The Influence of Teachers' Implicit Attitude on Primary School Students' Development of Gender Ideology

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Abstract. This template explains and demonstrates how to prepare your camera-ready paper for Trans Tech P The gender gap exists between male and female students' test scores, classroom performance, and future careers. Research has found that students' perception of their gender will affect their thoughts and behaviors. However, it is still not clear how teachers' implicit attitude affects students' development of gender ideology. By reviewing existing research and literature, specifically from primary schools, this paper examines the relationship between primary school teachers' implicit attitudes and their influence on students. The paper proves that primary teachers' understanding of gender roles and their self-concept affect their implicit attitude about gender, which is reflected in their teaching methods, classroom management, and their perceptions of students. Teachers who hold implicit gender bias will have a negative influence on students. Students who are taught by teachers with biased implicit attitudes will have poor academic achievement, low self-esteem, and more misconduct. Therefore, it is necessary for teachers to increase their gender awareness and improve gender equity in the classroom.

Keywords: gender gap; implicit bias; primary education; gender awareness; self-concept.

1. Introduction

There is a gender disparity in education and occupation after decades of efforts in promoting gender equality. Males are overrepresented in the fields of science and STEM whereas females are overrepresented in the fields of education, health, and welfare [1]. A similar gap emerges in the school context—girls generally report fewer self-concepts and lower grades in subjects like science and mathematics, while boys are less confident in reading and literature. Schools are a socialization agent in which students develop social norms and form their ideology and behavior that fits the social norm. Julia [2] states that schools' social composition added to the behavior of its components plays a crucial role in widening the gender gap. Students internalize those ideas as what males and females should behave and achieve. The idea of gender is constructed by instructions and daily activities at school. Therefore, schools play an active role in the formation of gender identities [3]. Gendered cultural roles are reinforced in school by teachers who are gender stereotyped. Those teachers with low gender awareness will show their biased idea through their language, instruction, class management as well as differentiated treatment of boys and girls. All of the factors contribute to the gender disparity.

Teachers are a crucial part of exacerbating gender-related problems since they are the primary transmitter of ideology in school. Previous studies have already proved that male students are found to receive more praise and have more interaction with teachers, they also receive more feedback from teachers than female students [4]. Therefore, it is predictable that boys and girls have differentiated academic self-concepts. Teachers have also been shown to have a large influence on students' behavioral development. For example, teachers who tolerate boys' misconduct because of the idea that boys are born to be naughty will foster their bad behaviors. In general, teachers' gender-stereotyped thoughts and behaviors have many negative effects on students' development. However, teachers usually fail to deal with this undesired gender gap in school because this implicit attitude is rarely noticed by people. Primary school teachers' gender awareness should be aroused. The onset of gender differences in children's self-perception about their awareness and ability of widely accepted gender stereotypes is around the ages of 7 to 12 [5]. Although informal observation suggests that the gender differences in mathematical tests become obvious in higher education, recent studies suggest

that the gap between boys and girls in math scores begins to diverge at the primary school level [6]. Moreover, primary school experiences are important in helping students shape their interests in different study fields. Primary students' ideology during this period will have long-term effects on their future education and occupation. However, in what ways primary teachers' implicit attitudes interact with their teaching behavior and classroom management thus affecting students' development is still not yet been clarified. The improvement of education and gender equality requires the exploration of what affects students' gender awareness and how this knowledge influences their development. In this concern, this paper aimed to explore how primary teachers' self-consciousness, implicit bias, and implicit teaching behavior influence the development of students' gender-related ideas by reviewing previous research. The paper will firstly discuss teachers' self-concept about gender, then the paper will focus on teachers' implicit bias toward primary school students. Lastly, this paper will explore primary school teachers' influence on students by implicit gender bias behaviors. The ultimate goal of this paper is to provide a more comprehensive understanding of students' development of gender ideology and increase teachers' gender awareness to help boost gender equality in schools.

2. Teachers‘ Self-Concept of Gender

2.1 Teachers' Self-image of Being a Certain Gender

Self-concept is defined by Huber and Stanton [7] as a person's sense of self that develops through interaction with the environment and is influenced by both environmental and interpersonal reinforcement, specifically, the role of "significant others". There is a general belief that boys outperform girls in science subjects like mathematics. However, research shows that the greatest gap between girls and boys is their self-confidence and attitude toward math instead of achievement [8]. That is, there is actually no big difference in girls' and boys' math scores, but boys believe they do better than girls. In the school context, significant others mainly refer to teachers. Teachers have a large impact on students because they are the ones who interact with students every day, transferring their knowledge, thoughts, and ideologies to them. Teachers' self-concept is an important factor to analyze when discussing the gender development of students. How students develop gender-related ideas largely depends on teachers' behavior and thoughts. The different ways that teachers treat boys and girls because of gender stereotypes might translate into self-concept differences, which have a substantial impact on student's motivation and achievement [9]. Many students view teachers as their role models. The research of Relich, Conroy, and Webber [10] shows that there exists a gender difference in the self-concept of mathematic teachers. Female teachers will present a negative role model for students, especially female students, by holding low self-concept. Moreover, this fact is attributed to the level of study. Male teachers are more likely to study mathematics at a higher level, thus scoring themselves higher in mathematics self-concept scores.

Teachers' gender awareness will cause a difference in their teaching strategies and beliefs. Stereotypically, people always see females as more understanding and caring, whereas males are portrayed as more aggressive and peremptory. Teachers' self-concept of being a certain gender affects their teaching practices. In past research, shreds of evidence have shown that male and female teachers have different teaching styles in terms of how they manage lecture and class activity time. Female teachers tend to bring more activities into the classroom while male teachers usually focus on giving lectures [11]. Female teachers give students more freedom to let them direct their own studies. Grasha [12] argues that female teachers are more likely to impose student-orientated learning that strongly connects students themselves to their learning. For those reasons, students report themselves being more open and comfortable when interacting with female teachers [13].

Having a teacher with low gender awareness and who shows strong gender-stereotyped behavior will affect students' development of gender identity. For example, suppose a male teacher easily gets irritated by students' delinquencies and punishes students hard for that. In that case, it may transmit a false impression of males being grumpy and aggressive toward their students. In contrast, if a male

teacher kindly reminds students to remain in the classroom order, shows patience when students make mistakes, and actively counsels students when they have difficulties, the students will be more likely to establish unbiased gender identity.

2.2 Teacher's Way of Presenting Their Understanding of Gender Role

Teachers' teaching attitudes play a crucial role in students' learning. The difference in primary teachers' self-concept of math is associated with their different attitudes toward teaching. Half of the low self-concept teachers exhibit an indifferent attitude to math. One of them mentioned in the interview that she is doing this job because of money [14]. On the contrary, high self-concept teachers report more positive attitudes. They show passion and confidence in what they are learning. Those teachers who enjoy their careers are more likely to devote more energy to teaching, and they are more likely to develop a supportive relational bond with their students.

Differences can also be seen in teaching approaches between high self-concept primary teachers and low self-concept primary teachers. In the interview with primary teachers, Relich [14] finds out that low self-concept teachers are using more traditional approaches. Those teachers report that they prefer to focus more attention on the text. While almost half of the teachers are aware that there are various resources and methods for them to conduct the teaching process more interesting and engaging for students, most of them declare a lack of necessity and motivation, disinterest, and unmotivated to do that. One of the most important factors that motivate students to learn is to let them see the applicability of textbook knowledge in real life. In this case, if teachers can combine mathematical principles with real-life examples, students will be more willing to learn. Research by Relich [14] indicates that this approach of making the concepts more relevant and concrete to students are tend to be used by high self-concept teachers. They make the concepts more appealing to students by conducting reality-based activities. They also change the way speak to make the class more interesting and make students think math is enjoyable. Just as a high self-concept female teacher said in the interview that "Math is relevant, and can be enjoyable, all you need is a bit of confidence." [14]. What is more, high self-concept teachers are more likely to let students lead their studies. This student-orientated study process helps students to be the owner of their studies and intrinsically motivated.

Teachers' gender awareness is a leading factor that influences students' gender identity. Teachers who have higher gender awareness will be more likely to notice the difference between their female and male students and manage their behavior to promote gender equity in the classroom. For example, boys and girls show different behavioral patterns in the classes. Boys are more active during classes, they always take the initiative to raise their hands and answer the questions. On the contrary, girls tend to remain silent and wait for the teacher to call them even though they know the answer [15]. If teachers are unaware of this difference in students' behavior, they are more likely to pick up boys to answer the questions than girls and make false assumptions about girls' motivation. The situation will be different if the teacher has a stronger gender awareness. The teacher will encourage girls to be more engaged in the class by intentionally motivating them to answer the questions or interact more in the class. Also, by assigning girls to be the leader during group assignments, teachers can promote girls' sense of engagement in the class, thus helping them to become more expressive.

2.3 Students' Response Toward Teacher's Self-Gender Consciousness

When asking about gender problems in the classroom, low self-concept teachers are more likely to notice the gender gap than their high self-concept peers. Viewing boys and girls as different groups in a learning context could cause negative effects on both boys and girls. A low self-concept teacher mentioned in her interview that "Girls tend to require positive reinforcement more often than boys, and seek help more often. Boys seem to survive on less reinforcement" [14]. This idea will influence teachers' teaching philosophy and treat girls and boys differently. Since many students view teachers as their role models, it will be detrimental if teachers hold the opinion that girls have low self-concept

in mathematics, students are much more likely to develop the idea that they are never going to succeed in this field.

Teachers' gender affects students' learning outcomes. An assumption called same-sex teacher advantage [16] is expected that girls will have better academic achievement if they are taught by female teachers. However, with fewer female mathematics teachers compared to male mathematics teachers, boys are benefiting more than girls from same-sex teacher advantage.

3. Teacher's Implicit Gender Bias Against Primary School Students

3.1 Teachers' Gender Stereotypes of Students

Teachers' stereotypical thoughts about different gender will have a large impact on primary school students. Schneider [17] claims that Particularly when it comes to broad categories like gender, stereotypes have a significant effect on how biased expectations and behaviors are toward various groups. Teachers' stereotypical thoughts about students will affect their perception and expectation of the students, leading to different attitudes and teaching behaviors toward male and female students. Those implicit gender-biased behaviors of teachers in instructional management will yield a negative result in students' achievement. Teachers' gender-stereotyped beliefs and behaviors influenced by their implicit attitudes are affecting the way students perceive themselves as being of a specific gender. The expectancy-value theory postulates that individuals' expectation about how well they will do on a specific activity and how much they value the activity is related to their achievement and achievement-related choices [18]. Teachers with gender bias assume boys to be more aggressive, outgoing, and logical, and girls are warm, polite, and rule-following. Such gender stereotypes conveyed by teachers can result in gender different expectations.

Teachers' gender stereotypes of students can be commonly seen in previous research. Teachers hold different beliefs about boys and girls in mathematics. Research done by Tiedemann [19] concluded several findings on stereotypical thoughts. For same-achieving students, teachers rate math as more difficult for boys than for girls. Girls have less logical reasoning abilities compared to equally achieving boys. Also, girls are perceived to profit less from additional efforts than boys [10]. Another research studying third and fourth-grade students in Russia [20] also indicates that girls are less capable of logical thinking than boys. Girls' success in math is viewed as unexpected and is attributed to effort rather than ability. Similarly, Tiedemann's [21] research yields a result that 9% of the variance is shown in effort-resource-attributions and 4% variance in ability reported by teachers who have gender stereotypes. Moreover, teachers who hold gender stereotypes toward their students view boys' and girls' attitudes toward math differently. When teachers were asked to describe their best male and female teachers, they indicate that their best boy students are more independent in mathematics, more competitive, more logical, and more frequently offered solutions to mathematical difficulties [22]. In terms of teachers' beliefs about students' efforts and talent, two longitudinal studies show that teachers generally believe that girls try harder than boys but gain less from their effort, and boys are more intelligent than girls in mathematics [23]. Though no statistical evidence shows there is a gap between male and female students' testing scores in mathematics in primary school, teachers still hold this gender stereotype that will affect students in various aspects.

3.2 Implicit Gender-Biased Behavior in Teacher Teaching

With the perceived differences in gender, teachers are more likely to behave differently toward male and female students. Teachers who value male students less tend to engage in unconscious behaviors that make boys less likely to succeed in class [24]. Those behaviors include paying less attention, being less tolerant of students' mistakes, reward and encouraging students less. Those behaviors of teachers might affect students' self-concept on a particular subject, making them feel worthless and less motivated. Teachers may develop a self-fulfilling prophecy, that is when an incorrect belief causes conduct that causes the false notion to become true, to confirm their expectations of boys and girls [21]. Teachers' behaviors can create a gender gap that original doesn't

exist. For example, they may communicate more with boys than girls [25] and pay more attention to boys. Research done by Becker suggests that teachers are using different approaches when teaching boys and girls. They tend to encourage boys more than girls. Another way for teachers to confirm their gender bias is through students' behaviors. The phenomenon that boys are more active in class than girls may lead to teachers' false assumption that boys do better in math [26]. Therefore, teachers tend to pick up boys more than girls to answer their questions, and boys are more interactive with teachers. Course interaction is very important in contributing to students' feelings of involvement and school engagement. With fewer opportunities to respond to questions, girls' motivation of taking more mathematics classes is inhibited [27].

Teachers with gender stereotypes will show their instructional differences toward boys and girls. Teachers' action regarding gender differences has a large influence on in-class social interaction, both consciously and unconsciously [15]. For example, teachers may use more interactive approaches when teaching positively stereotypes students. Those approaches are often more student-centered and can help students to better engage with knowledge. The class atmosphere will also be supportive and challenging. On the contrary, when teaching negatively stereotyped students, teachers are more likely to use the traditional approach. They focus more on the text and teaching knowledge that lacks application to students in real life. This way of teaching will lead to a cold and less challenging learning atmosphere, decreasing students' motivation and their self-concept in that subject. Biased teachers might have a lower expectation of negatively stereotyped students and are unwilling to put the effort into encouraging them to reach their potential [28]. Lower teacher expectation has been proven to have negative effects on students' academic outcomes. A case study done by Hattie and Hamilton indicates that students who are taught by teachers who have low expectations have lower scores on literacy tests than students who are taught by teachers who hold high expectations of them [29].

An observational study done by Gosselin [30] compares the teaching approach of two first-grade teachers who hold different ideas on gender differences and their teaching outcomes. In the observation, Peter, a teacher who is aware of gender differences between students, gives students large freedom when doing a group project. In Peter's classroom, girls clustered together and form a group, and boys tend to wander around the classroom. Peter knows that a mixed-gender group is better for both boys and girls. He refuses to intervene in the grouping process to avoid conflict, however, he states that "women get involved in the details of something and lose sight of the bigger picture" and boys "stick less with details". By doing nothing, Peter reinforced gender separation in his classroom. In contrast, Laura is a teacher using more traditional approaches in her teaching, often telling students what she wants them to do. In group projects, she intentionally creates mixed-gender groups, with each group having a female leader in it. Laura makes effort to create a classroom environment in which boys and girls share equal workspace, ideas, and resources. Although quarrels happen during the collaboration between girls and boys, Laura doesn't intervene because she believes it is a necessary process to help students to work better as a group. Using this teaching method, Laura indirectly conveys the knowledge to her students that both genders have strengths and shortcomings, and cross-gender collaboration is demanded. It can be concluded from this study that students' development of gender-related self-concept can be largely shaped by teachers' teaching approaches.

4. Teachers' Influence on Students by Implicit Gender-Biased Behavior

4.1 The Impact of Gender Bias on Students' Moral Behavior

Teachers' teaching behavior and classroom management can also affect students' moral behavior. A study found that students' misbehavior has the strongest relationship with their perception of teachers' support [31]. Students and teachers need to build a positive relationship so that there can form an attachment. This attachment is critical in helping students regulate their behavior. Through this attachment, teachers can be psychologically "present" even when they are absent [32]. That is, even when the teachers are not there supervising the class, students can follow rules and learn

automatically because they are aware of the teachers' moral presence. Therefore, teachers who have great emotional bonds with their students can better regulate students' behavior and moral development. Moreover, students who perceived themselves as academically competent will be less likely to conduct misbehaviors [32]. Teachers show their academic support toward their students by helping them learn well and letting them be aware that they are learning well. However, when teachers are preferring one gender in certain classes, the students with another gender will feel ignored and have difficulty feeling supported by their teacher both psychologically and academically. For example, if a teacher focuses on interacting with active male students in math class because he thinks they have higher math skills, girls will easily feel they are the underdogs who are isolated in the class. Without a positive attachment with teachers, girls are more likely to be absent from class and conduct immoral behavior like cheating on tests.

Monitoring students' skills and behaviors is another important aspect of teachers' mission. Monitoring includes observing students' behavior and correcting their inappropriate behaviors. Doyle [33] points out that monitoring student achievement can provide an opportunity for providing constructive criticism, and the teacher's intimate connection to the students can stop disruptive conduct from starting. Teachers with gender stereotypes perceive boys as more piquant and view misbehaving as part of their natural character. During teacher training, the student teachers are told to tolerate boys' misbehavior—"Creating a disturbance is a phase in boys' development" [34]. When teachers ignore boys' breach of discipline, boys are more likely to think that it is fine to misbehave and cause future troubles. When asked about their opinion on students' delinquency, another teacher stated that "calling each other homos or whores – they don't mean anything, they are kind of letting off steam" [34]. This way of tolerating students' misbehavior will send a false message to them about what is considered moral and immoral, which can further lead to school tragedies like bullying.

4.2 The Impact of Gender Bias on Student Academic Performance

Students who are stereotypically favored in a particular domain are found to have a higher self-concept [35]. Primary school boys are found to have a higher self-concept in math than girls even though there is no difference in test scores. Students' self-concepts and teachers' attitudes are two interactive factors that have a large influence on students' academic achievement. How students perceive their math ability has a strong relationship with teachers' efficacy [36]. To elaborate, students' self-perception about their math ability will be higher if teachers use effective approaches to teaching and show a positive attitude toward teaching. In contrast, if low-achieving students are taught by teachers with low mathematics instruction skills, they are more likely to perceive themselves as having poor mathematics abilities. A female low self-concept teacher mentioned in her interview when asking about her satisfaction with her job that "I'm not here to enjoy myself, they are here to learn—not to enjoy either." [14]. If female teachers continue to hold such poor attitudes about teaching mathematics, they will likely be negative role models that lead to the low academic performance of girls in mathematics.

Teachers' gender-related stereotypical thoughts and behaviors are detrimental to students because they affect the development of students' self-concept in particular subjects. For example, Teachers tend to believe math is easier for boys than for equally achieving girls [21], and they will implement their biased thoughts into instruction in their classroom [37]. Teachers might encourage boys to do more challenging work, and do their best to help them finish it. For girls, because the expectations are low, teachers tend to let them stick to easier tasks. In this way, boys get more training and can improve faster than girls.

Besides academic self-concept, teachers' gender-related stereotypes will affect students' academic outcomes. Carlana [38] concludes from her research that math teachers who implicitly associate boys with mathematics hurt girls in their classes. In the classes assigned with teachers who think math is much harder for girls compared to boys, the gender gap in math achievement increased by one-third. Teachers' stereotypes work differently on girls than on boys. Math teachers' negative stereotypes against girls have negative effects on girls and have no effects on boys. However, literature teachers'

stereotypical thoughts favoring girls do not affect both boys and girls [39]. That is, boys are more tolerant of the stereotypes that "boys are bad at literature", and girls are more vulnerable to the stereotypes that "girls are bad at math". Another explanation is that teachers might show more stereotypes in math classes than they show in literature classes [37].

Students' self-confidence also has a strong relationship with teachers' biased thoughts and behaviors. The idea of students' self-confidence starts to develop at an early age and is gradually emphasized by parents' and teachers' biased thoughts after elementary school age [40]. This development of self-confidence is important because it relates strongly to affecting students' academic achievements. Students develop the concept of their study ability according to the information that their teachers are passing on to them. For example, if a teacher believes that girls are gifted in learning science subjects, their thoughts will transfer to students by their behavior and in-class instructions. Girls will then form the idea that they are not good at science subjects, therefore developing a lower self-confidence in their ability in the scientific field [14]. Data from Carlana's [38] research shows that female students are more likely to have critical views on their math performance, and they are 9.2% points less likely than boys to think they are competent in math. The lack of confidence in girls might make them behave in a certain way that is not beneficial to their learning. For example, girls will keep their inquiries in their minds instead of asking teachers in the class to avoid teachers' scorn. Thus, girls' questions might never have a chance to be answered.

There are several ways for teachers to decrease the gender gap in their classrooms. One of the most effective ways is through teacher training. Interviews with primary school teachers show that teachers with high self-concept elicit positive comments about their in-service training, while low self-concept teachers have negative comments about the training [13]. It is unknown whether it is the training about children's development and teaching mythology that has some positive effect on teachers' self-concept to help them form a better understanding of students' gender. Further research is needed. Moreover, girls are perceived to be quieter, and boys to be more active in class [24]. It is helpful for teachers to pay more attention to girls, ask about their concerns and difficulties, and call on more girls to respond in math classes.

5. Conclusion

The purpose of this paper is to explore the influence of primary school teachers' implicit gender-related attitudes on students' development. The findings reveal that teachers' understanding of their self-image affects their teaching methods, expectations of students, and their attitudes toward students. teachers with low self-concepts about gender have poorer teaching skills which can have a negative influence on students' motivation and their development of self-concepts. Moreover, teachers' implicit gender bias can affect their way of classroom management, which will not only have negative influences on students' academic achievement but also on their moral behavior.

One leading course that schools fail to address the issue of the gender gap is the lack of teachers' knowledge of gender. Even though some teachers are aware of the gender problems, they don't seem to have effective strategies to address these undesired gender stereotypes in their teaching since the topic of gender is rarely discussed in their teacher training. Therefore, it is necessary for us to develop programs that increase teachers' gender awareness. In addition, research also indicates that the condition has changed when students are taught by experienced teachers who have strong teaching strategies. Specifically, a master teacher who is patient and gives students personal attention can help to increase their performance in different aspects [13]. This individualized focus can help students increase their self-esteem by helping them feel their importance and value. Pedagogical training including theory framework and observing classes taught by experienced teachers will be helpful. Lastly, gender equality promoted in education will be ineffective if students can see its applicability in their real lives. All departments in society need to build a network that is friendly to all genserss.

The ways to estimate teachers' implicit attitudes are mainly from self-report and observation in this paper. Thus, it will be helpful if quantitative methods can be used to evaluate teachers' attitudes.

Furthermore, the result concludes from this paper only focuses on students and teachers at the primary school level. Since adolescence is a critical period in people's development, further in-depth explorations including observational and longitudinal studies to examine teachers' implicit gender-related attitudes' long-term effects on students' development are needed. Lastly, the ways to include gender education in teachers' training need to be considered.

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