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Effectiveness of Growth Mindset in the Classroom

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Abstract

This literature review discusses how effective a growth mindset can be in the classroom. The review begins by exploring the differences in fixed mindsets and growth mindsets. Fixed mindsets believe an individual is naturally talented or gifted, while growth mindsets believe that individuals can grow their ability or talent. This review discusses studies that have proved the importance of a growth mindset in literacy, mathematics and science classrooms. It then continues to give recommendations for fostering a growth mindset in the classroom to ensure learners are working at the best of their ability and achieving their goals.

Effectiveness of Growth Mindset in the Classroom

“Mindset is a set of attitudes and beliefs about abilities, such as intelligence” (Robinson, 2017, p. 18). According to Carol Dweck (2008), author of *Mindset: The New Psychology of Success*, there are two different types of mindsets. Dweck (2008) termed them, fixed and growth mindsets. Dweck (2008) suggests that the way people think about themselves and their life can affect their success and achievement. This means that one’s mindset is important and has an effect on the decisions an individual makes and the results of those decisions. One’s mindset can be the factor in success or disappointment.

One mindset a person may embody is a fixed mindset. Dweck (2008) proposes that in a fixed mindset people want to look smart so they avoid challenges. Individuals believe that their intelligence cannot be developed or changed because a belief in natural talent or intelligence. These individuals do not believe in getting better at something with hard work and practice. People with a fixed mindset believe that mistakes are failures. These individuals do not see the value of learning from mistakes. Trevor Ragan (2016), founder of *Train Ugly*, suggests individuals with a fixed mindset want an easy, safe life that does not involve any struggle. People with a fixed mindset stay in their comfort zone to look good.

Dweck (2008) proposes that people with a growth mindset embrace challenges and mistakes, because of a desire to learn from them. Growth mindset individuals believe in change and growth with each challenge or mistake. People with a growth mindset focus on the process and effort, rather than the result. Dweck (2008) wrote, “Those with the growth mindset found success in doing their best, in learning and improving. Those with the growth mindset found setbacks motivating. They’re informative. They’re a wake-up call” (p. 98-99). Ragan (2016) stated in a video, “We learn best when we are operating at the edge of our abilities, a little bit

outside of our comfort zone and when we are stretched and challenged” (3:07). This is what a growth mindset looks like. This is how people are able to achieve at high-levels.

Each person has a choice in which mindset to embrace. “In the fixed mindset, setbacks label you” (Dweck, 2008, p. 100). Ragan (2016) proposes that most people choose a fixed mindset because the stories and labels given to each other, such as “You are not a math person” (3:55). This labeling happens often in the current culture and people have accepted those labels. When discussing labels Ragan (2016) states, “These all talk about learning with a fixed mindset, saying that we are good or not good at something. That we can’t or don’t have to grow” (4:06). Yeager and Dweck (2012) found that students do not need self-esteem boosting or trait labeling to respond resiliently when faced with challenges. Yeager and Dweck (2012) found students need a mindset that allows for facing those challenges. The labels need to go away. Thinking as individuals and as a culture needs to shift to a more growth mindset for people to achieve their fullest potential.

Dweck (2016b) discusses that a growth mindset is a complex idea that can be confused with being open-minded or flexible. “Even after educators understand growth mindset, it takes a lot of hard work to move toward it. This is because we’re all a mixture of fixed and growth mindsets” (Dweck, 2016b, p. 37). Dweck (2016b) goes on to discuss how there are triggers that put one into a fixed mindset. Dweck (2016b) writes how important it is to identify these triggers to overcome them and remain in a state of growth mindset. “In short, even once we’ve fully understood what a growth mindset is – the belief in everyone’s capacity to grow their abilities – it’s a lifelong journey to fully embody that belief” (Dweck, 2016b, p. 37). According to the research of Carol Dweck (2008), a growth mindset allows for higher achievement. The findings

in this literature review discuss the research associated with growth mindset and higher achievement of students.

Literature Review

Literature and research have proved the importance of the mindset that a student holds. Blackwell, Trzeniewski, and Dweck (2007) conducted a two-part longitudinal study and intervention in a New York City public junior high school to examine the connection between a student's intelligence theories and mathematics achievement. Both parts of the study verified the importance of teaching growth mindset to students. Blackwell et al. (2007) substantiated the need to teach students the structure of the brain. Blackwell, Trzeniewski, and Dweck (2007) found significance in teaching the function of the brain and how it can grow with hard work and effort.

In the first study Blackwell et al. (2007) followed 373 students in four groups that were entering the seventh-grade. The sample population included 198 female and 175 male students that were in classes ranging in size from 67 to 114 students. The classes were heterogenous regarding mathematics achievement. The students scored in the 75th percentile nationally on the sixth-grade math tests. Blackwell et al. (2007) trained research assistants to administer and score a motivational questionnaire at the beginning of the seventh-grade year. The questionnaire assessed students' theory of intelligence and their beliefs about effort. Mathematics grades of all students voluntarily participating in the study were collected at the end of each term, fall and spring, during the student's seventh and eighth-grade year. Blackwell et al. (2007) studied the data collected over the five-year period and found,

“Junior high school students who thought that their intelligence was a malleable quality that could be developed affirmed learning goals more strongly, and were more likely to believe that working hard was necessary and effective in achievement, than were students who thought that their intelligence was fixed.” (p. 253)

Blackwell et al. (2007) wondered if teaching students to have a growth mindset would increase positive motivation in the classroom, resulting in higher achievement. This was the basis for the second study, an intervention.

For the second study, Blackwell et al. (2007) used a different New York City public school. A total of 91 students from the seventh-grade class voluntarily participated in the intervention, 48 in the experimental group and 43 in the control group. The students were randomly assigned to each group. All students started relatively at the same math achievement with the fall term math grades an average of 2.38 for the experimental group and an average of 2.41 for the control group, based on a 4.0 scale. There was also little variance on the initial motivational questionnaire.

The intervention started in the spring term of the seventh-grade year and lasted eight weeks. There was one 25-minute period, one time per week, where all seventh-grade students were taught lessons by trained undergraduate assistants. Both the experimental and control groups were taught lessons on the structure and function of the brain, anti-stereotyping and study skills. The experimental group also received instruction on Incremental Theory and how learning makes you smarter with a discussion about avoiding labels such as dumb; Whereas, the control group received instruction on memory and mnemonic strategies with a discussion on academic difficulties and successes.

Blackwell et al. (2007) analyzed the data after the spring term of the seventh-grade year and found a substantial decline in grades from the spring of sixth grade to the fall of seventh grade and then continues to decline to the spring of seventh-grade. Blackwell et al. (2007) noticed from the fall of seventh grade to the spring of seventh-grade (the intervention period), the experimental group increased their grade point average; Whereas the control group continued to decline.

“The fact that promoting an incremental theory seemed to have the effect of generating increased motivation in the classroom again supports the idea that students’ theory of intelligence is a key factor in their achievement motivation. Within a single semester, the incremental theory intervention appears to have succeeded in halting the decline in mathematics achievement.” (Blackwell et al., 2007, p. 258)

Blackwell et al. (2007) confirmed the need for teaching growth mindset to students. The students who were instructed on the brain and how to grow it were able to stop the decline of mathematics grades. The students without instruction on growth mindset continued to see a decline in their mathematics grades, despite the same mathematics instruction.

A growth mindset has not only proved to be beneficial in a mathematics classroom, but also in reading. Petscher, Otaiba, Wanzek, Rivas and Jones (2017) conducted a study that focused on mindset and the effect on standardized reading outcomes. Petscher et al. (2017) studied how general and reading -specific mindsets relate to reading comprehension. A great deal of literature focuses on growth mindset in the junior high school and beyond population. Petscher et al. (2017) research is unique because it examines reading in fourth grade students.

Petscher et al. (2017) used 195 fourth-grade students to examine the effects of growth mindset on reading outcomes. The students were from six public elementary schools from the

southern United States with 49% of the participants being female. Of the participants, 25% identified as African American and 43% identified as Caucasian. The sample consisted of 58% English learners (ELs) and 94% were considered low income. Trained research staff administered reading assessments over a three-and-a-half-week period to all participants. Reading assessments used include the Word Attack and Letter-Word Identification subtests from the Woodcock-Johnson III Tests of Achievement, Gates-MacGinitie Reading Test, and the Test of Silent Reading Efficiency and Comprehension (TOSREC). The research staff also administered a Mindset Survey. The Mindset survey used by Petscher et al. (2017) consists of 13 of the 23 questions from the Student Mindset Survey (Blackwell, Trzeniewski, & Dweck, 2007). Four of the questions were slightly changed to allow fourth-grade students to better understand. Petscher et al. (2017) also created and added 13 items on reading mindset to the survey.

After all surveys and reading assessments were administered, the data was analyzed. Petscher et al. (2017) found four major outcomes from their analysis. Petscher et al. (2017) discovered,

“First, we evaluated the dimensionality of general and reading-specific mindset and found that a global factor of growth mindset (GGM) existed along with specific factors of general and reading mindset. Second, GGM and reading mindset strongly predicted word reading and reading comprehension. Third, GGM and reading mindset uniquely predicted reading comprehension after controlling for basic word reading skills. Fourth, GGM was more strongly associated with reading comprehension for those individuals with weaker reading comprehension skills, whereas reading mindset was more strongly associated with reading comprehension for those with stronger reading comprehension skills.” (p. 376)

Petscher et al. (2017) found that students at the end of fourth-grade who had lower reading comprehension achievement also had a more fixed mindset about their abilities. Petscher et al. (2017) suggest more research should be conducted to see if mindset interventions are effective in producing reading comprehension growth in a larger scale, as research in this area is new and limited.

A growth mindset is not only helpful in a mathematics and reading classroom, but also in a science classroom. Schmidt, Shumow, and Kackar-Cam (2016) compared the daily science classroom experiences of students. Some of the students received an intervention in growth mindset, while the other groups did not. Participants in the Schmidt et al. (2016) study included 370 seventh grade life science students and 356 ninth grade general science students. Data was collect from 2011-2013 from two middle schools and a high school from a Midwestern metropolitan area. Participants were 50% female, 61% Hispanic and 18% Caucasian. The Brainology mindset intervention was assigned to sixteen of the 29 classrooms. This encompassed 369, or 51% of the total participants. The intervention was implemented for one full class period each week for six weeks. The remaining 13 classrooms, which consisted of 357students, or 49% of the total participants were assigned an in-class writing task for the six-week intervention period. Students wrote five sentences about the science content that was being taught. During the last ten minutes of the class period students summarized what they were learning or stated why the content was useful.

Schmidt et al. (2016) found ninth graders in the mindset intervention group showed significant increases in perceived control and interest, whereas both seventh and ninth grade students in the writing group showed a decline in perceived control and interest. Schmidt et al. (2016) also found that the ninth-grade students in the intervention group retained baseline levels

in regards to skill and learning, whereas the writing group declined in skill and learning. The Brainology intervention was not able to increase the skill and learning of ninth grade students, but it was able to stop the decline of skill and learning. Schmidt et al. (2016) proved that intervention on growth mindset is positive but know that the specific intervention of Brainology will need to be changed to show an increase in skill and learning. Overall, a growth mindset intervention has proved to be positive in a mathematics, reading and science classroom.

O'Brien, Makar, Fielding-Wells and Hillman (2015) studied classroom video data from a Year 5 classroom in Queensland, Australia. The video features 27 students, ages nine and ten, along with an experienced inquiry classroom teacher. At the time of the video, the students had already completed three other inquiry units so students were familiar with the inquiry format. The video data was analyzed from a similar process as Powell, Francisco, and Maher (2003). Powell et al. (2003) had seven stages of analysis, including: intent viewing, describing the video data, identifying critical events, transcribing, coding, constructing a storyline, and composing a narrative. O'Brien et al. (2015) found that mathematics inquiry requires students to be open-minded and be flexible in their thinking. This is the basis for a growth mindset. O'Brien et al (2015) found the inquiry within a mathematics classroom allows the teacher to scaffold and model embracing challenges and perseverance. Theses skills are essential to embracing and fostering a growth mindset.

Claro, Paunesku, and Dweck (2016) completed a nationwide study in Chile to research the effects of a poverty on academic achievement. Claro et al. (2016) used standardized test data from all 10th grade public school students. The standardized tests measure mathematics and language skills, and includes questions about the student's family. The standardized tests also included a mindset measure for the first time in 2012. The mindset measure used was a shortened

version of the instrument used by Dweck (as cited in Claro et al., 2000, p. 8665). After analyzing all the data, Claro et al. (2016) found the students who held a growth mindset, regardless of their socioeconomic status, outperformed those who did not hold a growth mindset. This large-scale research held true for all levels of income and all schools in Chile. In addition, Claro et al. (2016) found the Chilean students with the lowest income were twice as likely to have a fixed mindset than the students with the highest income. This knowledge makes it imperative to foster a growth mindset in all students, especially targeting those who are socioeconomically disadvantaged.

Students who have a growth mindset have proved to perform better academically in the classroom in reading, mathematics, and science, despite socioeconomic status. Duckworth and Yeager (2015) found aside from cognitive ability, students need many other skills to be successful in school and in life after their educational career. For this reason, it is important as an educator to instill a growth mindset in all students to allow students to achieve their goals. Children learn from adults and peers, so it seems natural to assume that students will embody a growth mindset from a teacher that shows a growth mindset. Dweck (2016b) discovered the opposite to be true - there is not much correlation between student and teacher mindsets or children and parents' mindsets. This means teachers and parents need to be intentional in their teaching and modeling of growth mindset.

Robinson (2017) recommends teaching students about brain development and how learning occurs in the brain to promote a growth mindset. Robinson (2017) also endorses making mistakes and failures comfortable and normal by sharing a teacher's own mistakes and failures with students. Growth mindset can also be fostered in a classroom by communicating high expectations to students (Robinson, 2017). It is imperative to provide students with feedback that emphasizes the process, not correct answers. Barnes and Fives (2016) recommend active,

purposeful learning to aid in timely, growth mindset feedback to students. Barnes and Fives (2016) presented a case study of a New York City, English Language Arts, fifth grade teacher, Kara. Kara has 13 years experience teaching in New York City. Kara's New York City suburb school student population is ethnically diverse, with 54% of students being Caucasian. To provide timely, active assessment feedback in writing Kara uses "love notes" to her students. These "love notes" are Post-Its with an arrow and feedback written on it. Kara is able to give feedback in a timely manner and continue to update the feedback as the student changes their work. The "love notes" also allow for the students to use the feedback she provided, without marking up the student paper in red pen.

O'Brien (2015) showed that a growth mindset is not taught separately from curriculum in school. Growth mindset characteristics were scaffolded within the inquiry mathematics classroom. Over a three-month period, Rau (2016) studied and showed the importance of teacher's language within the classroom. Rau's (2016) administered a mindset survey to all fourth-grade students in her classroom. The three students who scored the lowest on the mindset survey were chosen as participants in the study. Those participants included two male students and one female student. Rau (2016) focused on presenting process-oriented language in the classroom throughout the entire day, during lesson and transitioning time. Rau (2016) analyzed the data and found a pattern in all three students. At the beginning of the study, students were focused on completing the tasks quickly, not worrying about the content or the process. As Rau (2016) submerged students in a classroom environment full of process-oriented language, students shifted their thinking. Throughout the study, all three students moved from speed-focused to content-focused and eventually to process-focused. Rau (2016), although a small and short study, proved that teacher language can affect student's developing mindsets.

Dweck (2007) warns about praising students for their intelligence, as it contributes to a fixed mindset. Dweck (2007) recommends praising for engagement and effort, known as “process” praise, as this encourages motivation. “The wrong kind of praise creates self-defeating behavior. The right kind motivates students to learn” (Dweck, 2007, p. 34). Dweck (2016a p. 38) also warns, “It’s dangerous to tell students that they ‘can achieve anything’ – give them the truth” (p. xx). Dweck (2016a) means to ensure students realize that a growth mindset does not promise higher achievement. Mangels, Butterfield, Lamb, Good, and Dweck (2006) found evidence that people who have a fixed mindset do not process feedback the same way that individuals do who have a growth mindset. Mangels et al. (year) found that the deep-level processing in the brain does not occur when the individual has a fixed mindset. This makes explicit feedback, focusing on the process important. Barnes and Fives (2016) presented the idea of teacher-student conferences in the case study of Kara mentioned previously. Kara conducted conferences with all students that focused on the growth the student made throughout the year. Kara a an individual chart for each student and was able to show and discuss areas if improvement, highlighting the growth and effort the student has displayed rather than solely focused on outcomes.

A growth mindset fosters increased motivation, which can allow students to grow their ability and achievement. Students must also be taught how to speak with a growth mindset. This means teaching students how to replace fixed mindset statements with growth mindset ideas (Robinson, 2017). Robinson (2017) also recommends setting growth-oriented goals and allowing students to visibly track progress on those goals. This allows students to see the growth with the increased motivation and effort. In five studies, Grant & Dweck (2003) found when students embraced learning goals (growth-oriented) it predicted higher achievement when challenges

arose and students who embraced performance goals (goals linked to a fixed mindset), performed more poorly when faced with challenges. Educators who follow these recommendations will be sure to foster a growth mindset in their classrooms, which has proved to increase student performance and achievement.

Schmidt, Shumow, and Kackar-Cam (2015) studied the importance and effects of teachers truly embracing and teaching a growth mindset, using the strategies previously mentioned. Schmidt et al. (2015) studied 160 seventh-grade science students. These students were distributed among seven classrooms, with two teachers for all seven classes. The public school district was made up of a diverse population, with 50% being Hispanic and 60% of the students being considered “low income”. Schmidt et al. (2015) refers to the two teachers using the pseudonyms Celia and Donna. Donna was a 54-year-old, white female with her master’s degree and 20 years of experience teaching science to middle school students. Celia was a 28-year-old, white female with 6 years of experience teaching science to middle school students. Celia had been Donna’s student teacher. Both teachers were identified as having a growth mindset in science intelligence, according to the mindset measure used in the study. The Brainology program, a 6-week web-based intervention was used. Schmidt et al. (2015) studied the data and noted that Celia’s comments to students were unlikely to promote a growth mindset in students and rarely mentioned the Brainology intervention. Celia emphasized speed and grades and rewarded performance. Celia often informed students when tasks were ‘easy’ or ‘hard’. Donna mentioned the Brainology intervention once during every class period and focused on mastery rather than performance. Donna encouraged students to try strategies when challenging tasks arose. Donna’s lessons promoted deeper understanding and allowed students to

work through challenging tasks. Celia helped students when they struggled, but did not encourage students to try different strategies.

Throughout the study, Schmidt et al. (2015) tracked malleability of intelligence, mastery orientation, and grades. In regard to malleability of intelligence, the mean score for Donna's class started at a score of 4.06, rose to 4.94 for the post test and then descended to 4.69 for the follow up. Celia's class, on the other hand started at 4.33, rose to 4.7 for the post test score, and then descended to 4.35 for the follow up test. This shows that even though Donna's class started with a lower score, the class finished with more malleability of intelligence than Celia's class, due to Donna's teaching strategies and focus on a growth mindset and learning. Donna's class scored .21 for the pretest on mastery orientation. Donna's class scored .31 on the post test and follow up. Celia's class started at .09 for mastery orientation, rose to .2 for the post test, but then plummeted to -.06 for the follow up. This shows that a focus on growth and learning with challenges, rather than speed and easy tasks, will grow and maintain mastery of skills, rather than improvement for a short period. Grades were another factor analyzed throughout the study. Donna's class started with an average of 2.7, rose to 2.9 for the post test and during the follow up had an average of 2.86. Celia's class started with an average grade of 2.34, decreased to 1.77 at the end of the intervention and rose to an average of 1.97 for the follow up. The grade analysis shows that when Celia was focused on speed and easy tasks (fixed mindset), the grades decreased. Donna focused on growth and learning, which allowed her students to increase and maintain growth and mastery for a length of time, not just for the intervention period. Both teachers planned and did similar activities to teach the same standards; However, the teachers communicated with students about goals, effort and encouragement differently, which made a

difference in the results of the data. Using the strategies, along with continuous growth mindset feedback and encouragement will foster a growth mindset in students.

Conclusion

It is imperative that educators are equipped with knowledge of growth mindset. Students displaying growth mindsets have proven to achieve more highly in the areas of literacy, math and science than students who have a fixed mindset, regardless of socioeconomic status. Students with a growth mindset embrace challenges and are able to persevere to find an answer. It is critical to educate teachers on the best practices and strategies to teach students to embrace a growth mindset. Growth mindset should be taught simultaneously with the curriculum. Fostering a growth mindset requires teachers to integrate strategies and inquiry into the classroom environment. It also requires teachers to be intentional in language choices when interacting with students. Educators need to promote student growth at all times, during lessons and transitions. It is important to teach educators ways to instill a growth mindset in students. This will ensure students will reach their fullest potential while progressing through their educational career and beyond. Equipping students with these skills will allow students to be successful in school and beyond, both academically and in personal endeavors, regardless of the socioeconomic status of the family. Educators teach students and give students the tools to achieve goals and continue to strive for more. This is all possible when educators are equipped with skills and strategies to foster a growth mindset in all students.

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