

Becoming Reflective Practitioners: Gender GAP Analysis of Mathematics Student Teachers' Reflective Practices

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ABSTRACT

While reflective thinking practices are thought to be a factor in building bridges between a course of study and personal experience resulting in engaging and personalized learning activities, the present study examined the potential disparities in reflective thinking practices and how they influence preservice mathematics teachers' behavior. Underpinned by a positivist paradigm, the present study employed a quantitative research approach and a survey design. Data was collected from three hundred and fifty-nine mathematics student teachers who were preparing to become mathematics teachers once they had obtained a Bachelor of Education (B.Ed.) degree. Data collected was therefore analyzed through the use of descriptive statistics. Lifelong learning skills, self-assessment, self-belief, teaching awareness, and reflective thinking were all examined using a framework based on five components. Research findings revealed that while reflective thinking practices are often emphasized in teacher education programs, results clearly show that the process of reflective practices is conceptualized differently by female and male participants. Research findings also revealed that constructs such as lifelong learning skills, self-assessment ability, and teaching awareness have a more decisive influence on male participants than their female counterparts. This resulted in male participants having less perception of the usefulness of reflective thinking practices. Based on the findings, it was suggested that various support systems should be developed in mathematics teacher education programs to facilitate more independent and self-directed reflective thinking practices among both female and male mathematics students teachers.

Keywords: Classroom Practices, Gender GAP, Reflective Thinking, Self-Belief, Teacher Education.

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INTRODUCTION

Teachers' development as reflective practitioners is widely acknowledged as vital professional qualities in teacher education worldwide (Aldahmash, Alshmrani, & Almufti, 2017; Ngololo & Kanandjebo, 2021). This is because reflective practice is a technique that can aid in smoothing instructional activities while also improving students' learning and comprehension. Similarly, reflection can improve teacher education programs (Moore, 2004) and enables student teachers to develop the ability to make a well-informed evaluation and proficient decisions regarding their teaching and empowering strategies (Mathew, Mathew, & Peechattu, 2017). Aldahmash, Alshalhoub, and Naji (2021) also add that reflective practice is critical in achieving mathematics education goals and evaluating student teachers' experiences in the classroom. As such, by engaging in continuous and focused reflection, beginning teachers are fortified to cultivate a critical attitude toward their classroom practice (Cavanagh & Prescott, 2010). However, in teacher training programs in developing countries, the nature of reflection and the development of

effective practitioners remains a significant issue.

According to Chapman (2012), reflective practice demands making a conscious effort to learn new things every day and admitting that lifelong learning is one's responsibility. It is also concerned with developing general capabilities and exceptional performance in any given activity by promoting skills and competencies (Sibahi, 2015). Therefore, critically reflecting on one's classroom practice is widely viewed as a vital aspect of any teacher's professional development (Jaworski, 2006), especially for new teachers (Cavanagh & Prescott, 2010). According to Ngololo and Kanandjebo (2021), the degree to which student teachers perform tasks and are able to apply their knowledge and competence to new ones is significantly influenced by the skills and competencies they acquire through training programs. Research, however, shows that student teachers rarely reflect on their methods but prefer to concentrate on technical teaching skills and practical concerns like planning and classroom management rather than listening to and being more aware of the students they teach (Bean & Stevens, 2002; Nyaumwe, 2004; Shoffner, 2008;

LeCornu & Ewing, 2008; Cavanagh & Prescott, 2010). Therefore, to help student teachers improve their classroom practices, assessment approaches, lesson planning, and all other aspects of the teaching and learning process, critical reflection remains a significant practice (Fook, 2010; Aldahmash, Alshmrani, & Almufti, 2017; Ngololo & Kanandjebo, 2021). Thus, it has become a part of professional teacher development to incorporate reflective practice, which is a desirable teaching activity (Zembylas, 2014).

Despite the prospect of reflective thinking practices in teacher education programs, researchers have criticized reflective practices as sterile and impassive, as well as a method for a professional concession that confirms present ideas rather than challenging preconceptions (Fendler, 2003; Fook, 2010; Choy, Dinham, Yim, & Williams, 2021). Similarly, reflective practices within approved frameworks, according to Myers, Smith, and Tesar (2017), are inherently problematic because they might result in standardization rather than innovative and critical teaching methods. It is further argued that reflective practices envisioned to generate pertinent, operative, and

responsive insights for enhancing the quality of teaching can have complex effects (Fendler, 2003). While much has been written on reflective practices, their benefits, and shortcomings, few, if any, research has examined the impact of cultural backgrounds on such practices, especially within the mathematics teacher education programs. Hence, the need for the present study.

AIM OF THE STUDY

It's vital to remember that teachers' previous experiences and interpretations of their practices and the teacher education programme they participate in are one of the most important factors in explaining why they do what they do. As such, the paper's main aim is to fill a knowledge vacuum regarding the differences in the application of reflective thought among female and male mathematics student teachers at a South African institution. Choy, Yim and Tan (2017)'s established model for reflective thinking practices that includes five constructs was employed to achieve this aim. This construct comprises "lifelong learning skills, self-assessment ability, self-belief, teaching awareness, and reflective thinking" (Choy, Yim, & Tan, 2017; p.5). As such, the researcher believes that the findings

of this study will provide insight into potential disparities in reflective thinking practices and how they influence preservice mathematics teachers' behavior.

METHODS

A positivist paradigm underpins this study. A positivist paradigm was found relevant because it is a philosophical position that emphasizes the necessity of observation to advance knowledge. Hence, it regards the measurement of phenomena as crucial to promoting understanding (Fox, 2008). A quantitative research approach was employed for the present study because it focuses on obtaining numerical data and evaluating it using mathematical methods, particularly statistics, to understand a phenomenon under investigation (Apuke, 2017). For this study, survey research was found suitable, given that it is a quantitative approach in which the researcher asks a planned set of questions to a whole group, or sample, of people. According to Blackstone (2018), when a researcher wants to characterize or explain the characteristics of a big group or groups, survey research is beneficial.

At the institution, a request to participate in the research was sent electronically through the use of student

emails at the beginning of the first semester of the 2021/22 academic session to approximately 6500 students in the faculty of education across the three campuses of the university. The participants were thereafter screened by area of specialization (mathematics education) given that the researchers were only interested in student teachers who were preparing to become mathematics teachers once they had obtained a Bachelor of Education (B.Ed.) degree. A stratified sampling technique was employed for the study because it enables the researchers to obtain a sample population that best represents the entire population being studied thereby making sure that each subgroup of interest is represented (Cohen, Manion, & Morrison, 2018). The researchers derived a minimum sample size estimate of 363 based on a normal approximation to the binomial distribution with a finite population correction applied using a 95% confidence level and margin error of 5%. The questionnaire was thereafter administered electronically via students' email to the 363 participants in which 4 responses were excluded based on incomplete information, voluntary withdrawal, and failure to return the questionnaires, making it a total of 359 participants.

All the participants in the study were student teachers who were preparing to become mathematics teachers once they had obtained a Bachelor of Education (B.Ed.) degree. In the selected university, pre-

service teachers usually keep a reflective journal during their school experiences, given that this is a compulsory module that all students must pass. For ethical purposes, participants were told that they could withdraw from the study at any moment and that the information they gave would be kept

anonymous and confidential. Similarly, pseudonyms were used to represent research participants and the research site. As such, the sample for the study consisted of 359 mathematics student teachers - as shown in table 1 below.

Table 1: Profile of the study participants

Demographic Factors	Frequency	Percent (%)
Gender		
• Female	212	59,1%
• Male	147	40,9%
Year/Level of Study		
• 1 st Year	71	19,8%
• 2 nd Year	103	28,7%
• 3 rd Year	96	26,7%
• 4 th Year	89	24,8%
Teaching Practice experiences?		
• Yes	288	80,2%
• No	71	19,8%

Note: University A, $n = 359$

INSTRUMENT

The scale items for the study were from Choy, Yim, and Tan's (2017) Reflective Thinking Practices for Teachers Questionnaire (RTTQ). The questionnaire has twenty-eight (28) items in which sixteen (16) items were used to test the present study's construct: "life-long learning skills" (4 items), "self-assessment ability" (4 items), "self-belief" (4 items), and "teaching awareness" (4 items) (p.5). The RTTQ was modified for mathematics student teachers in a South African university to be able to grasp the items. The RTTQ

consisted of two parts: items related to demographic information and those related to reflective thinking practices. The questionnaire was subjected to validation by three mathematics education experts for content appropriateness in which feedback was incorporated. To ensure language appropriateness, the questionnaire was subjected to a pilot study on 188 participants, and the feedback was also incorporated. The questionnaire was thereafter administered to the sampled participants, and descriptive statistical analysis (measures of frequencies) was

conducted on the responses that has adequately been completed and returned. A descriptive data analysis was found suitable for this study because it provides a broader picture of the phenomenon under investigation.

RESULTS AND DISCUSSION

To investigate the disparities in reflective thinking practice among female and male mathematics student teachers at a South African institution, the contribution of the social construct, which includes “lifelong learning skills, self-assessment ability, self-belief, and teaching awareness”, was examined and presented below.

IMPACT OF LIFELONG-LEARNING SKILLS ON REFLECTIVE THINKING PRACTICES

Participants' responses on the impact of lifelong learning skills on mathematics student teachers' reflective practices are shown below. Figure 1 below shows that 36 percent of female

participants and 33 percent of male participants saw the need to look into new strategies to deliver their lessons better so that they can remain relevant now and in the future. Findings further revealed that when mathematics student teachers are faced with mistakes, only 25 percent of female participants and 12 percent of male participants try to make corrections and learn from their experiences to move forward. In terms of reflection on what participants must do during the lesson to enrich their teaching strategies, only 22 percent of the female participants and 41 percent of male participants highlighted that they get inspired by other colleagues to incorporate their current strategy with a new and more effective one. In addition, 17 percent of female participants and 14 percent of male participants emphasized that they know their strengths and weakness. As such, they constantly practice to be more effective in their lesson.



Figure 1: Impact of lifelong learning skills on reflective thinking practices

Based on the above findings, lifelong learning skills, which refers to the inner pursuit of knowledge for professional or personal objectives, were momentous among female mathematics preservice teachers but not for their male counterparts. From figure 1 above, it is quite evident that male mathematics student teachers were not so willing to exert lifelong learning skills capable of promoting reflective thinking practices. An example of such area was the need for corrections when mistakes are made and the need to constantly look at their practices to be more effective with their lessons. However, the highest loading factor for male participants was on their reflection of lessons to enrich teaching strategies which are sometimes inspired by talking to their colleagues from another field. This finding suggests that reflective thinking as an internalized and self-motivated process is rare among male participants. This might be

because male mathematics student teachers have less perception of the usefulness of reflective practices. This finding corroborates that of Kano, Ayana, and Chali (2017) who argue that a lowered view of the value of reflective teaching, a lack of prior experience, the inadequacy of free expression, and a lack of time for reflection are contributing factors that inhibit reflective practices. Hence, Boud (1999) posited that in order for reflection on teaching and learning to be effective, it must be methodical through participation in professional conversations with other colleagues that spark inquiry and experimentation for lifelong learning.

IMPACT OF SELF-ASSESSMENT ABILITY (SA) ON REFLECTIVE THINKING

To examine the influence of mathematics student teachers' self-

assessment ability on their reflective thinking practices, figure 2 below shows that female and male participants constantly reflect on their practices for further improvement. As such, findings revealed that 6 percent of female participants and 12 percent of male participants felt there was a need to think about what they had done during their lesson to further improve on it. Similarly, 12 percent of female and 14 percent of male participants were interested in self-discovery to apply their knowledge on how they teach and become better

teachers. Findings also revealed that the majority of the female mathematics student teachers believed strongly that students' feedback is vital for critical reflection. As such, 38 percent of the female mathematics students' teachers held this belief to self-assess themselves, while only 33 percent of the male participants were of a similar view. Lastly, 41 percent of the male participants, as opposed to 44 percent of female participants, believe that learning from the feedback they get is a way of self-assessment that helps them reflect on their practices.

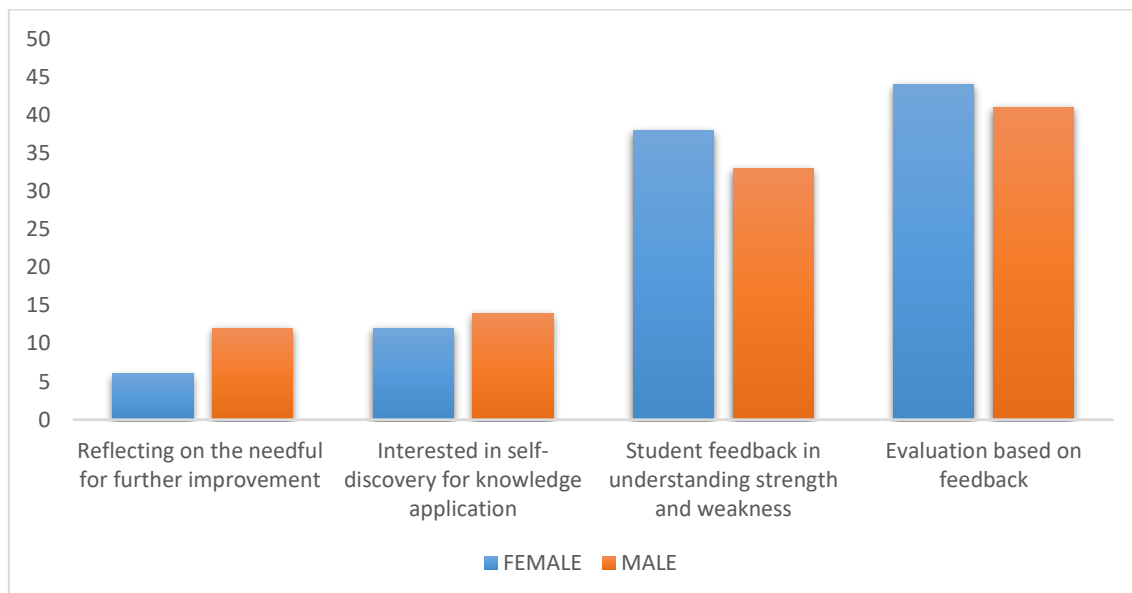


Figure 2: Impact of self-assessment ability on reflective thinking

Based on the above responses, self-assessment, which is often referred to as a practice of analyzing an experience to foster self-reflection, had little or no impact on reflective thinking practices amongst both female and male participants. While most participants are familiar with the assessment process, overall responses revealed that both

female and male participants were more familiar with an assessment process where student feedback is vital towards understanding their strengths and weaknesses. The study participants were also familiar with an assessment process where supervisors are a source of feedback. This finding thus corroborates that of Snead

and Freiberg (2017), who argue that even though teacher education programs include self-reflection strategies, the focus is usually on external validations/explanations. From the above findings, it is evident that both male and female participants saw no need for reflecting on the needful for further improvement, and neither were they interested in self-discovery for knowledge application. Civitillo, Juang, Badra, and Schachner (2019) warn that teachers should encourage self-assessment. This is because teachers who do not are less likely to reflect on their teaching approaches and may be unable to support a school vision that encourages cultural values, responsiveness, and value cultural diversity.

IMPACT OF SELF-BELIEF ON REFLECTIVE THINKING

This section presents findings on the influence of mathematics student teachers' self-beliefs on their reflective practices. Figure 3 below revealed that 22 percent and 17 percent of female and male participants, respectively, believe in the need to take care of their own needs before they can take care of others. Findings also revealed that 26 percent of female participants and 24 percent of male participants believe in the need to look for areas of connectivity between what and how they teach in relation to their life experiences. While only 11 percent of females felt that their mistakes in class might influence students' lives, 21 percent of male participants held a similar view. In addition, 41 percent of the female participants and 38 percent of male participants believe in student feedback as a means for critical evaluation of reflective thinking practices.

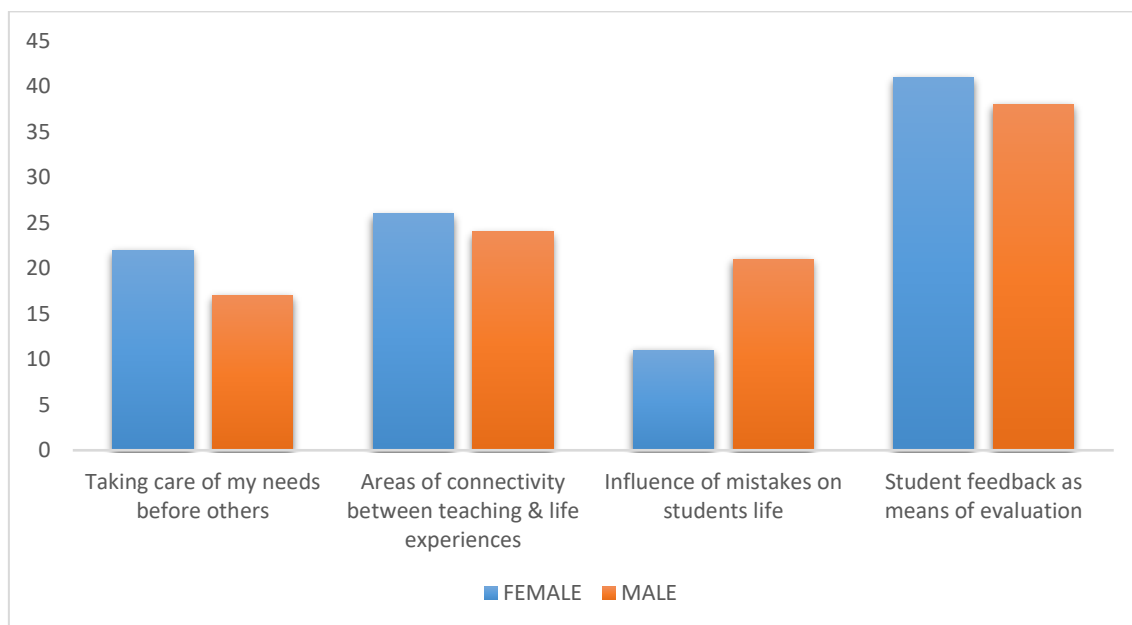


Figure 3: Impact of self-belief on reflective thinking

From figure 3 above, self-belief, referred to as the personal view of a teacher's teaching ability, which can inspire and promote teaching skill improvement, had a substantial impact on female and male mathematics students' reflective thinking practices amongst female participants. This suggests that female participants with higher levels of self-belief might refrain from engaging in reflective activities because they don't see the need to alter or enhance their teaching methods. This finding resonates with the views of Markus and Kitayama (1991), who argue that in an interdependent society that emphasizes personal responsibility to make meaningful contributions to their social group, having a strong sense of self-worth can be seen as an accomplishment incentive. One could therefore conclude that female mathematics student teachers hardly engage in reflective thinking practices as opposed to their male counterparts. This finding also corroborates that of other studies, such as Lee (2005) and Choy et al. (2021), who found out that in an independent environment, it is only when

there is a need to evaluate a situation that most teachers will reflect on their practices.

IMPACT OF TEACHING AWARENESS ON REFLECTIVE THINKING

To investigate the impact of teaching awareness on the reflective thinking practices of mathematics student teachers, 17 percent of females and 13 percent of males believe that they think about what they teach their students in terms of their area of discipline to enhance their lesson. Thus, while 26 percent of the female participants are aware that the feedback they get from their students and supervisor will help them improve on their practices, only 5 percent of the male participant shared a similar sentiment. In addition, 23 percent of female and 34 percent of the male participants were aware that their belief thus influences their behavior towards themselves and others. Lastly, 34 percent of the female participants and 48 percent of the male participants were aware that their belief about themselves and others would ultimately control their behavior.

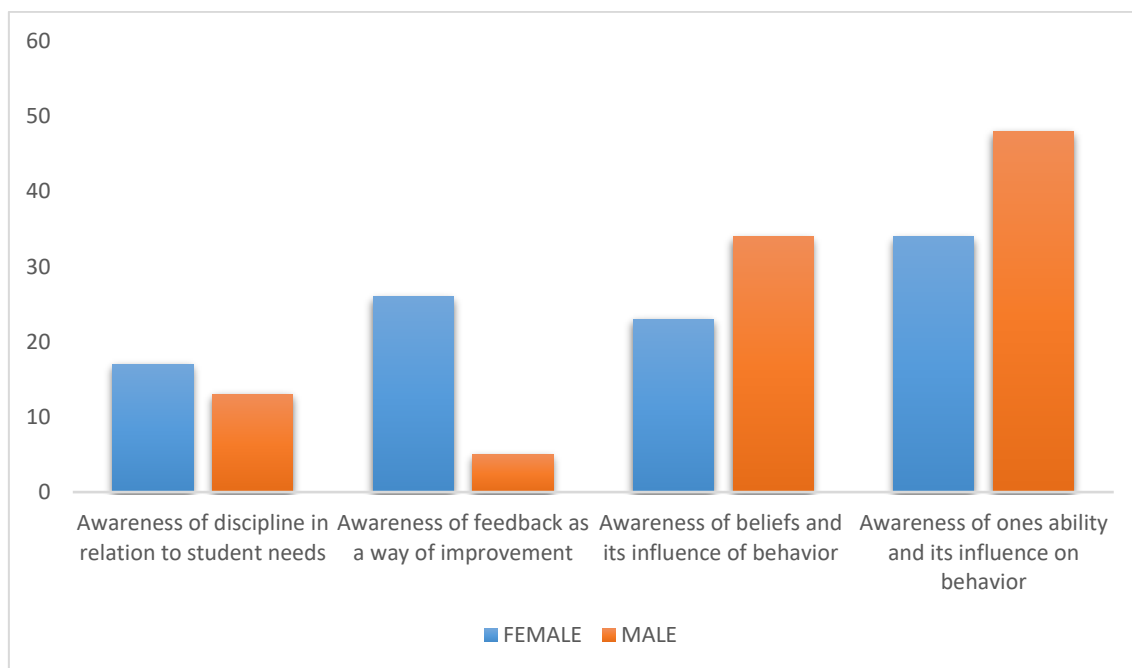


Figure 4: Impact of teaching awareness on reflective thinking

From the above findings, teaching awareness, which is the ability to recognize the impact of one's actions on others and encourage one's student to review and evaluate themselves, is more significant among female mathematics student teachers than their male counterparts. While the highest factor loading in the teaching awareness for female participants is about their awareness of feedback to improve their practice, for male participants, it is about knowing their abilities and beliefs about themselves and others as a factor capable of controlling their behavior. This finding confirms that most male mathematics student teachers are more worried about the impact of their activities on students. In addition, awareness in the area of discipline in relation to student needs and feedback as a way of improvement is less among male

participants, implying that dynamic and situational thinking amongst male participants may be undervalued. This appears to be consistent with the findings of Hollingsworth and Clarke (2017), who found that the capacity of teachers to critically analyze their teaching practice is correlated with their capacity for self-reflection.

CONCLUSION

Although teacher education programs frequently stress reflective thinking, the findings show that female mathematics student teachers have different conceptualizations of reflective thinking practices. As a result, the findings of the current study were intriguing. Although research findings showed that three out of the four constructs such as lifelong learning

skills, self-assessment ability, and teaching awareness strongly influence male mathematics student teachers' reflective thinking practices, only self-belief was found to influence reflective thinking practices of female participants negatively. These findings suggest that various support systems should be developed in mathematics teacher education programs to facilitate more independent and self-directed reflective thinking practices among female and male mathematics students' teachers.

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