การนำเสนอบทบาททางเพศในหนังสือแบบเรียนวิชาคณิตศาสตร์ที่ใช้ในโรงเรียนมัธยมแห่งหนึ่ง
ในจังหวัดชลบุรี

GENDER REPRESENTATION IN MATHEMATICS TEXTBOOKS: A CASE
STUDY OF MATHEMATICS TEXTBOOKS USED IN A DEMONSTRATION
SCHOOL IN CHON BURI PROVINCE, THAILAND

TING-FONG TSAI

Burapha University

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The Thesis of Ting-fong Tsai has been approved by the examining committee to be partial fulfillment of the requirements for the Master of Arts in English for Communication of Burapha University

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TING-FONG TSAI : GENDER REPRESENTATION IN MATHEMATICS TEXTBOOKS: A CASE STUDY OF MATHEMATICS TEXTBOOKS USED IN A DEMONSTRATION SCHOOL IN CHON BURI PROVINCE, THAILAND. ADVISORY COMMITTEE: SUCHADA RATTANAWANITPUN, , SUTRAPHORN TANTINIRANAT 2020.

Gender inequality had been around for centuries that women are more likely to be in lower-status positions than men. Manifestations of gender norms could be found in educational systems, one of the tools was the textbooks. Textbooks may contained content that indicates prejudice against particular gender groups. The purpose of this study was to examine the ratio of male-to-female, gender-neutral and marked constructions, gender roles, the order of mentions, the common adjective used, and titles of address in the selection of mathematics textbooks used in a demonstration school. The context was then coded using modern software tools in attempting to find out the stereotype hidden in the textbook. The result found out that in most of the selected textbooks, the representation of women and the firstness of women were less visible than men. According to the gender-marked and gender-neutral construction, there were common uses of gender-neutral constructions. However, the accordance with gender role, the males were more represented in social role, while the female was more in the domestic role. The female title of Miss and Mrs. were found in all the textbooks. These results suggested that the writer or the people who used textbooks should beware of the importance of gender equalities shown inside the textbook since the world today wanted the society to be in balance between gender.

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Ting-fong Tsai

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CHAPTER 1

INTRODUCTION

Statements and significance of the problems

Gender is known to be a culturally and socially constructed. Berkowitz, Manohar, and Tinkler (2010) mention that gender is socially constructed through human interaction and interpretation, rather than biologically determined. According to Goldstein (2003), sex is fixed and based in nature while gender is fluid and based in culture. In society, gender is under the influence of parents, schools, peers, and mass media, which boys and girls behave in the way that their communities expect them to be.

Gender representations have been shown in many places. For instance, in media, books, signs, etc. As in society, many people want a world with gender equality, however, in reality, there is not that equality. In the field of sociolinguistics, gender inequality has been occurring for quite some time, as pioneered by the study from Lakoff (1973), which revealed that women are more likely to be in lower-status position than men.

Young children are bombarded daily with language and images that influence their information on gender roles (Narahara, 1998). Languages that contain gender roles are considered being as sexism. When children enter school, books begin to play a huge influence on children. Gender inequality means that men and women are not equal, and that gender affects an individual's lived experience.

The evolution of the role of women within a community takes place throughout the centuries, and it has not finished. Women have found themselves in many parts on the stage of life, from key characters to ones of very little importance, but always present in the spotlight (Pirnuta & Grigorescu, 2011). Pirnuta and Grigorescu (2011) add that from goddesses to slaves, from the symbol of sin to the image of holiness, women have had a difficult path in understanding their purpose, their limits, and most importantly, their freedom. For instance, race, class, and gender influence relations of oppression and privilege in society at both the individual and structural levels. White women within the movement argued that they were being oppressed and their demands for equal rights were being ignored. Women of color agreed that their equal rights as women were being ignored and argued that because of their race they experienced multiple, simultaneous oppressions (Collins, 2002; Collective, 1977)

Although in many places, the governments tried to apply various creative solutions to rectify this issue, gender bias is still present in many societies (Al-Qatawneh & Al-Rawashdeh, 2019).

Manifestations of gender norms can be found in educational systems. Education plays a very important role in shaping the minds and the attitudes of children. School is a place where children start to learn about their historical bounds, cultural, and social identity. Therefore, the school has a great impact on children and young adults who later become adults in society. The way students are taught, and the educational materials used in schools are very important to the children's identity development. One of the educational materials is the textbooks. They are the first materials that students would experience in terms of learning input. Anjaneyulu (2014); Sydney (2004) state that textbooks are the most important elements of the teaching process for the aims and objectives of the course. Sydney (2004) adds that the textbooks provide the technical and academic knowledge that the officials want the children to achieve during their schooling years. Moreover, textbooks have always been a central and indispensable place in modern education systems.

However, textbooks may contain content that indicates prejudice against a particular gender group. Gender roles and related cultural and ideological meanings are a part of the side-line knowledge conveyed by educational materials and classroom interaction. This shows an issue of the relation between gender and language and how it is represented inside the textbooks known to be in the form of linguistic sexism. For centuries, stereotypically portraying men and women in children's and youth's school textbooks still occur (Bazzul & Sykes, 2010; Macleod & Norrby, 2002; Leo & Cartagena, 1999; Sohel, Akhter, Ullah, Haque, & Rana, 2016). Blumberg (2008) mentions that his studies exposed gender bias in school textbooks at the same as the second women's movement in the 1960s in the United States. A study carried out by Ansary and Babii (2003) concluded that women often appeared less visible than men and women were more visible in indoor passive activities and were placed in traditional roles. Many of the female's roles were portrayed as playing a supporting role to males in the textbooks (Hamid, Yasin, Bakar, Keong, & Jalaluddin, 2008).

Several researchers have examined the presents of sexism in ESL/ EFL textbooks. Hartman and Judd (1978) investigated some TESOL textbooks and examined the images of women and men, firstness, and stereotyped roles of females and males. The result demonstrated that sexist language usage was built in the English language. Hellinger (1980, p. 12) conducted three ELT textbooks used in German schools. She found that men participated in over 93% men of the passes while less than 30% of the texts included women. Also, it was mentioned that 80% of the speakers were males and the females were rarely engaged in any, "demanding, interesting, or successful" activities, while male roles represented a broad range of occupational choices. In addition, Chick & Altoon (2006) evaluated elementary, middle, and high school American history textbooks for gender balance. The text contents and illustrations were used to analyze, and the results showed the percentages that males were found to be more than females at both levels. As in China,

Zhu (1994), Zeng (1995), Jin (2000), Yang and Lv (2002), Zhang and Yang (2003) reported similar results where men were more mentioned than women.

The inequality in gender could lead to a narrower understanding of the social roles that females play (Nagatomo, 2010). Also, Turner-Bowker (1996) suggests that textbooks teach children what behavior is appropriate or inappropriate and that they serve as a source that children acquire gender stereotypes.

Many researchers have found that children understand the world and the relationship within society through the influences of textbooks. Gender-biased language in textbooks can affect students adversely, and it can create an oppressive world for them because this gender-biased language most often is unjustified and unfair (Cameron, 1990). Lesikin (2001) found out that gender bias and gender stereotypes in written texts and pictures have deleterious effects for female students. These effects include feelings of exclusion, devaluation, alienation, and lowered expectations.

To the researcher's knowledge, few studies have attempted to investigate gender representation in school mathematic textbooks. Mathematics textbooks have an important role in representing and translating the abstract curriculum into operations that teachers and students can carry out (Valverde, Bianchi, Wolfe, Schmidt, & Houang, 2002). They are extensively used in everyday classroom practice (Mullis, Martin, Foy, & Arora, 2012), differ in content and pedagogical styles (Pepin & Haggarty, 2001), and therefore potentially shape learning opportunities for students. Hence, it is assumed that textbooks have a substantial effect on student achievement. Ullah, Abdullah, Ahmad, and Ali (2019) conducted a study of gender representation in mathematics textbooks used in primary schools. The analysis revealed gender stereotypes by portraying men/boys in the public domain (playing games, driving, running shops, doing and investing in businesses, etc.) and women /girls in the private domain of home (engaged in cooking, home decoration, helping out their children in homework, etc.).

As the researcher was a mathematics teacher and was curious on the gender representation of the mathematics textbooks, the main aim of this study was to investigate gender representation in mathematics textbooks used in lower secondary levels. This study employed a quantitative research approach to determine the ratio of gender representation appearing in the mathematic textbooks. The use of titles, activities, and the firstness between men and women used in the contexts in the mathematics textbooks were also investigated. This study aspires to reveal whether there is any gender imbalance in the textbooks. In addition, social and domestic roles that reveal in the textbooks were analyzed as well. The study would raise awareness about gender representation in the textbooks.

Purpose of the study

The present study attends the following purposes:

1. To examine the ratio of the words representation of women compared to men in the selection of textbooks used in a school in Chon Buri Province.

2. To determine the use of gender-neutral and gender marked constructions in the textbooks.

3. To determine the gender's social roles and domestic roles and the order of appearance of women and men when both are referred to in a single phase in the textbooks

4. To investigate the titles used to describe women and men in the textbooks.

Research questions

This study attempts to find the answer to the following questions:

1. What are the ratios of the words representation of women compared to men; in the selection of textbooks used in a demonstration school in Chon Buri Province?

2. To what extend are gender-neutral and gender marked constructions used in the textbooks.

3. What are the types of gender's social roles and domestic roles and the order of appearance of women and men when both are referred to in a single phase in the textbooks?

4. What are the titles used to describe women and men in the textbooks?

Contribution to knowledge

1. This research would give a clearer representation about gender bias, gender-stereotype, and gender inequalities aspects, especially in mathematics textbooks, where it used to represent and translate abstract knowledge into operations.

2. The results of this research would also help to deconstruct the hidden curriculum and the asymmetrical ways in which the two genders are presented in the textbooks. This research would also help to notify the gender-bias and gender stereotyping that might prevalent in the textbooks.

3. This research would help other researchers to write research that would not lead to a gender bias or gender-stereotypical way of using the word choice that is gender-neutral or visibilities balances of two different genders.

4. The results of this study may serve as useful and fundamental information for further research on topics of gender and expression of uncertainty in gender representation in textbooks.

Scope of the study

1. This study investigated the ratio of male and female representations in the mathematics textbooks used in lower secondary schools in Chon Buri Province, and the textbooks were purposively selected.

2. In six lower secondary mathematics books, three of which are the first editions and the remaining three are the latest version of the same textbooks. Three of the textbooks of the first editions were published in the year 2009, and one of the latest editions was remade and published in 2017. The authors of these books are Tay Choon Hong, Mark Riddington, and Martin Grier.

3. The exercise at the end of the chapter of the mathematics textbooks were to be used in data analysis. The visuals were excluded and only the text dialogs were in consideration.

4. Quantitative content analysis was used as the mean of the data analysis technique. The content in the textbooks were analyzed by using a framework, adapted from previous studies in the field and listed in the research question section.

Limitations of the study

1. The textbooks that were used in this study were published by foreign publishers. Locally published textbooks were not included in this study due to the lack of English language in the textbooks. As for these limitations, the study did not provide enough foundation to be generalized about the gender representation in educational material and textbooks locally published or revised in these years in various countries.

2. Only six textbooks that had revised in recent years were included in the scope of the current study and only the lower secondary level textbooks were analyzed because of its practicality. It would be more validated and reliable if all series of textbooks which would have been included in the study.

3. The gender of the authors of the textbooks were not considered in this research.

Definition of terms

For a better understanding of the definitions used in this study, the following terms are operationally defined.

1. Sex

Sex refers to the biological features which define human beings as female or male (Shbitah, 2016). In this study, sex refers to male and female.

2. Gender

Gender refers to the socially formed roles and characteristics that society attributes to the two sexes on different basis (Yilmaz, 2012). In this study, gender refers to as men and women characters that appear in the textbooks.

3. Gender bias

Gender bias refers to beliefs or attitudes that show an initial view or set of expectations of people's abilities and interests according to their sex (Stitt & Erekson, 1988). This study defines bias as female stereotyping shown in the mathematics textbooks.

4. Gender stereotyping

Gender stereotyping refers to a widely held but fixed and oversimplified image or idea of gender usually female (Weitzman et al. 1972.) Weitzman, Eifler, Hokada, & Ross (1972) found gender role portraits in the picture books: boys were active, leading and rescuing others, while girls were passive, following, and serving others. The present study attempted to find out the gender stereotyping appeared in the mathematics textbooks.

5. Linguistic sexism

Linguistic sexism refers to sexism conveyed within language, found in many different languages, and exists in many forms. In this study, it refers to English language sexism appears inside the mathematics textbook.

6. Titles

Titles refer to prefixes of a person's name. In this study, Mr. may refer to a man who is married or not married. However, the female titles Mrs. and Miss have traditionally been used to address married and unmarried women.

7. Male-firstness

Male-firstness refers to placing the masculine vocabulary in front of the female vocabulary. Traditional assumptions of male supremacy are reflected in the male-first ordering of the coordinates in paired expressions such as Mr. and Mrs. Matsuda, Romeo and Juliet, and he or she (Lee, 2014). In this study, it refers to the order of expressions of titles, pronouns and bi-sex-related noun pairs shown inside the mathematics textbooks.

8. Visibilities

Visibilities refer to the frequency if female representation against male representation. The frequency of gender inequality is female invisibility (Lee, 2014). This study refers to it as the lack of female shown inside the mathematics textbooks

9. Domestic role

Tasks performed inside a household to ensure that the basic needs of its members are met, such as cooking, cleaning, and taking care of children or older adults and other dependent family members. This study defines it as the task that women or men do inside their homes.

10. Social role

Social role refers to a set of connected behaviors, rights, obligations, beliefs, occupations, and norms as conceptualized by people in a social situation (Biddle, 1986). In this study, it refers to as appropriate and permitted forms of behavior and actions that women and men do that were guided by social norms.

11. Gender-neutral

A gender-neutral refers to vocabulary that does not specify or imply the gender of a person, for instance, firefighter or lawyer. In this study, it refers to the vocabulary that appeared in the mathematics textbooks that are gender neutral.

12. Gender marked

A gender marked refers to vocabulary that specifies or implies the gender of a person. For example, in English, the job title stewardess implies that the person is female; the job title policeman implies that the person is male. In this study, gender marked refers to the vocabulary that appeared in the mathematics textbooks that are gender marked.

13. Mathematics textbooks

Mathematics textbooks refer to the mathematics textbooks named The New Mathematics Counts, which the author by Tay Choon Hong, Mark Riddington, and Martin Grier that are used at a school in Chon Buri province. In the textbooks, at the end of each chapter, the exercises sections were also included in the analysis.
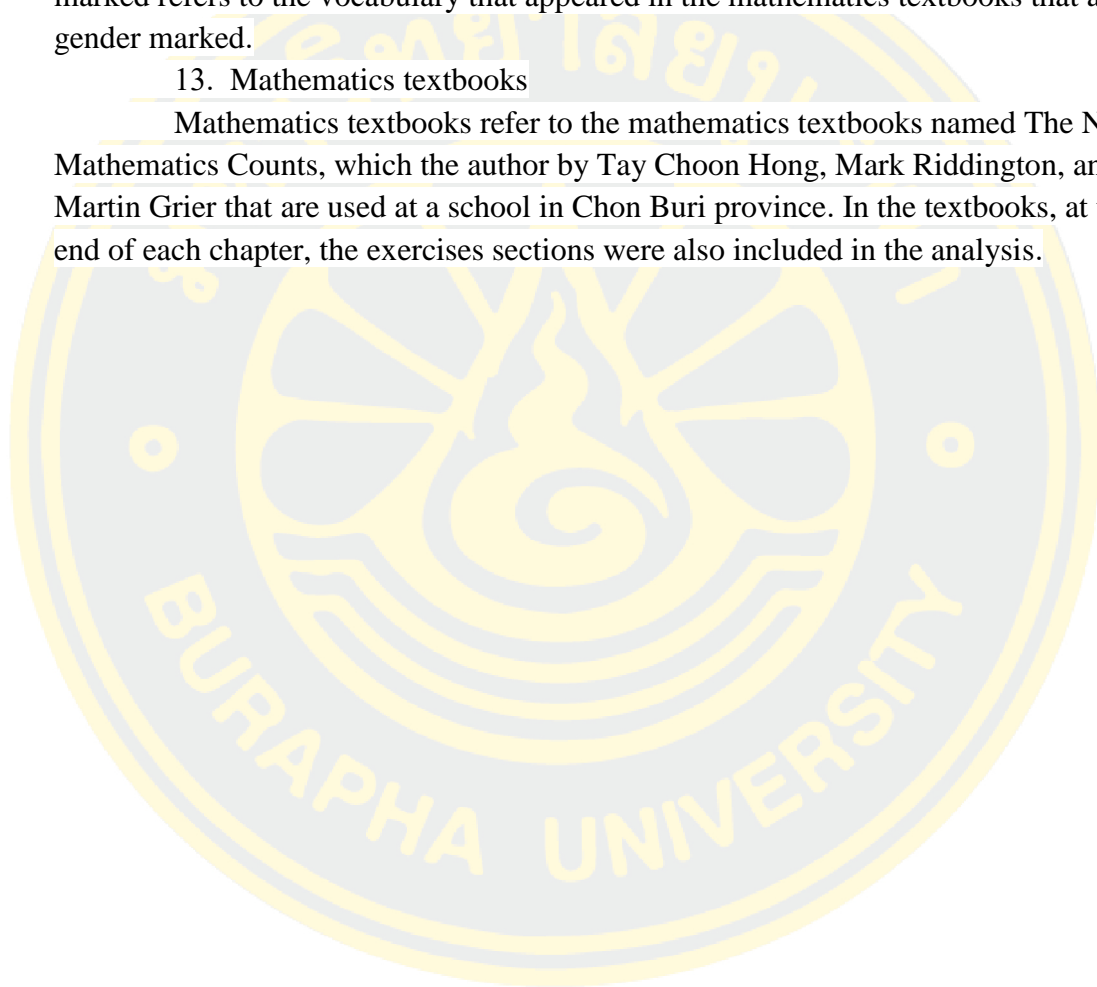
CHAPTER 2
LITERATURE REVIEWS

This chapter presents underlining theories about the fields in language and gender studies. The theories used in this study and the main idea related to gender stereotypes are firstly described. Also, this chapter discusses how gender bias in textbooks has been studied. Roles and the importance of textbooks are also explained in this chapter. Later, the documents findings from different studies that try to analyze the representation of gender roles in textbooks used in different places. Since the change in terms of the representations of the two genders between the first and the latest publications of the textbooks included in the current study the key point, the relevant studies are classified in accordance with the years they were conducted.

Sex and gender

Gender is not equivalent to someone's biological sex. Rather, it is a person's identity. The English-language distinction between the words "sex and gender" was first introduced in the 1950s and 1960s by British and American psychiatrists and other medical personnel working with intersex and transsexual patients (Moi, 2005). Moreover, Goldestein (2003) discusses that sex was fixed and based in nature while gender was fluid and based in culture. Since then, the term gender had been increasingly used to distinguish between sex as biological and gender as socially and culturally factored. Gender was relational and refers not only to women or men but to the relationship between them as well (Burke, 2000). Siren (2018) mentions that gender was not biological, but it is the conception of oneself.

Tate (2014, p.1) explained that in the field of psychology, gender identity had received two meanings. The first was the sense of self which was something more than a person's biological awareness, while on the other meaning, it was the sense of self as endorsing specific traits that were stereotypical of different gender groups. Tate argued that gender identity could be seen as a personality process. Gender was influenced by many components which were oneself, others, biological, and society. Gender was the culturally contingent range of biological, physical, behavioral, and psychological characteristics associated with a given sex (Wood & Eagly, 2002).

Shbitah (2016) defined gender as the relationships and roles selected a priori by the society for both women and men, in light of the prevailing social and cultural customs, traditions, and values that existed in a society that change according to time and place.

In addition, Fausto-Sterling, Coll, and Lamarre (2012) mentioned that sex was a biological state of being male, female, or intersex, as indicated by sex chromosomes, gonads, internal reproductive organs, and external genitalia, amongst other features. Sex, like developmental age, can be estimated from the skeleton

through several mostly morphometric methods with varying degrees of accuracy (Milner & Boldsen, 2012).

World Health Organization (2002) defined sex as the biological features which divide human beings as female or male. In addition, the World Health Organization mentioned while these sets of biological traits were not mutually exclusive since there were individuals who possess both, they tend to differentiate humans as males and females.

In conclusion, gender was culturally influencing whereas sex was considered as being a biological trait.

Sexism, gender bias

Language was one of the most powerful means through which sexism and gender bias were perpetrated and reproduced (Menegatti & Rubini, 2017). Michel (1986, p. 15) stated that "sexism was one of the most serious ills afflicting humanity. Sexism was the practices, prejudices, and ideologies that treat one sex as inferior to the other is worth and status. Prejudice is a belief or an opinion; something corresponding to a fixed or general pattern and lacking individual distinguishing features. It is a standardized mental picture held in common by a group and representing an overly simplified opinion, attitude or judgment".

As for Deem (2011, p. 23), he described sexism as "a process by which certain kinds of phenomena and behavior were attributed to a particular sex". For instance, pink is related to females, or the action of crying or being emotional in general while males did not have that kind of emotion. Moreover, he adds that fixing cars was associated with being male. According to Mary Vetterling-Braggins (1981, cited in Mills, 1995, p. 62), "a statement was sexist if its use constitutes, promotes or exploits an unfair or irrelevant or impertinent distinction between the sexes". Farooq (1999) adds that the term *sexism* conveyed different meanings, among them, the one concerned about how negative attitudes were signaled toward females were more noticeable. Also, Graddol and Swann (1989) define sexism as any discrimination against women or men. Another term that can be used was *gender bias*.

Stitt and Erekson (1988, p. 3) added that gender bias was a set of beliefs or attitudes that indicates a primary view or set of expectations of people's abilities and interests according to their sex. Gender bias revealed on the unfair treatment to one gender by under-representation comparing the opposite gender (Gouveia, 2005; Mineshima, 2008).

Michel (1986) discusses that sexism happened inside the textbooks where they describe a real society in which women and girls were treated as inferior to men and boys, and not attempt to challenge this alleged inferiority. Also, Michel pointed out that a children's textbook was not sexist if, throughout the text and illustrations, there was only one stereotyped role for one character.

Sexist language

The study of sexist language had been the main focus of many feminist groups for a long time. Pauwels (2011) found out an overt sexist terms, such as the use of generic *he* and the normalization of the masculine; these were considered as reflecting the social forces and institutionalized power inequalities rather than being an individual mistake or slip (Mills, 2008, p. 1). According to Cameron (2006, p. 16), "If we take it that no expression has a meaning independent of its linguistic and non-linguistic context, we can plausibly explain the sexism of language by saying that all speech events in patriarchal cultures have as part of their context the power relations that hold between women and men."

Within this view, it was not only the linguistic aspect of sexism that had to be taken into account but, more importantly, contextual, social and wider discourse aspects that involve peoples' beliefs and worldviews about men and women and which were, in turn, reproduced and often perpetuated through language use.

During the 1970s and 1980s, the work of Lakoff (1975) and Spender (1998) resulted in the discussions that led to the recognition of certain language features as discriminatory and, by extension, to discursive intervention through creation of anti-sexist alternatives. Hence, the attempt to deal with over forms of sexism seems less timely or relevant, as they were now supposed to be easily recognized and, thus, easily questioned and potentially amended.

Pauwels (2003, p. 553) stated that outside English language communities, issues of gender-neutrality and non-sexism has attracted attention in a diversity of languages and settings. This ranges from documentation of sexist language, as in China, Iceland, Italy, Japan, Lithuania, Poland, and Thailand.

Liddicoat (2011) mentioned, depending on the unique properties of the languages involved, non-sexist language reform has concentrated on, among others, feminization, namely making women visible (in, for example, French, Italian, Spanish and German) and neutralization, the usage of unmarked non-sexed terms. Nevertheless, sexist language had affected and modified, through the age of time.

Textbook analysis for gender representation

As mentioned earlier, gender inequality representation had been manifested in many educational systems of which the one system was the textbooks. Scholars interested in gender studies had examined the various manifestations of gender inequality that may appear in textbooks (e.g., Graci, 1989; Hellinger, 1980; Lee & Collins, 2008, 2009; Mannheim, 1994; Porreca, 1984), including 1. female and male visibility, 2. gender stereotyping, 3. gender-neutral and gender marked construction 4. use of gender-biased language, 5. domestic and social roles 6. asymmetrical titles of female address, and 7. male-firstness. These various forms were reviewed below.

Female and male visibility

Visibilities referred to the frequency of female representation against male representation. Several previous studies (e.g., Britton & Lumpkin 1977; Clarkson 1993; Equal Opportunities Commission, 2000; Hellinger 1980; Porreca 1984) had revealed a quantitative imbalance in the appearance of women and men, with the former being less frequently mentioned and thus implicitly presented as being of lesser importance. Hellinger (1980) early investigation of sexism in English-language textbooks used in German schools showed that over 93% of the texts had male participants, but less than 30% had female.

Porreca (1984) stated that when women's appearances in texts or illustrations were not as numerous as men's or weren't important enough to be mentioned. The omission of women was commonly found in some previous textbook studies (Gupta & Yin, 1990; Hellinger, 1980; Lee & Collins, 2008, 2009; Porreca, 1984; Wharton, 2005). Weitzman, Eifler, Hokada, and Ross (1972), analyzed award-winning picture books for preschool children, finding that women were "simply invisible" (p. 1128) in close to one-third of the books examined, and were under-represented in the titles, central roles, pictures, and stories. In a replicated study in the 1980s, Williams, Vernon, Williams, and Malecha (1987) found that the ratios of females to males had moved closer to parity, although this varied considerably among individual books.

Arnold-Gerrity (1978) performed a content analysis of a 1976 series of primary reading textbooks, examining the visibility of female characters. She found that in the first four textbooks, for grades one and two, there were twice as many male-oriented stores as female-oriented. While for grades three and four, surprisingly results showed male-oriented were five times as frequent. Moreover, there were three times as many male-oriented as female-oriented stories in two textbooks for grades five and six.

Gender stereotyping

Gender roles were closely linked with gender stereotypes (Eagly, 1987). Moreover, Anselmi and Law (1998, p. 195) stated stereotypes were "overgeneralized beliefs about people based on their membership in one of many social categories". Yilmaz (2012) discussed that gender stereotypes began when a baby's sex was found out. As soon as it was found out that it was a female, parents immediately began decorating a pink baby's room filled with soft décor, butterflies, flowers, and beautiful dolls in pretty dresses. They believed that their daughter would be very "girly" and filled her wardrobe with frilly dresses. Although most parents did not realize what this was essentially doing, setting daughters up to be the "perfect lady," and teaching her how to be the stereotypical woman. They were teaching her that girls were supposed to wear nice dresses, serve food, makeup to look more attractive, and take care of babies; the biggest and most common stereotype put on women. Yilmaz also added that stereotyping was not much a different when baby's sex was a male.

The baby's room was decorated in blue, his wardrobe was filled with small suits, trousers, shirts, trainers, and the theme was usually something like jungle animals or superheroes. Boys' toys were usually trucks, cars, trains, planes, dinosaurs, action figures, and video games. From the beginning, boys were taught to be tough, to be protective, adventurous, and to defend themselves. Boys were taught that the father goes to work and the mother stays at home to take care of the house and the children; from their point of view, boys had fun, and girls do all the work.

Deaux and Lewis (1983) mentioned that gender stereotypes vary in four dimensions: traits, role behaviors, physical characteristics, and occupations. For instance, whereas men were more likely to be perceived as aggressive and competitive, women were more likely to be viewed as passive and cooperative. Physical characteristics and occupations had also been considered consistent or inconsistent with masculine or feminine roles. For example, women were supposed to be beautiful, slim, and attractive while men do not need to look after themselves or pay attention to their physical appearance. Relatively passive, domestic, and less interesting jobs or jobs that do not require much intelligence or physical strength were usually associated with women such as housewives, secretary, nurse, teacher, model, flight attendant, shop assistant, etc. On the other hand, men can do various adventurous, interesting, socially respectable jobs which require physical and psychological power like politician, artist, scientist, doctor, businessman, professor, police officer, soldier, etc.

Walzer (2000), supported that internalized gender roles often show more clearly when men and women got married and became parents, saying that women would take care and spend more time with children. This care involves taking responsibility for the mental work of processing information about infant care, doing the tasks related to infant care, and infant well-being. Therefore, the unequal division of both household work and childcare was believed to lead to the reported lower marital satisfaction for women. Gender stereotypes also influenced traditional feminine occupations, resulting in social and psychological pressure on women who break traditional gender roles. These stereotypes included that women had a caring nature, had a skill at household work, had more manual skills than men, were more honest than men, and had a more attractive physical appearance. Jobs that were usually associated with these stereotypes include midwife, teacher, accountant, cashier, salesperson, receptionist, cook, maid, social worker, model, and nurse (Anker, 2001). Some jobs that were associated with women and men had changed in recent years. For instance, early computer programmers were women and this had reversed in recent decades with programming being perceived as a masculine occupation (Light, 1999). Boulis and Jacobs (2010) mentioned, in the field of medicine, the role of the physician was traditionally seen as masculine, while the role of the nurse was considered feminine.

Lips (2001, p. 33) added that gender stereotypes could also affect men's and women's performance. Stereotype threat was defined as "an individual's awareness that he or she may be judged by or may self-fulfill negative stereotypes about her or his gender or ethnic group". Research indicated that stereotype threat can negatively affect performance by increasing anxiety. For example, Spencer, Steele, and Quinn (1999) found that women performed significantly worse than men on a math test when the participants were directed to believe that the test would probably produce gender differences. However, women and men performed equally well when the participants were led to believe that the test did not produce gender differences. These findings revealed that negative stereotypes may negatively affect the performance of men and women.

Another occupation considered as masculine was leadership and women were considered less favorably as potential leaders (Chin, 2007). Masculine leadership was associated with tasks, control, and authority whereas feminine leadership was associated with help and cooperation, which might be advantageous over masculine leadership. Klenke (2004) added that female leaders were more often described by Western media using characteristics associated with femininity, such as emotion.

As for this research, another form of gender inequality commonly seen in textbooks was gender stereotyping. Stereotyped gender roles were also evident in adjective usage and activity description: Men were associated with physical strength, body size and reputation, and women with weakness, emotion, attractiveness, and domestic roles. In Jassey (2002) study of 71 stories found in 36 language arts textbooks published in 1988, 1991, and 1995, improvement in female visibility was noticed in the newer editions. However, there was also evidence of gender stereotyping associated with character traits and occupational roles.

It had been argued that constant exposure to stereotypical models in children's books plays a role in the vicarious learning of such traditional norms, which could restrict children's role behavior and limit their horizons and expectations (Macaulay & Brice, 1997; Scott, 1980). Weitzman et al. (1972) found gender role portraits in the picture books: boys were active, leading and rescuing others, while girls were passive, following and serving others; men engaged in a wide variety of occupations, while women were presented as wives and mothers. Similar depictions of women in a more limited range of social roles and as weaker and more passive than men had been noted in some recent studies (e.g., Amare, 2007; Evans &Davies, 2000; Lee & Collins, 2010). The inadequacy of models for girls' personal and career aspirations was of concern to many feminists and others.

Gender-neutral and gender marked constructions

Gender marked constructions of many languages also resulted in a lack of terms referring to one sex. Maass and Arcuri (1996) discussed that due to gender stereotypes that want women to be pure and family-oriented, there was no male

counterpart in current language use for terms such as *virgin*, *working mother*, or *career women*. Moreover, in many languages, there was no male equality for *Miss*. This suggested that being married was considered as relevant for the status of women but not of men. These lexical gaps were particularly evident for work-related terms. Classic examples were all the English terms ending with *-man*, such as *businessman*, *chairman*, *anchorman*, or *policeman*, for whom the corresponding female term had been coined only recently when women started to enter male-dominated work fields. Two main solutions can be distinguished (Hellinger & Pauwels, 2007): maintaining grammatical gender marks, yet assuring that they were used in a gender-balanced way (e.g. in Swedish the use of "hon och han" [she and he] instead of a generic use of "han" [he]), and avoiding the use of gendered terms by linguistic creativity (e.g. use of a third personal pronoun in Swedish, "hen", as a gender-neutral alternative to the gender-specific "hon" [she] and "han" [he]). Also, Maass, Suitner and Merkel (2013) added that the efforts had been made to introduce gender-neutral terms or unmarked terms, such as *anchor*, *flight attendant*, *chairperson*, or *health operator* (instead of *nurse*). In order to refer to men and women with one occupation term. Consequently, there had been no clear consensus on appropriate ways to refer to people of different genders, in any language.

Use of gender-biased language

Gender inequality could also be found in the use of gender-biased language. It had long been known that one of the languages, English was, in this sense, a sexist language.

For example: "To say that "all men were created equal was to tell the child that women were not equal to men" (Michael, 1986). Moreover, English uses masculine words to denote functions and occupations that could consider to be both gender for instance, "fireman", "postman" and "chairman" were all examples of using masculine nouns to name occupations. This could lead young adults to think that these occupations were for men only. Michael noted that the use of words such as "waitress" and "actress" when describing females in these occupations, gave the impression of a female being second to male. There had to be something extra added to the word for it to describe women while a" male word" was the norm.

Some language commentators (e.g., Miller & Swift, 1988; Mills, 2008; Schneider & Hacker, 1973; Spender, 1998; Swim, Mallett, & Stangor, 2004) had found out the use of masculine nouns and pronouns as the benchmark for all human beings, as this rendered women invisible and may inhibit their career choices.

However, there seems to be a change to a more neutral way of speaking. Neutral words such as "police officers" and "firefighter" were becoming popular.

Lee and Collins (2008); Pauwels (1998) mentioned that the current, gender-neutral or unmarked terms (e.g., people, human being, businessperson, salesperson) and paired pronouns (e.g., he or she, him or her) are increasingly used in place of their gender-exclusive counterparts.

Michael (1986) described how insinuations serve to attribute non-conventional roles to one sex as if such roles were the exclusive property of only one sex. For example, to say that someone was good at ice-hockey "for a girl" was sexist. Or, to say that "She runs just as fast as a boy" was to imply that it was normal for boys to run fast but not for girls.

Conversely, to say of a boy who plays with barbies, for example, that he plays "girl's games" was sexist. "We had seen that no aspect of human potential, whether it involves intelligence, emotion or activity, can be denied to human beings based on his or her sex" (Michael, 1986).

Domestic and Social Roles

Menegatti and Rubini (2017) discussed that these expectations lead to normative pressure to engage, since childhood, in behaviors consistent with sex-typical social and domestic roles. Indeed, behaviors that were consistent with the gender stereotypic expectations of social roles were considered as more desirable for the congruent sex (i.e., agentic behaviors for men and communal behaviors for women). The content of stereotypes was not neutral, as the traditional roles occupied by men were higher in hierarchies of status and authority than those occupied by women. This was particularly evident in the workplace, where women were more likely to be employed in positions with lower status and less power than men.

Wood and Eagly (2002) adds that in other terms, the content of gender stereotypes had been established by the characteristic and activities required by individuals of each sex in their sex-typical occupations and family roles: Women were expected to engage in a feminine gender role that reflects communal qualities but not agentic ones.

Similar results by the stereotype content model (Fiske, Cuddy, Glick, & Xu, 2002), which stereotyped groups, can be differentiated along two dimensions, *competence,* and *warmth*-which in turn can be associated to the dimensions of *agency* and *communion*. Whereas warmth captures traits that were related to perceived intent, such as friendliness, helpfulness, sincerity, trustworthiness, and morality, competence refers to traits that were related to perceived ability, including intelligence, skill, creativity, and efficacy (Cuddy, Fiske, & Glick, 2008).

The stereotype content model accounts for evidence according to which attitudes toward some social groups were not negative on both warmth and competence, but were mixed or of which low on one dimension and high on the other. This was especially true for gender stereotypes. Cuddy, Fiske, and Glick (2004) states that women were usually liked or respected but not both. For example, housewives were seen as warm, but not competent, and yield to paternalist prejudice that in turn elicits condescending affection. Conversely, female professionals were seen as competent, but cold, and induce envy, jealousy, and resentment.

As mention earlier, Deaux and Lewis (1983) added on the occupation sides stated that relatively passive, domestic and less interesting jobs or jobs that do not

require much intelligence or physical strength were usually associated with women such as housewives, secretary, nurse, teacher, model, flight attendant, shop assistant, etc. On the other hand, men can do various adventurous, interesting, socially respectable jobs which require physical and psychological power like politician, artist, scientist, doctor, businessman, professor, police officer, soldier, etc.

In conclusion, social roles and domestics roles between the genders still occur in many of the textbooks writing. Therefore, understanding of the roles would help identify the gender inequality that happens inside the mathematics textbooks.

Asymmetrical titles of female address

An honorific was a title preceding a person's name. English language honorifics had long been known to be gender-asymmetrical; in contrast to the neutral male address title Mr, which does not indicate a man's marital status. The female titles Mrs. and Miss had traditionally been used to address married and unmarried women respectively. Mrs. was characterized by an implicit relationship between the woman referred to and her husband. The non-parallel address titles provoked criticisms about why women were thus defined in relationship to men. Despite some impediments in earlier years (Lillian,1995), attempts to redress this asymmetry by introducing the neutral title Ms as a substitute for Mrs. and Miss had received increasing endorsement worldwide (Atkins-Sayre, 2005; Holmes, 2001; Pauwels, 2001; Winter & Pauwels, 2007).

However, recent research on stereotypes of women as a function of their reported preference for Ms. as a title of address vs. a traditional (Miss or Mrs.) title of address suggests a potentially important exception to the link between gender and managerial stereotypes observed in the 1970s. In testing whether the title Ms. evokes a stereotype in perceivers, Dion (1987) stated in two experiments in which university students of both sexes rated either a male stimulus person or a female stimulus person varying preferred title of address (i.e., Ms., Mrs., Miss), but with age and employment status constant in all cases. Both experiments showed that a woman who prefers the title Ms. was seen as more achievement-oriented, socially assertive, and dynamic, but less interpersonally warm than her counterparts with traditional titles of address. Dion also added that many traits underlying the Ms. stereotype were similar to the "requisite" characteristic Schein (1973; 1975) identified as the stereotype of the successful, middle manager. The belief that a woman lacks the necessary characteristic for success as a manager may therefore not be associated with a woman who uses the title Ms. as opposed to a traditional title of address (i.e., Miss, Mrs.), Thus, the title Ms. may evoke an image of a woman possessing the necessary traits for success as a manager in the business world. From here, it was expected that for perceivers of both sexes, the Ms. stereotype would overlap considerably with the "successful manager" stereotype, whereas stereotypes of women with traditional titles of address would not be similar to the stereotype of a successful, middle manager.

In conclusion, asymmetrical female address titles had been shown inside the mathematics textbooks and this factor would be considered as one type of gender stereotyping. Later, this factor was analyzed in this research

Male-firstness

By firstness in the present research means placing male terms before the female terms. The male-first ordering of the coordinates was first shown in paired expressions such as *M.r and Mrs. Matsuda*, *Romeo and Juliet*, and *he or she*. When both female and male referring terms come in a text, it was almost always the male term that precedes the female term. The endorsement of this practice can be traced to at least the 16th century, when Wilson (1560, p. 189; cited in Eckert & McConnell-Ginet, 2003, p. 34) remarked, "let us keep a natural order and set the man before the woman for manner's sake". Male-first ordering was still common, as shown in Amare's (2007) study of online grammar exercises, which observed an almost 5:1 ratio in favor of male-firstness.

Mills (1995) believed that the order of male terms coming before the terms referring to females was another aspect of the unequal treatment of women and men and this prioritizes men. In the English language, fixed collocations were used "where the male referents occur first-as in 'he or she', 'husband and wife', 'men and women'" (Goddard & Patterson, 2000, p. 57). Hartman and Judd (1970 cited in Farooq, 1999, p. 16) stated "while such automatic ordering (with the male first) may be a minor point, it reinforces the second-place status of women."

The Firstness of pronouns was another feature of language where gender discrimination can easily be observed (Eckert & McConnell-Ginet, 2003). This represents a common conviction that men were more important than women in almost every society, suggesting that it was necessary to place them first everywhere. 'Firstness' refers to the linguistic feature where one particular gender was often mentioned first (Pillay & Maistry, 2013).

Analysis of gender firstness in textbooks was first undertaken in 1978 in an investigation of several textbooks published over 12 years (Hartman & Judd, 1978). The authors proposed that many texts presented needlessly stereotyped portrayals of men and women, whether through one-sided role allocation, overt put-downs or omission' The order of mentioning two nouns, such as 'Mr and Mrs', 'brother and sister' and 'husband and wife', was investigated-and the masculine word always came first. This automatic ordering reinforces the second-place status of women.

Five years later Porreca (1984) made a study sought to determine whether the change had occurred since the Hartman and Judd analysis. Porreca investigated, focusing on female visibility and firstness in sentences where 15 textbooks were evaluated, the findings confirmed those of Hartman and Judd and indicated that sexism in English First Language (EFL) textbooks was still a problem. Women were mentioned half as often as men were. Firstness for men was three times as prevalent as female firstness and women were less visible in occupational roles. The author also

noted that when two gender-specific nouns or pronouns appeared as a pair, like 'mother and father' or 'he or she', the one appearing first could be interpreted as having higher status. This, she maintained, reinforces the stereotypical notion of who was regarded as more worthy and important in society. Textbooks, therefore, had a way of telling less than the truth by reflecting the ideology of the dominant worldview.

Lee and Collins (2010) found out similar firstness tendencies were found in a sample of Hong Kong textbooks. This ordering of the male first reinforces the second-place status of women, and these authors suggested mixing the order because female learners will feel weak and unimportant in comparison to male learners. Bias in EFL textbooks was evident: when masculine and feminine nouns occurred together, the male noun usually came first (Healy, 2010). This type of language usage was regarded as conventional usage (Bahman & Rahimi, 2010), an issue that might be addressed by critically engaging learners in understanding that such usage was not restricted by grammatical rules or convention and they could choose which gender to use first (Healy, 2010).

Finally, the analysis of Iranian high school EFL textbooks revealed that men were mentioned before women in the majority of cases (Amini & Birjandi, 2012). In one of the books, there were 12 first mentions of males and only two first mentions of females. Amini and Birjandi (2012) explained this linguistic feature as representing the traditional patriarchal view of women in Iranian society; deeply rooted traditions show that men always come first and that women were subordinate to men. A key omission from the findings was the authors' failure to comment on how Iran, being a 'patriarchal' society, ranks equally with all the other countries in terms of gender inclusivity. Besides, Aronowitz and Giroux (1991) added that this omission served to conceal issues of power and ideology. To this effect, textbooks were described as 'both pedagogical and political'.

To sum up, male-firstness was one of the sexist-stereotyping which was happening inside many of the educational materials especially textbooks. Therefore, to notify the inequality of gender in textbooks, male firstness was to be considered in the study as well.

Importance of textbooks

Textbooks were the most important elements of the teaching process for the aims and objectives of a course (Anjaneyulu, 2014). Mkuchu (2004) asserted that textbooks were an important element in the teaching and learning process. Therefore, messages about gender roles and gender identity that were transmitted through these texts were thought to affect the future behavior of the children who consume them as they formulate their roles in society (Eisenberg, 2003). Textbooks were one of the sources of presenting language. Sociolinguistic usage, among other factors, occupies

a significant place in presenting both males and females' roles in society as well as cultural arrangements learners were exposed to, in the textbooks (Otlowski, 2003). It was believed that women were derogated in language and texts were manipulated in favor of men as Rahimi and Sahragard (2006, p. 29) believed derogation was "… rife in the ideological manipulations of the texts".

According to Hartman and Judd (1978) what was taught in ESL classrooms including lexicon, topics of reading passages, or grammar, were all of cultural importance. Based on different cultures, different characteristics, and behaviors were expected from both genders. Contemplating the culture and its relationship to language, therefore that in most of the cultures, women had been treated oppressively (Mills, 1995, p.1). Moreover, Mills added that unequal treatment of women and men was not only in the textbooks; rather, it can affect other aspects existing in a society. According to this, it was through language that ideas were shaped. Therefore, if language treats women and men unfairly, it affects the thought and ideas of the EFL learners (Bravo, Enache, Fernandez, & Simo, 2010). Although the issue of gender and language plays a very important role in students' language learning and attitudes, not much had changed since the first study of sexism in the 1970s (Ansary & Babaii, 2003, p.10).

Firestone (2000) emphasizes that textbooks were political means for shaping the minds of people through which the way that people think, act, or feel regarding different phenomena including gender issues was dictated. Firestone added that the main purpose of the textbooks including foreign language textbooks was to guide and also to instruct children about the past as well as the idealized presentation of the past. Moreover, Firestone discussed that textbooks were informative resources for living and behaving in every society. In other words, textbooks provide a history of people, their relationships, and even ideologies of that people. Besides, textbooks were something more significant than names, dates, facts, but they inspire realities that were shaped by "the ruling system in legitimizing and preserving their dominance and preventing the production of the alternative discourse" (Keshavarz & Malek, 2009, p.7).

Keshavarz and Malek (2009) mentioned that textbooks play an important role in socializing children. They had a significant role in conveying specific and distinct information about the world to mimic the suitable and proper types of behavior. Moreover, they explained that textbooks producers try to express (an idealized) reality. Apparently, a conscious or unconscious gender message was transmitted through the process of production to instruction, though it was purported that these attempts were conscious.

Gender message that was conveyed through textbooks or other means reflects information about the norms and values governing in the society. Therefore, these conveyed messages express something about the opportunities and chances available for both females and males (Keshavarz & Malek, 2009).

As far as it was gender bias in textbooks matters-that stereotyped portrayals of the sexes and underrepresentation of female characters contribute negatively to children's development, limit their career aspirations, frame their attitudes about their future roles as parents, and even influence their personality characteristic.

Schau and Scott (1984) reviewed 21 studies on the effects of sexist versus nonsexist children's instructional materials (e.g., male versus female characters; sexist versus nonsexist generic pronouns), and discovered a consistent tendency for sexist materials to strengthen children's biases dependent variables in the studies including the occupational interests, gender-typed attitudes, and interest in traditional versus non-traditional activities.

More studies by Ashton (1978) showed that 3–5-year-old children read gender-biased or an unbiased children's picture books. Children who read biased books later made more stereotypic toy choices. Tognoli, Pullen, and Lieber (1994) conclude that gender bias in children's books gives boys a sense of entitlement and lowers girls' self-esteem and occupational aspirations.

Weitzman, Eifler, Hokada, and Ross (1972) argue that the dearth of female characters teaches both sexes that girls were less worthy than boys. Gender was one of the sociological variables that should be observed in the mathematics textbooks.

It appears that understanding definitions and presentation of realities in textbooks were significant because they were reflecting the aims and purposes of society and government.

Previous studies

Since the 1970s, scholars, and researchers had been concerned with the depiction of gender roles in EFL textbooks. Since then, numerous studies had examined the representation of gender roles in textbooks, shedding light on both visual (e.g., drawings and photographs) and textual (e.g., conversations and written texts) presentations of female and male characters such as Porreca (1984); Sadker & Sadker (2001); Shteiwi (2003); Lee and Collins (2008); Hamdan & Jalabneh (2009); Hamdan (2010); Hall (2014). Porreca studied sexism in fifteen of ESL textbooks in six sorts of occurrence, either visual or textual; 1. omission ratio of females, compared to males, in text and illustration, 2. occupational roles, 3. frequency of male nouns to female nouns, 4. firstness, 5. masculine generic constructions, and 6. types and frequency of adjectives associated to either sex. In every category of the study, there were evidences that sexism continued to flourish in ESL materials.

Hartman and Judd (1978) surveyed several TESOL textbooks and found that women suffered from low visibility. They counted the sex-linked proper names, titles, or non-generic pronouns and reported in their findings that, in most cases, male references outnumbered the female ones.

Hellinger (1980) evaluated 131 passages from three ELT textbooks. She reported that male characters participated in over 93% of the passages. Moreover, her

results showed that 80% of the speakers were male and female characters were barely shown.

Porreca (1984, p. 705), even though the population of females comprised over half of the United States, they were depicted or mentioned only half as often as males in both texts and illustrations. She added that "the role played by language in maintaining and strengthening sexist values…was less widely understood or acknowledged than economic gender inequality probably because linguistic sexism was much more deeply rooted and far more subtle than other forms of sexism".

Sadker and Zittleman (2001) identified seven types of bias that often appear in educational materials. These types were 1. omission where males and females were not equally presented in text and illustrations, 2. sexist language where masculine pronouns and terms such as *mankind* and *policeman* were used, 3. stereotyping where the genders were featured in traditional roles such as male heavy-equipment operator and female nurse, 4. imbalance where minimal information was given on important issues, 5. unreality where controversial topics were ignored in favor of traditional views, 6. fragmentation where groups were portrayed in a fragmented or clustered fashion so that all women writers were featured together rather than integrated throughout, and 7. cosmetic bias where efforts were made to have materials look balanced when only minimal coverage was offered.

According to previous studies of gender-bias in textbooks, in their study of junior high school EFL textbooks, Sano et al. (2001) noted the elimination of gender-biased language such as *chairman*. Implicit gender-biased messages, nevertheless, were evident: male characters tended to be decision-makers, while female characters filled subordinate roles, as reflected in the former's more frequent association with such verbs as choose and decide.

In Jordan, Shteiwi (2003) conducted a study on the representation of gender roles in 96 primary school textbooks. He found that the majority of public roles were male-dominated, 87%, whereas female roles were traditional such as teaching. Similarly, Hamdan and Jalabneh (2009, p. 55) examined the dominancy of gender in conversational topics, mainly, dialogues and comprehension passages in *Action Pack Series t*extbooks which were offered to preparatory and elementary students in schools. The researchers proposed one question to achieve the study objective (i.e. which specific sex dominates maximally the conversational topics in EFL used in the series?). They concluded that "textbooks practically reflect reality; but, this was since women's stereotype was visible more than men's".

This was overt as the fewer females took turns when compared to male characters. Like Shteiwi (2003); Hamdan and Jalabneh (2009); Hamdan (2010) examined the occurrence of gender bias in textbooks, namely, the *Action Pack Series* from grades 1 to 9, used in public schools in Jordan. The content analysis of the discourse was based on a checklist designed to calculate the number and types of jobs for males and females. The researcher leaned against both qualitative and quantitative

analyses and concluded that the selected textbooks reflected the culturally-prevalent gender bias. He also maintained that males practiced a variety of jobs and were depicted as effective and dominant characters in the labor market. However, females practiced traditional jobs such as teachers and nurses.

In Hong Kong, Lee and Collins (2008) investigated whether there were improvements in the status of women in the country that were mirrored in patterns of gender representation in Hong Kong secondary English textbooks. They compared ten published books that were in use with ten published in the late 1980s and early 1990s in order to examine changes in gender representation in secondary English language textbooks published and used in Hong Kong over the past two decades. The results showed that although women enjoyed more frequent presence in the newer published books, some authors maintained the stereotyped image of women as weaker than men, and as operating primarily within domestic rather than social domains.

In Iran, Hall (2014) investigated gender representation in EFL textbooks that were designed and taught in Iranian secondary schools. The researcher made use of two methods of analysis; namely, a systematic quantitative analysis and a qualitative analysis. Hall concluded that there was an imbalance in gender representation in the ELT curriculum in Iran due to that it runs by the country's cultural and religious ideologies.

Otlowski (2003) observed, in the textbook *Expressways A*, discriminatory use of the address titles Mrs. and Ms. and stereotypical portrayals of women as homemakers and mothers. Contrary to previous investigations, gender equality was found in Mineshima (2008) more recent study of an EFL textbook used in senior high schools, which included fairly egalitarian representations of the two genders in terms of visibility, character attributes, and picture representations.

In Thailand, Na Pattalung (2008) investigated the presence of sexist language that appears in ESL textbooks by Thai authors, the result showed that there was sexist language presented in the textbook and that it contains content that promotes sexist assumptions concerning gender roles.

Hamid (2008) researched on the preliminary findings of on-going documents the extent of gender bias and linguistic sexism in selected Malaysian primary and secondary school English language textbooks, of which the result also stated that the sexism was found present in these textbooks.

Moreover, Sulaimani (2017) explores gender representation in international English as a Foreign Language (EFL) textbook that had been specifically adapted for the Saudi Arabian context. The results indicated that the textbook was biased in terms of gender. Women were underrepresented in the textbook.

However, Yasin, Hamid, Keong, Othman, and Jaludin, (2012), Qatari Mathematics textbooks portrayed an over-representation of female nouns than foreign textbooks but the difference was not very significant.

As seen in the previous reviews, linguistic sexism had occurred in many of the textbooks, mainly the English EFL/ESL textbooks. However, there are still some textbooks that are not being considered as linguistically sexist. Therefore, the researcher is interested to find out according to the objective of this research.

CHAPTER 3
RESEARCH METHODOLOGY

This section first introduces the research design. Later, the explanation of the stimuli of this study, the instrument used to analyze the study, the collection of the data and finally data analysis was explained.

Research design

For the research design, the researcher approached the study in quantitative research approach to find out the frequency of the words appeared in each part of the research questions. The ratio of gender representation appearing in the mathematics textbooks, the consideration of the social and domestic roles, titles used firstness, and visibilities of the two genders were include in the analysis. The texts were digitalized, and each of the following data was coded. Later, the data was analyzed by the use of the software.

Stimuli

1. The stimuli used in this study are mathematics textbooks series called *The New Mathematics Counts.* The researcher used the lower secondary edition of the series which consists of six books of which three of the books are published in the year 2001 and the latest version in the year of 2015.

2. Six textbooks were analyzed in this research. The book series was currently used in a demonstration school in teaching mathematics in English. Each of the six books contained 9-12 chapters.

3. Each chapter presents different topics in mathematics with different word problems and exercises.

3.1 The first book of *New Mathematics Counts 1* was what the student would have in grade 7. The book mainly focused on numbers and operations of numbers that were more complex than at the primary level and followed by fractions, shapes, and polygons. At this point, many of the exercises were in word problems. However, the texts within the books are still quite simple.

3.2 The second series of *New Mathematics Counts* was *New Mathematics Counts 2,* which was used for grade 8. This book contained more themes about Algebra, expanding of expressions, and a lot on the factorization of expression in mathematics. In this book, the languages and word problems was more than *New Mathematics Counts 1* and started to be more complex.

3.3 The last series of *New Mathematics Count*s was The *New Mathematics Counts 3.* This volume contained a lot of equations and statistics problems. Therefore, contexts were the most for the lower secondary level textbooks. The books started to be more complex than all of the previous books.

Instrument

In order to investigate gender representation and gender-bias in the selected mathematics textbooks, the researchers constructed a coding sheet to collect the occurrences of gender representation according to the categories.

Firstly, the word problem with gender representation in the exercise parts were collected and put in the exercise of the textbooks. Later, the exercises were analyzed with the criteria of female and male appearances, masculine and feminine pronouns, use of gender-marked and gender-neutral terms, social and domestic roles, the order of appearances firstness, and common addresses titles used for women, and common adjective used to describe women and men. The criterion was only to use the female and male appearances and social and domestic roles are to be considered using open coding. The software of *Wordsmith* which is software for work in collecting of the modules for searching patterns in a language was used to categorize the data with the Concord tool. Later, *the Wordlist* tool was used in finding the words. It was an application that creates a word list from a text document. It helped to extract words from text files.

Data collection

This section presents the procedure to collect the data for the studies.

1. The books were in a digitalization process. The textbooks were first transformed into the digital format by scanning procedure. The scanning procedure produces the .jpeg format of the textbook images. Later the .jpeg was converted into .txt file.

2. The .txt formats of the textbooks were to be revisited for checking and analyzing purposes.

3. The researcher then took down notes for each part of the chapters according to the purpose of the study.

4. The data were then analyzed in the data analysis process

Data analysis

To accomplish the research objectives, the following procedures were used to analyze the collected data.

1. To analyze the ratio or quantitative aspect of female and male representation in the mathematics textbooks, quantitative content analysis was used in analyzing the data. WordList tool was used in listing all of the words and word-clusters in a text, set out in alphabetical or frequency orders.

2. With WordSmith Tools, which was an integrated suite program for looking at how words behave in texts, was a tool to find out how words are used in the contexts.

3. To categorize words according to the research question, the researcher adapted the criteria by Lee (2014) as follows:

3.1 Female and male appearances

The criteria of frequency of occurrence of selected gendered words and their inflected forms (e.g., man/men/man's/men's, woman, boy, girl, Mr, Miss, Ms, Mrs, mother, father)

3.2 Masculine and feminine pronouns

The criteria of Frequency of occurrence of masculine pronouns (he, him, his, himself) and feminine pronouns (she, her, hers, herself)

3.3 Use of gender-marked and gender-neutral terms

Frequency of occurrence of pseudo-generic man/men, and their corresponding gender-neutral counterparts (e.g., human, people), compound words ending with a masculine morpheme (i.e.,-man/men,-boy[s],-master[s]) or a feminine morpheme (i.e.,-woman/ women,-girl[s],-mistress[es]), and their corresponding gender-neutral counterparts and gender-inclusive paired pronouns (he or she, her/him, etc.)

3.4 Common addresses titles used for women

The frequency of occurrence of the female address titles (Ms, Miss or Mrs).

3.5 Order of appearance

The order of mention of female and male characters in a phrase coordinated by and/ or.

4. To determine whether there are any differences between male and female characters of witness and defendant concerning the appearances of genders by percentage.

Table 1 Coding scheme

Categories	Criteria	Codes
Female and male appearances (RQ 1)	Frequency of occurrence of selected gendered words and their inflected forms (e.g., man/ men/ man's/ men's, woman, boy, girl, Mr, Miss, Ms, Mrs, mother, father)	Female Male
Masculine and feminine pronouns (RQ 1)	Frequency of occurrence of masculine pronouns (he, him, his, himself) and feminine pronouns (she, her, hers, herself)	Masculine Feminine

Table 1 (Cont.)

Categories	Criteria	Codes
Use of gender-marked and gender-neutral terms (RQ 2)	Frequency of occurrence of 1. pseudo-generic man/ men, and their corresponding gender-neutral counterparts (e.g., human, people) 2. Gender-inclusive paired pronouns (he or she, her/ him, etc.)	Gender-neutral
	compound words ending with a masculine morpheme (i.e., -man/men, -boy[s], -master[s]) or a feminine morpheme (i.e., -woman/women, -girl[s], -mistress[es]), and their corresponding gender-neutral counterparts	Gender-marked
Common types of activities associated with men and women (RQ 3)	The collocates associated with the pronouns he and she (five words on either side), e.g., painter, insisted, youth, feeling	F-Social/ F-Domestics M-Social/ M-Domestics
Common address titles used for women (RQ 4)	The frequency of occurrence of the female address titles (Ms, Miss or Mrs)	Ms Miss Mrs
Order of appearance (RQ 4)	The order of mention of female and male characters in a phrase coordinated by and/or.	Male first Female first

CHAPTER 4
RESULTS

This chapter presents the findings of the study. The findings are based on the results of sexism and gender representation presented in 6 mathematics textbooks, of which 3 were the new edition; Mathematics Counts1 (C1N), Mathematics Counts2 (C2N), Mathematics Counts3(C3N) and 3 were old editions with the same name, but assigned as; Mathematics Counts 1 (C1O), Mathematics Counts 2 (C2O), Mathematics Counts 3(C3O). To analyze the representation of gender representation in mathematics textbooks, Lee's (2014) framework was employed.

In order to present and discuss the details of the findings, the results presented in this chapter are divided into four major parts as follows:

Part 1 presents the ratio of the text representation of women compared to men in the selection of textbooks used in a demonstration school in Chon Buri Province.

Part 2 presents the gender-neutral and gender marked constructions used in the selection of textbooks used in a demonstration school in Chon Buri Province.

Part 3 presents the types of social and domestic roles assigned to genders and the order of appearance of women and men when both are referred to in a single phrase in the selection of textbooks used in demonstration schools in Chon Buri Province.

Part 4 presents the titles used to describe women and men in the selection of textbooks used in a demonstration school in Chon Buri Province.

Part 1: Ratio of the text representation of women compared to men in the selection of textbooks used in a demonstration school in Chon Buri Province.

In order to find the ratio of text representation of women and men, the frequency of some selected words and their inflected forms (e.g. man/ men/ man's/ men's, woman, wife/ wife's/ wives/ wives', husband) was recorded in Table 2.

Table 2 Frequency of gender representation words appearance

Male	Counts New 1		Counts Old 1		Counts New 2		Counts Old 2		Counts New 3		Counts Old 3	
man	1	5.6%	4	8.3%	1	2.5%	16	18.2%	7	24.1%	4	14.3%
men	0	0.0%	13	27.1%	12	30.0%	14	15.9%	0	0.0%	6	21.4%
Mr.	5	27.8%	8	16.7%	5	12.5%	13	14.8%	9	31.0%	12	42.9%
boy	1	5.6%	0	0.0%	3	7.5%	8	9.1%	0	0.0%	0	0.0%
father	0	0.0%	1	2.1%	3	7.5%	6	6.8%	2	6.9%	0	0.0%
dad	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
husband	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
son	0	0.0%	0	0.0%	5	12.5%	5	5.7%	1	3.4%	0	0.0%
brother	1	5.6%	1	2.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
grandfather/ grandpa	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
uncle	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	8	44.4%	27	56.3%	29	72.5%	62	70.5%	19	65.5%	22	78.6%
Female	Counts New 1		Counts Old 1		Counts New 2		Counts Old 2		Counts New 3		Counts Old 3	
woman	1	5.6%	0	0.0%	0	0.0%	1	1.1%	1	3.4%	0	0.0%
women	0	0.0%	4	8.3%	0	0.0%	2	2.3%	0	0.0%	2	7.1%
Ms/ Mrs/ Miss	5	27.8%	15	31.3%	4	10.0%	9	10.2%	2	6.9%	2	7.1%
girl	0	0.0%	0	0.0%	0	0.0%	3	3.4%	0	0.0%	2	7.1%
mother	2	11.1%	1	2.1%	3	7.5%	3	3.4%	0	0.0%	0	0.0%
mom	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
wife	0	0.0%	0	0.0%	0	0.0%	0	0.0%	6	20.7%	0	0.0%
daughter	1	5.6%	0	0.0%	3	7.5%	7	8.0%	1	3.4%	0	0.0%
sister	0	0.0%	1	2.1%	1	2.5%	1	1.1%	0	0.0%	0	0.0%
grandmother / grandma	1	5.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
aunt	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	10	55.6%	21	43.8%	11	27.5%	26	29.5%	10	34.5%	6	21.4%

As presented in Table 2, Mathematics Counts 1, the new edition has more female representation than males, at 55.6% and 44.4%, respectively. Conversely, in the old edition of Mathematics Counts 1, there was greater male representation than females, where 56.3% were males and 43.8% were female. In Mathematics Counts 2, the new edition has a high male representation of 72.5% and female representation of 27.5%. As for the old edition, males are also more well-represented than females, with 70.5% male and 29.5% female, respectively. In Mathematics Counts 3, the new edition also has more male than female representation with 65.5% compared to

34.5%. As for the old edition of Mathematics Counts 3, the percentage of males is more than females with 78.6% and 21.4% respectively.

In comparing the old and the new edition of each series of textbooks, the new edition of Mathematics Counts 1 has more female representation at 55.6% while the old edition has only 44.4%. For Mathematics Counts 2 and Mathematics Counts 3, in both the old and new editions, the male representation was more than female with a percentage of 72%, 70.5%, 65.5% and 78.6% for new Mathematics Counts 2, old Mathematics Counts 2, new Mathematics Counts 3 and the old Mathematics Counts 3 respectively.

The ratio of male-to-female gendered terms was 0.80:1 for the new edition of Mathematics Counts 1, 1.29:1 for the old edition of Mathematics Counts 1, 2.63:1 for new Mathematics Counts 2, 2.38:1 for old edition Mathematics Counts 2, 1.9:1 for new edition Mathematics Counts 3, and 3.67:1 for old edition Mathematics Counts 3.

The following are examples of gender representation in mathematics textbooks

If 13 **men** can complete a job in 22 days,   how long will it take 11 **men** to finish the same job at the same rate?

(New Edition, Mathematics Count 1)

A **man** borrows $8 000 from a bank and pays simple interest at 5% per year.

(Old Edition, Mathematics Count 1)

Mr. Lin is sending $6 600 to his daughter in Canada. How much is that in Canadian dollars if Can$1.00 = S$1.10?

(New Edition, Mathematics Count

In these examples, men, man, and Mr. appeared in the mathematics textbooks where there was only male gender representation in the sentence.

A **mother** is five times as old as her **daughter**. If the sum of their ages 6 years ago was 60, find their present ages.

(New Edition, Mathematics Count 2)

Solve the equation to find the **girl's** age.

(Old Edition, Mathematics Count 3)

A **girl** 1.2 m tall casts a shadow 4.8 m long at a certain time one morning.

(Old Edition, Mathematics Count 2)

In these examples above, female-only gender representation in contexts inside the textbooks is presented.

A **boy** is 12 years old. His **mother** is 4 times as old. In x years' time, the **mother** will be three times as old as the son. Form an equation in x and hence find x.

(New Edition, Mathematics Count 2)

There are 350 people in a housing block. 30% of the people are **men** and 32% are **women**.

(Old Edition, Mathematics Count 3)

A **girl** is x years old. Her **father** is three times as old. If the difference in their ages is 30 years,

(Old Edition, Mathematics Count 1)

In this example, both female and male genders appeared in the same context inside the mathematics textbook.

Table 3 Masculine and feminine pronouns

Types of Pronoun		C1N	C1O	C2N	C2O	C3N	C3O
Nominative	he	20	42	26	91	76	25
	she	18	23	6	8	15	13
Accusative	him	0	1	2	4	2	0
	her	16	10	12	7	11	11
Genitive	his	34	32	31	58	42	22
	her/ hers	16	11	12	5	11	11
Reflexive	himself	0	0	0	0	0	0
	herself	1	0	0	0	0	0
Total	Masculine	54	75	59	153	120	47
	Percentage	51.4	63.0	66.3	88.4	76.4	57.3
	Feminine	51	44	30	20	37	35
	Percentage	48.6	37.0	33.7	11.6	23.6	42.7

The result showed that in all 6 textbooks male-gendered pronouns shown in Table 3 appeared more than female, with a percentage of 51.4% for the new Mathematics Counts 1, 63% for the old Mathematics Counts 1, 66.3% for the new Mathematics Counts 2, 88.4 for the old Mathematics Counts 2, 76.4% for the new Mathematics Counts 3, and 57.3% for the old Mathematics Counts 3. Comparing between the new and the old edition of Mathematics Counts 1 there was an increase in female pronouns from 37% in the old edition to 48% in the new edition. In addition, the series of *Mathematics Counts 2* also showed an increase in female pronouns from the old edition (11.6%) to the new edition (33.7%). For the series of *Mathematics Counts 3*, there was a decrease in female representation from an old edition with 42.7% to a new edition with only 23.6%. However, in every instance, the masculine pronouns still exceed the feminine pronouns.

The resulted yield that regarding gendered vocabulary discussed above can be express as a ratio that there are more occurrences of masculine pronouns than feminine pronouns according to the ratio of 1.06:1 for the new edition of Mathematics Counts 1, 1.70:1 for the old edition of Mathematics Counts 1, 1.97:1 for the new edition of Mathematics Counts 2, 7.65:1in the old edition of Mathematics Counts 2, 3.24:1 for the new edition of Mathematics Counts 3, and 1.34:1 for the old edition of Mathematics Counts 3.(male/female of each book).

Below were examples of masculine and feminine pronouns found in the selection of textbooks;

He travels on the bus which moves at an average speed of 50 km/h.

(Old Edition, Mathematics Count 1)

Calculate the value of the sales that **he** made in 2004.

(New Edition, Mathematics Count 1)

Amy has 3 types of ribbons of lengths, 84 cm, 140 cm, and 308 cm. **She** wishes to cut the ribbons into pieces of the same length for making butterfly knots.

(Old Edition, Mathematics Count 1)

What is the greatest possible length that **she** can cut for each piece if no ribbon is to be left unused?

(New Edition, Mathematics Count 3)

The examples above represented the nominative feminine and masculine pronouns. In these contexts, the word *he* and *she* were used in the examples given in the selected textbooks.

If <u>she</u> then used 71 of the remainder for **her** own dress,

(Old Edition, Mathematics Count 1)

How far is Amy's home from **her** school?

(Old Edition, Mathematics Count 1)

This is the use of accusative feminine and masculine pronouns used in the context. In the above example, the word *her* and *him* were used in the context.

Mr. Li traveled at an average speed of 3 km/h for 2.2 hours. In the first hour, **his** average speed was 5.0 km/h. Calculate **his** average speed for the next 2 hours.

(New Edition, Mathematics Count 1)

Calculate the percentage increase in **his** basic salary from 2003 to 2004.

(New Edition, Mathematics Count 1)

What is **her** average rate of typing?

(New Edition, Mathematics Count 2)

What is **her** average speed in the first 2 hours?

(New Edition, Mathematics Count 2)

The examples above use genitive feminine and masculine pronouns <u>in the context</u> with the word of *hers* and *his* were <u>used in the context</u>.

A woman <u>bought 3.1m</u> of cloth to make 2 dresses, one for **herself** and one for her daughter.

(New Edition, Mathematics Count 1)

The example above uses reflexive feminine pronouns <u>in the context</u> of *herself*.

These findings showed that gender imbalance was still prevalent in the textbooks. Besides, the visibility of masculine pronouns exceeds the feminine pronouns.

Part 2: The gender-neutral and gender marked constructions used in the selection of textbooks used in a demonstration school in Chon Buri Province.

Regarding gender-neutral and gender marked constructions used in 6 selections of textbooks; the results revealed that there were uses of both gender-neutral and gender-marked words in selected textbooks.

Table 4 Gender-neutral and gender-marked vocabulary.

gender-neutral (N) /gender-marked(M)	Vocabulary	Count1 new	Count1 old	Count2 new	Count 2 old	Count3 new	Count 3 old
M	Man	1	4	1	16	7	4
N	People	9	13	15	4	2	7
N	Person	1	4	6	1	3	1
N	Human	1	0	0	0	0	0
M	headmaster/ headmistress	0	0	0	0	0	0
N	Principal	0	0	0	10	7	1
M	Chairman	0	0	0	0	0	0
N	Head	0	0	1	0	0	0
M	Policeman	0	0	0	0	0	0
N	Police	1	0	0	0	0	0
N	Police officer	0	0	0	0	0	0
M	Salesman	1	0	0	7	12	1
N	Salesperson	0	0	1	0	0	0
M	Landlord	0	0	0	0	0	0
M	Landlady	0	0	0	0	0	0
N	Owner	2	2	0	2	2	0
M	Businessman	0	0	0	0	0	1
N	Businessperson	0	0	0	0	0	0
Total gender-marked		2	4	1	23	19	6
Percentage of gender-marked		12.5%	17.4%	4.2%	57.5%	57.6%	40%
Total gender-neutral		14	19	23	17	14	9
Percentage of gender-neutral		87.5%	82.6%	95.8%	42.5%	42.4%	60%

The study showed in Table 4, a total of only 2 (12.5%) gender-marked terms in the new edition of *Mathematics Counts 1* and 4 (17.4%) in the old edition. The gender-neutral terms found numbered 14 (87.5%) and 19 (82.6%) respectively. For *Mathematics Counts 2,* the new edition had 1 (4.2%) gender-marked term and for the old edition with 23 (57.5%). In addition, the gender-neutral terms were 23 (98.5%) and 17 (42.5%) respectively. For *Mathematics Counts 3*, the gender-marked terms

were 19 (57.5%) and the old edition was 6 (40%). Inversely, the gender-neutral terms are 14 (42.4%) and 9 (60%) respectively.

The finding suggested the writers had awareness of the need to use gender-inclusive vocabulary. For instance, *owner* (*landlord, landlad*y), *head (*cf. *chairman*), *police (*cf. *policeman)*, and *principal (*cf. *headmaster, headmistress).* Gender-marked terms were still in use in some textbooks.

The following are examples of gender-marked terms presented in the selection of textbooks.

In 2003, a **salesman** was paid a basic monthly salary of $1,375.

A **man** earns a salary of $760 per month. If his monthly salary increases by 5%, calculate his new monthly salary.

In the above-mentioned examples, *salesman* and *man* were classified as gender-marked constructions.

Using a speed meter, the **police** measure the speeds of vehicles traveling on an expressway. The histogram below shows the data collected.

If 319 **people** did not show up, how many **people** were invited to …

The examples above showed gender-neutral constructions with the words *police* instead of policemen and *people* instead of man.

Part 3: Types of social roles and domestic roles and order of appearance.

This section analyzed what social and domestic roles the two genders were likely to engage in. Open-coding was used and categorized them into two main categories, the passive (domestic roles) and the active (social roles), of which the collocates associated with the pronouns of he and she five words on either side to be considered.

Table 5 Social role and domestic role

Textbooks	Gender	Role
Mathematic Counts 1 (New)	M	Salesman, students, motorist, container manufacturer, gardener
	F	Knitter, cook, housewife,
Mathematics Counts 1 (Old)	M	Mathematician, vendor, motorist, garden, farmer
	F	Chef, housewife
Mathematic Counts 2 (New)	M	Mathematician, captain, cyclist, farmer
	F	Student, driver
Mathematic Counts 2 (Old)	M	Civil servant, salesman, pianist, tourist, runner, shopkeeper, mathematician, computer dealer, estate agency, farmer, insurance salesman, biker, worker, debt collector
	F	Loaner (sic)

Table 5 (Cont.)

Textbooks	Gender	Role
Mathematic Counts 3 (New)	M	Shopkeeper, stamp collector, bookseller, traveler, salesman, estate agent, mathematician, philosopher dealer, wholesaler, coin collector, student, musician, insurance agents
	F	art dealer, caretaker, wife
Mathematics Counts 3 (Old)	M	Office worker, mathematicians, motorist, travel,
	F	Caretaker, factory worker, worker, students

The result yield that men were more often portrayed in social roles. As shown in Table 5, in six mathematics textbooks, males were shown to be a salesman, mathematician, traveler, wholesalers, etc. On the contrary, females were portrayed as more passive and in more domestic roles: crafter, housewife, knitter, and caretakers. Moreover, the selected textbooks portrayed females as weaker and as engaging in child care, care of a baby, and buying a dress for her daughter.

As for the previous studies (Porreca, 1984; Mills, 1995; Lee & Collins, 2010), the paired expressions appeared in the present study showed that there was a tendency for male-gendered terms to be presented before female-gendered terms. As shown in Table 6, the textbooks consist solely of male firstness in the new edition of Mathematics Counts 1 and the old edition of Mathematics Counts 2, while the other textbooks did not show instances of mixed-gender examples.

Table 6 Order of mention (coordinated by and/ or)

	C1N	C1O	C2N	C2O	C3N	C3O
Male first	3	0	0	1	0	0
Female first	0	0	0	0	0	0

This showed that the tendency to place females' second implied female inferiority, rearranging the order of appearance of females and males is a step that textbook writers should be aware of to make a more fair representation of the two genders.

Below are examples of firstness in selections of textbooks.

The ratio of the number of teachers, **boys, and girls** in a school is 2

(New Edition, Mathematics Counts 1)

If the data of **the boys and the girls** are tabulated separately,

(New Edition, Mathematics Counts 1)

An examination was taken by 6 **boys and 4 girls**. The mean mark of the 10

pupil

(Old Edition, Mathematics Counts 2)

As shown in the examples above, of male firstness of the word *boys and girls.* The word *boy* comes before the word *girl* in the same context.
Measure the height of each classmate to the nearest cm and record it against **his or her** name.

(New Edition, Mathematics Counts 1)

As shown above, the male firstness was shown, *boys and girls*. Moreover, the example of pronouns *his or her*, the male is still presented before the female.

Part 4: Common address titles used for women

In the present study, the asymmetrical use of female tile addresses had been shown in the study. The female title *Mrs* and *Miss,* which addressed married and unmarried women respectively, is present in the 6 textbooks as shown in Table 7. No instance of *Ms* to address an unmarried woman was used in the textbooks in any of the series.

Table 7 Female address titles

Variable	C1N	C1O	C2N	C2O	C3N	C3O
Miss	0	1	1	0	0	0
Mrs	5	14	3	9	2	2
Ms	0	0	0	0	0	0

Below are examples of female address titles presented in the selected textbooks;

The bar chart shows the number of mice **Mrs**. Sun's cat caught over a period of 6 months

(New Edition, Mathematics Counts 3)

Mrs. Tan takes 55 minutes to travel to work each morning. She takes 50 minutes to travel home each evening.

(Old Edition, Mathematics Counts 1)

Miss Li traveled on a train for 40 km at an average speed of 50 km/h. How many minutes will her journey take?

(New Edition, Mathematics Counts 2)

Based on Table 7, it was found that the highest frequency of occurrence of asymmetrical titles of feminine Mrs was found in the old edition of mathematics Counts 1 with 14 instances, followed by the old edition of Mathematics Counts 2 and the new edition Mathematics Counts 1 with 9 and 5, respectively. Asymmetrical titles of the feminine Miss, the same numbers of results shown in the Old edition of mathematics Counts one and the new mathematics Counts 2 with only 1. However, there are no results shown in the asymmetrical use of female title Ms.

CHAPTER 5
CONCLUSION AND DISCUSSION

The final section presents the conclusions and discussions drawn from the analysis. Gender stereotyping and sexism in textbooks have been present for centuries as shown in the pioneering study from Lakoff in 1973. Everyone espouses for a world with gender equality. However, in reality, that equality does not exist in this society. Previous studies have found that males are overrepresented compared to females. This study aimed to show and uncover the possible gender imbalance inside the Mathematics Counts textbooks.

Summary of findings

1. The rate of the text representations of women compared to men in the selection of textbooks used in a demonstration school in Chon Buri province, of which male representation outpaced female representation in five out of six selected textbooks.

2. Gender-neutral constructions used in the selection of textbooks used in a demonstration school in Chon Buri province were used more often than gender-marked constructions.

3. Males were represented more in social roles, whereas females were presented more in the domestic roles. According to firstness, the males are presented first in the same context, while there were no examples of female firstness in any of the selected textbooks.

4. According to feminine asymmetrical titles in all the selected textbooks, the highest frequency of occurrence was the title of *Mrs.*

Discussion of the findings

Based on the results reported in the previous chapter on the rate of illustrations and texts of the representation of women compared to men in the mathematics textbooks, the findings showed that the textbooks were male-dominant. In addition, the gender inequality affected not only the lack of status and visibility in the society but also it had shown these facts in textbooks as well. The findings of the current study supported the claims made by Hellinger (1980) that the texts inside the textbooks used in German schools had male participants of 93%, but less than 30% had female. Gupta and Lee (1990), Hellinger (1980), Lee and Collins (2008), Porreca (1984), and Wharton (2005) added that the omission of women was commonly found in studies of textbooks. The result is the rate of gendered pronouns found the masculine pronouns exceeded the feminine pronouns in all of the selected textbooks. This supports the omission of women mentioned above. It can be concluded that,

although there is a measure of female visibility, the dominant visibility in textbooks is still of male.

Based on the findings related to gender-neutral and gender marked constructions, the results showed that in the selected textbooks, there were uses of gender-neutral and gender marked constructions. However, it was found that the frequency of gender-neutral constructions outnumbered the gender-marked. A possible explanation was that the writers of the books had awareness of using gender-neutral vocabulary (Lee, 2014). Interestingly, the new edition of *Mathematics Counts 1* has a higher percentage of gender-neutral constructions than the old edition with 87.5% and 82.6%, respectively. Moreover, the new edition of *Mathematics Counts 2* has a substantially higher percentage of gender-neutral constructions than the old edition of Mathematics Count 2 at 95.8% compared to 42.5%. The finding certainly agrees with Pauwels (1998) and Lee and Collins (2008) that gender-neutral or unmarked terms and paired pronouns are increasingly used in place of their gender-exclusive counterparts. These results showed changes in word choices over the past decade with the new edition of textbooks

In sum, the gender-neutral and gender marked constructions used in textbooks are both visible. However, gender-neutral constructions lead to a more gender-balanced language in textbooks. These findings may be beneficial to writers who aim to write gender-balanced textbooks.

According to the third aim of the study, social and domestic roles for the genders in the selected textbooks, the results indicate that males have more active, more socialized roles such as motorists, bikers, runners, pianists, captains, gardeners, and farmers. On the contrary, females were portrayed as more passive and in more domestic roles. The examples include crafter, housewife, knitter, and caretaker. Moreover, the selected textbooks portrayed females as weaker and as engaging in child care, care of a baby, and buying a dress for her daughter. Like many previous studies (Lee & Collin, 2008; Sadker & Sadker, 2001) females were featured in a domestic role, such as teachers. Moreover, Lee and Collins (2008) added that some authors maintained the stereotyped image of women as weaker than men, and as operating primarily within domestic rather than social domains. Also, the findings were consistent with that of Nofal and Qawar (2015) which stated that women are depicted in a different social setting such as child-minder, housewife, tourist, business person, and students. Men are depicted in more social settings than women. Men monopolize a variety of roles such as writer, tour guide, professor, artist, and police officer.

According to gender firstness, the males are presented first in instances in which they were mentioned together. Some examples where male-firstness appeared were "boys and girls" and "his or her". A possible explanation of why women came later than men is due to Asian cultural biases; wherein men are represented as leaders in society while women have secondary or tertiary roles. Besides, the females' low

visibility might be attributed to authors consequently, they excluded them from mainstream society and refrained from endowing women with the right to equal representation with men.

Concerning the fourth purpose of the title used to describe women and men in the selected textbook, the titles used to describe women, traditional address for married and unmarried women of Mrs. and Miss were used in all of the selected textbooks, Miss appeared in two textbook, the old edition of Mathematics Count 1 and the new edition of Mathematics Count 2. Unexpectedly, Mrs. was found in all editions of the textbooks. These findings run contrary to the previous research conducted by Atkins-Sayre (2005); Holmes (2001); Pauwels (2001), and Winter and Pauwels (2007), which found that the neutral title of Ms. as a substitute for Mrs. and Miss had increased worldwide. A possible explanation was that the writers may be unaware of the asymmetric titles of females. The social problem of gender inequality can be decreased (Lee & Collins, 2009) and hopefully removed by taking some simple precautions against linguistic sexism.

The findings of this research provided some findings that are intriguing in improving the quality of gender equality in the content of textbooks. This suggests that the authors who write textbooks must be aware of the importance of gender equality, as textbooks are a vital source of information and a window through which students can see the real world outside of their families and homes. To show gender equality in the society, it is the responsibility of authors to display a society that provides an equal opportunity for both genders. Therefore, the negative effects of linguistic sexism inside textbooks can influence students' lives and mindsets forever (Vahdatinejad & Bahiyah 2017).

The result of this research will be of great interest to the academic world of writing textbooks who are interested in improving the quality of sex equality in the content and pictures of textbooks. It is essential people writing textbooks take into account the learners' sex equality in all forms. In this regard, the writers can take advantage of this study as it reveals the points that the content contains strong discrimination against females, and the pictures are gender-biased illustrations. The authors should pay attention to the issues of gender and equality.

In sum, it is suggested that this research would help textbook writers, publishers, and teachers to strive for gender equality in educational materials.

In addition, the authors should include the balanced representation of men and women inside the book, the opposition of gender stereotyping in terms of activities performed and characterizations displayed, avoidance of sexist language and word choice, symmetrical titles of women and men, and changes of alternating arrangements of men and women. These would help in shaping student mindsets about the society.

However, according to the limitation of this study, there are still things that could be interesting to examine in future studies. This study investigated the gender

representation presented in mathematics textbooks used in a demonstration school in Chon Buri province that included only the lower secondary level textbooks. This limitation may not be able to be generalized to other textbooks. Therefore, the upper secondary level textbooks could be considered in further studies. This would help cover the whole series for the secondary level to later be generalized. Moreover, the gender of textbook authors was not considered in the analysis. Differences in genders of authors would broaden the understanding of whether gender construction is related to the gender of the writer. Also, another further research that could look at the gender role represented in the textbooks with comparison to its society in other countries. Lastly, the textbooks that were used in this study were published by foreign publishers. Local textbooks could be used in further research. More research could be done with several textbooks to create greater validity and reliability.
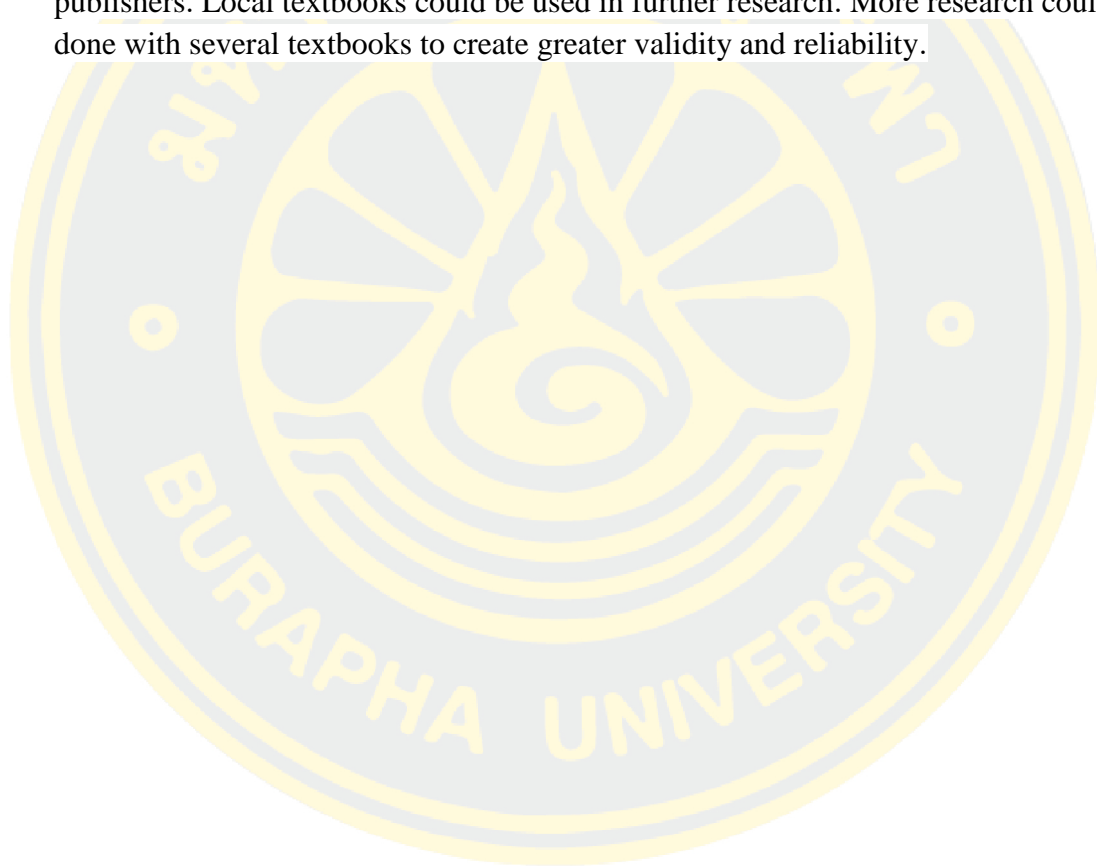
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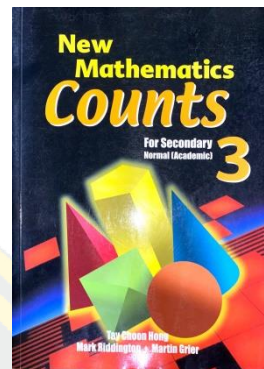
APPENDICES

APPENDIX A

The cover of the Mathematics Counts Books

The cover of the Mathematics Counts Books

1. New Mathematics Counts 1 for Secondary 1

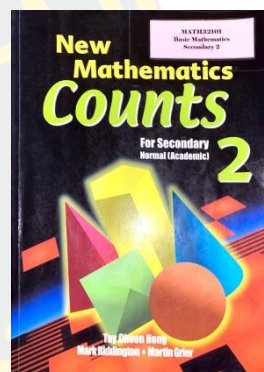Author: Tay Choon Hong, Mark Riddington, Martin Grier

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2. New Mathematics Counts 2 for Secondary 2

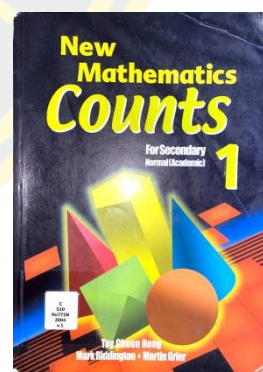Author: Tay Choon Hong, Mark Riddington, Martin Grier

Year of published: 2000

3. New Mathematics Counts 3 for Secondary 3
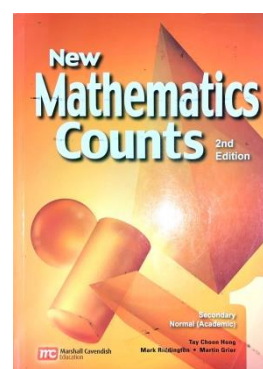
Author: Tay Choon Hong, Mark Riddington, Martin Grier

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4. New Mathematics Counts 1 for Secondary 1 (2nd Edition)

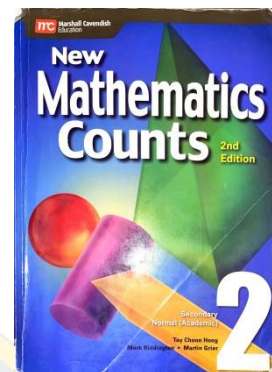Author: Tay Choon Hong, Mark Riddington, Martin Grier

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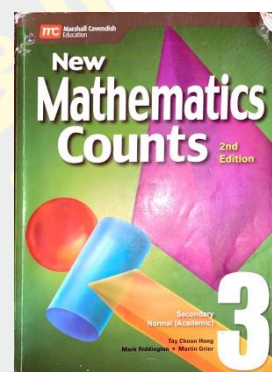**5. New Mathematics Counts 2 for Secondary 2 (2nd Edition)**

Author: Tay Choon Hong, Mark Riddington, Martin Grier

Year of published: 2015

6. New Mathematics Counts 3 for Secondary 3 (2nd Edition)

Author: Tay Choon Hong, Mark Riddington, Martin Grier

Year of published: 2015

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