N =767 teachers and administrators*). The benchmark that was selected for the statistical analysis of results was *α= 0.01* at 99 % confidence level, due to the sheer amount of analyses and the huge number of hypotheses involved (Creighton, 2007). The minimum sample size needed for small, medium and large effect size (*ES*) at power 0.80, *α= 0.01*, is 586, 95 and 38, respectively (Cohen, 1992).

Instrument

To collect quantitative data from the students, the EETT survey was administered via a self - constructed survey questionnaire instrument. Two different survey instruments were developed by the program external evaluator- one each for teachers and students. The student survey questionnaire consisted of total 50 items and were collected at two different time points- winter 2007 and spring 2008. 4 items were related to school and student demographic data like, school ID, building IRN, grade level and gender of students. Fourteen items corresponded to computer use; of which 5 items described computer use with different computer programs (*Destination Math, Learning milestones, Odyssey, Plato*, and others) and 9 items corresponded to computer use for different content areas (English, Math, Science Social Studies, Spelling, Writing, School Presentation, Distance learning and Games). 30 items (rating between 0-2, with matching choices of "I do not know how to do it" to "I am very good at it") in the questionnaire were corresponding to computer skills of the students and a **composite score** of **Total Computer Skills** was computed by adding these 30 items. The scores for Total Computer Skills for students ranged between 0 - 60 points.

The teacher survey questionnaire, consisted of more than 50 items and were collected at two different time points- winter 2007 and spring 2008 for three different constructs- Teacher Computer Skills score, Student Computer Skills score (Teacher assessed) and Teacher Computer Use score. 5 items were related to school and student demographic data like, school ID, Building IRN, grade level taught, years of teaching experience and gender. Seventeen items were corresponding to computer skills, where the teachers could rate on a scale of 0-4 lowest to highest and the **composite score: Total Computer Skills** Scores ranged between 0 – 64 points. 15 items corresponded to technology use (use of technology for teaching, student learning, access to student data, communication, handouts, teaching resources, presentations, hand held devices, management systems, soft-wares, student progress, higher order thinking collaboration, self-regulation, use of graphic organizers, and smart boards / white boards) where the teachers could rate between 0-4 ("never" to "always") and the **composite scores: Total Computer Use** ranged between 0-54 points. 10 items corresponded to teacher assessed students' computer skills, where the teacher could rate between 0-2 (From –"I do not know how to do it", "not very good at it" and "I am very good at it") and the **Composite scores**: **Student Computer Skills (as assessed by teachers) -** ranged between 0-42 points.

All **composite scores** were computed by adding those corresponding items to get a comprehensive composite total score on each of those constructs. This allowed the students and teachers to directly provide their responses regarding their school experiences-demographics, school processes and student learning from the given choices. Additionally, responses to individual items were cross-tabulated to explore possible relationships between multiple variables. The demographic information, consisted of both gender and grade level, which was used to disaggregate the data so obtained. "Demographic" data are very imperative to

comprehend, because, "they are the part of our education system from which we can observe trends and glean information for purposes of prediction and planning" for the future (Bernhardt, 2004, p. 22).

Data Sources and analysis

The data sources, which contained the responses of the target sample (*N =1799 students, N =767 teachers*), was the **EETT Survey Data Sets** for students and teachers: *EETT Overall Student 6-8 variables* and *EETT Overall Teacher Variables K-8.* For ideal statistical use and analysis; these datasets had already been loaded into a statistical package named SPSS Statistics (SPSS). SPSS is specifically designed to perform a wide range of statistical procedures for social sciences (Cronk, 2012). Prior to transportation of the extracted data into SPSS, the dataset was pre-prepared for statistical analysis (labeling and coding of variables) by the evaluators. The responses entered by the students and teachers appeared as different variables, in both the *EETT* datasets- for students and teachers. Each dataset variables went through conversion into numeric values (codes) for both descriptive and inferential statistical analyses. Student technology use and their computer literacy skills change due to EETT was recorded using student survey at the beginning and at the end of the participation by grade level 6-8. Access to student dataset for this project was only for 6-8 grade and the analysis does hold good for those students only. Teacher technology use, their skills in integration technology in curriculum and their assessment of their student's skills due to EETT participation was recorded in the SPSS dataset for teachers and administrators K-8.

Results

Demographic characteristics of teachers and students

An overview of the demographic characteristics of this population is provided in Table 1. While Table 2 provides a gender breakdown of the students by their grade level. The demographics table shows that the maximum number of participants were male (44%). Also, the highest number of participants were from the 6th grade (45%) while, the least number of students were special education students, as they account for only 1.20% of the sample who participated and had revealed their gender and grade level as well as special education status.

Table 1

Student Demographic Data Categories, Frequencies and Percentages

Variables	Categories	Frequency	Percentages %
Student Gender	Male	925	44.30
	Female	854	40.90
	Total	1779	
Grade Level	6th grader	946	45.30
	7th grader	380	18.20
	8th grader	447	21.40
	Special Education	26	1.20
	Total	1799	100.00

Table 2

Demographic Data With *Gender By Grade Level Cross Tabulation*

Gender	6th grader	7th grader	8th grader	Special Education	Total
Male	495	190	221	18	924
Female	437	186	223	8	854
Total	932	376	444	26	1778

An overview of the age range of teachers is provided in Table 3. It indicates data by age category of teachers, including frequency numbers and those missing from the dataset (either missing or did not respond) and % and valid percentage of total teachers participating. The table shows that

maximum number of teachers (28%) belong to the 50+ age range while, least number of teachers

fall below the age 28 (6.30%)

Table 3

Teacher Demographic Data: Age Category, Frequency and Percentage of Total Teachers

Age of teachers	Frequency	Percentage	Valid Percentages %
20-27	44	5.70	6.30
28-35	166	21.60	23.90
36- 42	150	19.60	21.60
43-50	141	18.40	20.30
50+	194	25.30	27.90
Total	695	90.60	100.0
Missing	72	9.40	
TOTAL	767	100.0	

Table 4 shows the grade level taught by the participating teachers as well as the number of

administrators who participated in the survey. Maximum number of teachers taught K-2

(38.30%), while the special educators accounted only for 5.3% of the teachers surveyed.

Whereas, teachers teaching only grades 6-8 were 117 out of total 767 teachers who participated.

Table 4

Teacher Demographic Data: Grade Level Taught and Other Particulars

Grade level	Frequency	Percentage	Valid Percentages %
K-2	244	31.8	38.30
3-5	240	31.3	37.70
6-8	117	15.3	18.40
Special educators	34	4.40	5.30
Administrators	2	0.30	0.30
Total	637	83.10	100
Missing	130	16.90	
TOTAL	767	100	

Teacher qualifications are summarized in Table 5 below. It shows that more than half of total teachers were highly qualified with a Master's degree (59%) while only 2% of the teachers reported to be having other degrees apart from Bachelors or Masters.

Table 5

Teacher Demographic Data: Degree Obtained, Including Frequency % and, Valid Percentage

Degrees obtained	Frequency	Percentage	Valid Percentages %
Bachelors only	290	37.80	39.10
Masters	436	56.80	58.80
Other	15	2	2
Total	741	96.60	100
Missing	26	3.40	
TOTAL	767	100	

Table 6 provides the demographic illustrations of data as teacher gender reported during the survey.

Table 6

Teacher Demographic Data: Gender Reported, Including Frequency, % And Valid Percentage

Gender	Frequency	Percentage	Valid Percentages %
Males	88	11.50	11.90
Females	652	85.00	88.10
Total	740	96.50	100
Missing from system	27	3.50	
TOTAL	767	100	

Majority of the teachers (88%) were females while rest of them were males who participated in the survey. Next step was to develop research hypotheses based on all the research questions. So, as a decision maker, the bench-mark or criterion for risking error (α) was chosen to be 0.01 for all the hypothesis tested.

Teacher's years of experience

The second purpose of the study was to assess if the teachers in Ohio had adequate experience to implement this integration and hence have a mark on the improvement of the student's academic scores due to integration of technology. This is important to consider because, research discloses that among experienced teachers, for whom an abundance of mastery experiences were available, contextual factors (which is the introduction of technology integration) played far less important a role in their self-efficacy beliefs and hence boosted student performance (Moran, 2007).

On an average, is the teaching experience of teachers, in Ohio in 2008 comparable with the national average?

H_1: On an average, the teaching experience of teachers for k-8 in Ohio is significantly more than the national average for all US teachers in 2008.

H_0: On an average, the teaching experience of teachers for K-8 grades in Ohio is not significantly more than the national average for all US teachers in 2008.

One sample test/ Z test was conducted ; with the dependent variable as continuous; years of teaching experience and independent variable- two categories - Ohio K-8 grade teachers (sample) and all the teachers in the US-(population) (Creighton, 2007). During the analysis, the test value for population was set to 14.20 as because, average years of teaching experience for K-8 teachers in US in 2008 survey is 14. 20 (National Center for Education Statistics, June 2007). The descriptive and inferential statistical analyses are given in Tables 7 and 8 respectively.

Table 7

Descriptive Statistics: Z Test/ One Sample test

Variable	N	Mean(SE)	SD
How many years have you been teaching?	692	14.58(0.35)	9.38

Table 8

Statistics For One sampled t-Test/ Z Test

Variable	*t*	*df*	*Sig(2-tailed)*	*Mean Difference*	*99 % CI of the difference*	
Post -pre weight	1.05	691	0.29	0.37	Lower -0.32	Upper 1.08

Note. Test Value 14.2

The result in Table 8 above, shows that the significance of this analysis $p=0.290$ ($p>0.001$), is higher than the set criteria/ benchmark for the hypothesis. So, we fail to reject the null hypothesis and conclude that, on an average, the teaching experience of teachers for K-8 grades in Ohio is not more than the national average for all U.S. teachers in 2008. Even though the slightly greater experience for Ohio middle school teachers is not statistically significant, yet it is almost similar to the U.S. national average teacher's experience and this could possibly be a strength in the integration of technology through *EETT* program. Further analysis with breakout experiences of all teachers in all grades implementing *EETT* could possibly reveal different and statistically significant results.

Improvement in Total Computer Skills Scores in Students

On an average, is there an improvement in computer skills score of Ohio 6-8 grade students in 2008 compared to 2007?

On integration of technology, through *EETT* program, student's scores of their Total Computer Skills were improved from winter 2007 to spring 2008. The results revealed that the average scores of Total Computer Skills were increased by 2.36 points in spring 2008.

H$_1$: There is a statistically significant improvement in Total Computer Skills score of Ohio 6-8 grade students in spring 2008, compared to their scores in winter 2007.

H₀: There is no statistically significant improvement in Total Computer Skills score of Ohio 6-8 grade students in spring 2008, compared to their scores in winter 2007.

Based on the above hypothesis, we have a paired group or category; that is one same group, the students of 6-8 grades are tested twice, once in winter 2007 and once in spring 2008. As the dependent variable was continuous and is their total computer skills score in winter 2007 and spring 2008, a paired samples *t*- test was conducted (Creighton, 2007). Result of the analysis is given below with the descriptive provided in Table 9. The range of score that could be achieved as a composite score- Total Computer Skill is 0-60.

Table 9

Paired Samples Descriptive: Students' Students Total Computer Skills Scores

Computer Skills	*M(SE)*	*N*	*SD*
Winter 2007	29.04*(0.25)*	1790	10.70
Spring 2008	31.41*(0.27)*	1790	11.49

Table 10.

Paired Samples t- Test Statistics: Winter and Spring Students' Total Computer Skills Score

Paired Differences							
Mean	*SD*	*SE*	99% Confidence		*t*	*df*	Sig.(2 tailed)
-2.36	15.65	0.37	-3.08	-1.63	-6.38	1789	.000***

The pre *EETT* score M *(S.E)* was 29.04*(0.25)* and post *EETT* was 31.41*(0.27).* The student's average scores in Total Computer Skills (a composite score as described in the instrument section of the project) before and after the program shared a statistically significant correlation, meaning the scores increased significantly after the program, $r = 0.992$, $p < 0.001$. The interpretation of results, as indicated in Tables 10, shows that it is highly significant

(p=0.000) and we can reject the null and accept the test /alternate hypothesis, that there is a statistically significant improvement in computer skill score in spring 2008 from winter 2007. The significance is seen through the end of the Table 10. It is significant at 99% confidence level, t $_{1789}$ =-6.38, p< 0.001, which indicates that the result of analysis is statistically significant at the benchmark selected for the analysis. The effect size was calculated d = 0.213 and it can be interpreted that the magnitude of effect size is between small and medium (Creighton, 2007). The magnitude of difference between the two scores is 0.213 SD units from zero. As there is a statistically significant increase in computer skills score (2.36 points) in spring 2008 from winter 2007, before integration of technology; as evident from the mean scores in Table.10. This accounts for more such endeavors and further continuation of EETT funding and its integration in comparable school districts for the betterment of student learning.

Students' Total Computer Skills Test Score by Gender and Grade Level

Student's Total Computer Skills Test Scores by gender

Gender wise, it was found that the scores improvement was better for boys. Boys' scores were more than girls with average score of 29.50 in winter 2007 and gained 2 points to have a final average score of 31.50. However, girls had an initial score of 28.55, which gained by 2.76 points to become 31.31. Even though the initial winter scores were less for girls compared to boys yet, the total improvement was more for girls- accounting for their total average gain in scores by 2.76 points compared to boys with 2 points gain in Total Computer Skills scores in spring.

Student's Total Computer Skills Test Scores by grade level

Improvement in Total computer skills score grade wise -descriptive statistics is provided in Table 11 below. It is evident that the highest improvement had been among the youngest grade that is grade 6 (increased by 2.79 points), while the least had been for the special education

students (increased by 0.23 points). This accounts for special care, support services, resources, professional development for special educators for the EETT implementation and more responsiveness to the special education students in these grades, compared to the typically developing peers in these middle schools.

Table 11

Students' Total Computer Skills Grade wise, Winter 2007 And Spring 2008

Grade	6th grader	7th grader	8th grader	Special Education
Winter 2007 *M (SE)*	28.89(*0.34*)	28.94(*0.55*)	29.55(*0.49*)	28.61(*2.89)*
Spring 2008 *M (SE)*	31.68(*0.37*)	31.10(*0.59)*	31.22(*0.53*)	28.84(*1.94)*
Increment in mean	2.79	2.16	1.67	0.23

The above tables suffice only the descriptive statistics for Students' Total Computer Skills Score during the intervention. This is further needed to be analyzed statistically. Therefore the following hypothesis was developed from the research question.

Is there a statistically significant difference in overall Total Computer Skills score for 6-8 graders for spring 2008, by gender?

H$_1$: There is a statistically significant difference in Total Computer Skills score 2008 of Ohio students based on their genders- males and females.

H$_0$: There is no statistically significant difference in Total Computer Skills score2008 of Ohio students based on their genders- males and females.

Based on the above hypothesis, we have a two group or categories; that is male and female-students of 6-8 grades are tested once, once in spring 2008. The dependent variable is their total computer skills scores in spring 2008. An Independent Samples *t*- test was conducted to test if there is a statistically significant difference in Total Computer Skills score 2008 of Ohio students

based on their gender. The descriptive is provided in Table 12, while the result of this analysis is provided in the following Table 13.

Table 12

Descriptive statistics for Total Computer Skills Score spring 2008 by gender

Gender	*n*	*M(SE)*	*SD*
Boys	922	31.49*(0.38)*	11.64
Girls	848	31.31*(0.39)*	11.40

Table 13

Independent Samples t-Test Statistics Result for Total Computer Skills Scores spring 2008 by gender

Mean Difference(SE)	*99 % CI of the difference*		*t*	*df*	*Sig.*
0.18(.548)	<u>Lower</u> <u>Upper</u>		1760	.740	
	-.89	1.26			0.33

Levene's test of equality of variances revealed that the variances between males and females on Total Computer skills score were not statistically significantly different and thus the assumption of homogeneity was met, $F = 1.22$, $p > .05$ (0.27). An independent samples *t*-test revealed statistically non-significant difference in Total Computer Skills Score by sex in spring 2008, $t_{1760}=0.33$, ($p>0.01$). (Table 13) From the above analysis we can interpret that the result is not statistically significant $p=0.740$ ($p>0.01$). We accept the null hypothesis and reject the Test/ alternate hypothesis, which is the mean difference in Total Computer skills scores in spring 2008 between females and males is not statistically significant (Creighton, 2007). The greater values for males over females was just by chance or sampling error.

Is there a statistically significant difference in overall Total Computer Skills score for 6-8 graders, grade wise?

H_1: There is a statistically significant difference in Total Computer Skills score 2008 of Ohio students based on their grades.

H_0: There is no statistically significant difference in Total Computer Skills score2008 of Ohio students based on their grades.

Based on the above hypothesis, we have a 4 categories as the independent variable; that is 6-8 grades and special education students were tested for scores in spring 2008. The continuous level dependent variable is their Total Computer Skills Scores in spring 2008. So the analysis was conducted through One- Way ANOVA (Creighton, 2007). That is compare means for Spring Total Computer Skills score 2008 grade wise. The descriptive is given below in Table 14 and the ANOVA result is given further in Table 15. The observed result of test of homogeneity of variances revealed that homogeneity was met which means the differences in variances is not significant; (p > .05). Table 15 gives F statistic value which is not significant, F (3, 1786) = 0.73, p > .01, η2 = .002. The difference in average Total Computer skills scores in spring 2008 among the four groups or categories- 6th, 7th, 8th and Special education students- is not statistically significant. This is very crucial as because, this indicates that the effect of EETT has been similar on all grades and student improvement in technology literacy had also been similar across all the grades. We might assume that equal efforts have been given to all students and that this intervention worked equally positively with improvement in technology literacy for all grades.

Table 14

Descriptive statistics for Spring Total Computer Skills score 2008 grade wise

Grade	*n*	*M(SE)*	*SD*
Sixth grade	943	31.68*(0.37)*	11.62
Seventh grade	377	31.10*(0.59)*	11.58
Eighth grade	444	31.22*(0.53)*	11.23
Special Education	26	28.84*(1.94)*	9.93
Total	1790	31.40*(0.27)*	11.49

Table 15

Result for One Way ANOVA Test- Spring Total Computer Skills Score 2008 grade wise

Particulars	Sum of Squares	*df*	Mean Square	*F*	*Sig.*
Between Groups	290.69	3	96.89	0.73	0.53
Within Groups	236161.77	1786	132.22		
Total	236452.47	1789			

Improvement in Total Computer Skills and Use of Teachers & Administrators and Students' Skills (as assessed by teachers)

On an average, is there a statistically significant difference in Total Computer Skills score of teachers and administrators in spring 2008 compared to winter 2007?

On integration of technology, through *EETT* program, teachers' scores of Total Computer Skills were decreased from winter 2007 to spring 2008.

H$_1$: There is a statistically significant difference in Total Computer Skills score 2008 of Ohio Teachers and administrators (K-8), compared to their scores in 2007.

H$_0$: There is no statistically significant difference in Total Computer Skills score 2008 of Ohio

Teachers and administrators (K-8), compared to their scores in 2007.

Based on the above hypothesis, we have a paired group or category; that is one same group, the

teachers and administrators (taken together) of K-8 grades are tested twice, once in winter 2007

and once in spring 2008. The dependent variable is continuous and is their Total Computer

Skills score in winter 2007 and spring 2008. So the analysis of dependent sample or paired

samples *t*- test was conducted (Creighton, 2007). These assumption of normality were tested

with skewness and kurtosis values (-.03 & 0.025 skewness for pre and post intervention

respectively and 0.17 kurtosis for both pre and post intervention Total Teacher's Computer Skills

Scores), which were within acceptable range of -1.0 to 1.0 (Meyers, Gamst, and Guarino, 2006).

Result of the analysis of dependent samples *t*- test is given below in Table 17, with the

descriptive provided in Table 16 below. The study is balanced because we have the same number

of participants before and after the running program intervention, hence pre and post scores are

reported for equal number of participants was reported (*n*= 767). The average scores before and

after the *EETT* program shared a moderate to highly negative, statistically significant correlation,

r = -.078, *p*< 0.01,The results from a Dependent Samples *t*- test indicated that the Total

Computer Skills Scores for teachers did not statistically significantly decrease after *EETT*, t $_{767}$=

-1.32, *p* >0.01. The significance is seen through the end of the Table 17, at 99% confidence level

(*p*=0.180), which indicates that the result of is not statistically significant at the benchmark

selected for the analysis (Creighton, 2007). Through the interpretation of results we can reject the

alternate hypothesis and accept the null, and there is no statistically significant difference in

computer skill scores for teachers from winter to spring. Results revealed that the average scores

of Total Computer Skills were increased by 1 point in spring 2008 from scores in winter 2007,

before its implementation. Even though there has been an increase (0.09 points as seen in Table 16), yet it is not statistically significant. However, their students had statistically significant increase in computer skills. The result might account for similar and sustained professional development, better training and demand better allocation of resources for the teachers and administrators of ODE to improve scores further in future such endeavors.

Table 16

Paired Samples Descriptive Statistics for Teachers

Computer skills and use score over time	N	M(SE)	Std. Deviation
Winter Survey Total Computer skill score	767	35.67(0.46)	12.96
Spring Survey Total Computer skill score	767	36.58(0.45)	12.61
Winter Survey Total Teacher Computer Use	767	25.55(0.36)	10.03
Spring Survey Total Teacher Computer Use	767	25.20(0.35)	9.90
Winter Survey Total Student Computer Skill(6-8 grades teacher assessed)	107	3.51(0.33)	3.45
Spring Survey Total Student Computer Skill(6-8 grades teacher assessed)	107	6.58(0.60)	6.30

Table. 17

Paired Samples Test Results for Teachers Total computer Skills, Use and Student Computer skills as interpreted by teachers.

Winter-Spring Paired Differences	Mean Difference(SE)	SD	99 % CI of the difference		t	df	Sig(2 tailed)
			Lower	Upper			
Total Computer Skills Score	-0.91(0.67)	18.77	-2.24	-0.42	-1.32	767	.180
Total Teacher Computer Use	0.35(0.01)	0.54	0.31	0.39	17.80	767	.000***
Total Student Computer Skill (as assessed by 6-8 grade teachers)	-3.07(0.43)	4.53	-4.22	-1.92	-7.00	107	.000***

Is there a statistically significant difference in overall computer use score for teachers and administrators from winter 2007 to spring 2008?

H_1: There is a statistically significant difference in Total Computer use score 2008 of Ohio Teachers and administrators, and their scores in 2007.

H_0: There is no statistically significant difference in Total Computer use score 2008 of Ohio Teachers and administrators, and their scores in 2007.

Based on the above hypothesis, we have a paired group or category; that is one same group, the teachers and administrators of K-8 grades are tested twice, once in winter 2007 and once in spring 2008. The dependent variable is continuous and is their total computer use score in winter 2007 and spring 2008. So the analysis of dependent sample or paired samples t- test was conducted. These assumption of normality were tested with skewness and kurtosis values (0.31 & -.31 and 0.30& -.13 skewness and kurtosis respectively for winter and spring Total Teacher's Computer Use Scores), which were within acceptable range of -1.0 to 1.0 (Meyers, Gamst, & Guarino, 2006). Result of the analysis of dependent samples t-test is given in Table 17, with the descriptive provided in Table 16 below. The study is balanced because we have the same number of participants before and after the running program intervention, hence pre and post scores are reported for equal number of participants was reported ($n = 767$). The average computer use, scores before and after the *EETT* program shared a highly positive, statistically significant correlation, $r = 0.99$, $p < 0.001$ (Creighton, 2007). Computing effect size Cohen's d for Dependent Samples *t*-test: $d=$ Paired difference of means / paired difference of standard deviations = 0.35/ 0.54 = 0.002, which is a small effect size (Cohen, 1992).

The results from a Dependent Samples *t*- test indicated that the Total Computer Skills Scores for teachers statistically significantly decreased by 0.35 points after EETT, $t_{767} = 17.80$, p

<0.001. The significance is seen through the end of the Table 17, at 99% confidence level (p=0.000), which indicates that the result of is highly statistically significant at the benchmark selected for the analysis (Liang, 2016, Creighton, 2007). Through the interpretation of results we can reject the null hypothesis and accept alternative, and that there is statistically significant difference in Computer Use scores for teachers from winter to spring by 0.35 points (seen in Table 16). Unlike their students, who had statistically significant increase in computer skills, the teachers had decrease in both Computer use and their skills score. The result might have implications for professional development, and teachers might need improved motivational tactics employed in EETT program to keep up computer use. However, as mentioned earlier, additional training, better allocation of resources for the teachers and administrators of ODE is warranted to improve both use of computers and hence further improve skills scores in future such endeavors.

Is there a statistically significant difference in Students' Total Computer Skills Score as (assessed by teachers) from winter 2007 to spring 2008?

H$_1$: There is a statistically significant difference in Total Student Computer Skill Score in 2008 (as assessed by their teachers of 6-8 grades) and scores in 2007.

H$_0$: There is no statistically significant difference in Total Student Computer Skill Score in 2008 (as assessed by their teachers of 6-8 grades) and scores in 2007.

Based on the above hypothesis, we have a paired group or category; that is one same group, the teachers and administrators of 6-8 grades are tested twice, once in winter 2007 and once in spring 2008. The dependent variable is continuous and is Total Student Computer Skills Score- as interpreted by teachers, in winter 2007 and spring 2008. So the analysis of dependent sample or paired samples t- test was conducted (Creighton, 2007). These assumption of normality were

tested with skewness and kurtosis values (1.86 & 5.22 and 2.31& 6.95 skewness and kurtosis respectively for winter and spring Total Teacher's Computer Use Scores), which were not within acceptable range of -1.0 to 1.0 (Meyers, Gamst, and Guarino, 2006). The study is balanced because we have similar number of participants before and after the running program intervention, hence pre and post scores are reported for equal number of participants was reported ($n=107$). The average Total student computer skills scores (as interpreted by teachers) before and after the EETT program shared a moderate to high positive, statistically significant correlation, $r =0.71$, $p <0.001$ (Creighton, 2007). The results from a Dependent Samples t- test indicated that the Total student computer skills scores (as interpreted by teachers of 6-8) statistically significantly increased after EETT, $t_{107}= -7.00$, $p <0.001$. The significance is seen through the end of the Table 17, at 99% confidence level ($p=0.000$), which indicates that the result of is highly statistically significant at the benchmark selected for the analysis (Creighton, 2007). Computing effect size Cohen's d for Dependent Samples t-test: $d=$ Paired difference of means / paired difference of standard deviations $= -3.07/ 4.53 = 0.67$, which is between medium and large effect size (Cohen, 1992). The minimum sample size needed to detect statistical significance at an alpha level .01 for a medium effect size for a power of .80 is 95 (Cohen, 1992) Through the interpretation of results we can reject the null hypothesis and accept alternative, and that there is statistically significant improvement in Total Student Computer Skills scores (as interpreted by teachers of 6-8 grades) from winter to spring by 3.07 points (seen in Table 16). Just like their students had statistically significant increase in computer skills scores, the teachers rightly interpreted their students' improvement, as evident from the results, even if their own skills score had just improved by 1 point. The result might have implications for future and similar tactics and methods should be followed by the teachers to keep predicting and

interpreting rightly about their students' improvement in technology use and integration. Because, not only did the students improve in their total computer skills, but also improved in terms of what their teachers interpret their development had been due to EETT.

Computer Skills Score of teachers and administrators among the different groups and between the genders.

Is there a statistically significant difference computer skill score for teachers and administrators for spring 2008, based on the grades taught?

H₁: There a statistically significant difference in computer skill score for K-8 teachers and administrators for spring 2008, based on the grades taught.

H₀: There is no statistically significant difference in computer skill score for K-8 grade teachers and administrators for spring 2008, based on the grades taught.

Based on the above hypothesis, we have a 5 categories as the independent variable; that is different groups of teachers based on grades taught and the administrators. The continuous level dependent variable is their Total Teacher Computer Skills Scores in spring 2008. So the analysis was conducted through One- Way ANOVA (Creighton, 2007). That is compare means for Spring Total Teacher Computer Skills score in 2008, grade wise. The descriptive is given below in Table 18 and the ANOVA result is given further in Table 19. The observed result of test of homogeneity of variances revealed that homogeneity was met which means the differences in variances is not significant; ($p > .001$). Table 19 gives F statistic value which is not significant, $F(4,636) = 1.688$, $p > .01$, $\eta2 = .02$. From the result depicted in Table 19 below, it is evident that we can interpret that the result is not statistically significant $p=0.151$ ($p>0.001$). We accept the null hypothesis and reject the Test/ alternate hypothesis. The value of $\eta^2 = .02$. The difference in average Total Teacher Computer skills scores in spring 2008 among the five groups is not

statistically significant (Creighton, 2007). This is very crucial as because, this indicates that the effect of EETT has been similar on all groups of teachers- K-3, 3-5, 6-8 and administrators, in terms of technology literacy and integration. We might assume that equal efforts have been employed by all groups of teachers and that this intervention worked equally and certainly for all.

Table 18

Descriptive statistics for Spring Teacher Total Computer Skills score 2008

Grade	*n*	*M(SE)*	*SD*
K-2 grade	244	35.94*(.77)*	12.13
3-5 grade	240	38.20*(.82)*	12.83
6-8 grade	117	35.89*(1.23)*	13.33
Special Educators	34	34.02*(2.02)*	11.83
Administrators	2	30.50*(14.50)*	20.50
Total	637	36.66*(0.50)*	12.65

Table 19

Result for One Way ANOVA Test- Spring Teacher Total Computer Skills Score 2008 grade wise

Particulars	Sum of Squares	*df*	Mean Square	*F*	*Sig.*
Between Groups	1077.012	4	269.25	1.68	.151
Within Groups	100836.432	632	159.55		
Total	101913.444	636			

Is there a statistically significant difference in Total Computer Skill score for teachers and administrators for spring 2008, based on gender?

H$_1$: Is there a statistically significant difference total computer skill score for teachers and administrators for spring 2008, based on the gender.

H$_0$: There is no statistically significant difference total computer skill score for 6-8 grade teachers and administrators for spring 2008, based on the gender.

Based on the above hypothesis, we have a two group or categories; that is male and female-teachers tested once, in spring 2008. The dependent variable is their total computer skills scores in spring 2008. So independent samples *t*- test was conducted (Creighton, 2007). The descriptive is provided in Table 20, while the result of this analysis is provided in the following Table 21.

Table 20

Descriptive statistics for Teachers' Total Computer Skills Score gender wise

Gender	*n*	*M(SE)*	*SD*
Male	91	39.37*(1.41)*	13.50
Female	608	36.58*(0.50)*	12.47

Table 21

Independent Samples t-Test Statistics Result for Teachers' Total Computer Skills Score gender wise

	Mean Difference(SE)	*df*	*Sig.*	*99 % CI of the difference*		*t*
				Lower	Upper	
Total Computer Skills Scores	2.79(*1.50*)	697	.06	-.18	5.76	1.85

Levene's test of equality of variances revealed that the variances between males and females on Total Computer skills score were not statistically significantly different and thus the assumption of homogeneity was met, $F = 0.73$, $p > .05$ (0.39). An independent samples *t*-test revealed statistically non-significant difference in Total Computer Skills Score by sex, t_{697}=1.85. (Table

23) From the above analysis we can interpret that the result is not statistically significant *p=0.06* (*p>0.01*). We accept the null hypothesis and reject the Test/ alternate hypothesis, which is the mean difference in total computer skill score for teachers and administrators for spring 2008, between females and males is not statistically significant (Creighton, 2007). The greater values for males is just by chance or sampling error. And that the intervention has equally impacted both the sex, which is a positive finding of the outcomes of EETT.

A summary table (Table.22) with all the hypothesis tested, their dependent and independent variables, t/F statistic, *p* value and Cohen's *f* or *d* values, with the interpretation of effect sizes has been provided below.

Table 22.

Summary of Hypothesis Tested And Their Statistical Analysis Results

Hypotheses tested	Test Conducted	DV	IV	*t*/F Statistic	*p* value	Cohen's *d* / *f* (effect size)
Teaching experience of teachers for k-8 in Ohio is significantly more than the national average for all US teachers in 2008	One Sample *t*-test/ Z test	Teaching experience	Categories 1.Ohio-k-8 teachers- sample 2. US teachers-Population	1.05	0.29	Not significant
Significant improvement in computer skills score of Ohio 6-8 grade students in 2008 spring compared to winter 2007	Paired Samples *t*-test	Students Total Computer Skills Score	Two matched pair of students- 6-8 grades tested twice	-6.38	0.000 ***	0.213 (small to medium)
There is a statistically significant difference in overall computer skills score, spring 2008, for 6-8 graders, gender wise	Independent Samples *t*-test	Students Total Computer Skills Score 2008	Two categories of students- 6-8 grades males and females	0.33	0.740	Not significant
There is a statistically significant difference in overall computer skills score in spring 2008, for 6-8 graders, grade wise	ANOVA	Students Total Computer Skills Score 2008	4 categories of students- 6th, 7th, 8th and special education students	0.73	0.53	Not significant
There a statistically significant difference (decrement) in Total Computer Skills Score of k-8 teachers and administrators in spring 2008 compared to winter 2007	Paired Samples *t*-test	Teachers Total Computer Skills Score	Two matched pair of teachers- K-8 grades tested twice	-1.32	0.180	Not significant

There a statistically significant difference (decrement) in Total Computer Use Score of k-8 teachers and administrators in spring	Paired Samples *t*-test	Teachers Total Computer Use Score	Two matched pair of teachers- K-8 grades tested twice	17.80	0.000 ***	0.002 (small)
There a statistically significant difference (decrement) in Total Student Computer Skills Score (as assessed by 6-8 teachers and administrators in spring).	Paired Samples *t*-test	Total Student Computer Skills Score (as assessed by teachers	Two matched pair of teachers- K-8 grades tested twice	-7.00	0.000 ***	0.67 (between medium and large)
There a statistically significant difference Computer skill score for teachers and administrators for spring 2008, based on the grades taught.	ANOVA	Total Teacher Computer Skills Score 2008	5 categories of teachers, K-2, 3-5, 6-8, special educators and administrators	1.66	0.15	Not significant
There is a statistically significant difference in Total Computer Skill score for teachers and administrators for spring 2008, based on gender	Independent samples *t*-test	Teachers Total Computer Skills Score 2008	Two categories of teachers -males and females	1.85	0.06	Not significant

Conclusions and Recommendations

Balanced rate of participation

The results of the *EETT* data analyses indicate that the demographic distribution of the student participants was higher on the side of the males and also highest from 6th grade- 52.58 %, with respect to total strength (N=1766). Only 1.45% participants were special education students. A balanced rate of participation with regards to gender and grade distribution of participation for the survey could have conceivably led to a different result of the analyses conducted. Maximum number of teachers (28%) belong to the 50+ age range while, least number of teachers fall below the age 28 (6.30%). Highest number of teachers taught K-2 (38.30%), while the special educators accounted only for 5.3% of the teachers surveyed. Whereas, teachers teaching only grades 6-8 were 117 out of 767 teachers who participated and only 107 of them responded to the survey.

Improvement in computer skills score for all students

The average increment in students' Total Computer Skills scores (2.79) from winter 2007 to spring 2008 was highest among 6th graders while least being for the special education students

(0.23). This could possibly have called for additional specialized support and differentiated instruction for the special education students. Additionally, more attention and increased assistance was needed for students in 7th and 8th grade as well, to pull up their scores as at par with the other grades. The ANOVA analysis for different grades and gender analysis indicated that students' growth is no different across gender, and grade level. Particularly when comparing general education students with special education students, we can also infer that the growth is statistically significantly the same. This is colossal achievement for the program developers and implementers.

Competent and Qualified teachers

The teachers who were in charge of implementing technology for students had an average experience of over 14 years which is a little above the National average experience in teaching for teachers in US in the year 2008; though not statistically significantly above. Thus, the graduating middle school classes, in Ohio schools have been taught by teachers competent with respect to experience-(as a part of the overall teacher quality) to help in academic improvement of the students through the new initiative of technology integration. Further, an abundance of mastery experiences were available to them due to their experiences, when contextual factors (which is the introduction of technology integration) played far less important a role in their self-efficacy beliefs and hence boosted student performance (Moran, 2007). More than half of total teachers were highly qualified with a Master's degree (59%) while only 2% of the teachers reported to be having other degrees apart from Bachelors or Masters. Majority of the teachers (88%) were females while rest of them were males who participated in the survey and had disclosed their gender.

Change in computer skills and use of teachers

Further analysis, of the improvement in Total Computer skills score for all students from winter 2007 to spring 2008 was found to be a highly statistically significant ($p<0.001$); as evident from the mean scores of 29 in winter and 31 in spring. However, there was only a minor increment (0.09 points) in Total Computer Skills Scores for teachers after implementing *EETT*. Even though there has been an increase, yet it is not statistically significant ($p>0.001$). Nevertheless, their students had statistically significant increase in computer skills, and was not affected by the teacher's scores. The result might account for more professional development, better training and demand better allocation of resources for the teachers and administrators of ODE to improve scores in future such endeavors. There was a statistically significant decrease in Computer Use Scores (by 0.35 points) of teachers in spring 2008 ($p<0.001$).

Strategies, resources and training warranted for teachers

Unlike their students, who had statistically significant increase in computer skills scores, the teachers had decrease in Computer Use. Likewise, the result might have implications for professional development, and teachers might need improved motivational tactics compared to what was employed in *EETT* program to keep up their computer use. However, as mentioned earlier, additional training, better allocation of resources for the teachers and administrators of ODE is warranted to improve skills and use scores in future such endeavors. This result have insinuations for further knowledge and expertise improvement through practiced and researched methods of development.

Teacher's self-fulfilling prophecy

Furthermore, the teachers rightly interpreted their students' technology skills improvement as evident from the results of Total Students Computer Skills scores (as assessed by teachers), even if their own skills score hadn't improved considerably. The increment (2.60

points) in Total Students Computer Skills scores (as assessed by teachers 6-8 grade) was statistically highly significant (p<0.001). The result might have implications for future and similar strategies and methods should be followed by the teachers to keep predicting and interpreting rightly about their students' improvement in technology use and integration. As a means of self- fulfilling prophecy, it helped improve students' technology literacy. Because, not only did the students improve in their total computer skills, but also the teacher's interpretation of their improvement due to *EETT* was correct.

Colossal achievement of EETT

Analysis had also put forward that the improvement in the Total Computer Skills Scores for students in spring 2008, was not statistically significantly different among groups. Hence, conclusion can be drawn upon that, all the different grades of Ohio Middle schools had similar improvement in their scores; especially when we have special education students and general education students not significantly differing. The difference in average Total Teacher Computer skills scores for teacher groups in spring 2008 among the five different groups (K-2, 3-5. 6-8 and administrators) was also not statistically significant; p>0.001 (Creighton, 2007). This is very crucial achievement because, this indicates that the effect of EETT had been similar on all groups of teachers and students in terms of technology literacy and integration. Particularly when comparing teachers teaching different grade levels and administrators, the growth is similar. This is likewise a very positive finding like Student's Computer Skills score. Hence, it is huge accomplishment for EETT developers, implementers and researchers. We might assume that equal efforts have been employed by all groups of teachers on all students and that this intervention worked equally positively for all. Again, gender wise there was a gap between the Total Computer skills scores of males and females in students. Males progressed somewhat

better than the females. However, it was not statistically significant. The mean difference in Total Teacher Computer Skill Scores spring 2008, between females and males is not statistically significant. The greater values for males is just by chance or sampling error. And that the intervention has equally impacted both the genders among teachers, which is a positive finding of the outcomes of EETT. So, we can conclude, that, the attempt of EETT intervention was successful in improving students and teacher's skills and use of technology for learning and teaching practices.

Crucial recommendations

Further, availability of qualitative data and segregated district data was to be studied to find out the reasons of their lower scores and means implemented to pull up the scores where needed. The students' needs was to be assessed (but not limited to) in terms of instructional strategies required, time period of instruction employed, hurdles faced or other demographical or school process glitches that could possibly have been tendered and taken care of. These above recommendations are but just a few and deeper examination could possibly lead to further innovative approaches by the *EETT* program implementers and funders. Regrettably, few recommendations above were provided for the enhancement of teaching and learning that could be derived from the limited variable data available. However, with the addition of the commended variables cited above, a greater collection of data and a mixed methodological approach might lead to increased and holistic group comparisons, correlational studies and eventually further inferential statistical analysis and practical implications to support the State's data driven information needs, providing a firm foundation for unremitting school enhancement.

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Moving Down the Yellow Brick Road: The New Paradigm of Digital Teaching and Learning for Teacher Preparation

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Abstract:

It is not a new revelation that education is changing and shifting to a new paradigm. We have been journeying as educators in this paradigm since the first computer lab entered our schools. But, we didn't necessarily believe that this journey into a digital world would be our responsibility. We were comfortable leaving the journey to the technology coordinators and technology educators. Today however, we can no longer leave technology outside of our classrooms. As educators, we are all responsible to insure that our students embrace the 21st century with the knowledge and skills they will need to succeed as global citizens. This article focuses on the new 21st century paradigm shift to digital teaching and learning in education, provides an overview of this learning, and challenges teacher preparation programs to embrace this new paradigm in their teaching in higher education.

It is not a new revelation that education is changing and shifting to a new paradigm. We have been journeying as educators in this paradigm since the first computer lab entered our schools. But, we didn't necessarily believe that this journey into a digital world would be our responsibility. We were comfortable leaving the journey to the technology coordinators and technology educators. Today however, we can no longer leave technology outside of our classrooms. As educators, we are all responsible to insure that our students embrace the 21st century with the knowledge and skills they will need to succeed as global citizens.

This is as true for higher education, as it is for K-12 and is even more significant for teacher education, since K-12 teachers lay the foundations for skills used later in college and beyond. It is not impossible today to see mobile learning, 1:1 technology, flipped classrooms, and distance education in P-20 classrooms.

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However, it is not a reality for every classroom or every district and even these experiences are just a transition into the 21st century digital culture. Teacher preparation programs need to insure that effective integration of technology and a new paradigm shift becomes a reality for every classroom. This begins with understanding of a new paradigm in education by teacher education faculty and continues with new pedagogy and learning experiences in classrooms by our candidates; making it possible for everyone to journey down the *yellow brick road*.

This paper attempts to provide the essential ingredients to move teacher education programs forward in developing teacher licensure programs and advanced master's programs for the 21st century. Each section in this paper has been chosen because the writers believed they were critical to a process of change. The paper begins by providing a literature review of 21st century teaching and learning for our P-12 classrooms. Without this knowledge, it is difficult to move forward in digital teaching and learning in teacher preparation. Knowledge of the skills needed in the 21st century sets the foundation for practice, as well as understanding the new pedagogy to foster 21st century skills in classrooms. It then goes on to identify the essential ingredients that are needed for change. It concludes by providing a professor's journey in using this knowledge and understanding in developing a Master's Degree in Digital Teaching and Learning, along with infusing digital teaching and learning for the 21st century in undergraduate preparation. It is hoped that the paper will provide support to educators that seek to grow in 21st century ways of teaching and learning.

A Review of the 21st Century Learning Model

We would all agree that traditional methods of instruction are no longer sufficient for today's society (Gunn & Hollingsworth, 2013).   This is primarily due to radical technological changes that have increased the availability of information and improved communication. In an industrialized educational system, classrooms were based upon knowledge acquired via "textbooks, curriculum guides, and rote memorization-based instructional practices and evaluation techniques" (p. 202). Today however, students in our schools need more than the structured and rote ways of knowing. In our technological world, students need to build the skills to solve real-world problems, while building their own critical thinking skills, leading to greater knowledge and ability to be life-long learners (Scardamalia & Bereiter, 2006). These 21st

century learning skills are not new skills, the model of 21st century learning has been around for a while and many teachers already use some 21st century teaching strategies. In recent years however, their value has increased and research has validated the need to expand the use of these skills, making them even more crucial for learning and living effectively (Gunn & Hollingsworth, 2013).

The Framework for 21st century learning which began in 2002 with co-founders Ken Kay and Diny Golder-Dardis identified these 21st century skills as the 4 C's. These include creativity, communication, collaboration and critical thinking. Technology has become an essential tool for building these skills and the use of technological literacy has also been seen as a skill to master (Pacific Policy Research Center, 2010). Teachers who chose to build the 4-C's in their students have the opportunity to utilize technology to tap into the knowledge of experts through research-based practices online, visualize and analyze data with their students, link learning to authentic contexts, and take advantage of opportunities for electronic shared reflection.

Alongside these 21st century skills, nonlinear thinking and the need for student reflection in the process of learning are also essential if technology is to be effective in education. Linear multimedia tools are those that progress from one screen to another and are used as a supplementary aid to teaching, whereas nonlinear tools require active participation and allow for control of progress and choice of how to construct knowledge. The ultimate goal of utilizing these two methods is to allow for successful movement from a linear learning environment to a non-linear learning environment and therefore, aligning the learning environment with the 21st century (Lambert & Cuper, 2008).

Learners in 21st century classrooms must become aware of all the technology and resources available to them and understand how to effectively use these for learning and for life. High levels of technological literacy and practices that embrace the 4-C's require consistent and effective practices. To foster consistent practice, classroom environments must allow for creative output and thinking. Classrooms must embed creativity within the classroom culture. Technologies that build experiences promoting problem-solving, while continuing to develop essential *traditional* skills in content as reading, writing and computation skills through

meaningful, real-life learning experiences need to replace textbooks and the paper/pencil mundane and repetitive tasks (Allington & McGill-Frazen, 2000; Davies, 2011; Lampert & Cuper, 2008).

Though critical thinking is crucial, it does pose challenges according to Rotherham and Willingham (2010) who believed that there was no direct way to teach self-direction, creativity, innovation, and collaboration. They believed that to meet this challenge critical thinking must begin to be developed early. Therefore, 21st century learning also has implications for early childhood educators, who need to provide active and meaningful learning experiences that build essential 21st century skills, along with providing essential questioning strategies that encourage reflective thinking on students own personal learning processes (meta-cognition).

Just as important, 21st century students need to be versed in effective communication for the 21st century. Today's students are different learners who are "rapid processors of information and demand more expedient methods of instruction and communication" (Saavedra & Opfer, 2012, p. 202). Technology exposes students to an expansive amount of knowledge and allows them different ways to learn, practice, and share this new knowledge. It also fosters students' skills in information literacy by guiding their ability to filter out information from unreliable sources.

When used effectively together, technology and communication for the 21st century can reduce learning barriers, improve academic success, increase the chances of higher high-school completion rates, create a greater sense of adaptive communication and school community, and provide greater opportunities for flexible access to learning (Gunn & Hollingsworth, 2013). Later in life, these 21st century skills can help individuals adapt to a variety of jobs that require effective communication through a variety of technological sources, an ability to think and problem-solve, and be a life-long learner, capable of using technology that is continually changing.

For these positive consequences to occur, both teachers and administrators must learn how to smoothly integrate technology in the classroom and understand ways to foster 21st

century learning (Gunn & Hollingsworth, 2013). Teachers must also have access to the technologies they need to implement 21st century learning effectively. Administrators need to be aware of the economics and leadership that will be needed, along with the understanding of the new pedagogy in order to transform their schools and districts into 21st century learning communities (Fullan & Langworthy, 2014).

For 21st century learning to be successful, a classroom teacher's training and education must be a combination of innovative pedagogy within a global community using the networking tools students utilize outside of the classroom. With this current generation of students' familiarity with and motivation to use multimedia tools, teachers have an advantage with using such tools as; asynchronous and synchronous communication, social networking tools, intelligent tutoring systems, virtual learning experiences, digital libraries, feedback mechanisms and mobile devices. The utilization of these tools, with increased student collaboration, creative, real-world application, cultural awareness and a global perspective can yield positive results. (Kong, Chan, Griffin, Hoppe, Huang, Kinshuk, Looi, Milrad, Norris, Nussbaum, Sharples, So, Soloway, Yu, 2014; Discipio, 2008; Lambert and Cuper, 2008). Students have stated that they are more motivated by solving real-world problems via experimentation and action rather than listening to a teacher lecture. Students today should also be comfortable in their ability to solve real-world problems once they graduate and enter the job market, and authentic learning combined with 21st century technology can prepare them for success in their future careers that will rely heavily on digital, multi-media and global communications. (Lombardi, 2007).

Technology integration also has many benefits for the classroom teachers. The benefits that have been identified by Lawless and Pellegrino (2007) include cutting down time in the learning process, eliminating mundane and routine teaching practices, making it possible to adopt new and better approaches for instruction, and/or changing the actual content of learning to promote concepts that relate to a student's everyday life.

Although education may have seen some rapid changes occurring, the nature of classrooms may not be as easily altered as hoped, so transforming into 21st century classrooms may not be that easy (Lee, 2011). Technology in learning is useful if inquiry-based curriculum

becomes the preferred model of learning and computers take the place of books and worksheets. Professional development supporting inquiry-based learning and the use of new technologies for teaching and learning to support this inquiry-based learning is essential. Lombardi (2007) believed that certain factors must be aligned in order for teachers to create a successful learning environment. These include: teachers setting goals for integration of technology with the content they teach, awareness and skill in instructional design, an ability to plan authentic learner tasks with effective assessments, an understanding of a teacher's instructional role using integrated technology, and technological affordances.   All of this leads to the importance of consistent professional development for classroom teachers and college professors.

A study by Gorder (2009) that focused on developing a professional development model for K-12 teachers, ranked barriers to professional development by 174 teachers in South Dakota. The top five barriers involved time and money. Time related to teachers learning how to develop, integrate and communicate with other colleagues about technology and time for students to use the computers. Funding for technological changes and resources was also in the top five barriers, which could alleviate the need to use computer labs and carts and move on to 1:1 technology.

States' mandates and accountability also need to be reckoned with, since they can also become a barrier, especially when teachers are fearful to venture down the *yellow brick road* and change classroom culture to meet 21st century learning needs at the cost of what he or she believes will help their students pass *a test* (Lambert & Cuper, 2008).   Innovators in districts and schools will always be the ones paving the way on their own in this process of change to a new pedagogy. But, an ability to get all teachers on board means district leaders will need to use a more systematic and systemic way to overcome the barriers and deliver effective professional development.

As teacher educators, we share a responsibility in professional development for practicing teachers and for future teachers, ensuring their successes with technology integration and creating 21st century classroom culture. But faculty at institutes of higher education deal with their own barriers and fears. A survey provided in the Department of Teacher Education at the

writers' university identified similar barriers of integrating technology. These barriers included time, competency, and availability of technology. In addition, faculty believed that they would integrate more technology into their courses if additional support was provided to support their integration, including time, workload, and professional development.

Bull (2010) stated that "differences in life priorities and patterns of social use of technology are a reflection in the way the one generation prepares the next for teaching roles" (p. 29). He goes on and stated that the millennial generation, who are versed in the social uses of technology do not see this use of technology in their courses in higher education where the baby bboomer or generation X faculty are instructors. When provided a survey on what defines them as a generation, 25% of millennials listed technology use as top factor that made their generation unique, while baby boomer faculty chose work ethic as number one. Collaboration between students and faculty could be instrumental in reaching teacher preparation goals for 21st century students, particularly with this distinct difference in perspectives.

Teacher preparation programs must be able to discuss and determine which skills must be developed in teacher candidates to prepare them for 21st century teaching and learning (Rotherham and Willingham, 2010). A successful journey down the *yellow brick road* is never accomplished in isolation. Therefore, bringing together teacher educators, district administrators and teachers is necessary to provide the catalyst to develop and sustain a 21st century educational culture that reflects 21st century curriculum and learning environments.

The New Pedagogy for 21st Century Classrooms

Understanding the need for integration of technology and 21st century learning in our schools and institutions, does not mean we know how to do this effectively, either as a classroom teacher or teacher educator. Just as K-12 classrooms need to transform their practice into 21st century learning experiences, teacher preparation programs need to address the delivery of their instruction, moving away from a lecture model and integrating technology as a model of good practice, but more importantly a tool that takes teacher candidates into the 21st century as both a teacher and learner. This model will need to infuse content learning and technology with a new

pedagogy of deeper learning that transcends the lecture and teach and drill/test mode to creative and collaborative learning opportunities that provide higher order ways of thinking.

Often, educators in P-20 begin to integrate technology by substituting technology for a teaching strategy that they are already using comfortably. This type of substitution (Puentedura, 2009) does not innately change the learning experience, just the tools that are used to support the content being taught (Romwell, Kidder, & Wood, 2014). It also does not necessarily provide students with the 4-C's of 21st century learning.

Puentedura (2009) defined the growth in using digital technology within the classroom through the SAMR Model. The SAMR model provides a framework for understanding the level of technology integration and included not only **S**ubstitution, but also **A**ugmentation, **M**odification, and **R**edefinition. **A**ugmentation provides a substitute that encompasses functional improvements. Learning activities that encompass **S**ubstitution and **A**ugmentation are said to *enhance* learning. **M**odification occurs when the learning activity is given a new design, and **R**edefinition allows for the creation of tasks that wouldn't have been possible without the use of technology. Both of these latter forms are said to *transform* learning. The SAMR module appears to be nicely aligned with Bloom's new taxonomy that identified *create* as the highest level of learning, a goal for 21st century learning.

Though **S**ubstitution is seen as the lowest level of technology integration, Romwell, Kidder, and Wood (2014) stated that multiple studies have shown that substituting experiences through mobile learning (mLearning) for more traditional methods of learning was beneficial. It allowed the students to engage in activities in times and places that they could not do with traditional learning methods (e.g. listening to a podcast of a lecture while travelling in the car). With mLearning, students can connect to course information from outside the classroom and consequently encounter more opportunities for learning. Some examples of these include recording lectures in a podcast and having students make videos on their cell phones about the material that is being learned in class.

Advocates of 21st century learning would identify the central focus of learning experiences as being collaborative, authentic, inquiry-based experiences that are student-

centered. Therefore, 21st century teaching includes relevant learning that develops thinking skills (meta-cognition) through such strategies as higher order questioning, encouraging learning transfer from one content and one experience to another, teaching students how to learn, and addressing misunderstandings directly (Saavedra & Ofper, 2012). The P21.org website provides numerous resources that support authentic teaching strategies to support the 4-C's within classrooms.

Fullan and Langworthy (2014) believed that the teacher/professor needs to take a highly proactive role in insuring that the learning process moves forward and sees the instructor as more "an activator with great teacher-student relationship, reciprocal teaching, high levels of effective feedback, metacognition and teacher clarity as instrumental, with discovering and creating digital learning tools and resources that will support this deep learning experience" (p. 20).   The teacher helps the *student master the difficult and demanding process of learning.*

An additional framework, referred to as TPACK or Technology, Pedagogy and Content Knowledge Framework (Mishra and Koehler, 2006) spins off of the work of Shulman (1986) who identified effective teaching as a complex act between content knowledge and pedagogy. TPACK integrates the additional element of technology into the picture and sees effective teaching as the complex intersection between content, pedagogy and technology. Teachers and faculty must adapt and adjust their thinking in pedagogical approaches when effectively analyzing what technologies to use to promote the most effective learning opportunities for their students. Mishra and Koehler challenge educators to think deeply and creatively in using technology and to understand that deep reflection sees all three complex domains interrelating to support effective learning. When this model is infused with 21st century skills of collaboration, creativity, communication and critical thinking the learning is then transformed, as teaching is transformed into a new pedagogy.

Systemically, there needs to be a lot going on to be successful in transformational learning and pedagogy. Through this glimpse into 21st century digital teaching and learning, a new paradigm shift is evident, moving away from the sage on the stage with rote paper pencil experience to a focus on personalized learning and innovation. The basic skills do not go away, it

is just that content knowledge and basic skills are interwoven into the focus of higher order skills through learning experiences that captivate and propel students forward in concepts of self-interest that promote deeper learning. Basic skills no longer take center stage, nor does the teacher who becomes a consultant and partner in this journey.

Meeting the Challenge in Higher Education

The faculty writer used the knowledge acquired through this research, along with various technology conferences and webinars to begin the journey of developing a master degree in digital teaching and learning. This knowledge-base also spilled over to the undergraduate licensure programs through integration of technology in several courses, and providing a workshop in professional development related to technology and the new paradigm for interested faculty in the department. It has become apparent from both the literature review and experience with other faculty that most faculty begin to integrate and use technology within their courses without fully understanding the shift to a new paradigm. Understanding the shift to a new educational paradigm is critically foundational for teacher preparation faculty to transform their teaching pedagogy and content to foster 21st century ways of thinking and teaching for teaching candidates now and in the future. Teacher preparation faculty need to support candidates in understanding the students they are going to be teaching and how they are different learners who are being prepared for a different digital culture. Often, faculty integration with technology is substituting what they currently do with a technology that can support the same learning outcome that they achieved without technology. This type of technology integration is basically shifting tools and not related to a shifting and changing paradigm. The need to shift our understanding to a new paradigm identifies the importance of providing faculty release to engage in dialogue and participate in professional development that hones faculty attention on the 21st century learner. Gorder's (2009) study on professional development for K-12 teachers identified time as a barrier for effective integration that was ranked high as a reason that keeps teachers from effectively using technology. This is no different for higher education faculty. Deans and chairs of teacher preparation programs need to realize that their faculty need time in understanding this new paradigm and how to use technology effectively in order to support those who will become future educators of the 21st century.

When the author addressed program and course design for a digital teaching and learning graduate program model, the following outcomes were identified:

- apply research-based principles to establish positive, safe, and secure student-centered learning environments that utilize digital technology effectively in the 21st century classroom;
- design and implement appropriate 21st century curricula to maximize learning for all students and prepare them effectively for participation as a 21st century global citizen;
- evaluate emerging technology for personal and professional productivity;
- effectively integrate digital technology and tools into curriculum to maximize effective student learning;
- develop leadership skills through engaging in opportunities of research, collaboration and on-going professional learning that foster personalized learning in 21st century classrooms and transforms education.

The process of taking teachers through a journey of a new paradigm has begun by creating the first of two courses. Teachers who embark in acquiring this new Master's Degree will acquire competencies that were not even discussed 10-15 years ago. They will hopefully acquire skills that will set the foundation of learning environments that look much different than you or I know or can visualize today. But knowledge brings possibility and as long as we have educational leaders who are not afraid to be change-agents for the new paradigm we will have innovation.

The following recommendations come from an innovator who is hoping to create sustained change in a new educational paradigm for higher education faculty in teacher preparation. The recommendations are food for thought and are not intended to be a blueprint for success. These recommendations are expressed through the acronym TRANSFORM:

1. Take Action and become knowledgeable about the new paradigm. A variety of resources included books and white papers abound with a descriptive vision of this new educational paradigm.
2. Rejuvenate pedagogy: Have discussions and/or faculty learning communities that provide a platform to discuss how to prepare teacher candidates for the 21st century learner.

3. Add professional development opportunities for faculty in digital teaching and learning. Provide some incentive that supports and encourages all faculty to attend like TECH Tuesday. This keeps professional development on a regular schedule and allows dissemination of personal faculty journeys.

4. <u>N</u>ame your yearly technology goals for the department as faculty move to setting their own personal goals for 21st century teaching. Models like SAMR and TPACK can guide their journey, goal setting and professional conversations.

5. <u>S</u>end invitations to school districts to become part of a collaborative network of digital thinkers, setting up professional twitter accounts and/or blogs to exchange ideas and host professional development opportunities.

6. <u>F</u>ormulate long-range goals with districts that will bridge the gap in transforming teaching together for the 21st century.

7. <u>O</u>utline Methods of Assessments that will inform practice for faculty in helping teacher candidates develop 21st century skills in teaching.

8. <u>R</u>eward innovation and achievement of goals. Faculty who are close to retirement or are considered *lagers* may not budge in their teaching unless a reward system is established that can encourage transformation.

9. <u>M</u>aintain an atmosphere of collegiality in moving forward, allowing diverse thinking and commitment to the 21st century learner.

The baby-boomers who are currently the majority of teacher educators must be willing to foster teacher candidates who are digital, life-long learners, who are critical thinkers and problem-solvers as they lead and share in the journey of the 21st century educator. This journey into the 21st century has already begun. We do not have the luxury of remaining complacent. We must be open to the new student who is sitting in our K-16 classrooms and be open to new ways of learning that prepare K-12 students for careers and life in a global society in the 21st century. The teacher for today and tomorrow will need to be a leader who is innovative, can personalize learning, and support students to become entrepreneurs of their own skills and competencies. Teacher preparation programs must embark down the *Yellow Brick Road* to find a new educational world…somewhere beyond the current paradigm and embrace the new paradigm *somewhere over the rainbow*.

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What do Entrepreneurs want for K-12 Schools?

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Abstract:

*This article discusses the results of an online survey and focus group discussions with entrepreneurs to identify their opinions on how they envision K-12 schools that prepare students for today's dynamic workplace. The purpose of the study was to identify the critical factors that entrepreneurs feel make "pioneering schools" successful. A **pioneering school** is defined as "an educational entity that applies better solutions that meet new requirements, unarticulated or existing needs". The research question for this study is to determine what components entrepreneurs would include if they could create a K-12 school.*

I sat in the back of a darkened auditorium listening to one entrepreneur after another telling their stories. One out of three entrepreneurs made statements such as "School didn't help me be an entrepreneur." "I quit school." "School was boring." From an outsider's perspective, the men and women should have been some of our top students in K-12. They were highly intelligent, brilliant problem-solvers, and creative thinkers. They were business people, artists, and social entrepreneurs. They described their school experiences as ones where they were not engaged in the learning process, where connections of "real life" to the subject areas were not made, and where they were discouraged to interact or collaborate with other students or the community. This experience raised many questions in my mind. If entrepreneurs could create a school, how would teaching and learning look? What type of learning experiences would students have? Would the curriculum look different? Would the local community be involved? What would the role of teachers be? In this study, I focused on the following question: How would a K-12 school look if entrepreneurs could create a K-12 school?

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To answer this question, I went to the people who are at the forefront of start-ups and innovative endeavors; the people who live and work in entrepreneurial environments. Urban areas across the United States are experiencing a surge of start-up companies fueled by individuals who are creative, forward thinking, and initiators. What type of educational system will promote the development of future entrepreneurs? How can our educational systems better prepare children for creative, critical-thinking jobs of the future as well as contribute to society? What type of learning will promote that "entrepreneurial spirit"? Focus groups and surveys with entrepreneurs were used to gather their opinions on how they envision successful schools that prepare students who are ready for today's dynamic workplace. For the purposes of this study, a "successful school" is defined as one that prepares children who are college and/or career ready and who are critical, creative thinkers.

Method

The researcher administered an online, 15-minute survey based on school success criteria categorized by University of Chicago Consortium on School Research, CCSR (2015), Microsoft Educator Network (2015), and the University of Chicago Impact (2009). The survey consisted of 52 statements covering five major themes: leadership, teachers, school environment, family, and instruction. CCSR refers to the themes as the five essentials (University of Chicago, 2015). Effective leadership statements connected to how principals work with teachers and community to implement a clear and strategic vision for school success. Statements relative to teachers focused on how teachers work together and are committed to improve the school. Supportive school environment statements included the importance of high expectations for all learners and the security and safety of the school environment. In addition, the survey included statements related to the family and school community and their relationships to support the learning process. Lastly, the survey incorporated statements connected to academic rigor and the assessment of student progress through the application of knowledge. The level of importance of each statement was measured by a five-point Likert scale whereby "Not Important =1", "Slightly Important = 2", "Moderately Important =3", "Important = 4", and "Very Important = 5". See *Appendix* for the complete survey.

The survey was conducted through SurveyMonkey.com and confidentiality and anonymity parameters were ensured. For recruiting participants for the survey, the researcher

met with leaders of six accelerators who sent the link to members of their organization. An exact number of how many participants recruited is not known but based on the total number of employees in the accelerators, an estimated 130 participants were solicited. Forty online surveys were completed for a 30.7% return.

The researcher conducted focus groups in which two groups of 4-6 entrepreneurs discussed the following questions: "In your opinion, what would a successful school look like?" "If you were going to open a school, what kind of instructional leader, instruction, curriculum, and school environment would you want?" "How would you envision schools for your children or for the future?" "What else would you like to share about schools?"   Participants for the focus groups were solicited through the online survey. They supplied their contact information independently of the survey and the researcher contacted them to schedule the focus group. Group 1 consisted of seven participants including two females and five males, ranging in 20 – 62 years of age. Group 2 consisted of four participants, including one female and three males, ranging in ages from 26-58. A consent form outlining confidentiality and research data use was given to the participants. The researcher recorded each forty-five minute session and transcribed the sessions.

Results of study

The analyses of the survey and focus group data find that entrepreneurs rated the majority of the success components of leadership, teachers, school environment, family, and instruction as identified by Microsoft Educator Network (2015) and the University of Chicago Impact (2009) as important to very important. Examples of the survey results in Table 1 outline the entrepreneurs' responses and the means for each theme.

Table 1
Sample Results of Survey

Entrepreneurs and Education

Level of Importance	Not Important	Slightly Important	Moderately Important	Important	Very Important
Effective Leadership Mean (S=10)	0.25%	1.75%	7.26%	45.18%	45.55%
School leaders are flexible in dealing with change and are willing to experiment.	0.00%	0.00%	2.63%	36.84%	60.53%
Leaders intentionally build a culture that inspires a love of learning for staff and students.	0.00%	0.00%	5.00%	30.00%	65.00%
Supportive Environment Means (S = 9)	2.86%	5.14%	14.55%	39.74%	37.71%
Every student is expected to achieve at a high level.	5.13%	7.69%	12.82%	35.90%	38.46%
Students are expected to learn and demonstrate a core set of values including respect, tolerance, and responsibility.	0.00%	2.56%	12.82%	41.03%	43.59%
Involved Families Means (S = 6)	3.07%	4.39%	20.18%	48.25%	24.12%
Teachers, parents, and community members think of each other as partners in educating children.	2.63%	0.00%	5.26%	57.89%	34.21%
Students work with people from outside class who are from other countries or cultures, either physically or virtually.	5.26%	0.00%	31.58%	44.74%	18.42%
Instruction Means (S = 16)	2.48%	5.44%	17.24%	39.47%	35.37%
Students apply their knowledge to develop solutions to real problems from outside the school setting.	2.63%	5.26%	5.26%	36.84%	50.00%

Student groups create joint products that include contributions from each student.	2.63%	5.26%	28.95%	36.84%	26.32%
Collaborative Teachers Mean Means (S= 9)	1.80%	5.11%	15.62%	42.34%	35.14%
Teachers adjust instruction and assignments for individual students based on their knowledge, skills or learning needs.	0.00%	8.11%	16.22%	37.84%	37.84%
Teacher lessons are observed by the school leader or senior staff.	2.70%	5.41%	29.73%	35.14%	27.03%

Note. S = number of survey statements under each theme..

Under the theme of effective leadership, 90.73% of entrepreneurs ranked as "important" or "very important" that school leaders apply current research to develop and support teachers and students and build a culture that inspires a love of learning. In addition, they responded that school leaders analyze data, use the data to make decisions, and be flexible in a changing environment.

The results for supportive environment indicated 77.45 % of entrepreneurs ranked as "important" or "very important" that students demonstrate a core set of values and the school focuses on what is best for student learning as well as a school environment that ensures everyone feels safe and respected. The results for the statement "Every student is expected to achieve at a high level" where 48.72% entrepreneurs responded "moderately important" or "important" appeared unusual. The focus groups provided a possible rationale for this response. There, the entrepreneurs discussed that students should have opportunities to succeed in ways other than tests and schools too often placed too much emphasis on grades.

Under the involved families theme, 72.37 % of the entrepreneurs ranked as "important" or "very important" that families are vital partners in the education of the students and students should study issues that directly relate to their family or community. Areas where the majority of respondents replied "moderately important" or "important" focused on community-based projects and collaborating with people from outside the class who are from different countries or cultures of the school community.

The results for the instruction theme demonstrated 74.84% of entrepreneurs choose "important" or "very important" that student discussions are highly valued as well as student active participation and responsibility in their own learning and students have opportunities to apply knowledge and/or develop a product to solve real world problems. Furthermore, the use of technology to gather, organize and produce information was highly valued by entrepreneurs. On the topic of collaboration or peer reviews, the majority of entrepreneurs choose "moderately important" or "important". The result contradicts the necessity of most entrepreneurs to collaborate in their own work as well as the researcher's experience in this study.

Lastly, the theme of collaborative teachers indicate 77.48% of entrepreneurs ranked as "important" or "very important" that teachers respond to the individual student's knowledge, skills, and learning needs, use and share effective teaching methods, and that teachers collaborate with one another and with experts to enhance student learning. Sixty five percent of the entrepreneurs selected "slightly important" or "important" on the importance of school leaders or senior staff observing teachers. Individuals in the focus groups stated that ineffective teachers are often impossible to fire. Possible explanations for the decrease of importance relative to observations are entrepreneurs do not understand the evaluation process of teachers or they feel teacher observations are not effective.

In the focus groups, the entrepreneurs' responses often referred to one of the survey statement themes of leadership, teachers, school environment, family, or instruction but the entrepreneurs frequently added a twist or extension to their comments that reflected a different way of thinking about schools. Every entrepreneur mentioned the value of hands-on and experiential learning to engage students and to develop creative, critical thinking.   Students need to engage and apply what they know starting at a young age. Another young entrepreneur remarked that the focus in school should be on thinking and learning, not just "getting good grades".   In fact, the participants spoke at length on why students should have opportunities to fail because "we learn from our failures and it reflects real life". Through the process of failing and figuring out other solutions develops problem solving and critical thinking. One individual said "celebrate failure" and there is "too much focus on extrinsic motivation and grades". Many of them referred to the considerable emphasis on standardized testing and how it deters from critical thinking and focus on "the right answer".

Another major outcome that emerged in the focus groups was to promote options other than college. As one person mentioned, "technical and vocational schools are viable venues for profitable employment and are often a better match for students' interests and abilities". One participant noted that in many high schools the perception is students who go to technical schools are "losers or nerds". "There is a hierarchy and this is a mistake because there are successful people at all levels" and "We need to change how success is defined". Another person said "bring back apprenticeships". The relationship between engaged, hands-on learning and experiential experiences in venues such as vocational schools or practicums further emphasize entrepreneurs' opinions about school design. The majority of participants stated teachers should cultivate students' interests to inspire students to learn and to personalize learning. The entrepreneurs identified there are many different types of students so there should be different types of schools depending on students' interests and aptitudes.

Entrepreneurs expressed that more soft skills development such as collaboration, curiosity, working in teams, and building social and emotional intelligences were vital to be a contributing member of the work force. Coupled with the soft skills, the participants identified that not only should the school environment be safe and secure but needs to include more physical spaces where students can engage and learn from one another and "have fun doing it". School administrators and teachers need to involve families, community, and businesses in the educational process by offering opportunities for children to participate in projects, arts, and businesses to connect academics to real world experiences as well as foster student interests and identify possibilities for future employment or endeavors. They discussed that experiences should begin in the early years so children can develop a sense of self.

Discussion and Conclusions

Implications for Schools

The majority of our schools are designed to educate people for the industrial age where reading and writing skills are the primary goals. This type of education served the United States well for many decades. Others such as Robinson (2015) and Mitra & Rana, 2001 argue that our educational system also needs to focus on developing people who are creative and critical thinkers. The knowledge and skills needed for a contributing member in today's society and economy are much different from the requirements of the past where the employment

opportunities focused on routine tasks in manufacturing and agriculture. The jobs of the future are largely unknown and part of K-12 education is preparing students for the future. In Autor, Levy, and Murnane's study (2003), the way work tasks are evolving is evident.

Table 1
Index of Changing Work Tasks in the U.S. Economy 1960-2009
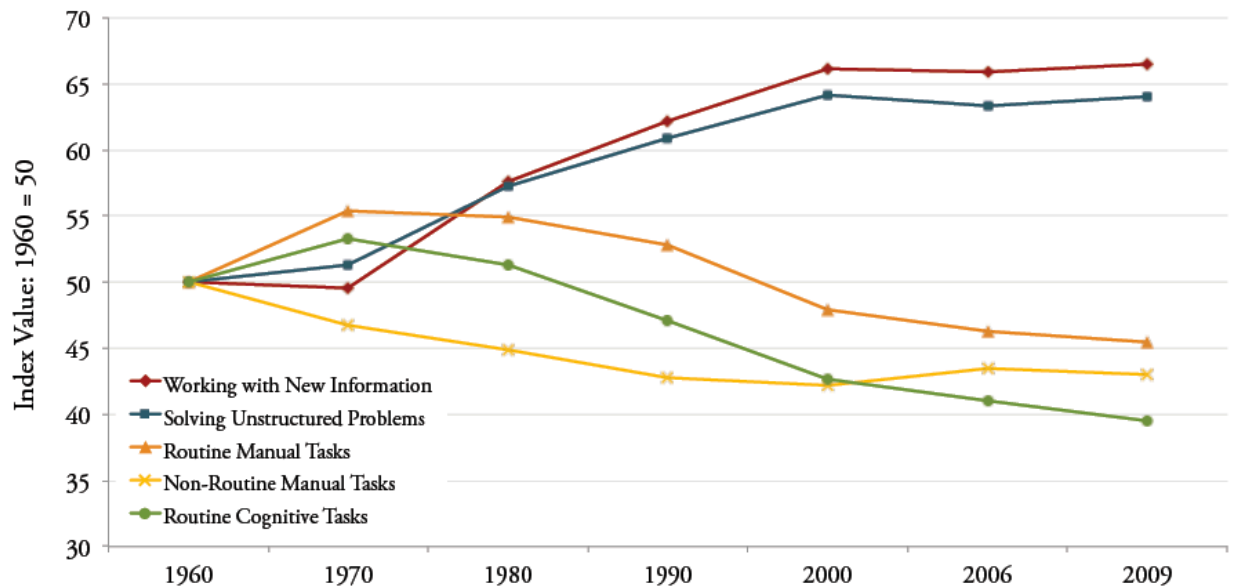
Note. Adapted from "The skill content of recent technological change: An empirical exploration," by D.H. Autor, F. Levy, and R.J. Murnane, 2003, *Quarterly Journal of Economics. 118*(4). 1279-1333. Copyright 2003 by the Harvard College and The Massachusetts Institute of Technology.

The data from the study with entrepreneurs further demonstrates that a child's education needs to prepare them for a different world of work. Appling concepts and making learning personable and meaningful to students are common themes identified by the participants. Leveraging technology to individualize learning and engaging students is vital, along with social and relational development by using collaborative physical and virtual spaces to work with other students, the teachers, and outside partners. In addition, leaders invested in the school community and those who support teachers provide a foundation for student success. Much of what today's entrepreneurs want for schools can be captured in instructional methods such as project-based at http://www.bie.org/about/what_pbl or experiential learning which facilitate critical thinking and the application of real world concepts. Innovative schools that include these components are out there. Check out Acton Academy in Austin, Texas (http://www.actonacademy.org) and NewTech (http://newtechnetwork.org). Both models mirror many of the components that today's innovators want for children. Partnership for 21st Century

Learning (2015) identifies the same ideas as the entrepreneurs in this study. They espouse that the development and nurturing of skills and knowledge around communication, collaborations, creativity, and critical thinking.

The participants in the study identified teaching and learning approaches which address students' interests and abilities. The vast number of resources, particularly web-based or other available technologies, makes this type of learning a reality. Web resources such as Khan Academy (www.khanacademy.org), Aleks (www.aleks.com), and No Red Ink (www.noredink.com) fuel personalized learning. The technology provides progress data, allows students to learn at their own pace, and capitalizes on students' interests to personalize learning. These strategies and technologies are currently available to schools.

In *Smart Cities* (p. 52) Vander Ark's analysis summarizes that physical schools will exist "but learning will not be limited to what is offered there". As students explore and expand upon their personal interests, the resources for learning will often take place outside of traditional schools. As suggested by an entrepreneur in one of the focus group that perhaps schools become the place for collaboration with "edupreneurs" and other students. Many suggest that the academic work will take place in businesses, homes, and non-profits. Key to this type of learning is partnerships with others outside the school's four walls so that diverse types of learning opportunities are available.

Another change suggested is the elimination of established grade levels. Coinciding with personalized learning will result in students academically advancing at different levels at different times. Instead of differentiating within a classroom, schools will look at each student as a unique, individual learner rather than "eighth graders". Competency-based learning, complimented with appropriate technology support, provides educators one pathway for determining student progress and achievement. Advancing is not dependent on age or grade level; rather it focuses on mastery of the content. Using a personalized learning approach, students learn to set goals to track their growth both academically and personally. They are empowered to develop relationships with adults in a variety of learning environments, pursue their own interests and talents, and expand their opportunities to drive their own current and future lives so they can envision the future (Ryerse, M. Schneider, C., & Vander Ark, T. , 2015). In addition, student groups are dynamic; they will change with the needs of the individual student. In many ways, dynamic groups mirror the accelerators and start up communities that

focus on individual learning. The individual is in herself/himself the 'start-up'; building and developing a human brain. According to VanderArk, smart cities have an innovation mindset. An innovation mindset begins with schools that engage and challenge students, view failure as a way of learning, and value grit as well as academic achievement. In my focus groups, the participants stated failure is essential for learning rather than focusing on "getting the right answer". Schools need to think about developing a school environment where it is safe to fail. Productive discussions evolve out of failures where students can consider alternative solutions or develop different procedures or designs.

Another part of the learning environment is the opportunity for children to develop relationships with teachers and other adults. The data from the entrepreneurs supported the value of relationship as indicated by highly rating the need for students to have a meaningfully connection with an adult at school. Furthermore, Pierson (2013) in her TEDx talk identified what all good teachers know. Teaching and learning is a relationship. Students need teachers who support and empower them and are interested in their lives in and out of school.

Many schools would find it challenging to make a complete overall of their approaches, assessments, learning environment or other elements of the teaching and learning processes found in this study. What they can do is focus on one or two areas that facilitate the development of students' ability to think creatively and problem solve. Today's dynamic work place needs individuals who can work nimbly with new information and solve unstructured problems. School designs need to consider the diversity of students' interests, aptitudes, abilities, and personalities and it will require a variety of school models or programs within schools that allow students to choose areas that best meet their individual needs.

Convergence's (2015) project *A transformational vision for education in the United States*, business leaders, educators, foundation leaders, and others identify the crucial elements for schools and which lend further support to what entrepreneurs desire. The elements that best serve the educational needs of the students in the United States are competency-based learning, personalized learning, and socially embedded education, learners as active participants, and educational opportunities which extend beyond the school walls. Schools have the tools to create schools that are pioneering and develop students who are ready to meet the challenges of a dynamic society and workplace.

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The OHIO Journal of Teacher Education provides a forum for the exchange of information and ideas concerning the improvement of teaching and teacher education. Articles submitted should reflect this mission. Their focus should concern concepts, practices, and/or results of research that have practical dimensions, implications, or applicability for practitioners involved with teacher education. The journal is regional in scope and is sent as a benefit of membership in the Ohio Association of Teacher Education.

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Length: Manuscripts, including all references, bibliographies, charts, figures, and tables, general- ly should not exceed 15 pages.

Style: For writing and editorial style, follow directions in the latest edition of the Publication Manual of the American Psychological Association. Omit the author's name from the title page. Include an 80-100-word abstract.
Please do not use auto-formatting when preparing the manuscript!

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