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Socio-Cultural Foundations in Teacher Education: Fostering Egalitarianism Among Preservice Teachers in The Mathematics Classroom

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Abstract: The study investigates the impact of a new teacher education curriculum emphasizing cross-cutting approaches for equal and inclusive mathematics teaching. Following from this, this study aims to assess the impact preservice teachers said the programme had on their practices. Employing a qualitative approach, this case study involved interviews with five preservice teachers. The investigation focused on understanding how the curriculum assisted them in addressing egalitarianism in mathematics education. Findings indicated that preservice teachers gained insights into equity-oriented mathematics teaching, emphasizing equal accessibility. They encountered challenges and opportunities associated with inclusive mathematics instruction, navigating complex situations to ensure equal student achievement. The results also underscored their enhanced understanding of equality in mathematics education. The study draws conclusive insights from the results, emphasizing the importance of teacher education programmes in shaping preservice teachers' perspectives on egalitarian practices in the mathematics classroom. Implications: The research suggested that fostering egalitarianism in mathematics education necessitates active involvement from teacher educators. They should play a pivotal role in guiding preservice teachers to enact egalitarian practices during their practicum experiences.

Keywords: Egalitarianism, Teacher Education Curriculum, Pre-Service Teachers, Challenges, Socio-Cultural Perspectives.

1. INTRODUCTION

The quest for a fulfilling teacher education (TE) curriculum in teacher preparations to deliver quality teaching and by implication, quality mathematics teaching at the basic schools, has been unrelenting since the dawn of Ghana's independence. This quest is established in the fact that the quality of the student's learning outcomes is influenced by the quality of the teachers' input (Wilmot, 2009; Hill et al, 2005) and therefore there was a need to act fast. With that desire, the basic teacher education institutions have undergone several transformations over a span of 60 years and have increased in numbers from one to 41 colleges as of 2014 (Mereku, 2019). This has also led to increased teacher intake even though the numbers churned out, continue to be inadequate. However, concerns have been raised about the quality of the products from these teacher-training colleges. The concerns include the generic and subject-specific competencies required by basic school teachers and the capacities of these institutions to meet the increasing demand for basic school teachers (Mereku, 2019).

Further, "low investment in teacher education, allowing for non-professional graduates to teach, poor living and working conditions are deterrent to teachers from accepting posting to rural and deprived areas" (Annan, 2020). Invariably, the consequences are poor quality in education delivery at the basic schools that could be attributable to inadequate professional development training and motivation packages for teachers. To forestall these challenges, Mereku (2019) suggested upgrading the teacher training institutions to tertiary status, admitting more qualified candidates, and abolishing



the boarding system. As though to deliver on the request of Mereku, policy considerations have led to the establishment of an additional seven colleges and the upgrading of the 48 colleges to the tertiary level by the beginning of 2018 with the initial intake of 4-year degree students (Buabeng et al, 2020) without removing the boarding system though. The aim was to raise the quality of teacher education through a transformed teacher education curriculum at the basic school level.

The government at the time was determined to cause a total transformation of the teacher education system and therefore sought a partnership through the Ministry of Education, Ghana, with Transforming Teacher Education and Learning (T-TEL), a UKaid organization. The planned programme is to train teachers according to a set standard, hence the institution of the National Teacher Education Curriculum Framework (NTECF) and the National Teachers' Standard for Ghana (NTS) guidelines. The NTECF set out the framework within which the curriculum of the colleges is to be adhered to strictly. The four pillars of the framework are subject and curriculum knowledge – these are several courses covering the subject taught in the basic schools; Literacy studies (Ghanaian languages and English) – language proficiency and communication components; pedagogic knowledge – methodology courses to equip prospective teachers with instructional skills to be able to handle various topics in the basic school curriculum and at a grade for which they are being prepared to teach; and supported teaching in school – i.e. peer teaching under the tutelage of their college tutors (Frykholm, 1998) and practicum (mentorship outside the college). When all these are done, they will be accredited through the National Teaching Council (Annan, 2020) to complete the programme for teacher preparation for the basic schools.

Since socio-cultural and ethnological foundations in mathematics presume the understanding that mathematical knowledge emanates from the social context of the culture within which it is being practiced (Rosa & Orey, 2013), egalitarianism suggests that all Ghana children should have equal access to the benefits of learning mathematics irrespective of their circumstances (Afolayan, 2015). Hence, the NTS set out “cross-cutting issues” that every initial teacher must master and be seen to exhibit as part of professional values and attitudes during mathematics lesson delivery. The TE curriculum is fashioned in a form so that preservice teachers will have in-depth knowledge of the basic school's mathematics curriculum so that they can very well deliver on the 4Rs of the core and transferable skills. In that process, learning to read will not be ‘divorced from meaning’ while mathematical activities will be ‘linked to learning concepts’ (Akyeampong et al, 2013); in so doing, the egalitarian perspective will be achieved in the mathematics classroom where children's learning will take centre stage.

The current socio-cultural and ethnological composition of Ghana can be likened to the strands woven of a piece of “kente” which has become no one particular group's preserve but is found all over the countryside (Afeadie, 2013). “Kente” is a locally manufactured cultural cloth with multi coloured strands woven together. The mathematics found in it is so broad in content and depth. However, hardly do the trainers of the basic school teacher preparation programmes find the use of it as an ethnomathematical tool to bridge the gap between school mathematics and the home experiences. The effect is that those trained to teach the mathematics cannot effectively incorporate it into teaching it and hence students who cannot resolve these discrepancies sometimes fail to cope with ‘strange’ school mathematics and are often labeled as failures (Davis, 2013) and may eventually fall off since their teachers find it difficult to design locally compatible examples for them (Fauzi et al, 2022). According to Owusu and Addo (2023), social injustice would have been committed against such children through whose no fault the learning has failed to take place. The reformed TE curriculum incorporates explicit language or words to accommodate all manners of learners to demonstrate an egalitarian perspective in the execution of the curriculum.

Having gone through the college programme, preservice teachers are expected to have had extensive experience with the new TE curriculum so as to be able to execute it, at least to a very large extent. Both the college and the basic school mathematics curricula emphasis the relevance of using local knowledge and artistic games that can be utilized to augment teacher pedagogy, synergizing ethnological teaching approaches with inventive strategies into their teaching plans. In so doing, they will be creating new knowledge critical for ethnomathematics (Owusu & Addo, 2023).

Ghana is replete with different and diverse cultural activities and games that can promote the teaching and learning of mathematics at the critical stages of children's schooling (Akayure & Ali,

2016). Even though, according to Davis (2013), many tutors in the colleges hardly promote the practice of ethnomathematics, the current dispensation suggests that they were obliged to teach it to their preservice mathematics teachers since the basic school curriculum they were going to execute would possess such ample local examples. Failure to use local funds for knowledge of the learners will amount to social injustice to the students (Owusu & Addo, 2023). On that note, the study, therefore, seeks to find out how preservice teachers perceived themselves to have addressed the issues of egalitarianism in the teaching and learning of mathematics in the classroom.

The purpose of the study is to explore how the reformed teacher education curriculum impacts the mathematics preservice teachers to promote egalitarianism in the mathematics classroom. The research questions guiding the study are as follows:

- a. How has the reform of the TE curriculum influenced the mathematics preservice teachers' prospects in their lesson delivery for egalitarianism?
- b. What challenges do mathematics preservice teachers encountered in their lesson delivery?

2. LITERATURE REVIEW

2.1. *Disregard for Sociocultural Equality in Mathematics Education*

Issues of equality in mathematics education are not gone yet. From the classroom to the research field, it has become problematic to overlook pertinent social and cultural factors in current mathematics education reforms (Lubienski, 2002). This concern has necessitated the current research because although reforms have been driven by good intentions and existing research, they sometimes fall short in providing comprehensive guidance to effectively address the intricate challenges of equality in today's mathematics classrooms. There has always been the need to conduct research from a socio-cultural perspective to emphasize the exploration of how students from under-represented communities may encounter difficulties when exposed to specific instructional approaches.

Aside from that, for a long while, most developing countries continue to import foreign mathematics curricula and by implication the dominant order (Francois & Van Kerkhove, 2010, p. 147) into their learning. To offset the negative consequences of this order, researchers are waking up to the realization of socio-cultural and ethnological foundational significance in teaching and learning mathematics in a way that will be meaningful and developmentally oriented toward societal peculiar needs. This is very important, because, according to Ashcroft et al. (2013), mathematics can be seen as a form of colonial discourse that impose a universal and rational order on the world. But mathematics can be used as a tool of resistance and empowerment by post-colonial subjects to challenge the dominant modes of knowledge and representations. Hence, the need for new teacher preparation programmes to orient preservice teachers.

2.2. *The Essence of Culturally Responsive Teaching of Mathematics in Schools*

It is in light of this that Stevenson & Markowitz (2019) argue that preservice teachers need to be schooled in the issues of social-emotional learning (SEL) and culturally responsive and sustaining practices (CRSP), to carry through with this as part of the TE education programmes. According to them, SEL and CRSP are essential for helping all students succeed, but in this case, most crucially for preservice teachers. SEL is "the process of developing self-awareness, self-management, social awareness, relationship skills, and responsible decision-making skills that are essential for school success. CRSP on the other hand is "an approach to teaching that is grounded in an understanding of the cultural backgrounds and experiences of students, and that uses this understanding to create a more inclusive learning environment. When preservice teachers are tutored in these skills, SEL can help them assist students to develop the skills they need to manage their emotions and make responsible decisions while CRSP helps them to develop a sense of belonging and learn how to navigate a diverse world. Teaching mathematics self-awareness activities such as mindfulness exercises or journaling to students can help them to be conscious of how to learn mathematics. Most critical in this case is using the strategies of CRSP to create a more inclusive classroom, such as learning to

use culturally relevant materials, and using examples from within the society will be involving for the learners. This way, all students are helped to succeed to attain egalitarian purpose.

2.3. Importance of Cultural Diversity, Equality and Language in Teaching Mathematics

Mathematics understanding is driven by language in all its forms: speaking, listening, reading, and writing, which are also cultural concerns. Therefore, to make this reform work better than before, the NTS guideline demands that preservice teachers must be able to “use at least one Ghanaian language as a medium of instruction” (p. 14) to the benefit of every child. This is also explicitly stated in the NTECF (Pillar 2). Using a local language (L1) in the mathematics delivery process will not only pull the class along but will make the learners part-owners of the knowledge generated. Again, this helps bring some level of diversity into the mathematics classroom. According to Mahalingappa et al. (2022), exposing preservice teachers to critical language awareness in classroom discourse helps them to appreciate cultural diversity and this most likely motivates them to even learn the English language (L2) for that matter other languages. This is because it provides opportunities for preservice teachers for reflection and dialogue.

Holding an egalitarian perspective on ethnological and socio-cultural considerations of mathematics preservice teacher preparedness is to assume that equality is measured at the end of the learning process. But students starting points can be dissimilar in such a way that strictly equal deals will prove insufficient to achieve equality (Francois & Van Kerkhove, 2010). This implies that a meritocratic approach – which measures equality at the start of the process – cannot fully guarantee equal chances. Egalitarian approaches, therefore, should start from a certain pedagogic optimism, considering the diversity of the learners in order to give them the greatest chance of equality. It is therefore expected that the preservice teachers could see through this in their lesson delivery and offer the needful assistance to those who needed it most thereby increasing their marginal learning outcomes.

To successfully navigate this path of egalitarianism through culturally responsive mathematics teaching, “it is teachers’ understanding of various cultures as opposed to their understanding of the mathematics content that makes multicultural education a possibility and this could be intimidating” (Naresh, 2015). And how this is turned out can be seen in the fact that most preservice teachers do operate in their locality. It is very important the new reform has incorporated issues of equal inclusivity in initial teacher preparations. Because without it “local knowledge systems are in grave danger of being superseded by an imperialistic monocultural school mathematics system” which can help “multiple mathematical worldviews to co-exist” (Luitel & Taylor, 2007) in a symbiotic manner to enrich one another.

2.4. Theoretical Framework

Mathematics education is evolving beyond individual mental activities to embrace cultural engagements, challenging traditional constructivist notions (Lerman, 1998). Lerman’s socio-cultural study emphasizes the importance of socio-cultural and ethnological perspectives, revealing the gap between formal and informal mathematical knowledge. This exploration incorporates the zone of proximal development, scaffolding, mediation, and the impact of technology, proposing activity theory as a unitary framework for understanding human activity within a cultural context.

Building on Vygotsky’s socio-cultural theory, Whipp et al. (2005) highlight the diverse needs within the zone of proximal development (ZDP), necessitating varied support systems for preservice teachers’ preparedness and students’ learning. The study aims to uncover how preservice teachers adapt to diverse learning needs of students, recognizing the influence of knowledge, experience, culture, and technology through the new teacher education programme. Cultural and social factors play a pivotal role in shaping preservice teachers’ prospects and practices in promoting egalitarianism in mathematics education. According to a study by Paetsch et al. (2023), these factors significantly influence academic achievement in culturally diverse settings by impacting how teachers address linguistic and cultural diversity in classrooms. Arrington-English (2020) emphasizes that being open to cultural and social class differences is crucial for fostering awareness among preservice teachers,

leading to changes in classroom practices driven by the need for equity. Social interaction emerges as a pivotal component in mathematics learning, echoing Steele's (2001) insights. Engaging in discussions allows students to share ideas, receive feedback, and enhance problem-solving skills.

Within the socio-cultural context, ethnomathematics is employed to explain classroom engagements. Rosa and Orey's (2013) theory assert that mathematics is culturally bound, rejecting a universal approach. This underscores the significance of culturally responsive pedagogy and ethnomathematics in making mathematics relevant and meaningful to students. The reformed teacher education programme aligns with this direction, integrating socio-cultural perspectives into mathematics teaching.

2.5. The Conceptual Framework

The theoretical framework is intricately woven into the conceptual framework through the dynamic interplay of the reformed TE curriculum, the mode of delivery, and the active engagement of preservice teachers. This intricate interconnection culminates in shaping the prospective outcome of preservice teachers' commitment to egalitarian principles. Envisaged within this framework is the implementation of the reformed TE curriculum within educational institutions. This strategic move aims to revolutionize the experiences of preservice teachers, differentiating their instructional approach from the current classroom norms. The transformation encompasses both the preservice teachers themselves and the methodologies employed in their instruction.

This metamorphosed preservice teacher, along with the adapted delivery mode, is conjoined in a synergistic alliance exemplified by a commitment to ethnomathematics and egalitarian values (refer to Figure 1). This holistic integration emphasizes the alignment of theoretical perspectives with practical implementations, fostering an educational environment rooted in cultural mathematics and a commitment to egalitarian principles.

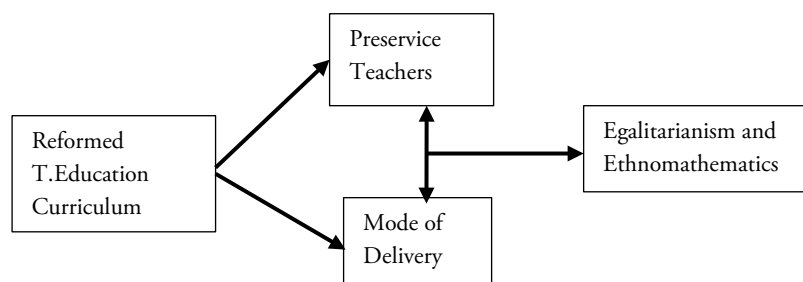


Figure 1. Conceptual Framework

3. Research Method and Materials

3.1. Research Paradigm

The research paradigm adopted here was interpretive descriptive research. The philosophy underpinning this choice is that the behaviour of individuals in a cultural and social setting is unpredictable because their observed characteristics cannot be controlled and “knowledge and facts are relative and subjective” (Melnikovas, 2018; Abdelhakim & Badr, 2021).

3.2. Research Approach and Design

The Qualitative inductive approach was used for the study and the data form was words, sounds, and sights. The design for the study was an explorative case study of preservice teachers from a selected community.

3.3. Population

The population of the study was all sixteen preservice teachers doing their national service at Akropong-Akuapem, Eastern Region, Ghana, and yet to write their licensure exams. They were considered for this study because they have had a full experience of the new reform teacher education curriculum, being the first batch, and also, they have a substantial encounter with the new Ghana Education Service (GES) mathematics curriculum as well. These curricula were crafted with the belief that the approach to teaching would be inquiry-based using adapted teaching and learning materials as far as possible. There are seven Junior High Schools in the Akropong-Akuapem township with four of them having double streams of classes.

3.4. Sample and Sampling Techniques

The sample size consisted of five participants, who were trained as mathematics majors and science or ICT majors with minors in mathematics and were teaching mathematics during their internship (National Service). The sample size reflected the qualitative approach being used and hence a large volume of data was collected. The sampling technique used was snowballing and willingness to participate fully in the study. The participants are referred to as A1, and A5 as pseudonyms.

3.5. Data Collection Procedures and Instrument

A letter of intent and purpose was sent to the various headmasters under whom these preservice teachers served, who then gave their consent and avail the teachers for the exercise. A meeting was scheduled with the participating preservice teachers for interviews which were conducted and lasted between 16 and 23 minutes. The instrument for data collection was a semi-structured interview schedule.

3.6. Data Analysis

The interviews underwent the process of data coding and theme emergence, employing rigorous methodological steps. Initially, audio recordings were transcribed utilizing sophisticated transcription software, namely Descript and Notta.ai. This initial phase ensured a textual representation of the interview content. To increase the reliability of the transcriptions, each interview underwent multiple playbacks, scrutinizing the accuracy of the textual renditions. Instances of omissions or inaccuracies were meticulously addressed through manual corrections, ensuring a faithful reflection of the intended words. Subsequently, the transcribed interviews underwent a review, involving a minimum of four readings. During this phase, a systematic colour-coding approach was applied to highlight and categorize recurrent themes emerging from the dataset. This method facilitated a visual representation of the thematic patterns inherent in the interviews. The final stage of analysis encompassed the application of a thematic tool, specifically drawing from the methodology outlined by Leedy and Ormrod (2016). This systematic approach provided a structured framework for the identification, organization, and interpretation of the identified themes within the dataset. This comprehensive process of data coding and thematic emergence adheres to robust qualitative research standards, ensuring a nuanced and in-depth analysis of the interview data.

3.7. Trustworthiness

To ensure the credibility of the data set and its analysis, critical questions were asked to exhaust all possible avenues that sounded questionable. This was done by taking information from the appropriate source – the preservice teachers trained to teach mathematics and the tool for analyzing data. Expert advice was sought to further ensure that the data was reliable, valid, and accurate.

Furthermore, steps were taken to represent the views of the participants adequately so that others from this field could confirm the findings. In order to enhance the transferability of the study and enable others to relate the findings to their context, rigorous measures were taken to ensure the trustworthiness and authenticity of the data collected by collecting data to reach the saturation point

where it becomes comprehensive and thorough, leaving no space for doubt with regard to credibility (Kivunja & Kuyini, 2017; Elo & Kyngas, 2008).

4. RESULTS AND DISCUSSION

4.1. *The Impact of the Reform of the Teacher Education Curriculum on Mathematics Preservice Teachers' Understanding of Mathematics Teaching*

Having gone through the curriculum experiences at the colleges, the participants expressed their views on how their mathematics teaching was transformed "... I've noticed that without content knowledge, you would find yourself fumbling in the class. So, the teacher curriculum, that is, the course we did at college really informed my content knowledge and pedagogical skill" (A3). Moreso, "...we're trained on how to select different teaching methodologies for a particular lesson. So that one, I can say, through that experience, I know how to select my methodologies that can suit my learners for a certain lesson" (A5). It was critical to know how these preservice teachers understood the teaching methodological shift towards the learner-centred approach of teaching and interactive ways of teaching mathematics. "Now I take my time. It's like lessons are prepared in a child-centred way...." (A3). "...when I went to college, I got to know.... how you have to make it easy for the students to understand and how you start from their understanding before you reach where you want to go" (A2). This realisation was important to draw the preservice teachers' attention to teaching mathematics to help students develop a deeper understanding of mathematical concepts and to become more proficient at solving mathematical problems (Steele, 2001). It further revealed that the preservice teachers were embracing the role of being proactive, well-prepared, and knowledgeable about their content and pedagogical skills to teach mathematics in the manner envisaged by Stevenson and Markowitz (2019) and as stipulated in NaCCA (2019).

The Challenges and Opportunities of Teaching Mathematics in New Ways.

In spite of the difficulties being faced by these preservice teachers, they still saw opportunities to use different teaching strategies to engage students. One of the "... challenges will do with..... availability of resources because in college, we were trained to teach from concrete to the unknown. Yes. So, the availability of TLMs has quite been a challenge for me over here, especially in teaching mathematics" (A3), "...but the main ones are one, the time factor, the time allocated for mathematics lessons. Mathematics is a subject which is based on practical aspects, ..." (A5). Nevertheless, some of the participants have to deal with students' anxiety about mathematics since "... some of them fear mathematics" (A1). Meanwhile, these preservice teachers have to deal with the challenges related to individual differences among the students just as "I always schedule time for those who are slow learners so that they also catch up with those who are fast learners, irrespective of their backgrounds and others. I give them equal opportunities" (A5). And striving to achieve equality in their instructional practices "The objective and standard is for each and every child to get and do well in mathematics. ... lesson plans are always designed to suit every gender. like I said, the girl child, it's like they have this fear of doing math. So, mostly I involve them more" (A3). "My perception is that since the learners, ... all come from different backgrounds, they all have different learning needs, so they may not be equal. Somebody may understand the thing faster. Others too, may be below or average. So, I need to prepare the lesson to suit all of them equally" (A4) resonated well in the theory of Vygotsky as captured by Whipp et al., (2005). To promote egalitarianism in the mathematics classroom, it was important that these preservice teachers met each student at their zone of proximal development to bring the best out of them. This was critical to the learners' growth as participants' actions were aligned with Francois and Van Kerkhove's (2010) argument that egalitarianism can best be measured at the end when every child is given the opportunity and not the beginning. These actions of the preservice teachers demonstrated how the TE curriculum has impacted them and their teaching practices. It is with the hope that they will not sublime in the thick of the affairs of the real world.

4.2. Navigating Challenging Situations

The preservice teachers expressed their commitment and practical efforts in navigating the challenges that hindered the promotion of egalitarianism in mathematics classrooms by being aware of their biases. "...Especially when you kind of call one sex continuously..... calling the girls continuously than the boys. The boys will start saying you are being biased, by shifting your attention to the girls" (A3). Thus, "I try to be aware of my own biases, and I try to make sure that I treat all of my students equally" (A3). This necessitated the need that "I try to build relationships with my students so that they feel comfortable coming to me for help" (A4) and also to avoid this seemingly biasedness.

Instructional strategies employed in promoting equity in mathematics classrooms seemed to largely work for them since "I decided to use the grouping method so that everybody can have access to the facts that I've given to them. But I realized that the grouping did not suit some people" (A4). So, it became important "...we do girl-boy kind of answering questions or a quiz So, one boy will answer.... the next question will be a girl.... Yes" (A3). In situations where the dominant voices were likely to overcome the minority voice, "I give them a series of questionsa series of challenging questions to keep them busy so that I can concentrate on those who are not understanding the concept" (A1). "Yes, there was a time I gave a class work, about 80% of the learners were able to complete within the time frame, but others were still finding it difficult. I give them ... ample time to redo it, yet they were still struggling. So, Igave them much time to complete the task.... as take-home exercise" (A5).

Every beginning has difficulties and these preservice teachers were desirous to lead a generational change of mathematics teachers in Ghanaian classrooms and so, "One thing that I want to tell my colleague preservice teachers is, they should get a spirit of endurance because if they don't they will do what they don't want to do because sometimes they (students) do a lot of things to provoke you, the teacher. So you have to also control your temper..." (A2) in the face of mounting pressures from parents, work, and society. Again, "I think if they can do teamwork, as in, if, they are not the only mathematics teachers in that particular school, they can have a team work or share their challenges so that in sharing your challenges, one may find a solution to it for you" (A4).

Moreso, "What I would say is this, they should also try to consult their colleagues from other schools so that they can share ideas with them and find out how they were able to overcome whatever challenge they face...and then from there, I think they can also build on it to overcome what they are facing" (A5). These findings supported the claims of Francois and Van Kerkhove (2010) that students' starting points can be dissimilar in such a way that applying equal approaches to them will prove insufficient to achieve equality in the mathematics classroom. Hence, preservice teachers need to size up the challenges in the classrooms in order to navigate them.

4.3. Support to Address Challenges in Promoting Equality

In addressing some of the challenges that promote equity in mathematics classrooms, "The first thing I will say is the mathematics teaching and learning resources, we need to have them so that we can also practice before we go to the class. Because if you don't have the materials, at times it becomes very difficult for you to deliver a successful lesson" (A5). "... I think if they can get us more teaching and learning materials to facilitate the lesson, I think that one will promote equality among the learners" (A3). ".....and also, there should be timely workshops or orientations" (A1), and most importantly, ".....ICT integration in mathematics will really help because students also watch more videos on mathematics also broadens their understanding of the topic that I may be teaching. So, I think ICT integration in mathematics will really help" A1. While these may not be the only approaches to promoting egalitarianism in the mathematics classroom, these preservice teachers believe that, for their students to explore mathematics beyond the rhetoric of the curriculum (NaCCA, 2020), implementors must be resourced to carry it through.

Evolving Understanding of Equality in Mathematics Teaching by Preservice Teachers

It was satisfying to know the change effect of college experiences on the views of participants in demonstrating their initial understanding of equality in mathematics teaching. Initially, "... I had

the impression that, so far as one person understands it or half of the class understands it, that's all. So, ... the knowledge that I had in training college, broadened my mind that mathematics should be accessible to every student so that every student would understand those mathematical terms and concepts so that it will help everyone" (A1). This was because, "... you know mathematics is... our daily life ... So, everyone has to get the basics. I make sure that at least everyone has to also get the understanding so that they can even apply it in their daily life. If you are sewing, you need calculations and it's mathematics" (A2). It is "... involvement of all learners in the class to participate in the lesson or to have a fair idea. ... they should have at least something to go home with. All of them. All of them. You shouldn't leave one out" (A4). Thus, for equality in mathematics teaching, "... I see it to be making sure every learner ... in your class is given the equal opportunity in terms of assessing the materials, in terms of assessment, in terms of motivation, and others so...I take all together as one thing to be equality in mathematics" (A5).

These expressions and views showed how the participants in this study understood equality in mathematics teaching before they entered college and the influence college education had on them. They now understood equality in mathematics teaching was not just about making sure that all learners have opportunities to learn mathematics, but also about creating a learning environment where every child felt valued and respected, where they have the opportunity to exhibit their knowledge of mathematics and succeed as envisaged in the No Child Left Behind Act (2002). These evolving understandings of equality in teaching mathematics have helped these preservice teachers to navigate the challenges that they encountered in their teaching experiences. In so doing, they espoused some basic ethos of the teacher education curriculum that they had allowed themselves to be subjected to and it is believed that many others will exhibit similar traits to make the mathematics classroom a welcoming place to be for students.

5. CONCLUSION

The study examined the influence of the new teacher education programme on how it assisted preservice teachers in addressing issues of equality in mathematics classrooms in the context of sociocultural and ethnological foundations; their modes of lesson delivery and the challenges they face in making sure equity and equality were achieved. It was important to know how the preservice teachers considered critical, content, and pedagogical knowledge in teaching mathematics as a result of their experiences with the new programme which they were prepared to bring to bear on their teaching. Although they expressed concerns about the challenges, they encountered in becoming professional mathematics teachers, they saw them as opportunities to help learners overcome anxiety about the subject. Again, they believed both college and internship experiences have added to learning new skills and strategies as look forward to being licensed as pros.

Mathematics teaching and learning cannot happen meaningfully without resources and teaching and learning materials, so it was believed that when these are provided, they can complement the efforts of both the pre-and in-service teachers in giving off their utmost best. While the preservice teachers discussed ways to confront their challenges to promote equality in the classroom, they equally expressed how the new TE programme had helped in the evolution of their views on equity in teaching mathematics. They hoped to integrate these views into their teaching in the future.

The evidence in this study suggests that the new TE curriculum had gotten the preservice teachers thinking about issues of equity, equality and creating a congenial classroom environment for all these to occur. It is therefore important for college mathematics tutors to intensify their tuition on such relevant matters as laid out in the National Teachers' Standard (NTS) to boost their confidence and skills in this direction. Most importantly so is the fact that egalitarianism can happen in the mathematics classroom. Further, the findings implied that preservice teachers needed to be schooled to watch out for their temperaments in the discharges of egalitarianism in the mathematics classroom as some students can frustrate their quest to do so.

Despite the willingness of preservice teachers to engage in interviews, the constraints imposed by school schedules limited the interview duration to the allocated time. However, these constraints did not detrimentally impact the acquisition of essential information. Furthermore, the study adopted a self-reported evaluation approach to assess the influence of egalitarianism on participants. Through

this method, preservice teachers articulated their perceptions and the degree to which the TE curriculum shaped their instructional practices.

However, it is crucial to acknowledge a methodological limitation in the study. The absence of a verification mechanism, such as classroom observations during lesson delivery, introduces a potential gap in affirming the authenticity of preservice teachers' claims regarding the integration of egalitarian principles in their classroom mathematics teaching. This represents a notable shortcoming that warrants exploration in future research endeavours. The interview data provides the preservice teachers' perspective. Though valuable, preservice teachers' perspectives do not always match their practices (Brown & Melear, 2007). It was obvious from the results that preservice teachers face quite a number of challenges including teaching and learning resources and materials. It would be recommended that the Ghana Education Service through the Ministry of Education provide the needed tools to resource the schools so that preservice teachers who come for internship will gain the essential experiences to teach mathematics in a way as to benefit all students equitably. This study explored the impact of the new TE programme on preservice teachers in teaching mathematics as they experienced it at the college and how they were enacting it as interns. It would therefore be recommended that the study be extended beyond exploring the preservice teachers' experiences to observing how they enacted them in the classrooms.

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