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Teachers' Perception of Social Justice in Mathematics Classrooms

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Abstract

The purpose of this study was to explore mathematics teachers' perception of social justice in mathematics classrooms. We applied interpretive qualitative method for data collection, analysis, and interpretation through iterative process. We administered in-depth semi-structured interviews to capture the perceptions of three mathematics teachers about social justice in mathematics classroom at three public secondary schools in Kathmandu. We carried out multiple layers of thematic analysis and interpretation of the narratives from the interview data. Altogether five themes on perception of social justice emerged from the analysis of the data. These themes were associated with - equality, equity, fairness, social process, and caring students. Implications of the study have been discussed at the end.

Keywords: Social justice, equity, equality, qualitative research

La Percepción del Profesorado de la Justicia Social en el Aula de Matemáticas

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Resumen

El propósito de este estudio fue explorar la percepción de los maestros de matemáticas sobre la justicia social en las aulas de matemáticas. Aplicamos un método interpretativo cualitativo para la recopilación, el análisis y la interpretación de los datos, a través de un proceso iterativo. Administramos entrevistas en profundidad semiestructuradas para capturar las percepciones de tres profesores de matemáticas sobre la justicia social en el aula de matemáticas en tres escuelas secundarias públicas de Katmandú. Llevamos a cabo múltiples capas de análisis temático e interpretación de las narraciones de los datos de la entrevista. En total, cinco temas sobre la percepción de la justicia social surgieron del análisis de los datos. Estos temas se asociaron con: igualdad, equidad, equidad, proceso social y estudiantes afectuosos. Implicaciones del estudio han sido discutidas al final.

Palabras clave: Justicia social, equidad, igualdad, investigación cualitativa

Social justice has been one of the major issues in education in general and mathematics education in particular. What mathematics is taught in the classroom? Whose mathematics is taught? Who teaches mathematics and to whom? How do teachers teach the subject in the classroom? What context teachers use in teaching mathematics? How do students participate in learning mathematics? How do parents support their children in learning mathematics? How does school system maintain access to the resources for students? Do all students have access to resources to learn mathematics? Does education policy support equitable mathematics education for all students? How does power and politics play a role in supporting or hindering students' empowerment through learning of mathematics? These questions and others have been the major concerns of mathematics education community in recent years. This paper is developed around these questions. Now what follows in this paper are - theoretical foundation of social justice in mathematics classroom, research method, findings and discussion, and implication of the study.

Social justice in education is a phenomenon in which children are provided with equal opportunities to learn and grow. Bell (2007) views, "The goal of social justice is full and equal participation of all groups in a society that is mutually shaped to meet their needs" (p. 1). Thus, teaching for social justice refers to the application of "good teaching strategies" to support all types of students in a classroom with an expectation of success for all students, irrespective of their gender, social and economic background, level of intelligence and ability. Social justice in education also refers to equity, justice and fairness in teaching and learning. In other words, it refers to a situation in which all students have equal right or equal treatment. Gates and Jorgensen (2009) describe different forms of social justice: (i) moderate form that focuses on equity and fairness (ii) liberal form that sees classroom as a social organ and the relationships in a class room as a key feature in classroom interaction, and (iii) radical form that recognizes structural inequality and seeks to redress the ways in which inequality is built into existing practices.

If we relate the concept of social justice to classroom, it refers to a class in which all students' voices are equally heard, they are treated equally, their views are respected, and they get equal opportunity to learn, suggesting that it has equity. According to OECD (2012), social justice has two dimensions: fairness and inclusion. Fairness involves individual and social situations such

as socio-economic status, gender or ethnic origin should not be obstacle to succeed in education. Inclusion is taken as a notion in providing education to all (as cited in [Ministry of Education and Education International, 2014](#)). Thus, in a socially just teaching, the focus is on pedagogical practices that help all students to succeed. Social justice refers to providing equal opportunity to all learners in a classroom. Moreover, it includes providing equal access to experience pleasure and enjoyment of learning in the classroom to understand something that is difficult yet worthwhile ([Hempel-Jorgensen, 2015](#)). In this line, [Cotton \(2013\)](#) describes mathematics education in a 'socially justifiable' world as one in which a student finds it easy and empowering to be in his/her classroom.

Social justice might also include providing equal access to curriculum, resources and good teachers. It makes students feel that they are equally valued. Teachers need to make a commitment to transform educational fabric to develop, protect, and grow potential of their students. For this, they need to create a fair, just, and inclusive educational setting. Social justice provides engaging, empowering, and authentic learning contexts for students in which mathematics skill sets can come alive and transcend the traditional limit and delve into abstract operations that have isolated and discouraged many students. Social justice provides incentives that inspire all students ([Bond & Chernoff, 2015](#)). There is a role of race, class, and gender in education. But, students in many cases are facing “persistent and profound barriers to educational opportunity” ([Darling-Hammond, 1995, p. 465](#)).

Among the six principles of school mathematics, National Council of Teachers of Mathematics (NCTM) states equity as the first principle ([NCTM, 2000](#)). In its equity principle, [NCTM \(2000\)](#) states, “All students, regardless of their personal characteristics, backgrounds, or physical challenges, can learn mathematics when they have access to high-quality mathematics instruction” (p. 2). Further it states, “Excellence in mathematics education requires equity, high expectations and strong support for all students” ([NCTM, 2000, p. 10](#)). In this regard, NCTM advises for the arrangement of great prospects, valuable opportunities, and accommodations for differences to reach equity in mathematics classrooms.

Despite efforts to enhance social justice through equity, there are challenges to implement it in the classroom in general. One can look at this issue through the lens of access that all students have equal opportunities to study and learn ([Vomvoridi-Ivanovic & McLeman, 2015](#)). [Young \(1990\)](#)

sees cultural context as one of the barriers to maintain equity. According to Young (1990):

In the cultural context of the United States, male children and female children, working-class children and middle-class children, black children and white children often do not have equally enabling educational opportunities even when an equivalent amount of resources has been devoted to their education. (p. 26)

Young (1990) indicates that diversity of culture might be a challenge to maintain socially just school practice. In Nepal, challenge is surfaced more prominently in educational inputs, processes, and outcomes. A comprehensive study on performance in the School Leaving Certificate (SLC) by Mathema and Bista (2006) has revealed that the performance of boys was better in mathematics and other subjects than girls. The causes of this discrimination in SLC result has been attributed to discriminatory and differential treatment received by girls both at home and at schools. There was a low performance of the students in the public schools than the students of private schools in mathematics and other subjects (MOE, 2015). This indicates toward socially unjust pedagogy and school system in Nepal. In this context, it is essential to study mathematics teachers' perception of social justice. After that, the findings of study may help in uncovering different ways to treat students and improve their performance. Therefore, in this study, we aimed to explore mathematics teachers' perception of social justice in mathematics classrooms. The research question addressed in this paper is: How do secondary school mathematics teachers perceive social justice in mathematics classroom?

It is notable that, although the matter of equity has ever become more important in mathematics education, there is still little agreement on how the term should be defined, framed, and worked towards social justice in classroom learning (Esmonde & Casewell, 2010). Esmonde and Casewell (2010) use the terms 'equity' and 'social justice' interchangeably. Social justice in education has various meanings and hence it does not have a single or general meaning. It is questionable and debatable issue. When 'social justice' is used in context of teacher education, it is particularly flexible expression that circumscribes more than one meaning. Bolyan and Woolsey (2015) insist that our understanding of social justice is rooted in the importance of adopting both distributive and relational perspective as well as recognising a participative dimension. They also view that social justice

contains value and appreciation of social norm and distinct culture. It values equal access to materials provided to all. Participative dimension addresses capacity and opportunity to actively participate in decision-making (Cochran-Smith, 2009). Social justice embodies individual and social issues but given special attention, it must not focus only on large and community issues (North, 2008).

Social justice in teaching has been defined by scholars based on their worldviews. For example, Cotton and Hardy (2004) define it as “a way of working that accounts for, and works with, the links between oppressions, inequalities and exploitations that we see inside and outside our schools and classrooms” (p. 90). Tanko (2012) defined socially just teaching as a way of teaching that helps learners to understand their world better and enables them to seek their justifiable share of benefits in their society, while contributing to its positive development. It also includes issues of equal opportunities for jobs and income, civic participation, and information and support related to one's personal life.

Social justice principle promotes learning of individual or group and it contributes to equitable ways of achieving equitable outcomes recognizing disadvantages. Social justice denotes justice for poor, exploited and oppressed people in all societies, and surrounds struggles of people everywhere who work for gender equality, intellectual protection and human rights (O'Kane, 2002). Therefore, Keddie (2011) suggests that schools should give inclusive environments, where marginalized voices are heard (political justice), marginalized culture is recognized and valued (cultural justice), and marginalized students are supported in their academic achievements to successfully collect material benefits of society (economic justice).

Dimensions of Social Justice in Mathematics Education

Ratts, Anthony, and Santos (2010) discussed five dimensions of social justice – “naivete, multicultural integration, liberatory critical consciousness, empowerment, and social justice advocacy” (p. 160) in group works. These dimensions integrate different elements of social justice in group works increasing order from naivete (minimum integration) to social justice advocacy (maximum integration of social justice) with a group. We observed the term ‘social justice in mathematics education’ from three dimensions –

equity, criticality, and contextuality that we have discussed in the following subsections.

Equity

The National Council of Teachers of Mathematics (NCTM) published its position statement ‘Access and Equity in Mathematics Education’ in 2014 that focuses on “creating, supporting, and sustaining a culture of access and equity require being responsive to students’ backgrounds, experiences, cultural perspectives, traditions, and knowledge when designing and implementing a mathematics program and assessing its effectiveness” (p. 1). This document clearly outlines NCTM’s focus on equity as a key factor to close learning gaps with opportunity to learn with access to high-quality instruction. However, the current education system does not seem to focus on equity in terms of ethnicity, language, culture, age and gender (Atweh, Graven, & Secada, 2011). The performance measures in schools, increased supervision, control of curricula, and emphasis on efficiency, outcomes and skills in teacher education has influenced defining what counts as responsive or effective teaching for equity and social justice (Kaur, 2012). Acknowledging it, Fraser (1997) points out that addressing diversity might lead to the distinction between different groups. Diversity discourse is one of the biggest threats in social inequality and exclusion in mathematics education. For example, cultural differences, poverty, socio-economic condition etc. are its hindrances and Fraser discusses that equity reduces such differences (Atweh, Graven, & Secada, 2011).

The classrooms in Nepal have a great diversity in terms of students’ background. That means, there are students of different ethnic groups along with gender differences and their socio-economic status and physical (dis)ability. The diversity of student population has raised the issue of inequity in mathematics classroom. The National Curriculum Framework (CDC, 2007) for School Education in Nepal mentioned that:

From the point of view of access and equity, the principle of positive discrimination needs to be adopted for the expansion of education. Therefore, the nation should make special provision for women, marginal and senior citizens, orphans with disability and economically and socially backward community. Moreover, it

should safeguard the right to education in mother tongue, guarantee the child rights and provide free basic education. (CDC, 2007, p. 19)

It shows that Nepal has stepped ahead toward raising awareness to social justice in education in general that has implications in mathematics education too. However, there is much to do in dealing with and changing the uncritical curriculum and pedagogy in mathematics classroom. That means, criticality as a dimension of social justice in mathematics classroom should be tailored to equity with access and fairness.

Criticality

Frankenstein's (2006) conception of 'critical mathematical literacy' expands besides the evolution of numeracy to transforming learners' consciousness to social and political matter of knowing mathematics and to the improvement of a sense of working ability. The learner's consciousness toward their personal and social identity can help them position themselves within a learning environment with informed choice to be a part of multicultural milieu. In this context, "the objective of critical mathematics ought to be to engage marginalized students in cognitively demanding mathematics in ways that help them succeed in learning" (Powell & Brantlinger, 2008, pp. 424-425). Frankenstein (2006) offers a social justice model of instructing mathematics to learners that require instructors and learners to be argumentative in breaking down hurdles of power relation between instruction and learning in the study of mathematical concepts. Frankenstein (2013) sketches four aims of developing critical mathematical literacy: to understand mathematics, to understand mathematics of political knowledge, to understand politics of mathematical knowledge, and to understand politics of knowledge. Hence, critical perspective of mathematics education in the context of informed decisions in social, cultural, and civic life relates mathematical knowledge to politics and vice versa.

Critical view of mathematics education in Nepal has been discussed in recent literature. In this context, Luitel and Taylor (2009) challenge the notion of mathematics as a pure body of knowledge, ideology and culture free discipline and nonrecognizant field of study and they advocate for mathematics education to be transformed into a soulful, multiple, political, culturally rich, and empowering field of study. Hence, mathematics should be viewed with "epistemic referents of dialectical logics and performative

imagination” (Luitel, 2013, p. 65). With the advent of democratic republic as a system of governance with seven Pradeshes (States), Nepal is moving toward decentralized education system with a hope to develop socially just, inclusive, and politically empowered education. To meet the goal of socially just mathematics education, Luitel and Taylor (2006) suggest that “Nepal should embrace a critical mathematics education perspective that upholds cultural pluralism and a strong democratic ethos” (p. 91). Development of critical mathematics education pedagogy, curriculum, and assessment needs further consideration of social, cultural, and political contextualization of mathematics education.

Contextuality

Contextuality has been a growing interest in mathematics education in general (Boaler, 1993) and social justice in mathematics teaching and learning (Colquitt, 2014). Boaler (1993) emphasizes context as a powerful means to affect students learning of mathematics and their performance. She claims that “mathematics in everyday context is easier than its abstract equivalent (p. 13)” and hence the difference in the problems of mathematics and the real-life context brings in the issue of injustice to the students. Promoting a classroom culture of discourse in mathematics to bring the subject matter into a context may play an important role to promote learners ‘consciousness and working capacity (van Oers, 2002). Hence, teaching mathematics may be linked to instruction for social justice to improve working capacity through mathematics when they inquire with each other and collaborate in learning. This kind of practice is supported by the work of socio-cultural theorists (such as Vygotsky, 1978) who views that learning comes from people participating in social context. Such view is also supported by Lave and Wenger (1991) that a human being can acquire knowledge through participation in social interaction and learning in context. Taylor and Luitel (2005) suggest that mathematics in Nepal can be made contextual by adding ethnomathematics in it. We are immersed in and shaped by factors and forces of social, cultural, historical, and political structures which create various conditions of domination and oppression in Nepali society. Mathematics education should not be uncritical domain to be silent to such social evils. Hence, mathematics education research and teaching should contribute to the development of critical awareness through self-

reflection (reflexivity) giving up personal ego and transcending self beyond the limits of traditional practice of teaching and learning mathematics (Belbase, 2006). For this, there should be culturally contextualized mathematics resource materials designed, developed, used, and researched to include the local knowledge to global mathematics (Kathmandu University and UNESCO Kathmandu, 2008). Contextuality in mathematics education as a dimension of social justice may promote culturally responsive pedagogy in mathematics education through mutual respect, acknowledgement of cultural heritages, bridging the different domains of mathematical knowledge, and widening the pedagogical feasibility (Mukhopadhyay, Powell, & Frankenstein, 2009).

Research Methodology

In this study, we used qualitative interpretive inquiry as a research approach. Interpretive notion of qualitative inquiry relies on the normative or evaluative facts of data input, process and outcome that best justifies the total set of practices in which that concept is used (Plunket, 2013). Interpretive research is used broadly to describe social inquiry that develops knowledge assertions from the interpretation of lived experiences of the participants focusing on social justice issues in mathematics classroom. As such, it is a subset of qualitative research, which assumes that social reality is locally and specifically constructed (Lincoln & Guba, 1985) in a context. It emphasizes the reflective subjectivity of making sense, and developing knowledge claims about this reality. Interpretive approaches, thus, depend on the researchers' philosophical position rather than on their methodological orientation, which require a range of methods (Walther, Sochacka, & Kellam, 2013). Knowledge, as interpretivists claim, is generated as we interpret new experiences or new theories in the context of what we believe and what we teach (Hay, 2011). Interpretivists, in other words, are concerned with meaning and with explaining what teacher and students do by interpreting their social world (Hay, 2011). Interpretivists argue that if we are to explain what occurs in social justice in the mathematics classroom, we must analyse the meanings that mathematical concepts, practices and behaviour have for teachers and students (Hall, 2014).

The hermeneutic process of interpretation requires reflexivity, a process of turning one's gaze back upon oneself and paying attention to how one's

own pre-understandings and situation affect the people being studied, questions asked, data being collected and its interpretation (Berger, 2015). The reflexivity is thus, an active process that influences every stage of the research (Hamdan, 2009). Strategies such as repeating interviews with the same participants, member checking, journal writing and maintaining an 'audit trail' is related to decision to maintain reflexivity within a research study (Berger, 2015). Analysis within hermeneutic interpretive research is a search for meaning within the data and is perhaps the most challenging part of this type of research. In this relation, interpretation comes from reading and re-reading the text to see the meaning in context.

Selecting Participants and Location

The participants in this study were three secondary level mathematics teachers from three different public high schools in Kathmandu. The first author as a researcher selected three public secondary schools, three mathematics teachers (one from each school, all males). The main reason for selecting Kathmandu as the research site was that it was easily accessible for the researcher to collect data. As he has been living in Kathmandu for the last fifteen years, collecting data was economical both in terms of time and money. Additionally, his experience and awareness of different cultural and social situations of Kathmandu supported in collecting in-depth information for the study. The three participant teachers were Chandra, Saurya and Tara (pseudonyms).

Chandra is a secondary level trained mathematics teacher having qualification of M.Ed. in Mathematics as a major subject. He has five years of experience in teaching mathematics at a public secondary school in Kathmandu. He is from a marginalized family. He is a young and energetic and dedicated professional teacher. He is regular, punctual and responsible in his duty.

Saurya is a mathematics teacher at a public secondary school in Kathmandu. He is fifty-six years old. His qualification is B.Sc. and one year B. Ed. taking mathematics as a major subject. He is from a middle-class family. He is a regular, punctual, responsible and energetic teacher. He has thirty years of experience in teaching mathematics. He has also taken part in different pedagogical trainings conducted by the Ministry of Education.

Tara is a mathematics teacher at a public secondary school in Kathmandu. He is fifty years old. His qualification is M. Ed. in mathematics as a major subject. He has twenty-six years of experience in teaching mathematics. He is also a secondary level mathematics teacher trainer. He has taken part in different pedagogical trainings conducted by the Ministry of Education. He is from a middle-class family in a remote part in Nepal. He is also regular, punctual and responsible in his duty.

Generating, Analyzing, and Interpreting Data

Among different strategies of making interpretive inquiry, the first author employed in-depth interview for this study. As a qualitative researcher, he attempted to understand the world from the participants' point of view to "unfold the meaning of their experiences, to uncover their lived world" (Kvale & Brinkmann, 2009, p.1). However, it should also be noted that there are different ways of making an interpretive inquiry. As highlighted by Bold (2012), it was essential for this study to establish the use of research methods that fitted with the purpose. Thus, he generated data for teachers' perception of social justice through one-on-one in-depth interviews. He recorded their personal stories of teaching and learning mathematics and their perception of social justice in the classroom. Hence, they were "characters in their own stories of teaching and learning mathematics, which they co-authored" (Clandinin & Connelly, 1995, p. 12). Thus, the narratives of their experiences and perceptions acted as windows into their lived experiences and viewpoints.

The first author as a researcher informed the head teacher of each selected school before the visit for data collection. Then, he visited schools and met the participants. He took verbal consent for participation from them. After getting consent, he observed teachers' classroom on different days before the interviews. The class observation provided a context to talk informally during the interviews. Then, he administered interviews with teachers in Nepali language with a focus on social justice. He recorded each interview in a voice recorder. He captured participants' views and perceptions on social justice in mathematics classroom. Each interview with the participant teachers lasted from 40-90 minutes. After each interview, he transcribed the recorded data verbatim in English. The transcribed text was analysed for meanings and themes. Reissman (2008) suggests that transcription and

analysis cannot be separated because transcription is arranged in ways to support researchers' thinking about the meaning of interview (Bold, 2012). In thematic analysis, "emphasis is on 'the told', events and cognitions to which language refers (the content of speech). The focus was on 'what's' of the stories (rather than the structure), and common elements were identified to generate common meanings across cases (Reissman, 2008). Thematic analysis needed several steps such as "reading the transcripts several times, inductive coding, developing themes and subthemes, and seeking to identify core narrative elements associated with each theme" (Ronkainen, Watkins, & Ryba, 2016, p.16).

The researcher read and reread each transcript and coded data with meaningful units under different themes. He brought together all related information (with similar meaning) from different participants under the same theme. He focused more on contents and meanings than on the language of texts. He incorporated teachers' feelings, emotions and critical reflections into interpretation of field notes. All narrative studies depend largely on interpretation (Clandinin & Connelly, 2000). As it was an iterative process, he went back and forth in the process of analysing and interpreting the data (Bold, 2012). He compared different themes based on meaningful texts from critical theoretical perspective. He analysed, synthesized and re-analysed the data (interview transcript and field note) until five final themes emerged from the data. The five themes were - equality, equity, fairness, social process, and caring students that have been discussed in the next section.

Findings and Discussion

We answer the research question 'How do mathematics teachers perceive social justice in the classroom?' with five central themes emerged from analysis of the data - equality, equity, fairness, social process, and caring students. Discussion of each theme is followed by interpretation in relation to connection with theory and practice.

Equality

In general, equality means sameness in comparison of attributes in consideration. In a classroom context, every teacher should treat all students

equally. Saurya agrees with this view regarding equality. He manages classroom environment by asking questions equally to all students in the classroom. He expressed, "*I manage classroom environment by asking questions equally to all students; especially I focus on the weak and marginalized students... all of the students have equal rights to learn and to ask questions related to the topics in my class (Interview, 18th July 2016).*" However, students from marginalized communities have marginal thinking, that means they concentrate on other works rather than mathematics learning. Therefore, it is challenging task to transform their thoughts about learning mathematics. He said that he motivates the ones who do not have any concept of mathematical topics. Similarly, Chandra expressed, "*Equality is to behave equally with all students, not to deviate them, to make them enjoy freedom, and to create the environment of equal justice.*" His views seem to focus on equality in classroom environment. He further added that, "*Through this approach student feel themselves being equal. This approach (equality) aims to explore active participation in the classroom.*" He provided opportunity for participation by all students equally. For that, he maintained rotation of students for seating in the classroom. He claimed, "*I have managed the rotation wise seating of the students in their desks so that everybody gets a chance to sit on the first row. I give chances to all of them to ask questions and take part in discussions*" (Interview, 13th July 2016). Chandra also uses similar criteria as Saurya to evaluate all students. He fairly examines all his students to ensure social justice in his classroom.

Next participant, Tara, expressed, "*I emphasize on teaching the children in understandable way. I think, one-way cannot fit for all. Equality is necessary for maintaining uniformity in the quality of mathematics teaching. I try to maintain this using materials suitable for topic and information technology (for example: use of mobile for giving the concept of volume of cylinder. I also teach according to the capacity level of my students. (Interview, 21st July 2016).*" In Tara's view, uniformity in the classroom as a part of equality contradicts the view that weak and marginalized students should be given more focus to help them learn mathematics.

In this regard, in one hand, Gutierrez (2007) opines, "Although equity means 'justice' or 'fairness', it is often associated with equality, which means 'sameness'. However, to redress injustice and account for various home resources, student identities, and other contextual factors, students need distinct (not the same) resources, and treatment to achieve fairness"

(Gutierrez, 2007, pp. 40-41). In the other hand, different treatment hinders student learning and promotes inequity. “Treating all students the same will not necessarily meet their needs nor provide justice” (Hart, 2003, p. 29). Thus, Pravat (2011) views that the policy and practice of social justice should be equated with the principle of equality, which is based on the assumptions of sameness. The participants’ views about equal treatment to students in the class is like “the equality of humans (children in this case) in their potential to learn; however, it was not a statement about equity from a social justice perspective” (Jurdak, 2009, p. 24). Hence, sense of equality may not be a sense of social justice although there is “a dialectical relationship between equity and equality in the activity system...” (Jurdak, 2009, p. 49). Literature shows that equality in treatment does not necessarily mean social justice in classroom setting because students who come from minority and disadvantaged social, cultural, and economic background may not achieve the same as students from dominant groups (Maguire & Pratt-Adams, 2009) because of economic and other reasons.

The issue equality can be viewed from three perspectives – intrinsic, technical, and structural inequality perspective (Christensen, Stentoft, & Valero, 2008) as a power relation in the classroom. The intrinsic perspective positions students as different individuals with different capabilities and motivation to learn mathematics. That means students have inherent differences in their personal attributes that differentiates them in the process of learning mathematics. The technical perspective considers mathematics as a tool for solving problems or helping students to improve their lives. Study of mathematics and students’ performance is influenced by personal and institutional factors. At personal level, students may have different interest that guides their level of participation in learning mathematics. At institutional level mathematics is taught as a subject despite students’ interest because it is a part of the education system from which no students can scape out. The structural inequality perspective views that mathematics education as a vehicle to carry the “social class division” and “class stratification” leading to divided society. Then, achieving equality in mathematics classroom or treating all students in mathematics classroom equally is helping them to break injustice through learning mathematics (Christensen, Stentoft, & Valero, 2008). For this to happen, there should be a dialectical relationship between equality and equity.

Equity

In general, equity means conducting unequal behaviour to unequal students to help those who are more disadvantaged and lack ability to get benefit from equality of opportunities. In this context, teachers give an opportunity to all students according to their needs and ability to learn. It also refers to increasing the performance of low performers and socially and geographically backwards students. Saurya views, *“Equity is something where all students have similar position in their classroom. I think each teacher should realize that he/she should not discriminate students according to their caste. Teachers need to be free from any kind of biasness”* (Interview, 28th August 2016). In Saurya's view, when all students have similar position or status in their classroom in terms of their roles, participation, opportunities, and share of resources, it is social justice. For this kind of environment, according to Saurya, teachers should not have any kind of biasness to the students. He further adds that, *“In my classroom, students from different ethnic background and proficiency level are mixed in a group, and then they share their own culture to each other.”* For him, social justice in classroom is related to ‘mixing of groups’ and ‘sharing of culture’.

Chandra stated that equity is a necessary component for equality. Further, he argued that there should not be unequal behaviour to students from different backgrounds (Interview, 28th August 2016). Chandra said, *“Teachers need to behave students equally even in unequal situation to ensure social justice and equity.”* Chandra focuses on those students who obtain less mark in their terminal examination. He also arranges seat for his students based on their height. He emphasizes on the students who do not interact well in learning process. He asks questions in classroom to make them active in classroom. He tries to promote social justice by equity of all students in the classroom process both psychologically and socially. He encourages them to be present at school regularly. He supports weak students and makes them active in mathematics classroom. According to Tara, *“Equity is reducing gap between good and weak students. I behave equally with students from different ethnic communities and support marginal students. I also provide books to needy students and give them reinforcement”* (Interview, 29th August 2016). Tara's focus seems to be on managing the gap between students of different ability in learning mathematics.

Mathema and Bista (2006) recommended reducing the gender bias and caste/ethnicity disparities in SLC participation and performance of the students in secondary level. Some scholars (e.g., Gutstein, 2005) focused on students' awareness to themselves as ultimate part of solution to injustice. Esmonde's (2009) definition of equity is "a fair distribution of opportunities to learn" to all students (p. 1008). Teachers should understand that an equitable practice in mathematics teaching acknowledges the involvement of all students in making sense of their mathematical learning. Teachers need to use the approaches that take care of classroom diversity and ensure equity (Moscardini, 2014).

The concept of 'equity' has been challenged lately by many researchers who proposed 'social justice' as an alternative on philosophical and ideological grounds (Jurdak, 2009). In this regard, Berne and Stiefel (1984) proposed a framework for equity in school systems, which might be useful for Nepalese context of teaching and learning in the classroom. The framework consists of three components - targets of equity (which concerns gender, socioeconomic status, ethnicity, and disability status), objects of equity (which includes access, resources, and outputs) and principles of equity (which aims to analyze equity across individuals, regions and countries). Likewise, Berne and Stiefel (1984) provide three different principles of equity - horizontal equity, vertical equity, equal educational opportunity (EEO). The first principle, horizontal equity, requires that students need to be equally situated and equally treated to ensure that they experience similar levels of human and material resources and hopefully achieve similar outcomes. The second principle, vertical equity, focuses on different provision for resources arguing that resources should be provided to students according to their individual characteristics. The third principle, equal educational opportunity (EEO), is based on the notion that all students should be given equal chances to succeed. This requires that students should have access to resources that equalizes their starting point and allows the possibility of success for all (Jurdak, 2009).

Fairness

In general, fairness means unbiased behaviour to others. In a classroom context, it refers to a situation in which teachers do not bias their students. Saurya states, "*Fairness refers to treating all students without any bias. So,*

I teach fairly to my students. Saurya's perception of social justice is related to fair treatment to all students. For him, all students should be treated in the classroom without bias of their gender, race, and other status. He further adds, *“In my opinion, students should not feel unfair in their classroom and they need to have equal chance to learn mathematics. All activities that I conduct in my classrooms are fair (Interview, 18th July 2016).* In his opinion about fairness for social justice, Saurya focuses on treatment to all students without being bias to them. In the same vein, Chandra expressed, *“Students need to be treated equally. They need to clearly understand what teachers teach in their classroom. Classroom activities should be transparent and without biasness.* Chandra brings the idea of being transparent to the students. He also emphasizes promoting a good relationship among students for socially just classroom. He mentioned, *“To improve students' performances and develop their beliefs and confidence towards mathematics, we need to promote a good relation among students and expect good success rate for all students (Interview, 13th July 2016).* These views from Saurya and Chandra indicate different categories to make teaching fair such as clarity in teaching, teachers' confidence, transparent teaching, and focus on equality. From Tara's view, *“the process of teaching and learning including students' evaluation are to be carried out without biasness is fairness. It is needed for fair evaluation of students” (Interview, 13th July 2016).*

Singh (2011) views social justice as unbiased distribution of material and non-material resources that are “beneficial and valued” (p. 482). In other words, teachers need to provide equal opportunities to learners, if they focus on social justice. Singh also highlights the necessity of equal participation of all students in teaching and learning. However, Rousseau and Tate (2003) view that equal does not necessarily mean fair. According to Gutierrez (1999) and Hodge (2006), students have different ability in the classroom and teachers need to respond such differences. What is a good approach for one student may not be helpful to another student in the same class at the same time (Colquitt, 2014). Hence, fairness may contradict with the condition of equality or equity. A teacher should be able to use these conditions appropriately depending on the classroom environment and need of the students. Jurdak (2009) emphasizes “fair distribution of inputs, processes, and outcomes as a prerequisite for the quality of mathematics education” (p. 41). Students' interest in “what is fair and what is unfair can be used in mathematics lessons to explore examples in their local experience and daily

lives” (Margalit & Carter, 2009, p. 102) promoting social justice in the mathematics classroom.

Literature on social justice focuses on the “matters of justice and fairness that are at the heart of a democratic civil society” (Giroux, 2005, p. 155). However, current structure of schooling has been criticized as a machine of social injustice through meritocracy, standardized testing, vision of personal achievement, ruthless competition, survival of the fittest, and detached technology (Giroux, 2005). Fair share of students’ learning in the mathematics classroom have been much influenced by the technical aspects of education rather than true emancipation.

Social Process

Social justice includes socialization of classroom communities in which students and teachers cooperate to each other. It also refers to teachers’ and parents’ active participation and interaction to support students. Saurya includes good and weak students, from different ethnic communities in a group and helps them to socialize themselves. He helps to develop a good relation among the students in his class. Similarly, Chandra said, “*Social process is the process of socialization in a classroom in which all students are connected to one another.* For Chandra, making connection to each other by students in a positive way is social process. He further added, “*They have their own group and individual objective to be the best group. They devote their time in group activities. They teach one another and enhance their feeling of cooperation. Each student behaves well* (Interview, 28th August 2016). In his perception, social justice also means providing students’ opportunity to build a connection to each other, work together in groups, and help each other. Tara expressed, “*My students cooperate with each other. They also use mathematics in their daily lives. They are engaged with different project works. When they work together, they support each other.* In Tara’s view, social justice in mathematics classroom involves students’ group work to support each other. He emphasized, “*All students participate actively and coordinate with each other when they are engaged with project works. This practice has helped me to maintain social justice in my classroom* (Interview, 21st July 2016). For him, helping students in forming such a cohesive group to work together without any bias is social justice.

Social justice issues in mathematics classroom can be linked with critical pedagogy of Freire (1970). This pedagogy questions political impartiality of curriculum, pedagogy, and education systems and looks for promoting learners' socio-political awareness through co-investigation, problem-posing, and dialogue (Dover, 2013). Freire (1970/2002) describes this process as conscientização. It is learning to perceive social, political, and economic contradictions, and to act against the oppressive elements of reality. In any classroom, students should have opportunity to work in a space where they can work collaboratively, can express their views freely, can ask questions to peers or teacher, support each other, and learn from each other (Colquitt, 2014). Hence, a socially just classroom is student-centered, caring each other, and safe for students when they go wrong or make any mistakes in content or process or outcome. Giroux (2005) points out, “we come to be who we are through a process in which our very subjectivity is shaped in the institutions of our social world” (p. xv). However, this process is counterproductive in social justice in the sense that the social process is gendered, languaged, classed, raced, and segregated. The intent of social process in the mathematics class should be “manifestation of our social consciousness” (Giroux, 2005, xv). Social process in mathematics classroom should help students to hear and learn about other perspectives, develop their personal, social, and cultural agency, subjective and social reconstruction, and shift students outside their personal frame of reference (Wright, 2012).

Caring Students

It is generally accepted that social justice also refers to caring low performers and socially and economically disadvantaged and marginalized students. So, teachers need to care such students in mathematics classroom. Saurya seems to care his students and help them when they have questions. He expressed, “*There are some marginalized students in my classroom, such as Barang, Chepang, Praja students, etc. The students usually buy copies (notebooks), pens or books necessary for them with the money they save from their lunch. During breaks at school, I offer some extra time to those students so that they can ask questions on difficult matters (Interview, 27th July 2016).* Saurya emphasized caring his students giving them extra time during the lunch break at school. He thinks that the marginalized students need such help more than other students. In the similar vein, Chandra said, “*I focus on students, who*

are academically (in reading and writing), socially and economically weak and marginalized in their society. I provide extra classes, special treatment, counseling, and extra time to weak and marginalized students. Chandra's support goes to those students who are marginalized and who are weak in mathematics in the class. He further added, "In addition, I always support socially weak students for the improvement of their performance. I believe that such kind of support has encouraged them to be regular in their class (Interview, 28th August 2016). His support is aimed to encourage students to be regular in their class. Tara views that "economically and socially marginalized students are weak at studies. They do not want to ask questions about the topic. Teachers should persuade them in the ways that they can ask questions and understand teaching contents" (Interview, 29th August 2016).

Khanal and Park (2016) have revealed "seven caring habits supporting, encouraging listening, accepting, trusting, respecting and negotiating differences to replace external control" (p.59). According to Adams (2015), there are two primary ways to maintain relationship between morality of justice and morality of care: the superiority approach and the integration approach. The first one describes that one ethnic group is superior to others. In most cases, it is discussed regarding social justice. So, some people discuss it as a superior approach. The next point, the integration approach, seeks to find one monistic theory, in which care and justice are connected. The latter view is that justice cannot exist without care and vice versa. So, care and justice cannot be separated. They are interrelated. Hence, teachers need to give high priority to care each student in a classroom. Gilligan and Attanucci (1988) also advocate that care and justice are associated. For them, care is conceived through the prism of justice and it is upgraded by moral action. These authors conclude that justice and care cannot occur on their own.

The notion of 'care' has been widely researched and is emerging as an important component of effective teaching (Velasquez, West, Graham, & Osguthorpe, 2013). Teachers should prepare themselves to respond to emotional needs of students to care the changing psychological and physiological states (Onchwari, 2010). Teachers should watch and care marginalized, disadvantaged, weak and slow students so that the performance of all students may increase. Weak and marginalized students need special care and treatment. The concept of caring students during teaching is closely related to context and culture (Velasquez et al., 2013). Yet, despite research and theoretical contributions to defining care in

education, there is still a need to clarify and understand how teachers in different contexts and communities perceive care in teaching practice. Given that, care is contextual, and will vary depending on location and educational setting.

Implications

The result of this study has two major implications – policy implication and pedagogical implication. The policy implication focuses on policy intervention for social justice in mathematics classroom through appropriate action to reform curricula, textbooks, and mode of teacher education. The pedagogical implication focuses on practical application of socially just teaching and learning in mathematics classroom.

Policy Implication

The outcome of the study in terms of the five themes and related interpretation highlights the benefits of social justice in mathematics classroom and how teachers' perception of social justice impacts teaching, learning, and student performance. Mathematics teachers, teacher educators, education experts, curriculum planners, policy makers, and all stakeholders should understand the existing situation and practices of social justice in mathematics classroom. It gives insights for transforming curriculum and for promoting social justice in classroom. The study shows how research undertaken collaboratively with teachers working in 'typical' classroom situations (i.e. those where common issues and constraints relating to developing practice are present) is likely to be perceived as relevant and authentic by other stakeholders. Such research, therefore, has the potential to increase stakeholders' engagement with research findings. It also sheds light on the promoting social justice in schools and wider society. The first three themes – equality, equity, and fairness are not only related to classroom dynamics but also, they are political in nature. Therefore, they have greater policy implications.

Equality in a classroom context is possible only when each student has equal access to resources (e.g., books, accessories, technology, and time). The distribution of these resources to each student equally is not possible only through the actions of teachers and schools. It requires a broader

political will and that should be expressed through policy and actions from the government and other stakeholders. Another key element of social justice as perceived by the teachers is equity. Teachers' perception of equity shows some misconception of this construct and hence it cannot be well addressed by only efforts of schools and teachers. Equity as a principle of social justice should be agenda of transformation in the policy document and in action. Fairness seems to be related to school and teacher related factor, but it is beyond the limit of school community. Fairness in a broader sense relates to social, political, geographical, economical, and cultural treatment to the students. Do the students have fair share of social process (of democracy, power, etc.), political process (of decision making), geographical factors (of school location), economical process (of burden or share of income and tax), and cultural process (of expressing and preserving group identity)? The perception of teachers in these factors of social justice is not limited to the classroom, but their impact is high on social, political, and cultural milieu. Hence, these issues call for a broader policy reform in mathematics education.

Pedagogical Implication

The study has outlined the processes that enable transformation of classroom practices to other situations. It has also highlighted how secondary school mathematics teachers perceive social justice. All the themes emerged in this study have pedagogical implications. However, two of them – social process and caring students have even a greater significance in terms of teaching and learning mathematics by creating socially just classroom practices. Equality, equity and fairness have a broader implication and hence teachers have a less control on them because these constructs are wider in scope and stronger in influence socially, politically, and culturally. Whereas, social process and caring students are strongly concerned within classroom practices that are in the scope of teachers' roles and responsibilities to improve socially just classroom practices.

Teachers and students' perception of social justice in terms of social process focuses on socialization of classroom communities, including good and weak students, cooperating and developing a good relation among the students in a class. Literature also supports social justice through political action of curriculum, pedagogy, and education systems and looking for

promoting learners' socio-political awareness through co-investigation, problem-posing, and dialogue. These actions are first in the hands of teachers to enhance learning to perceive social, political, and economic contradictions, and to act against the oppressive elements of reality. Another theme 'caring students' has pedagogical implication through intervention teachers can implement in the classroom by caring low performer and socially and economically disadvantaged and marginalized students. Teachers' perception that marginalized students need such help more than other students is very helpful to develop positive learning atmosphere in mathematics classrooms. When teachers provide extra classes, special treatment, counseling, and extra time to weak and marginalized students, they feel motivated, supported, and cared. This kind of affective element enhances students' self-esteem and confidence toward learning mathematics. Literature also supports these views as emerging component of effective teaching of mathematics for social justice in the classroom.

Limitations

This study has some limitations in method of data collection, and hence it has limitation in the scope of generalization. There was a limitation in method of data collection through two interviews with three teachers. These limited numbers of interviews had limited amount of data for saturation of themes. Hence, the findings with the five themes emerged from the data cannot be generalized for other cases.

Conclusion

This qualitative interpretive study was conducted with three secondary school mathematics teachers. Their perceptions of social justice in mathematics classroom emerged through analysis of interview data in terms of five key themes related to equality, equity, fairness, social process, and caring students. The equality as a dimension of social justice is related to treating all students equally. Teachers should manage classroom environment by asking questions equally to all students in the classroom so that students feel equality among each other. Teachers may face challenges to transform students' thoughts about themselves as a member in a learning community. Teachers' perception of equality is to behave equally with all

students, not to deviate them, to make them enjoy freedom, and to create the environment of equal justice. Teachers view about teaching according to the capacity or level of students has a great pedagogical significance. Some of their views about uniformity in the classroom as a part of equality contradict the view that weak and marginalized students should be given more focus to help them learn mathematics. Teachers' views about equity in terms of students' having similar position in their classroom, in terms of their roles, responsibilities, and share of resources implies social justice. Their perception of social justice through mixed grouping and sharing their culture in a respectful environment is an important aspect of equity. This kind of action may lead to reducing the perceptual and performance gap among students in mathematics classroom. Literature also supports focusing students' awareness to themselves as an important member of groups in the classroom to promote social justice.

The perception of fairness connects to teaching without bias, providing students equal chance to learn, and transparent classroom activities promote social justice in mathematics classroom. Fairness does not mean making things equal. It is to respond to students of different ability and different needs variously. For this to happen in a positive way, there should be a social process that supports students' socialization and personal development in the classroom. Teachers' perception about social process as a means of social justice relates to sense of belonging to groups, feeling of connected, and devotion to each other's development. The perception of caring is linked with caring marginalized students in the classroom, helping them in learning by providing them extra time for coaching or guiding, and improving their performance. Literature indicates further to morality of justice and morality of care as an integral part of social justice in the mathematics classroom.

Hence, this study bears both policy and pedagogical implications connecting teachers' perception of social justice in mathematics classroom to macro elements of social justice at social, economic, cultural and political factors and micro elements of schools and teachers' awareness and actions to promote equality, equity, fairness, social processing, and caring students and their needs.

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