Empathy in the Math Classroom

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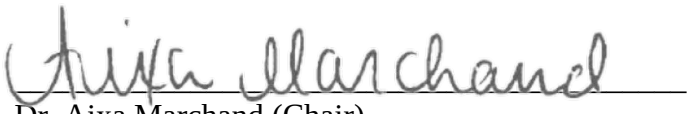

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Abstract

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Empathy is the ability to be able to infer what others are feeling or thinking, so then one can react or show care to another based on what is being inferred. Empathy is becoming a standard in many classrooms. While it is needed in every classroom, empathy is often excluded from the math classroom because many math teachers do not always know how to teach to the "whole" student, and do not understand how to empathize with their students. This thesis is a literature review, which examines what empathy is, why it is important in the classroom setting and why it is needed in the math classroom.

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Acknowledgments

First and foremost, I would like thank God for giving me the strength to finish this thesis, because in Him alone my joy and comfort is found.

I would also like to acknowledge my family, my mentors, and my professors for encouraging me to follow my dream of becoming an empathetic teacher.

My Pedagogical Commitments

From Kindergarten all the way to graduate school, I have struggled in school. Many of my previous teachers never thought I would pass high school much less graduate. One of my math teachers in high school compared me to broken crayons. This math teacher tried to show me how to solve a linear equation, but for some reason the concept was going completely over my head. Instead of trying to explain it in a different way, he decided the best way to handle this situation was to stop class while my classmates were completing independent assignments. In front of my entire class, this teacher said "there are bright crayons. There are dim crayons. Then there are crayons that children step on and stick in a drawer. Danerry is one of those crayons." This situation was not the first time and certainly was not the last time I felt publicly humiliated by a teacher for not understanding. Considering these experiences, building a classroom that is empathetic is important for teachers regardless of grade level.

To this day, I have no idea how to solve linear equations. The truth is, throughout college, every math class I took, I went into the class believing I was inadequate and not capable of comprehending college level math. Currently, every time I teach math, I feel like I am proving my old math teacher wrong. This brings me to my first pedagogical commitment, and that is being proud of my students as well as using optimism as a driving force to believe in them. I have no idea if my old math teacher would be proud of me, but I do know that he was not a supportive teacher during my junior year of high school. Instead of being my supporter, he was just another barrier on my way to feeling confident academically and generally in life. This experience has moved me to go one step further by transforming my mindset of being proud of my students to being proud with my students (Ladson-Billings, 2006). A teacher who is proud with their students uses empathy as a basis to form solidarity and collectiveness with their students. In this case, the teacher is realizing their role as a teacher is a supporting role to the student. As a

teacher I do not want to be just sympathetic. I want to be empathetic. A teacher who is sympathetic feels sorry for their students, but a teacher who is empathetic feels with their students.

Due to this experience, I am committed to always finding other ways of explaining the math concept at hand. If a student does not understand, it is my job to present them with the tools to help them understand. When my students may get a problem wrong, I want to support them and provide them with the scaffolding to get the problem right. Even as a student teacher I find myself saying “I am here for you. If this does not make sense, let me know and we can try it another way." One of my biggest commitments as a teacher is to never give up on my students in hopes that they will never give up on themselves.

When considering my class environment, I believe a math class is a place where all students should be welcomed and not all students feel that way in math classrooms due to racism, sexism, discrimination of socioeconomic level (Siu, 2016). In terms of advanced math classes, there is an equity gap showing less Black students, LatinX students, and students who attend schools where three fourths of students receiving free or reduced lunch are less likely to take Algebra II and Trigonometry (Achieve, 2013). This is not due to lack of ambition, but lack of opportunity due to schools that have a higher LatinX and Black population are less likely to provide advanced level math courses. (Achieve, 2013). Not only do many students not feel welcomed due to racism and sexism, but students are also not always given the chance to succeed because the lack of classes offered (Achieve, 2013). In turn, this sets students up to not be able to pursue a STEM degree or even a career in step (Achieve, 2013). Racism, sexism, and discrimination of socioeconomic level is systematic and sadly math classes are no exemption to that (Siu, 2016). However, I believe empathetic math teachers create an inclusive environment for their students because they know social justice can start in the classroom, but it does not have to end there.

Students feeling welcomed in classrooms has become a principle belief for many teachers, however it seems this belief casually slips by some teachers specifically math teachers. It should be a place where differences are not disregarded but accepted and appreciated. One of the coolest things about math is that there are so many different ways to solve the same math problem. Math invites students to think conceptually and is an exciting subject to learn. However, some students have been robbed of the joy of loving math because they may be taught by a teacher who does not employ empathy in their classroom. Understanding this, I am committed to showing my students that everyone has a place in my math class.

Introduction

Math can be considered a universal language, a topic that cuts across any differences in language, geography, politics, race, gender, and religion. Math helps humans make sense of numbers, patterns, and shapes. It is a subject that is useful for anyone to learn. Considering this, math should unite people because it is beneficial for the growth of personal and societal knowledge. However, many people do not feel like they learned math in an environment where they felt free from judgement when making mistakes (Siu, 2016). Math can involve higher level thinking, which can require a great deal of understanding and practice. The ability to understand math is not an innate skill for everyone (Medoff, 2013). Often times, students feel judged when learning math. Not every math teacher is willing to go back to the foundational steps in order to help students learn because of reasons like lack of class time, lack of patience, or lack of concern for their student's math efficacy (Siu, 2016). It almost seems as if some math teachers love math but not teaching. Educator Paulo Freire states "It is not possible to be a teacher without loving teaching" (2000, p. 28).

From my experience in a math classroom, I have found that many math teachers have an exuberant amount of pressure on them to fit in a large amount of content into a

small amount of time so their students will score well on standardized tests. Considering that many math teachers only have a small amount of class time to teach, it often leaves teachers with little to no time to genuinely engage with their students and form much needed connections. My mentor teacher and several other math teachers I know have used their math classrooms to emphasize humanity through conversations and math lessons, build connections with their students, and create classroom environments that help students believe they can do hard things. While some math teachers might love math more than teaching, some math teachers place making connections with their students and teaching with compassion, empathy, and kindness as their top priorities. My student teaching experience allowed me to learn from a math teacher who uses her math classroom as form of social activism by helping students to see that everyone is accepted and appreciated for the different skill sets, they bring to her classroom. Math teachers that prioritize their students are one of them main reasons I chose to write this paper; to bring light that empathetic math teachers exist and that I believe we need more of them because they change lives.

I believe education should be student centered meaning teachers helping students develop the ability to learn, collaborate with others, ask for help when needed, be able to facilitate further learning on their own outside of class, aid students in figuring out what to do when they do know what to do, find resilience especially in consideration to cognitive challenges, and supporting students when it comes to evaluating knowledge claims (Goodyear & Dudley, 2015). Anytime humans are involved, empathy should be a core principle in understanding how to treat them with respect and dignity.

The sad truth is having a teacher who does not create a safe learning environment for students can be detrimental to a student's self-efficacy and confidence which can have a big impact on their academic future. It is commonly expressed that most people have had a "mean" math teacher. Empathy is a much-needed quality in math teachers, because most math teachers are skilled at math, but not all of them are considerate of what it is

like to struggle with the subject (Medoff, 2013). However, it is important to note that not every math teacher contributes to students feeling inadequate or incapable of being proficient in math. There are many math teachers who care deeply for their students and show this through their teaching and student engagement (Siu, 2016).

Moreover, empathy is necessary for teachers in general, because there are so many factors that play a part in student learning. It is also commonly expressed that racism and sexism exist within some math classrooms and not everyone is treated equally in the work force in relation to math fields (Sax, 1993). These systems of racism and sexism at play in some math classroom along with other STEM classrooms affect student efficacy and confidence within that subject (Siu, 2016). Students of all genders, races, ethnicities, and religious backgrounds have a place in a math classroom. Students of all ability levels have a place in a math classroom. Students make mistakes even in math and sometimes need extra help, so math teachers need to be empathetic. Considering this, empathy can be defined as social cognition that involves feeling with others, which aids in maintaining interpersonal relationships and navigating everyday interactions.

In this thesis I examine why empathy is needed in the math classroom. My research starts with empathy as a whole, what it is, and why it is needed. Then I present research on why it's needed in the classroom and lastly, I look at why it is specifically important in math and math classrooms. My research is presented in this manner to give a vague to narrow view of empathy and empathy specifically in the math classroom. I have used twenty-seven articles to help define and detail the importance of empathy in math education.

Theoretical Frameworks

There are several empirical theories that help lay the foundation for why empathy should be prioritized by math educators. A theoretical concept that can be useful for math teachers to understand is the systems theory (Bertalanffy, 1968). There is a saying that

states “it takes a village to raise a child,” and sometimes it does. Whether the student has a physical or mental need, the systems perspective is helpful as it addresses needs using different systems including families, community, and even in-house resources within schools. Understanding this, mental health and the well-being of the student starts in the classroom. “Systems theory also enables us to understand the components and dynamics of client systems in order to interpret problems and develop balanced intervention strategies, with the goal of enhancing the “goodness of fit” between individuals and their environments” (Friedman & Allen, 2014, p. 3).“Goodness of fit” in terms of students refers to students having an environment or a set of systems in place that accommodate their mental and physical needs (Friedman & Allen, 2014, p.3). Considering this, the health of students relies on many systems including familial, community, and various in-house resources. Students physical and mental needs being met in the classroom relies on many systems such as families, schools, and communities. The systems theory is helpful for math educators because it gives insight on how to best serve the student by allowing math educators to comprehend the various systems they have to work through and with to successfully educate and support their students in regards to working with special education teachers to thoroughly follow student IEPs (Individualized Education Plan), working with guidance counselors, school social workers, and nurses to make sure students are physically and mentally well, as well working with and seeing parents as allies in meeting students needs.

Maslow’s Hierarchy of Needs is another important theory to consider because it is a model in the form of a pyramid that provides a visual hierarchy of human needs (Maslow, 1962). At the bottom of the pyramid is physiological needs including food, shelter, sleep, clothing, and air. The next largest section of the pyramid is safety needs including resources, employment, property, health, and personal safety. The third section to the bottom entitled loving and belonging includes friendship, intimacy, family, sense of belonging, and human connection. The fourth section to the bottom is esteem meaning

self-esteem, respect, freedom, and status. At the top of the pyramid is self-actualization and this is the desire to be all that one can be (Maslow, 1962). This theoretical model can be an important tool for math educators to have a basic understanding of and can be useful to better understand their students because each of their students come into the classrooms with various and unique needs. In order for students to reach their full potential, students require their needs be met. This model will help educators understand their students' needs in order of importance which applies to math teachers because it applies to all teachers who are using empathy as basis for teaching.

Another theory that can be used alongside the other two is the Biopsychosocial theoretical model. This model shows three circles that all intersect (Engle, 1980). The three circle topics include biology, psychology, and social environment which help explain what impacts students. This model can help teachers understand how mental, physical, and social health are connected. If a student experiences trauma or anxiety often it will correlate to physical symptoms. The model gives teachers an insight for when their student seems like they are extra hyper, but in reality, the student might have experienced trauma. Another example could be a student who has anxiety and says their stomach hurts. Overall, this model will help math teachers be more aware of the student as a whole which pertains to math teachers because many math teachers lack the mental health knowledge necessary to support their students (Fuentes, 2012).

Bertalanffy's systems theory, Maslow's Hierarchy of Needs, and the Biopsychosocial theoretical model all help teachers have an understanding of their student's physical, mental, and social health. These three models can be useful to math educators as they will help build the foundation for empathy in the classroom. These three theories can be used as tools for math educators to see the student as a whole. Considering that, these theories beckon educators to understand that everyone is socially and culturally situated even in a subject like math that requires abstract thinking. Moreover, empathy is an argument for humanization, and these three theories will help

math educators understand the humanity of their students.

Maslow's hierarchy of needs is important for math teachers to take into consideration because in order to be empathetic towards students in terms of their needs, one must understand the hierarchy that is human needs in consideration to prioritization of needs. This theory will help math teachers to employ empathy on the days students come in sad, hungry, or even not focused by helping them to understand their student's needs. Next, the biopsychosocial model takes this a step further by helping math educators understand how everything in a student's life is so connected and will help them meet a student where they are when students are facing physical, social, or mental issues. These two theories can help math teachers identify where their students are mentally, physically, and socially. Meanwhile the systems theory is beneficial for math educators to be aware of because it will help educators find the right channel to meet their student's needs by allowing educators to work with and find support systems for their students.

Methods

Overview of Research Design

My research consists of a literature review that explains teacher empathy in the math classroom. Throughout my literature review, I explore empathy through the lens of the theoretical frameworks listed above while detailing the importance of this concept in math classrooms. I explore four categories including what empathy is, what it looks like in a classroom, what it looks like in a math classroom, and why it is needed in a math classroom. By conducting a literature review I will explore the research that exists about empathy in math.

Procedures

In order to find literature on empathy in math, I first researched empathy and what

empathy looks like in relationships between people. In order to do this, I used the Academic OneFile Database found on the Barret Library website and searched empathy. I chose this database because it is peer reviewed and well trusted in the academic community. It also spans a host of different disciplines unlike many other databases, which was useful in defining a broad term like empathy. Varying results were found, and the majority were in the psychology category, because empathy is a cognitive process. I used the psychology articles that looked further into the articles that had a more generalized view of empathy and was not specific to disciplines outside of education and child development. Ringwald and Wright (2020) correctly articulate what empathy is, it describes altruistic motivations that are attached to empathy along with the overarching relationship factor that encompasses empathy. This was one of the several articles I used to describe empathy because it defined empathy and was not specific to any other disciplines. and I chose it because it gave a general view of empathy, but also explored empathy in relation to relationships and motivation. I looked at the keywords of each article, and if the keywords included at least two of the following: math, education, teacher, or empathy then I looked at the abstract. If the abstract seemed relevant to empathy, empathy in classrooms, or empathy in math then I looked at the article. I determined whether an article was relevant based on how in-depth into the subjects the abstract proved to be from my understanding. Considering this, I used (Ringwald & Wright, 2020) along with other articles to help define the definition of empathy and the importance of it in any relationship. I, then, went on to use ERIC which is the educational database. I chose this database because it yielded results specific to the classroom.

Then I narrowed my search to empathy in the classroom still using ERIC, because I wanted to define what empathy in this classroom is and why it is necessary. I once again used the Barret Library website and chose the Academic Search Premier database to research empathy and that was the only search I did in that specific database. This time I typed “in the classroom” in the keywords section of the database. I did this as a way to

research what it really means to be an empathetic teacher and to understand how the teacher-student relationship is built on empathy. This database displayed almost two hundred results. The results included studies on empathy in various different classrooms from elementary school all the way to graduate school. The studies that appeared from this search also looked at various class subjects from ELA all the way to counseling classes and religion.

Considering this, I narrowed my search to "empathy in math." I used ERIC to complete this search, and thirty-eight search results appeared. However, not all of these pertained to both empathy in math, so I looked at the keywords and read all of the abstracts of these articles that contained both topics which was about half of the results yielded. Lastly, I decided to try searching for "Empathy in Math Teachers" in the ERIC database. This search only yielded four articles including (Fuentes, 2012; Medoff, 2013; Miller, 2000; Siu, 2016). Each article proved to be useful in some capacity and are a part of the twenty-eight sources used in this thesis. The other 24 sources came from the search terms previously mentioned including "empathy," "empathy in the classroom," and "empathy in math."

Considering that this study is a literature review, my main form of analysis is to examine the research that already exists about empathy. Reviewing existing literature on empathy has allowed me to see the gap or absence of research on empathy in math. Not only does this allude to the need of empathy in math but the small amount of articles that exist surrounding empathy in math beckon that the importance of empathy in a math classroom is undeniable. The need for the research exists because of students' negative feelings surrounding math, low math retention in classrooms, and the mathematical gap found between different races and genders that starts in school and carries through to the workforce (Engle, 1980; Fuentes, 2012; Siu, 2016). The purpose of this thesis is to determine if teacher empathy can be a positive way for math teachers to support their students in hopes that the math classroom and mathematics in general will become a

welcoming community.

Literature Review

Empathy

Historians and scientists have considered empathy as a sort of methodological device or method used to help people understand others who come from different cultures or have different social circumstances (Gribble & Oliver, 1973). Empathy is a term that was created by Titchener in 1909 to translate "Einfühlung," which was a compound word used by Lipps and Wundt, meaning "in-feeling" (Gribble & Oliver, 1973). "Feeling into" can also be described as projecting oneself into something else (Swan & Riley, 2012). Since the early 1900s, empathy has gained more relevance and has become prevalent in many helping professions including teaching.

Empathy is often considered a vague concept and one that is hard to describe and difficult to measure; However, empathy crosses many different disciplines, but an agreed upon definition has yet to be formulated (Swan & Riley, 2012). Empathy can be described as a social cognition essential for forming and maintaining interpersonal relationships as well as navigating social interactions (Ringwald & Wright, 2020). Swan & Riley define the cognitive process of empathy by stating "The cognitive component of empathy is the ability to accurately infer what others are thinking or feeling. It is the mental activities involved in acquiring and processing information for better understanding" (2012, p. 3). Empathy can be considered a necessity in any environment where human interaction is found. Many social groups are formed by a common goal when empathy is implemented. Understanding this, empathy can be the uniting factor in a social group and can be the basis for altruistic motivation (Mathur et al., 2010). In the classroom setting, teachers and students are united by a common goal and that is a partnership towards education and learning.

Considering that empathy is needed anywhere that human interactions are found,

teachers need to employ empathy in their interactions with students. The educational system is based on the interaction between the student and teacher and this interaction directly impacts the student's ability to learn from their teacher (Cozolino, 2013). A significant part of a teacher's job includes responding to and interacting with students (Jordan & Schwartz, 2018). True engagement in any relationship is based on empathy (Jordan & Schwartz, 2018). Student engagement is the classroom can prove empathy to be imperative.

Empathy has a great deal in common with cognition specifically the cognitive component that enables someone to perceive and decode the emotional state of others which leads to an inference of how that person is feeling (Swan & Riley, 2015). While educating students and assessing student's work, teachers often experience empathy which can be considered a skill that allows people to resonate, feel, and cognitively grasp the experience of others (Jordan & Schwartz, 2018). Students come from a multitude of backgrounds and circumstances, so their teachers need to have an understanding and awareness of what their students are facing.

Many consider empathy the act of stepping into another person's shoes. Teachers should possess this skill because their students will be different from them in some capacity. A primary way to provide empathy is to show emotive or vicarious behavior in an effort to express concern for another's situation than to one's own (Swan & Riley, 2012). It is a universal truth that there are billions of people on Earth, and every person on this planet will experience each day differently. To that affect, today could be a magnificent day for some and awful day for others, but when someone employs empathy, they place themselves in another's situation for a moment. Being empathetic allows a person might be thriving to feel with and express concern for someone who is struggling. Many counselors comment on this phenomenon by admitting the importance of walking in someone else's shoes, but also keeping one's socks on. Implementing boundaries as a teacher can help sustain healthy boundaries whilst performing the duty of empathy that

teachers have to their student's. Swan and Riley state "By keeping clear cognitive and experiential boundaries, the empathizer can always distinguish between his or her own thoughts and the feelings and thoughts of others (2012, p. 5).

Empathy in the Classroom

Empathy has become an educational aim or seen as pedagogical commitment for many educators in recent years but remains an undefined term in the context of education (Bialystok & Kukar, 2008). It has come to be known as a desirable trait in teachers, but is not a stand-in for tolerance, even though many have found a correlation with the popularity of empathy and the sociocultural changes that have taken place over the past few decades (Bialystok & Kukar, 2008). Considering this, teachers employing empathy in the classroom has become known as one of many ways teachers can help work towards social justice and to combat social injustice (Bullough, 2019). There is so much injustice in the world, and the education system is just one of many ways to make a positive impact. Considering this, the application of empathy is necessary for culturally responsive teaching, which includes being committed to antiracist, anti-oppressive, and social justice teaching (Warren, 2018). Empathy is theorized in educational settings to aid teachers in teacher effectiveness specifically in but not limited to urban and multilingual classrooms (Warren, 2018).

Bialystok and Kukar (2017) define being empathetic as having the ability to care about the experiences of others. Empathy is also defined as an important social function used to help with understanding and communicating with others and involves recognizing the feeling of others through the understanding of common humanity and through an emotional response that can be considered vicarious (Phillips, 2020). Empathy is a key component in teacher caring because it has been known to help teachers increase job satisfaction and remain in the teaching field longer (Bullough, 2019). Empathy has become an initiative in k-12 schools among students and teachers even though there are

many disputes on how to properly train teachers in empathy (Bialystok & Kukar, 2008).

How effective training in empathy is has often been disputed as well. Considering this, educating teachers and students about empathy should be rooted in the purpose of forming awareness that empathy is a need. Teachers may not be able to teach empathy and kindness in the same way they teach math (Miller, 2000), sometimes the best way of teaching empathy is by creating a standard of empathy within the classroom. Empathy is known to be a way to help teachers specifically white teachers learn how to build connections with racialized students as well as build connections with their student's communities (Bialystok & Kukar, 2008). Empathy can also be a way to mitigate conflicts caused by race difference, and this has been proven by studies (Howard et al., 2006; Milner, 2010; Bialystok & Kukar, 2008). Even so, the rapid use of empathy in education has been traced to social and cultural changes including immigration, desegregation, and the integration of American schools over the last hundred years (Bialystok & Kukar, 2008).

Research done on empathy in the classroom has become increasingly specific, examples include articles that look at empathy in culturally diverse classrooms, empathy in inclusive classrooms, empathy in Spanish and social studies classrooms, empathy in cross-cultural education, empathy in special education classrooms, and so many more. The one common occurrence among research in education is that empathy is a helpful tool in teaching teachers and students how to effectively relate to those who are different than them.

For example, when special education teachers step into their student's shoes, they get frustrated 'for' not 'with' their students and these teachers make efforts to plan inclusive lessons as well as looking for student body language to see how their students are feeling about the lesson and classroom environment (Maher & Morley, 2020). Empathetic teachers' pay attention to their students' body language. All students are still going through the developmental stages; therefore, they cannot always communicate how

they are feeling or what they need. Empathy allows teachers to notice when their students are struggling by paying attention to signs like body language, lack of motivation, and even irritability.

Something that Ladson-Billings (2006) is alluding to when she states that she believes teachers need to move from feeling sympathetic for their students to a stance of informed empathy is that there is a difference between sympathy and empathy. Many researchers and theorists subscribe to the idea that sympathy and empathy are different (Swan & Riley, 2012.) A sympathetic teacher might feel bad for their students who have low retention and decide to give them easier work even though this easier work will not help their students in the long run. Meanwhile, an empathetic teacher might supply these same students with extra scaffolds in order to complete grade level work. A teacher who is using informed empathy is aware of the challenges her students face and instead of pitying them, they equip the students with the tools they need to be successful (Ladson-Billings, 2006). Warren (2018) states “Empathy is the piece of the student-teacher interaction puzzle that connects what a teacher knows or thinks about students and families to what he or she actually does when negotiating appropriate responses to students' needs” (p. 1).

Empathy is necessary in the classroom for several reasons including helping educators to battle unconscious personal biases by allowing teachers to recognize those biases in order to combat and overcome them (Dee & Gershenson, 2017). Empathy is known to be an important tool in building relationships, understanding others, and sharing feelings (Ütkür, 2019). When empathy is expressed in the classroom, it allows students to make connections between content and everyday life because empathy is a necessary skill for life (Ütkür, 2019). Empathetic teachers have been found to better communicate with their students along with being able to help their students form empathetic relationships, as well as being able to motivate their students (Goroshit & Hen, 2016). Empathizing with others is a legitimate means of being able to develop

impartiality (Gribble & Oliver, 1978). Treating all students fairly is an important part of being a teacher. Teachers who implement empathy in their classroom, have the ability to better engage and form relationships with their students (Gribble & Oliver, 1973).

Empathy in the Math Classroom

Empathy is often seen as a virtue that should transcend circumstances and even content (Dee & Gershenson, 2017). Gaining an understanding of empathy can help educators move from intellectual understanding to compassionate action. Facilitating math instruction with the goal of filling the mathematical gap requires teachers teaching math with consideration of emotional intelligence as well (Fuentes, 2012). The mathematical gap refers to an achievement gap in mathematical performance in school and math careers. Math has long since been a realm that is restricted to a certain few due to sexism, racism, and discrimination of socioeconomic level (Achieve, 2013; Fuentes, 2012; Geist, 2015;). When it comes to inequities by socioeconomic level "About 71 percent of students in schools with at least three-quarters of students eligible for free/reduced lunch take Algebra II and/or some trigonometry, compared with 80 percent of students in high-income schools (Achieve, 2013, p. 1). "There are inequities by race. About 71 percent of Black and Hispanic graduates take Algebra II and/or some trigonometry, compared with 83 percent of Asian and 77 percent of white graduates (Achieve, 2013, p. 1). Black and LatinX students, who attend public school, have not been able to close the mathematical achievement gap with white students attending private and public schools (Fuentes, 2012). The mathematical gap needs to be addressed because advanced math advances equity and a person's mathematical proficiency impacts their future whether that be in consideration to employment opportunities, potential to gain higher education, and could even positively impact the economy (Geist, 2015). A plausible solution to close this gap would be using a teaching framework that involves the emotional and relational areas of learning (Fuentes, 2012.) Using empathy in the

classroom can be a mechanism for social justice (Brown et al., 2008) especially in a subject like math that presents a deficit in equity (Achieve, 2013).

Empathy is a characteristic found more in teachers than the general population as found in self-reported scores, and empathy differs between those in STEM and non-STEM professions (Phillips, 2020). Those in non-STEM professions have higher self-reported scores of empathy than those who are in stem professions (Phillips, 2020). The issue is that it has somewhat become acceptable to not be empathetic based on profession or even preference. It is almost comparable to being accepted like a color preference. When in reality, it is perfectly fine to dislike the color green, but choosing to not be empathetic is more of a character flaw. Being empathetic is an educational aim, but it is a choice a teacher who is teaching for social justice makes (Brown et al., 2008). Educators have to choose to rise above apathy and actively choose empathy (Brown et al., 2008).

Empathy in the classroom should not be exclusive to subjects like English and social studies. While math is objective, it is being taught to humans meaning empathy is still a necessary skill needed by those who teach math. Many educators who teach math excel in math (Medoff, 2013), but this is not always true for all of their students. Millie, a student mentioned in the article, has Attention Deficit Disorder (ADD). She struggles to understand math due to not understanding the math problem the first time which often leads her teacher reprimanding her for not paying attention (Medoff, 2013). Considering this, Millie rarely asks for help in class and her ADD causes her to struggle to take notes. Her teacher does not understand and the emotional impact of the way they reprimand her when she is trying to ask for help led to her not being able to complete her homework or reach proficiency in math (Medoff, 2013). Millie's teacher may not understand what it is like to struggle with math, so she should have employed empathy by supplying Millie with extra scaffolds and connecting with her on a relational level by checking in with Millie every so often. Communicating with Millie to determine how her needs can be met and then meeting those needs with scaffolds or extra math practice would have been the

most appropriate way to employ empathy.

There are many other students that sit in math classes everyday with experiences and obstacles that their teachers know absolutely nothing about. The main focus on empathy in education settings is the teacher conveying to the student that they sense what the student is feeling (Jordan & Schwartz, 2018). In order to convey this to students and meet students' needs, teachers need to use empathy to solidify their own understandings, use a variety of supports and activities, place extra consideration on how they talk about math, answer all questions respectfully, and praise effort along with reinterpreting mistakes (Medoff, 2013). Empathizing with students is all about meeting them where they are by using helpful strategies and speech in class along with creating an environment that helps students feel safe to learn through trial and error.

Math educator Maeve O'Hara Siu (2016) taught math at four different schools over the span of four years, and she admits that these different environments impacted the way she sees math by stating, "My experience has led me to the conclusion that math education grounded in optimism, joy, and empathy enables authentic teaching and learning to happen quickly, across contexts and despite challenging factors that are often out of the teacher's control" (p.1). In terms of using empathy in her math classroom, Siu says it is beneficial because it allows students to have the freedom to make mistakes which is essential in math because of the many steps sometimes required to solve math problems and she recalls meeting many math teachers who mentally place their students into two groups: those who can and those who cannot do math (2016).

Grouping, in this case labeling, students in general is wrong much less grouping students based on low math retention. However, students are also grouped into these two categories based on socioeconomic status and race (Siu, 2016). Personal bias makes it simple for a teacher to place some of their students in the "can't do" math category. Great teachers believe in their students instead of labeling their students, because those labels can become self-fulfilling prophecies (Ladson-Billings, 2006). How teachers think of

their students can determine the type of impact that teacher has on students. Ladson-Billings comments on teacher mindset by arguing "whether teachers think of their students as needy and deficient or capable and resilient can spell the difference between pedagogy grounded in compensatory perspectives and those grounded in critical and liberatory ones" (2006, p. 30). Both educators and researchers are acknowledging the phenomenon that is "putting students in boxes." In math class, many students are labeled incapable of being successful in math due to their gender, socioeconomic status, cultural differences that are perceived as behavioral issues, and race (Siu, 2016)

O'Hara Siu taught middle school and high school math at a public magnet school: however, the math classes she taught were on the "lower" track, and she stated "many of my students have shared with me that my pedagogy is helping them feel like they can be successful at learning math. I have been teaching the only way I know how: with empathy and joy" (2016, p. 239). Students that were not seen as the magnet's school's brightest were encouraged by a teacher who taught math with empathy and thrived in her classroom due to her use of it (Siu, 2016). Students are often put into groups by teachers and school administration based on academic ability, race, gender, and socioeconomic level (Siu, 2016). For the students who are mentally placed in the "cannot do math" category, they may start to feel incapable to be successful in math. If a teacher does not use empathy to create an environment of optimism, then the student will not be optimistic about their ability in math. If a teacher does not believe in their student, their student might not believe in themselves.

Learning math is more than just learning math, it is learning how to find resilience and overcome the social barriers that surround the subject. Math is a living breathing language (Siu, 2016). Needless to say. Math is complex. When considering the complexity of math and the many different ways to solve problems, it is easy for a student to feel discouraged. It is also a common occurrence that teachers will only show students one way to solve certain math problems or situations which can be frustrating to

students and give them a narrow or right and wrong view of math (Buerk, 1982). Empathy will allow math teachers the discretion to introduce students to several ways to solve math problems, and help students understand that math while math is often viewed dualistically (Buerk, 1982), it does not have to be. Empathy can be a guiding factor and a fundamental reason as to why teachers should reframe math from a set of problems tied to one set of correct answers to a dynamic solving process involving puzzlement and creativity (Buerk, 1982).

Practical ways to use empathy in math involve asking yourself questions about what kind of environment would help students feel most comfortable, what frustrations may arise, and what do students need from their teacher to learn this information (Medoff, 2013). Working through all of these thoughts while working through the work students are expected to do will help teachers prepare to be empathetic by putting themselves in their student's shoes (Medoff, 2013). For example, if a student is completing an addition problem and struggling with it, a teacher putting themselves in their shoes by working through the problem with student after working it out during lesson planning can prove to be useful (Medoff, 2013). It can be helpful to students when teachers model how they learned the concept (Medoff, 2013).

For example, "learning mathematics, as cultural objectification is not simply learning to do mathematics (even less to solve mathematical problems), but rather "to be-in-mathematics", the mathematical activity being nothing else than a way "to be-with-others" (Radford, 2012; Guillemette, 2017). Math is simply another way in which humans understand the world. The concept of dépaysement épistémologiquecan is helpful in understanding why many students view math as a hurdle in their school day and having feelings of hate and apathy towards the subject. To quote Guillemette at length,

> From this perspective, the concept of dépaysement épistémologiquetakes on special meanings. Indeed, history of mathematics offers meeting opportunities

> with ways to do and to be radically different in mathematics. Articulating the problem of learning with the question of Alterity, dépaysement épistémologiquecan then be seen as a particular experience of otherness in mathematics. Thus, attention is not on an individual with personal possibilities of emancipation, but rather on the possibility for learners to discover new ways of being-in-mathematics, to open, with others, the realm of possibilities in mathematics. (2017, p. 352)

It has been reported that many math teachers are prepared in the subject area, but do not understand how to empathize or support their students with issues like anxiety, fear, apathy, and frustration (Radford, 2012). A great math teacher is able to see each individual student as a whole (Siu, 2016) and teach each student with consideration to their mental and emotional health which is not possible without empathy. Students may struggle emotionally and mentally in general, but in terms of math, many students struggle with their thoughts and feelings towards math. (Fuentes, 2012). Buerk (1982) gives an example of how many students view math by writing

> Math does make me think of a stainless-steel wall –hard, cold, smooth, offering no handhold; all it does is glint back at me. Edge up to it, put your nose against it; it doesn't give anything back; you can't put a dent in it; it doesn't take your shape; it doesn't have any smell; all it does is make your nose cold. I like the shine of it – it does look smart, intelligent in an icy way. But I resent its cold impenetrability, its supercilious glare. (p.19)

Here Buerk is painting a picture of how many students see math and is an example of why many students consider themselves to lack passion or feel apathetic towards the subject of math and understanding when it comes to mathematics which helps shed light on the deficit in mathematic fields, professions, and even teachers (Buerk, 1982; Fuentes, 2012).

Recommendations

After looking at the research, there is no question that empathy is needed in the classroom and there is a deficit of empathy in the math classroom that has led to other deficits. The best way for teachers to employ empathy is to create a safe classroom environment that allows students to have the freedom to get math problems wrong (Siu, 2016). Teachers should help students see math as the type of subject where creativity is welcome instead of the type of subject where every answer is either right or wrong. (Fuentes, 2012). Teachers should also make their classrooms an inclusive environment where every student is welcome (Siu, 2016; Medoff, 2013).

Through researching this topic, I have learned that empathy is necessary in every class but is missing in some math classrooms. I recommend that math teachers be held to a standard of empathy. Math teachers should see each student as a whole meaning a whole person with a unique skill set and unique needs (Siu, 2016). Ways math teachers can do that include allowing students to have scaffolds when needed (Medoff, 2013), approaching correct and incorrect answers with kindness (Siu, 2016), and inviting curiosity and questions into the classroom (Fuentes, 2012). In terms of pedagogy, adopting antiracist pedagogies and not shying away from hard conversations is a good way for teachers to stand up to prejudice and labeling students (Ladson-Billings, 2006; Siu, 2016). All of these actions are acts of empathy and will help math classrooms become a safe place.

Conclusion

The lack of all students feeling welcome in math classrooms, and the negative feelings many students have towards math contribute to the need for empathy in the math classroom. Employing empathy will help math teachers view each student as a whole. Some issues that employing empathy can combat include disregarding the mental and emotional health of students, presenting math as right and wrong, grouping or labeling students by gender, race, socioeconomic status, and assumed misbehavior as well as not

allowing students the freedom to get math problems incorrect. Choosing to be optimistic about their students' mathematical abilities also will help facilitate empathy with the math classroom. All of these concerns can explain student apprehension towards math and each of them can be attended to by the use of teacher empathy. Empathy is needed in every classroom, because teaching involves student interaction. Considering this, math teachers should not be exempt from using empathy but held to a standard of it.

This past year, I student taught fourth and fifth grade math students. I also had the opportunity to teach an RTI (Response to Intervention) group; however, my group was only one person and for the purpose of this paper I will use the pseudonym, Cori was a fourth grader whose previous MAP (Measure of Academic Progress) scores suggested she was on a first-grade level in math, and she currently has an IEP. I worked with her several times a week individually, teaching her math in a procedural and conceptual sense. I was informed that Cori had been to several schools and her parents had felt like her previous schools had either given up on her or were not able to adequately meet her needs. Three afternoons a week, I would review classroom material with her as well as assist her in completing her daily homework. In doing this, I was able to teach current course material to her at her own pace. Every week, I saw her improve and she grew fourteen points on her spring MAP test compared to the test she took during the fall semester.

I used empathy every step of the way when it came to teaching her. The importance of empathy was instilled within me when I began my undergraduate degree in social work. The theories presented in this thesis raised my awareness of the need for empathy. I used empathy as a way to feel with her by celebrating every triumph and comforting her on the tough days. I used class time along with Friday mornings for extra opportunities to go over anything she had questions about. Cori would often come up to me and ask me for extra help several times during the day. After working with her for months, she told me she loved math and she would never forget me. We had

conversations about math, school, and everything in between, I taught her math, and she taught me that being empathetic forms connections and helps students grow academically and relationally. I believed in her and in turn she believed in herself.

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