A COMPARATIVE STUDY OF MATRICULATION STUDENTS' MOTIVATION FOR LEARNING MATHEMATICS ACCORDING TO GENDER IN FIVE BURMESE MIGRANT LEARNING CENTERS IN MAE SOT, THAILAND

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Abstract: Among the several components of motivation for learning, the individual's sense of goal orientations, the impression and value of learning tasks, control of learning beliefs and perceptions of personal self-efficacy for learning are important components of the Social Cognitive Theory of Motivation for Learning, which provides the theoretical framework for this study. A number of studies have found that the gender gap in mathematics is highly correlated to perception of the culture of gender inequality in a society. The objectives of this study were to measure the levels of the matriculation students' motivation in learning mathematics and to investigate if there was any difference according to gender in five Burmese Migrant Learning Centers in Mae Sot. One hundred seven students (51 male and 56 female), aged 15-29 years, participated in the survey. The results of this study showed that the differences between genders on average motivation in learning mathematics were small among the migrant learning centers' matriculation students. However, female students had a lower level in overall motivation, higher motivation in control of learning beliefs and lower motivation in the factor of perceived self-efficacy. The reasons for this are likely culturally rooted and sustained. Traditionally, in Burmese culture, boys are regarded and treated as being superior to girls. This cultural perspective most likely affects the girls' motivation and self-confidence in their learning. The article concludes with recommendations for practice and for future research.

Keywords: Motivation, Social Cognitive Theory of Motivation, Gender Equality, Goal Orientations, Task Value, Control of Learning Beliefs, Self-Efficacy.

Introduction

Gender stereotyping in mathematics learning has affected girls' self-esteem and motivation for learning maths and sciences since their early years of schooling (Cvencek, Meltzoff, & Greenwald, 2011). The engineering, manufacturing and

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construction domains are dominated by men (Top Universities, 2012). Recent research has shown that there is a gender gap in the achievement of STEM - sciences, technology, engineering, and mathematics- related fields which persists in many Western and Asian countries. A professor at the Korea Advanced Institute of Science and Technology (KAIST) studied how social impacts influenced women and left them out of full participation in science and technology development (Yoon, 2009). A report from the United States Department of Commerce showed gender equity in school enrollment in primary through high school levels, and women filled close to 50% of all jobs. However, only 24% of STEM jobs were held by women (Beede, Julian, & Langdon, 2011). In Europe, the European Molecular Biology Organization (EMBO) reported that even though more than 50% of European Union students were female, only about 15% of the science professors were women (Ledin, Bornmann, Gannon & Wallon, 2007)

While talking about the women in Myanmar, it is impossible to leave out the world's best known pro-democracy icon and Nobel Peace laureate Aung San Suu Kyi. She won in the bi-election and took the parliamentary oath of the office in May of 2012 (Fuller, 2012). However, only 3.5% of the seats in national parliament are held by women (Inter-Parliamentary Union (IPU), 2015) and Myanmar ranks 134 out of 143 countries in participation of women in parliament (Sedghi, 2012). It is clear that gender stereotypes in mathematics and science learning still persist and affect the gender gap in education all over the world but especially in developing countries. This leads to gender inequality in the career professions of men and women as well as in political participation. When it comes to the gender gap in education, most western societies have gone through the process of opening up education access to girls, thus narrowing the gender gap (Office for Civil Rights, OCR, 2012). This is also the case in Thailand, where women, who in the past rarely received any formal education at all, now have equality with males in K-12 schooling and actually surpass males in university enrollments, including in science fields, though not in applied technology fields (Praparpun & Lynch, 2013).

Most gender gap studies have been conducted in Western countries. However, there is a lack of research examining the gender gap in education in Thailand's fellow AEC member, Myanmar. In order to move forward and close the gender gap in education in Myanmar, it is important to investigate where Myanmar stands in terms of gender equity in education. Being a high school mathematics teacher, the researcher is aware that girls' self-beliefs are influenced both by personal internal factors and by environmental factors. Many girl students in Myanmar are unenthusiastic to study STEM subjects, mathematics in particular, which leads to the gender imbalances in the professions specifically and in society generally.

Theoretical Framework

In the process of learning, motivation is one of the key factors which influences students' performance and achievement. Many education researchers such as Bandura (1993), Stanford University Newsletter on Teaching (1998), and Huitt (2011) have defined motivation as the energizer of goal achievement. Franken (as cited in Huitt, 2011) defined motivation as an internal state that arouses, directs and maintains behavior in a certain period of time. Among the several dimensions which

together determine general motivation for learning are intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs and self-efficacy for learning and performance, which are all important components of Bandura's social cognitive learning theory (SCLT) perspective which provided the theoretical framework for this study (Bandura, 1994, 2001). Motivation to succeed in life is affected by how the students perceive themselves as well as the perceptions of the society at large. Students' learning orientations and motivations are influenced by those socio-cultural attitudes (Bandura, 1993).

An individual's behavior is influenced both by their personal internal cognitive factors (including motivation) and also by environmental factors. The personal cognitive factors, which consist of intentions, goals, affect, expectations, and biological events are gradually upgraded by knowledge and ability. Environmental factors, which include all external elements that impinge on the individual (e.g., classroom atmosphere and structure, other students, teachers, parents, modeling, reinforcement) influence both cognition (including motivation) and also behavior, which includes engagement and persistence in learning activities. Therefore, the relationship among behavioral, personal and environmental factors is a reciprocal one as depicted in Figure 1.

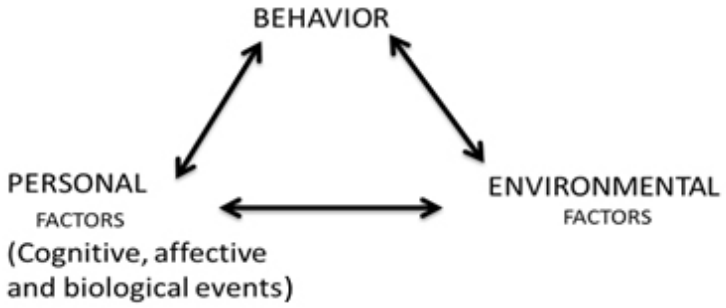

Figure 1: Bandura's Reciprocal Determinism Model (from Pajares, 2002)

Motivation for learning plays an important role in student learning and performance. Motivation is the inner energy to do something to achieve goals. If the learners have no motivation to learn, they will not learn at all, or at the very least, not learn in a directive, efficient manner. A number of studies have found that the gender gap in mathematics is highly correlated with a culture of gender inequality in a society. In gender equal societies, on the other hand, the performance difference of mathematics and reading by gender is smaller (Guiso, Monte, Sapienza, & Zingales, 2008). People's behaviors are influenced by social environmental aspects. Self-efficacy not only affects and but also is affected by the level of the individual's intrinsic goal orientation, extrinsic goal orientation, and the task value in learning and achievement (Pintrich, 1999). Goals escalate the activities and performance outcomes (Bandura, 1988). Students' attitudes relate to their self-influence, self-monitoring, affect, motivation and behavioral actions (Ragland, 2008).

Gender Differences in Mathematics

According to an analysis of international research by Else-Quest, Hyde, & Linn (2010), which examined data from 69 countries, the performance of girls in mathematics was at the same level as boys when they had suitable educational tools and female role models who were outstanding in mathematics. The researchers reported that the differences between genders on average were small but the most striking factor was the size by which the differences which varied in the 69 countries reviewed. In general, girls showed comparable mathematics skills to boys. However, boys' level of confidence in their abilities and motivation to do well in mathematics in order to pursue careers in science, technology, engineering and mathematics was significantly higher. When looking at the different measures of women's education level, political involvement, welfare and income in each country, it was found that the gender differences in mathematics related to the status and welfare of women in each country. Else-Quest (2010) stated that the quality of curriculum and instruction, the perceptions of the value of the schools, teachers and families on girls' learning mathematics influenced the level of female students' learning. The research indicated that given an equitable learning environment, girls can be the mathematical equals of boys and they are capable of developing talent, skills and interest in STEM subjects generally. Socialization, therefore, was found to be a primary cause of gender disparity. When the girls received encouragement in succeeding in learning mathematics from the social environment, they performed as well as the boys (Else-Quest, Hyde, & Linn, 2010).

Hyde (2008), in a study which analyzed the math performance of 7 million students of ten American states from grade two to grade eleven, insisted it was not true that boys are intrinsically better at math. In general, girls are equal to boys in math performance. The math test scores showed that there was almost no difference in the skills of males and females in mathematically demanding fields. However, Hyde found that boys were more confident in mathematics even if girls got better grades. The stereotypical belief that boys are better at math discourages mathematically competent girls who want to pursue careers in mathematics. The manner in which teachers treat male and female students also influences girls' motivation to take higher-level math and engineering courses (Hyde, 2008).

In general, the rate of attending school by gender does not differ significantly in Myanmar. UNESCO Institute of Statistics (2013) described under Myanmar Education profile of 2011, 73% of the population of secondary age, 11-16, was in secondary education with 72% male and 74 % female (UNESCO Institute of Statistics, 2013).

Clarke reported in the Evaluation of UNICEF's Education Program (2010) reported that boys culturally received more support from families to access education in some areas of Myanmar such as Rakhine State and Chin State. It was recommended that the persistence of gender stereotypes reflected in school textbook contents needed to be eliminated. In addition, the practice of gender inequality in teaching and learning persisted in some areas (Clarke, 2010).

Due to limited access and the politically closed situation in Myanmar for the past several decades, there has been a lack of published research and resources regarding Myanmar when it comes to both education and the gender gap. Myanmar

was not listed in the World Economic Forum's Gender Gap Index Report 2013 although the World Economic Forum was held in Naypyidaw, the capital of Myanmar, in June, 2013 (World Economic Forum, 2013).

Social Cognitive Theory of Gender Development

The social cognitive theory of gender role development and functioning, developed by Bussey and Bandura (1999), emphasizes that people perceive and imitate the gender roles of others as the result of observation and lifelong experiences. At the same time, societies promote those stereotypical gender behaviors in daily life by judging which are appropriate and which are not. Whereas *sex* is biologically determined, the gender categories of masculine and feminine are socially determined and influence people for their entire lives. Consequently and relatively, gender characteristics influence the occupational choices people make (Bussey & Bandura, 1999).

Sociologically-oriented theory and psychologically-oriented theory of gender development both emphasize the nature of social modeling and identification. The cognition of gender perceptions is constructed through recognizing same-sex performances over generations. Children regulate their gender constancy by performing behaviors harmoniously with their perceptions (Bussey & Bandura, 1999).

The combination of family responsibilities with professional life is one of the external factors regarding gender differences in the work place (Organization for Economic Co-operation and Development, 2012). In many societies, including Myanmar, people are told that boys are good at math and girls are good at reading. A study at the University of Washington applied implicit self-concepts, stereotypes and attitudes in a self-reported instrument to find out how children demonstrated the association of math with boys and girls. The researchers reported that the gender stereotype that math is more appropriate for boys than girls, is rooted in the socio-cultural belief system as early as second grade (Cvencek et al., 2011).

Method

Participants

This study was conducted in five Burmese Migrant Learning Centers (MLCs) in Mae Sot, northern Thailand. It was a quantitative study which utilized survey research to determine if there were significant differences between the motivation of male and female students in learning mathematics in the five MLCs. The target population consisted of 123 students of the special program - the Myanmar government matriculation course - offered by the five MLCs in the school year 2013-2014. All of the MLCs utilized similar teaching/learning materials and the same curriculum in preparing their students to take the Myanmar government matriculation exam. The total population of 123 in the 5 study centers served as the sample of the study. The collected data was analyzed by both descriptive and inferential statistics.

Instrumentation

The questionnaire included two sections, students' demographic data and students' motivation for learning mathematics. The demographic section covered the respondents' current school, gender, age, ethnicity, subject combinations, previous school and previous education. The motivation section included 5 motivation components from the Motivated Strategies for Learning Questionnaire (MSLQ). The highly validated MSLQ was developed by Pintrich, Smith, Garcia, & McKeachie (1991). The MSLQ has two sections: a motivation section and a learning strategies section with fifteen sub-scales altogether. The instrument was designed such that the sub-scales are segmental and can be used separately or together as needed (Pintrich et al., 1991). Only the motivation section of the MSLQ was used in this study. The MSLQ motivation section consists of 31 items that assess students' motivation in terms of six motivational components: intrinsic goal orientation (4 items), extrinsic goal orientation (4 items), task value (6 items), and control of learning beliefs (4 items), self-efficacy for learning and performance (8 items) and test anxiety (5 items). This study used all of the motivation components except test anxiety which was deemed not relevant to this research. The questionnaire was translated into Burmese by the researcher. It was then back-translated into English by three experts independently. Having the native-like proficiency in both English and Burmese languages and currently working in the educational field area were the criteria for the experts.

In a study of the scale reliability of the MSLQ motivation section, Taylor (2012) found that ". . . across a variety of samples, the six scales tended to yield acceptable reliability estimates" (p. 89). Artino (2005), in a review of the MSLQ, concluded that ". . . the MSLQ had relatively good internal reliability" (p. 8). Pintich et al., 1991 carried out three waves of data collection in 1986, 1987 and 1988 that included a total of 1,771 respondents. They computed alpha coefficients for each motivation scale. Those alpha values of the five sub-scales utilized in this study are shown in the Table 1 below.

Table 1: Reliability Coefficients of The Motivation Components of The MSLQ

Sub-scale	Item number	Number of items for each component	Pintrich et al. Alpha Values	Current Study Alpha Values
Intrinsic Goal Orientation	1,13, 18, 20	4	.74	.76
Extrinsic Goal Orientation	6, 9, 11, 25	4	.62	.78
Task Value	3, 8, 14, 19, 22, 23	6	.90	.82
Control of Learning Beliefs	2, 7, 15, 21	4	.68	.74
Self-Efficacy for Learning & Performance	4, 5, 10, 12, 16, 17, 24, 25	8	.93	.80
Total	26	26		

Collection of Data

The survey was carried out in March, 2014. The researcher requested permission from the heads of the five migrant learning centers in Mae Sot. The researcher coordinated with the head teacher and teachers of the five migrant learning centers in order to distribute the survey at the end of a class, as convenient to the teachers. A total of 123 questionnaires were distributed and 107 questionnaires were completed and usable which represented an 87 % return rate. The questionnaires were distributed, administered and collected by the researcher herself.

Data Analysis

For each of the motivation dimensions (intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs and self-efficacy), descriptive statistics were used to investigate the level of the male and female students' motivation for learning mathematics in terms of each dimension. Descriptive statistics involving means, standard deviations and frequencies were used to identify the levels of migrant learners' overall motivation for learning mathematics in the five MLCs.

Then inferential analysis, *t*-test, was then used to determine if there was a significant difference between the matriculation male and female students' motivation for learning mathematics in terms of the motivation dimensions mentioned above.

Table 2 presents how the scores on the motivation scale and sub-scales were interpreted. In this study, a low total score indicated low motivation for learning mathematics and a high total score indicated strong motivation for learning mathematics (Pintrich et al., 1991).

Table 2: The 7-point Likert Scale Revaluated into A 5-point Scale Criteria for Score Interpretation

Score	Meaning
5.81 - 7.00	Very High
4.61 - 5.80	High
3.41 - 4.60	Moderate
2.21 - 3.40	Low
1.00 - 2.20	Very Low

Results

In terms of demographics, the proportion of gender among the 107 respondents was 51 male students (47.7 %) and 56 female students (52.3 %). Ages of the students ranged between 15 and 29 years Tthe majority of the students were between 17 and 19 years, which accounted for 72% of the respondents.

(See Table 3 on the next page)

The group mean was calculated. The average scores of the motivation scale and sub-scales were interpreted by a 5-point rating scale. In order to determine if there was any difference in the male and female students' motivation for learning mathematics, the descriptive data of gender and the average scores results of the MSLQ questionnaire were used.

Table 3: Frequency Table of the Respondents by Age

Age of the students	Frequency	Percentage
15	1	0.93 %
16	8	7.48 %
17	20	18.69 %
18	28	26.17 %
19	29	27.10 %
20	9	8.41 %
21	7	6.54 %
22	2	1.87 %
23	1	0.93 %
24	1	0.93 %
29	1	0.93 %
Total	107	100.00 %

Table 4: Summary of The Comparison of Male and Female Students on Motivation Scales and Sub-scales (N=51 Males and 56 Females)

Scale	Gender	Mean	S.D.	Interpretation
Intrinsic Goal Orientation	Male	4.84	1.30	High
	Female	4.67	1.20	High
Extrinsic Goal Orientation	Male	5.79	0.94	High
	Female	5.98	0.99	Very High
Control of Learning Beliefs	Male	5.54	1.15	High
	Female	5.93	1.05	Very High
Task Value	Male	5.72	1.03	High
	Female	5.72	1.12	High
Self-Efficacy for learning & performance	Male	5.00	1.02	High
	Female	4.75	1.18	High
Overall motivation	Male	5.35	0.88	High
	Female	5.33	0.88	High

The *t*-test for the independent samples had been used to examine the difference of the mean of motivation components between the two independent sample groups

among the migrant learning centers' matriculation male and female students was applied.

Table 5: Summary of The Comparison of Mean Scores of Male and Female Students on Motivation Scales and Sub-scales (N=51 Males and 56 Females)

Scale	Mean		*t*	Sig (one-tailed)
	Male	Female		
Intrinsic Goal Orientation	4.84	4.67	0.69	.24
Extrinsic Goal Orientation	5.79	5.98	1.00	.16
Control of Learning Beliefs	5.54	5.93	1.83*	.04
Task Value	5.72	5.72	1.23	.45
Self-Efficacy for learning & performance	5.00	4.75	1.21	.12
Motivation	5.35	5.33	0.134	.45

*Significant difference at .05 level of significance

The researcher found that the motivation of the matriculation students in the migrant learning centers in Mae Sot was high overall and there was no significant difference between males and females. In terms of the subscales - intrinsic goal orientations; extrinsic goal orientations; task value; and self-efficacy for learning and performance, the findings showed no significant differences between genders. However, there was a difference between male and female students' motivation for learning mathematics in terms of control of learning beliefs.

Discussion

This study produced results which corroborated the findings of a great deal of the previous work in this field. The levels of intrinsic goal orientation of the students, both male and female, were moderate while they had a high level of extrinsic goal orientation, control of learning beliefs, task value and high level of overall motivation in learning mathematics. To achieve a reward or to avoid a punishment, students may complete the activities with an extrinsically motivated attitude. As several studies have indicated the level of extrinsic motivation often increases as the level of intrinsic motivation decreases with the age of the learners (Gillet, Vallerand, & Lafrenière, 2012; Lai, 2011; Lepper, Corpus, & Iyengar, 2005). This is especially true for learning areas where students do not have deeply felt interests. The external motivator, the reinforcement, such as getting the good grades in a learning process can bring the learner towards internal motivation (Ryan & Deci, 2000). As mentioned in the background of the study, most of the matriculation students of the migrant learning centers aimed to continue their education at the university level. In other words, the extrinsic goal of passing the matriculation exam for them was having a recognized high school diploma which can narrow the gap between the students' current educational status and the requirements of getting into national or international programs in universities.

The level of task value of the students was also high regardless of gender. This finding further supports the idea of Agnesia (2010) that being satisfied with the value of the task increased the students' motivation to learn. When students recognize that the knowledge to be learned is related to their personal goals, they enhance their engagement with the task. The respondents had high extrinsic goal oriented motivation for getting the high school diploma. This can explain the prevalence of extrinsic over intrinsic motivation among the subjects of this study.

Regarding the control of learning beliefs of the students in learning mathematics, the mean scores were high for both genders. This finding also indicates a characteristic of adult learners. The students were self-directed and their behaviors were the functions of their decisions to take the matriculation class to pursue their high school diploma.

Moreover, there was a significant difference between male and female matriculation students of MLCs. The level of female students' control of learning beliefs was higher than that of the male students. On the other hand, in terms of the level of self-efficacy for learning and performance, although the female students had a high level of overall motivation, the result of this study revealed that male students had more confidence in learning mathematics. The level of the female students' self-efficacy for learning mathematics was moderate while the level of male students was high. The lower score of female students' self-efficacy could be an indication of low confidence in learning mathematics.

What is surprising is that the female students had higher control of learning beliefs but lower self-efficacy beliefs in learning mathematics than male students. Therefore, this study has been unable to demonstrate that the control beliefs correlate highly with self-efficacy and other self-beliefs. This finding can correspondingly be related with the extrinsic goal orientation of the adult learners. The female students of the Burmese MLCs had chosen to enter the matriculation course by themselves while many of their friends have ended up as migrant workers in Thailand. The fact of being adult learners who are extrinsically motivated to earn the recognized high school diploma most likely led them to exert control over their own learning. According to Pintrich (1999), once the learner believes that they can learn and that their effort to learn will result in learning, then self-understanding is initiated with self-control. They will monitor and control not only their cognition and behavior but also their learning environment more strategically and effectively.

The apparent contradiction inherent in the female students having high control beliefs but only moderate self-efficacy beliefs likely resides in the fact that self-efficacy perceptions are domain specific (Bandura, 1993; Pintrich et al., 1991). People can have high efficacy in some areas and moderate or low efficacy in other areas. But they can still have high overall control of learning beliefs because they have opted themselves to study subjects for which they may have low efficacy because they realize that they must pass those subjects in order to attain their learning goal (e.g., to get the high school diploma).

Gender Differences in Mathematics

The findings of the current study are consistent with those of Else-Quest et al. (2010), who examined data from 69 countries. They reported that girls showed

comparable mathematics skills to boys in general. However, boys' level of confidence in their abilities and motivation to do well in mathematics in order to pursue careers in science, technology, engineering and mathematics was significantly higher. When the girls received encouragement in succeeding in learning mathematics from the social environment, they performed as well as the boys (Else-Quest et al., 2010).

The findings of the higher score in control of learning beliefs and lower score in self-efficacy of female students of MLCs support the idea that students will monitor and control not only their cognition and behavior but also their learning environment more strategically and effectively (Pintrich, 1999). The lower score to self-efficacy can be translated into low confidence in math learning. This result showed that, even though the girl students found mathematics difficult, they believed that they could be good in math if they studied harder and utilized effective learning strategies properly and that passing math was essential in achieving their goal of receiving the high school diploma.

Low self-efficacy in math learning on the part of the girl students could possibly derive from Burmese cultural and social opinions that boys are superior in general and better in math specifically. Such notions likely directly affected the self-efficacy for learning math of the girl students. Additional in-depth research is needed in order to determine the generalization of such findings to other populations. Pintrich & Schunk (1996) stated that the perceptions of the students' abilities are influenced by both personal and environmental factors. Perceived self-efficacy regulates learners' mindsets toward learning. The students' self-beliefs affect the identifying of the self-efficacy of their achievement which impacts their goal setting (Zimmerman, Bandura, & Martinez-Pons, 1992). The important distinction here, again, is that the girls knew that the proximal goal of passing math class was an essential step toward the terminal goal of getting their high school diplomas. Thus their control beliefs were high while their self-efficacy beliefs were moderate.

Furthermore, Hyde (2008) insisted it is not true that boys are intrinsically better at mathematics. In general, girls are equal to boys in math performance. The math test scores showed that there was almost no difference in the skills of males and females in mathematically demanding fields. However, Hyde found that boys were more confident in mathematics even if girls got better grades. The stereotypical belief that boys are better at math discourages mathematically competent girls who want to pursue careers in mathematics (Hyde, 2008). Cvencek, et al., (2011) reported that the gender stereotype that math is more appropriate for boys than girls, is rooted in the socio-cultural belief system as early as second grade. As Guiso et al., (2008) mentioned, a number of studies have found that the gender gap in mathematics is highly correlated to perception of the culture of gender inequality in a society. The performance difference of mathematics by gender is smaller in gender equal societies. According to the report of the Global Justice Center (2013), the rights of women have been promoted in many countries in the aspect of democracy; however, the lives of women in Myanmar have not greatly improved yet. Women have long been considered ineligible for many occupational, educational, professional and traveling opportunities under the previous military regime (Global Justice Center, 2013).

In brief, the results of this study showed that the differences between genders on average motivation in learning mathematics were small. However, female students had a lower level in overall motivation, higher motivation in control of learning beliefs and lower motivation in the factor of perceived self-efficacy. The reasons for this, as noted above, are likely culturally rooted and sustained.

This study has been unable to demonstrate that the control beliefs correlate highly with self-efficacy and self-beliefs. Further work is required to establish why the female students had higher control of learning beliefs but lower self-efficacy beliefs than male students. Also, further study with more focus on the relationship between gender identity and math concept is recommended. In future investigations, it might be possible to use the pragmatic approach which involves mixed different approaches. It can be using both quantitative method and qualitative approaches of in-depth interviews or focus group discussions and observations. Such a mixed approach can provide a greater richness and depth to the findings and this will enhance our understanding of the issues involved.

Based on the findings of this study, the researcher makes recommendations for teachers, administrators, principals, policy makers and the students of the migrant learning centers in Mae Sot. Teachers should develop teaching material, use gender neutral language, and encourage girls and boys to be high achievers in all subjects. Teaching materials should not include gender stereotypes. Gender unbiased language must be employed in materials and in classroom interactions. Teachers should encourage equally girls and boys to take the science stream subjects according to the students' potential and interests. Teachers need to make sure that all students get the opportunity to learn according to their level. Differentiated instruction helps the teachers in creating learning environments that respond to the needs of each learner. Teachers and learning center administrators should practice the strategies to eliminate gender inequities in the learning environment. They should be aware of expressing their attitudes, tone of voice, and body language to make sure that they are not communicating differently with boys and girls. Creating math tutoring clubs, collaborative activities and problem solving games, having girls as group leaders can also enhance the students' participation with positive attitude towards math.

At the same time, the authorized persons, the principals, the school leadership, stakeholders and the teachers need to aware of the gender responsive hidden curriculum that the students learn at school in addition to the official, formal curricula. It may include the school board composition, staff employment and promotion, assignment of school monitors and expectations about how to act in public. Teachers should support the girls to develop confidence and perceptions of self-efficacy. If there is any stereotyping peer pressure, teachers and administrators should work together to eliminate it. The role of the teacher is not only to be the source of knowledge and to transmit that knowledge to the students, but it is also to guide, to facilitate, to communicate, to analyze, to support and to develop the capabilities of the students to achieve throughout the learning process regardless of gender.

Another recommendation is to have regular meetings with the students about their academic performance. Teachers and students should review the self-reflective

assessments by conferencing individually or in small groups. This will help the students to monitor and evaluate their own performance and to direct their self-regulation of problem solving strategies. Self-evaluation conditions learners to make an effort to reach their learning goals (Bandura, 1988). In conclusion, it is important to determine the instructional approaches, strategies and methods of teaching and learning mathematic to improve the achievement of students and to have the gender unbiased learning environment to close the gender gap.

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