

Walking the Talk in Training Future Mathematics Teachers Has Potential for Benefits

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ABSTRACT

Culturally relevant mathematics instruction requires modeling of the multicultural theories in teacher training. Providing theory only to students about how to teach diverse students does not engage them in experiencing being on the other side except minority students. This study presents findings of the analyses of teaching artifacts, curriculum and lecture observations of two teacher training classrooms of mathematics pedagogy. The observations alone could not account for the rationale behind individual practices, hence students' experiences and syllabi of these two classrooms triangulate the observations to strengthen the analysis. The findings indicate that the "otherness" of diverse ways of knowing continue to prevail regardless of all efforts on informing mathematics teacher education about cultural affirming instruction. Also teacher trainer's theoretical framework on multiculturalism determines the nature of mathematics teacher education student teachers' will be exposed to.

I. INTRODUCTION

A global acknowledgement has been made that every student should access quality mathematics education because mathematics is a pillar of civilization practically and aesthetically. However, students are still failing in their mathematics courses and many teachers do not understand it either (Bishop, 1997, Schmidt et al, 2011; Hsieh et al., 2011). Hsieh, et al. (2011) suggest that teachers from low performing countries in TIMSS score very poorly in mathematics knowledge even lower than their countries' primary school students. This failure in students' mathematics performance doesn't only reflect lack of motivation but also reflects societal factors of injustice (Pewewardy, 2002). It has been noted that teaching and learning generally is affected by cultural differences, linguistic heritage, learning environments, experience and heredity (Pewewardy, 2002; Zhang and Kenny, 2010). It is therefore important to reconstruct student teachers' traditional experiences of learning mathematics to authentic understandings that, diverse learners bring diverse experiences into the classroom that need to be incorporated to their learning as their foundational cultural capital. These diverse experiences need to be embraced and brought forward during instruction to bring plural strategies of enriching intellectual mathematical learning. Moses- Snipes (2005) asserts that mathematics teaching should support learning of all students (NCTM, 2000) to increase performance in mathematics for all students. Inclusion of students' life experiences and culture in mathematics instruction should be the daily learning practice (Kersaint and Chappel, 2001). This paper aims to assess teaching practices that pre-service teachers are exposed to during their training in college with special reference to multicultural experiences in mathematics training. Teacher education has to prepare teachers that perceive diversity as a rich component of learning (Villegas and Lucas, 2002). Therefore, it is crucial to help teachers, from all backgrounds, to acquire the appropriate attitudes, knowledge, and dispositions to work effectively with students that come from diverse background (Tiedt and Tiedt, 2002; Villegas and Lucas, 2002).

Vygotsky (1978) suggests that construction of meaning happens when the external factors are internalized. These external factors are different in different cultures. Austin and Howson (1979); Feza and Webb (2005) confirm the major difference in mental preparation for mathematics learning between a learner whose language that is close to Greek-Roman terminology and the learner whose language is completely different. Teacher education should therefore prepare teachers well for these diverse assets brought by student's diversity in mathematics classroom. Instead of using children's language and culture as barriers to learning we need to learn that they are the rich foundations for learning. Setati, (2002. 2005), and Feza & Webb (2005) highlight the importance of mother tongue instruction in mathematics learning and teaching. However, little attention has been given on the cultural aspect of learning mathematics that is embedded in language in training

of teachers. This paper examines in-depth what teacher training colleges do in addressing the cultural aspect of mathematics instruction with a focus on one institution in Western New York. In doing so, a theoretical framework on multicultural pedagogy in the mathematics teaching and learning is discussed followed by the methodology used in this investigation. The results are then deliberated on individual classroom cases and a concluding argument finalise the paper.

II. THEORETICAL FRAMEWORK

This study focuses on mathematics student teachers' multicultural experiences and exposure during their teacher education training. Ladson-Billing (2000); Jackson & Wilson (2012) suggest that "literature does not expressly address the preparation of teachers to teach African American learners effectively" (p.206). Therefore this study aims at observing teacher preparation to see if it does prepare teachers to teach minority students inclusively. Bennet (2001) suggests four clusters of multicultural education that encompasses the comprehensive multicultural education. The clusters are curriculum reform, societal equity, equity pedagogy, and multicultural competence. Relevant to this study is the equity pedagogy that reflects on multicultural teacher education curriculum and cultural styles in teaching and learning of mathematics that this paper investigated.

2.1. Multicultural teacher education curriculum

Most of the curriculum offered in mathematics teacher education (MTE) has been revealed as not multicultural (Banks, 2004a, 2004b; Grant and Sleeter, 2006) instead the MTE embraces diversity as the "other" which is suggested to be the infant stage of "multicultural practice" (Gorski, 2009). This celebration of multicultural education falls short in committing to social justice and educational equity (Cochran-Smith, 2004; Jackson, 2003; McKenzie and Scheurich, 2004). Gorski (2009) recommends that MTE curriculum alone cannot represent what happens when the classroom door is closed behind the professor. He further asserts that what happen in a mathematics teacher education classroom is influenced by the lecturer/professor's deeply politicized structures. Three theoretical multicultural frameworks that influence multicultural practices have been identified by researchers as theoretical frameworks that influence teacher trainers' and educators' practices. The frameworks are: conservative multiculturalism; liberal multiculturalism and critical multiculturalism (Jenks et al., 2001).

2.2. Conservative multiculturalism

Conservative multiculturalist compels themselves in addressing inequities by acculturating minorities or others to their dominant culture (Jenkins et al., 2001). They perceive their marginalizing culture as the one that will liberate the marginalized by conforming to it (Grant and Sleeter, 2006). Their commitment goes with those who are willing to be acculturated to the mainstream culture and to them "equality comes through social mobility" (Gorski, 2009, 311). Therefore, ideas of minority students cannot play any role in knowledge construction in this kind of ideological environment.

2.3. Liberal multiculturalism

Liberal multiculturalist celebrates difference with "insufficient attention on power, privilege and control" (Gorski, 2009, 311). They embrace diversity programmes but disregard access consequences of difference (Gorski, 2009). The environment created by this approach will accommodate diversity as it sees the need without giving minority an equal floor in contributing to learning or changing the status quo of the dominant culture. The dominant culture continues to inform learning and teaching practices. Power relations are not addressed at all.

2.4. Critical multiculturalism

Critical multiculturalist challenges supremacy, questions traditionally dominant culture and empowers teachers to understand their role within a sociopolitical context (Jenks et al., 2001). Grant & Sleeter (2006) argues that this approach is a social reconstructionist approach with a responsibility to "reconstruct schooling in ways that dismantle rather than reify, social stratification" (p.311). This kind of environment is expected to eliminate dominant culture and support pluralism by emancipating students (Gorski, 2009).

2.5. Cultural styles in teaching and learning

The role of the instructor or professor has been highlighted as significant in nurturing student teachers for cultural relevant mathematics teaching and learning (Gorski, 2009). MacNaughton and Hughes (2007) cited five practices that research proposes to be included in teacher training from (Brown, 2004, Brown et al, 2000 and MacNaughton and Davis, 2001; Dee and Henkin, 2002). These practices are to:

- Acquaint student teachers to diverse cultural groups and experiences.
- Increase understandings of the supreme groups about effects of discrimination
- Provide time for study of cultural diversity principles and instructional practices
- Plan thoughtful approaches and permitting time for detecting and discovering the dominant group's opposition to cultural diversity principles and pedagogical practices
- Allow time for student teachers to reflect disparagingly on their present social location and on their experiences of cultural marginalization

Lowenstein (2009) proposes that student teachers' are nurtured to view diverse knowledge brought by diverse students as rich legitimate knowledge students come with to school. She then advocates for teacher training that models similar practices instead of treating student teachers as empty slates on issues of diversity but let them bring forward their theoretical frameworks of multicultural instruction.

III. METHODOLOGY

Twelve classroom observations of each of the two mathematics pedagogy classes were conducted over the semester on a Masters' programme of mathematics education at a University in Western New York. These lesson observations for both classes added up to 24 observed lessons. One of the two classes focused on mathematics curriculum from pre-K-12 and the other class focused on geometry education from 5th-12th grade. The diversity of students in these courses is of high importance for the study and therefore, is distinguished. Class 1 consists of 25 students from diverse backgrounds with international representation while class 2 consists of 9 Caucasian students with no other ethnic groups. The students' relationship with their trainers was observed based on caring, respect, and trust facilitating learning (Alport, 1954 & Schofield, 1995) cited by (Bennet, 2001). Therefore an ethnographic approach was employed to observe the classroom climate, relationships and multicultural opportunities to learning. The second stage was observing theoretical frameworks that influence teaching practices and cultural relevant artifacts used in these classrooms and therefore the appropriateness of the curriculum is examined (Jenkins et al (2001) and Grant and Sleeter, 2006). This was done by examining syllabus and pre-scribed materials for the class and also all articles involved. The syllabus was evaluated to examine if its role and purpose in creating an environment that embraces diversity and challenges dominant cultural practices. A triangulation of data with theory analysis approach is conducted in this data. For example the analysis of the syllabus uses the National Council of Teachers of Mathematics (NCTM) recommendations on how to teach, Vygotskian theory on how learning takes place and the multicultural theory based on D'Ambrosio's work on multicultural mathematics education. The analyses of classroom observation notes use Kitchen's research on how to facilitate pedagogy on multicultural education together with Grant and Sleeter and Gorski's research on the multicultural education pedagogy theoretical framework.

IV. RESULTS

Out of the two classrooms I observed one is dominated by teacher centered instruction while the other is dominated by high student participation. Therefore, presenting the data collected from these two classrooms will not be integrated but separated. The data will be identified by class 1 and class 2 respectively, with the purpose of drawing a clear picture of each classroom.

Class 1

A class of 25 students doing their master's degree in teacher education enrolled for a mathematics course that focuses on improving Elementary Math Instruction. The course's purpose is to develop mathematical content, mathematics pedagogy, curriculum, attitudes and power; and collaboration amongst students. For this paper I will focus on the development of mathematics pedagogy with the aim of responding to the question of the study. Which is "How does teacher training prepare in-service teachers for culturally relevant mathematics classrooms?" According to the syllabus of this class developing mathematics pedagogy means: "Students will select and use effective teaching practices appropriate for elementary mathematics instruction in an effort to create a positive and productive learning environment"(p.2).The statement of the syllabus reveals that the course's pedagogical aim which is effective teaching practices and appropriate instruction. It is clear that this course is guided by the National Council of Teachers of Mathematics (NCTM, 2000)'s recommendation that teachers utilize the cultural and educational background knowledge of their learners as a way to help them learn mathematics and make connections to other academic field. The course description of the mathematics pedagogy emphasizes the strategies that focus on "students' mathematical thinking as the construction of ideas, the application of mathematics in students' lives, and the integration of mathematics with other academic disciplines" (p.2). This statement supports socio-constructivist theory of Vygotsky (1978) that students' learning

occurs when external tools have become internalized and become understood ideas. Therefore, these ideas then are used in real life experiences and also connected to other areas of learning because they have been internalized. Focusing on students' mathematical thinking in construction of ideas means acknowledging and connecting students' ideas that already exist to the new ideas to bring understanding of the unknown.

One of the objectives of the course states that the students "will create instructional activities that will improve learning opportunities for all students, regardless of race, gender, ethnicity, socio-economic status" (p.2). D'Ambrosio (1995) supports this course's purpose by defining how new knowledge is built. He suggests that learners' practices that involve their cultural practices and their perceptions are the foundation where new ideas could be built from. If these new ideas cannot be linked with the learner's cultural foundation then development is impeded. Vygotsky's (1978) comparison of external tools that need to be internalized through construction of meaning before they are realized elaborates D'Ambrosio's words that "practices and perceptions of learners are the sub stratum on which new knowledge is built". By this Vygotsky means sense making is a process that connects what is known to the unknown and then the unknown becomes known. According to the multicultural theoretical framework this objective recognizes the need for equal opportunities without a plan to change the mainstream ideology (Grant and Sleeter, 2006).

Examining this course's text which is NCTM Principles and Standards for School Mathematics (PSSM) the purpose of this course is presented well by the PSSM documents as it advocates for equity (NCTM PSSM, 2000). The PSSM equity principle promotes "high expectations and worthwhile opportunities for all" (p.12). The opportunities that are promoted by NCTM are not uniform for all but "they require accommodating differences to help everyone learn mathematics" (p.13). The class observed consists of 25 students with diverse backgrounds. One student is from Kenya in Africa, one from South Africa, one from China, one male from Pakistan, and 21 students are all Caucasians from the US. Out of the 21 US students only two are males the majority is females even those from other countries there is one male. This diverse classroom presents rich opportunities for learning other people's ways of knowing, and also understands other people's perspectives of what mathematics education should entail. The course text and the classroom diversity had potential to bring forward the framework of liberal multiculturalism. This course objective embraced diversity and pluralism, however there is no rigorous plan in the syllabus to dismantle the traditional dominating culture nor for implementing cultural relevant pedagogy.

Classroom practice of class 1 presented a different story compared to the curriculum. There was very little interaction among students in this class as most of the instruction is done by the instructor. For example, using an example from day to day approach, the instructor was standing in front of two rows with students facing one another in each row forming four rows, she gave students' a verbal summary of an article she wanted them to read and the name of the article was "Running ahead: Mathematically Desirable and Accessible". Then, she told the class how she approached division in class and one kid couldn't do it because the kid said "Only even numbers can be factors, no odd numbers can be factors". Then she asked if students have bad math stories. By that she meant stories of teachers teaching wrong mathematics or difficult experiences teachers have. One student narrated this story: "I had home school girls that were brought in to my class to learn. They have never been in a school environment before. They could not do any math at all, and could not interact freely with others. They read but couldn't do their mathematics".

This student's story lays ground for a rich discussion because this is a real experience that these students face and need to find approaches of dealing with them. However, no discussion took place after the student teacher brought the story forward. Only two students responded with bad math stories. Then the instructor wrote a division problem in the board and asked students "How do you do this?" Then students in a choral way lead the instructor what to write: $19\overline{)1526}$ which was 8 on top of 2 and 152 below 152 and subtract the answer is 0 drop 6 and put 0 on top of six and put 0 below the dropped 6 and subtract and the difference is six. Then the instructor asks "What is six? How do you deal with six in a different context then she asked if people from other countries do the same. Then the Kenyan student stated that they will put zero on top of 1 and a zero on top of 5 before 80 in Kenya. While the South African student noted that they use dots before the number instead of zeros. After this the instructor presented how the kids would do it. Then one student was concerned and asked "Can we allow them to do it their own way what about testing? They won't be penalized?" Then the instructor put on slides of a paper on international research of Geometry leaving the division problem hanging. She also showed a video lesson of 4 year old Caucasian learners. The instruction on the video tape was more active and the teacher guided learning by using "Why" questions on this tape. Children were verbalizing their thinking and challenging one another. This is the format of the observations I had with this class. Most instruction is teacher centered. The instructional method of this class is influenced by the conservative

multiculturalism that believes that by allowing students to share their ways of doing mathematics and driving them to do it the mainstream way which is the American way in this case. Allowing students to share their diverse ways of doing mathematics algorithm stood alone with no follow ups. However, the American way of doing the algorithm was the one given more attention.

Again the rich question about (testing?) culture in schools is not addressed in this class. In US schools, teachers find themselves teaching for the test because of the pressures put on them when learners do badly on State tests (Feza, 2013). This is another opportunity that went unattended as some students might have come up with ideas on how to manage tests and continue having effective instruction. So the possibilities were endless but we'll never know because this teacher trainer did not follow up these opportunities. Kitchen (2005) hypothesizes three contributions that guide effective multicultural teaching. Those contributions are: "Creating a respectful and trusting community of learners, contributions of diverse cultures to mathematics, and considering students' cultures in the mathematics classroom" (p.41 & 42). Kitchen (2005) states that teacher educators need to model multicultural teaching when preparing teachers for their career. Another example was on use of mathematical terminology on shapes lesson when international students were calling an American trapezoid "trapezium". The instructor's response to this was "I will stick with American way and call it, trapezoid". When one student asked her why should teachers teach different approaches in solving problems? Why can't they allow learners to bring their own?" The instructor's response was "Some schools use everyday math especially well off schools, therefore teachers have to teach those approaches". This is contradictory to what the course aim to achieve. However, it is an indication of how important mainstream practices are. This practice continues to exclude minority students in active participation and construction of meaning as well as it will exclude minority children in their prospective classrooms. Although, there has been a lot of literature that advocates for cultural relevant mathematics education Grant and Sleeter (2004) state that theoretical framework of multicultural pedagogy vary for different instructors and influence their practices. The "assimilationist sociological accounts" Gorski (2009) still influence this classroom as students have to do things the dominant American way, divide the dominant American way and use the dominant American vocabulary as the instructor proposed. The melting pot theory still rules this classroom as it Americanizes all students regardless of their backgrounds.

Class 2

This class consisted of nine Caucasian students that were six males and three females. It was a methods course for teaching mathematics in grades five to twelve. The main course objective is "to prepare students with solid mathematics pedagogical knowledge to be middle school and high school mathematics teachers". The success of this course is continuously assessed when students become more knowledgeable of and experienced in the techniques of teaching mathematics; realize the responsibility and workload that a teacher carries; relate national and state standards to mathematics curriculum; be aware of resources for mathematics teachers; determine a theoretical base for their personal mathematics instruction (p.5). This class is characterized by student participation and an instructor who works as a co-learner most of the time. On both observations the learning is led by students who are dressed formally presenting well prepared lessons with relevant manipulatives. Students sit in an oblong shape facing the presenter and discussing their work in pairs. An example of the day to day instruction of this class, two students presented one male and one female.

The first presentation was conducted by the male students who handed out worksheets to students. Then he demonstrated his instructions using an overhead worksheet. The objective of the lesson was "to visualize and compare different slopes using multiplication tables" for grade 7-8 learners. He demonstrated using an 8 times table then asked students to create their own tables and graph them. Then they filled in the worksheet formulating their own equations. They swapped their work and marked each other. Those who scored high marks received candies. Then he gave out another assessment activity and those students who scored high marks again received candy. Unfortunately one group scored high marks on both occasions and then the teacher gave others consolation prizes of candies for their attempt. At the end of this lesson all students including the instructor took evaluation forms and assessed the presentation. The presenter had to evaluate himself too during the evaluation moment.

The second presentation was conducted by a female student on Conjunction and Disjunction (mathematics logic). She started by introducing meanings of the terminology used in the lesson and handed out notes with examples. In her notes Conjunction was described as the use of the word "AND" in combining two simple sentences to form a compound sentence. A symbol " \wedge " read as "and". An example she gave states that "P: Arthur reads the newspaper. Q: Patty went to the store. A compound sentence would be Arthur reads the newspaper AND Patty went to the store. In a symbolic manner it is written as $P \wedge Q$ ". Describing Disjunction she

stated that “it is when the word OR (symbol \vee) is used to combine two simple sentences to form a compound statement”. Her example was “P: Ronald plays basketball. Q: The park is closed. Then the compound sentence will be $P\vee Q$: Ronald plays basketball OR the park is closed”. She then gave students statements to determine whether they are conjunction or disjunction, or neither. She asked them to work in pairs. Her presentation was developmental because after she allowed students to practice their understanding of Conjunction and Disjunction she developed truth tables with them. She asked them to use the truth tables to complete worksheets she handed out. Students showed lots of enthusiasm during this session and actively participated throughout. Students evaluated the lesson and then the instructor took over by revisiting the plan for the day. Both examples above show the mainstream practices of a classroom that is monocultural because of the type of student representation. Also the presentations did not indicate any need to go beyond the audience and think about diverse students.

Students had readings from the book “Secondary Classroom Management by Carol Simon Weinstein” pages 1-124 that consists of chapters one to six. Written in a dynamic, likeable, colloquial style, it pools what research has to say about effective classroom management with knowledge picked from practice. This manuscript centers on real decisions made by real teachers as they manage the multifaceted environment of the secondary classroom. The manuscript assimilates the rational and the concrete management practices of five real secondary school teachers into debates of research-based management principles.

The instructor asked students to respond to her question that asked” Which teacher do they relate to the best? Why? Students responded that they were not happy with Carmen Sanchez class because it was not structured and she had little time for hands on work. Then the instructor referred the students back to the reading concerning Carmen Sanchez limitations on doing hands on work in her classroom. Students admired Fred Cereguas (social studies teacher) “because he keeps up with current issues and is young at heart. He is also spontaneous and knows how to jump in and improvise all the time”. However, students acknowledge that his kind of attitude needs experience and wisdom that develops with experience and therefore prefer Sandy’s approach that will work for some students. Each student was allowed to discuss his/her choice and support it. Then a general discussion on when to be strict emerged. Students reached a consensus on not to start in a relaxed mode to being strict because it causes chaos. They agreed that starting strict and loosening up little by little works better. They also agreed in using (p.73) model of teacher behavior and (p.53) principles for planning classroom rules. Weinstein (1996) exposes pre-service teachers to the diversity experienced by teachers in a variety of schools. The stories shared by individual teachers give a rich theory to upcoming teachers. In this activity teachers are allowed to make their choices according to their own teaching styles and beliefs, a good place to start in introducing change. Their comments reveal that they are aware of their limitations and strengths and therefore choose teachers that are close to them inexperience and aim to reach wisdom through their experiences.

Another example was when I arrived ten minutes before the beginning of the class. All students and their instructor were already in class. They have already organized the room to suite their presentations and their materials. The class started like the other classes with a slide that guided the day’s plan. The two presenters had a sound knowledge of their mathematics. They used manipulatives to build mathematical understanding. They all promoted active participation and construction of meaning. In the first presentation one of the students commented after completing and solving a problem and said “it was like a magic when I solved the problem”. The other students felt it was easy while the third group was surprised by the graph they used in solving the problem. In the second lesson the student managed to capture students’ interest using tessellation of shapes in teaching geometry. Students were proud of their constructions and patterns they designed. Success, pride, esteem and high expectation compel the climate of this class. The three contributions that are suggested by Kitchen (2005) are practiced in this classroom. Students’ ideas are respected and heard. Knowledge is socially constructed (Vygotsky, 1978) and different learning styles are explored a weakness in this case. In general two NCTM (2000) principles guided instruction in this class. The equity and teaching principles together propose strong support for all children and understanding of students’ knowledge with high expectations.

V. DISCUSSION

Diverse classrooms are growing with time and therefore mathematics teacher education has to face the challenge. Class 1 confirms the claim made by MacNaughton and Hughes (2007) that mathematics teacher education continues to encourage the dominant form of training teachers with no success to endorse respect for diversity. The instructor is influenced by the conservative multicultural theory of acculturating minorities to the mainstream ideologies and practices. Already the voices of student teachers in this class are deafened therefore; have to be changed to the dominant way of knowing (Jenkins et al., 2006). The relationship developed by this kind of instruction is authoritarian relationship that continues to marginalise minorities. On the other hand the

syllabus and materials used in this class embrace diversity. They fall short in proposing a rigorous plan on the implementation of a cultural relevant pedagogy.

Class 2 portrayed dynamic relationships between the instructor and students. Roles were shared amongst class participants. Students became instructors more often, and the instructor became a co-learner. Co-operative learning dominated this classroom practice and students' ideas were valued. The instruction in this classroom models a healthy platform to integrate a culturally affirming instruction. The relationships are of mutual respect, trust and caring nature. However, curriculum does not cater for multiculturalism combined with the instruction but the text used embraces diversity and expose student teachers to the diverse experiences teaching holds. Therefore the syllabus and instruction employ a monocultural environment while the text brings in liberal multiculturalism.

In summarizing Class 2 practices multicultural education here is treated as the "other" not the part of the whole process of learning (Gorski, 2009). These findings indicate that both classes embraced the dominant culture in their practices. The difference between the two classrooms was the relationships amongst teacher trainers and student teachers. Class1 indicated an authoritative relationship while class 2 indicated a respectful, dynamic kind of relationship. Both classes acknowledge diversity but lack rigorous approach towards educating for justice.

VI. CONCLUSION

Having been informed by most studies that diversity is the globally increasing, the ill preparation of teachers for the diverse mathematics classroom will cost education money, time and pride (Wiest, 2001). Voices of the minority societies are becoming louder and therefore teachers who have not acquired appropriate knowledge, skills, and attitude to teach from a mathematics multicultural perspective (Wiest, 2001). This will not only challenge teachers but colleges that train teachers need to reflect on their practices whether they are future oriented or stagnant. College reputations will be at stake. Mathematics is a controlling filter as it functions as a requirement to many fields of study, who has this power determines the future (Herzig, 2005). Therefore, it should be the priority of teacher education to allow access to learning of mathematics. Diversity enhances the academic environment of learning hence other ways of knowing become crucial elements of this environment to enrich it further. Diversity in an economic obligation and ignoring it has been proven to be costly to those societies (Herzig, 2005). The findings of this study reveal that the "otherness" of diverse ways of knowing mathematics continues to be the case in mathematics teacher education regardless of all efforts and literature out there. Therefore, public debate on teacher education should be on creating new ways of preparing mathematics teachers for a diverse society. Reforming the old ways continue to produce mediocre mathematics performance and practices.

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