A Corpus-based Investigation of Gender Stereotyping and Linguistic Sexism in Qatari Primary School Science Textbooks

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ABSTRACT

The content of textbooks that do not show gender equality can act as a conduit for the indoctrination of sexism and sex role conformity among primary students since they are too young to understand the hidden bias embedded. This corpus-based study is part of a bigger study that investigated the occurrence of gender stereotyping and linguistic sexism in the corpus of Qatari primary school science textbooks (Grades 1 to 6). The research design of this study paired the Corpus Lingusitics Approach with Critical Discourse Analysis, which is an innovative endeavour in textbook analysis not much capitalised by researchers in the area. This paper reports the findings of the quantitative textbook analysis. The findings revealed the existence of a large number of neutral gender roles which seem to indicate that the textbook writers were making a conscious effort to promote gender equality. However, further analysis reveals that there is indeed a masculine bias in the science textbooks in that the language used often reinforced male actors as the natural standard. Although in the public sphere females were significantly depicted, their positions are less varied and they occurred less frequently than the males. Males are portrayed as successful and powerful in the social domain and occupy higher positions in society. The second-place status of females is still deeply rooted in the textbooks investigated, and this may negatively impact on the effort to accentuate the active roles of Qatari females in the field of science.

INTRODUCTION

School textbooks play a major part in the educational systems of many countries of the world. They are the mainstay for teaching and learning. Thus, textbooks that do not portray gender equality can inculcate cultural prejudices and personal biases. The notion of textbooks as a source of influence on values and attitudes can be traced back from research carried out three decades ago. Cincotta (1978) and Scott (1980) believe that children's attitudes, behaviours and values are greatly impacted as children spend most of the time reading at schools. This is especially so for primary school students who are too young to understand the embedded bias when they encounter them in their interaction with textbooks since "textbooks indirectly and unconsciously function as conduits for the indoctrination and enforcement of sexism and sex role conformity among young" (Bahiyah *et al*., 2008, p. 49) learners. This was substantiated by Mukundan and Nimehchisalem (2008) when they assert the importance of textbooks in providing a neutral realistic representation of gender that will inevitably influence learners' understanding of social equality and national unity especially in the Malaysian context.

Language can also be "a primary factor through which gender biases are Iexplicitly and implicitly perpetuate" (McClure, 1992, p. 39). In other words, gender biased language is not apparent as it is usually camouflaged by other more prominent aspects. Porreca (1984, p. 705) theorised that:

"[t]he role played by language in maintaining and strengthening sexist values…is less widely understood or acknowledged [than economic gender inequality]… probably because linguistic sexism is much more deeply rooted and far more subtle than other forms of sexism."

Mineshima (2008) added that if sexism or gender biases are present in the learners' text, the 'harmful' information could also be transmitted to learners subconsciously. Gershuny (1977) warned that textbooks aiming to teach the specifics of academic discipline have concurrently taught secondary information – gender roles and social values. Bahiyah *et al*. (2008) cited several effects of gender role stereotyping and linguistic sexism in school textbooks on children. Specifically, linguistic sexism and gender role stereotyping could:

"mould in the young a sexist mind set, legitimizing the ideology that sexism is the natural order of things; lower the self-esteem of children and young adults creating a void that has detrimental effects on the self-images, aspirations and motivations of both genders; limit both genders to certain modes of behaviour, course of study and career choices thus preventing them from realizing their full potential; and promote gender biased classroom practises where

one gender is favoured over the other making the classroom context disharmonious" (Bahiyah et al., 2008, p. 49)

These may then "cause social ills such as violence, sexual violence, domestic violence and sexual harassment at the workplace" (Bahiyah *et al.*, 2008, p. 49).

Many researchers have made claims that textbooks demonstrate gender bias, sexism and stereotyping (see amongst others, Jariah Mohd. Jan, 2002; Sanda Kumari & Marzdiah, 2003; Bahiyah *et al.*, 2008; Mukundan & Nimehchisalem, 2008; Mineshima, 2008; Bahiyah, 2009; Mohamad Subakir *et al.*, 2012). In spite of this, there are textbook writers who deny the existence of gender bias in textbooks (Sunderland, 1994). O'Neill (1994) claimed that authors' creativity could be blocked if specific guidelines were imposed to avoid gender bias. Gender role stereotyping, according to Bahiyah (2009, p. 106), is the result of "oversimplified opinions, affective attitudes or critical judgements made about a person's role simply because the person is male or female." When there is reliance on such stereotypes, we may overlook important particularities of individuals and to perceive them only in terms of what we consider common to a general category (Wood, 1997).

English subject textbooks have been the focus of attention for many textbook researchers so much so that there is a gap in research on textbooks of other subjects. The study discussed here is a small part of a bigger research project investigating linguistic sexism and gender role stereotyping in Qatari Mathematics, English and Science subject textbooks written in English. It attempts to fill the knowledge gap about sexism and gender role stereotyping in science textbooks which is much neglected. Corpus linguistics, a methodology that uses computer support via a software programme which is not much used in textbook analysis, especially in Qatar, was adopted for this study (Baker, 2006, 2010; Mautner, 2009; Sinclair, 1991). It afforded not only a fast and reliable analysis of data, but also valuable insights into a large corpus of authentic data (Qatari Science textbooks amounting to 171,039 running tokens/ 5,258,711 total running tokens for the bigger study), which otherwise would have been limited had a purely manual technique been used. It explores the extent to which these textbooks hold such effects since they are considered to be vehicles for the presentation of scientific knowledge to students in which ideas, information, explanation, argumentation and persuasion are conveyed (Muspratt, 2005). Textbooks are an important component of science instruction (Graesser *et al.*, 2002; Menon & Mukundan, 2010; Sydney, 2004) despite the trend to minimize textbook use in science education by certain quarters. Further, the children who use these textbooks are at their formative age and the texts play an important part in formulating their cultural and social values, specifically where gender relations are concerned.

Consequently, the study hopes to

raise awareness among stakeholders in general and Qataris in particular concerning linguistic sexism and gender role stereotypes in Qatari primary school science textbooks via the following research questions:

1. What are the frequencies of occurrence of gender stereotyping and linguistic sexism in the Qatari primary school science textbooks?

2. How are gender stereotyping and linguistic sexism portrayed in the Qatari primary school science textbooks?

Linguistic Sexism in School Textbooks

Many researchers have conducted studies on sexism in various teaching and learning materials, where the two genders have been treated quite differently (Sydney, 2004; Blumberg, 2007; Abderrahim Sabir, 2008; Bahiyah *et al.*, 2008; Mukundan &Nimehchisalem, 2008; Nadia, 2010; Mohd. Faeiz Ekram *et al.*, 2011; Habibah *et al.*, 2011; Zarina *et al.*, 2011; Mohamad Subakir *et al.*, 2012). Yang (n.d.) expressed a similar view by illustrating the typical representation of males and females having different interests, personality traits and occupational roles.

Sydney (2004), who investigated gender role stereotyping in 40 textbooks of 6 subjects used in government primary schools in Tanzania, found that female characters depicted were fewer compared to males. Females were under-represented in appearance and power related aspects such as leadership, ownership of property

and association with technology, leisure and sports activities.

Abderrahim Sabir (2008), who reported on the importance of gender equality through family law passed in 2004 in Morocco, found that women are clearly marginalized in most of the spheres reviewed in the Arabic, Islamic studies, History, Geography, home economics and arts textbooks. Meanwhile, men were prioritized over women in pictures, drawings and texts. Gender stereotypes continue to exist and negative characteristics seemed to be widely attributed to women and girls. In Malaysia, Mukundan and Nimehchisalem (2008) discovered several interesting examples of gender misrepresentation in Malaysian Forms 1-4 English textbooks. Not only are females seen to be less prominent, there is also negative stereotyping of males. Nadia (2010) examined how gender roles were depicted in Malaysian English primary school textbooks of Years 1-6. The findings revealed obvious under-representation of females and over-representation of males. She concludes that this may negatively affect the students in believing that both genders must conform to their traditional roles in the society.

With regards to the research methodology used, some of the research studies cited in this section did not subscribe to the corpus linguistics approach applying instead the traditional manual approach in data analysis (see Sydney, 2004; Abderrahim Sabir, 2008). This may have curbed opportunities to exploit the data since the analysis of the data set is highly restricted (Yuen *et al.*,

p. 104). Thus, the scope and the scale of the study were also limited. In addition, researcher bias is also an issue to contend with besides contending with issues of direct access to data for verification and proof.

MATERIALS AND METHOD

Modern technologies via software packages have reduced the manual tediousness of analysis (Yuen *et al*., 2008; Mautner, 2009; Baker, 2010). Wordsmith Tools 5.0 (WST, henceforth) software was used to quantitatively analyse the distribution of male and female roles portrayed in 43 textbooks representing all the science textbooks used in Qatari primary schools (Grades 1-6) and in five predetermined categories, namely, pronouns, professions, kinship terms, hobbies and interests and salutations, following the framework set by Bahiyah (2007). This software offers both qualitative and quantitative perspectives on textual data, computing frequencies and measures of statistical significance, as well as presenting data extracts so that the researchers could access and assess individual occurrences of search words, qualitatively examine their environments through the collocations and describe semantic patterns that are salient (Mautner, 2009, p. 123). Meanwhile, Fairclough's (1989) Critical Discourse Analysis (CDA) was used to triangulate the findings in the quantitative analysis. The research design adopted for this study is discussed in detail in Bahiyah *et al*. (2007, 2008, 2009) and Yuen *et al*. (2008). This kind of research design may be deemed innovative as not

many research studies in textbook analysis have paired corpus linguistics in CDA projects, at least not in Qatar.

First, the data used to develop the corpus were taken from 43 science textbooks written in the English language and used in Qatari primary schools. The textbooks were scanned and transformed into digital form using ABBYY FineReader Version 10 (see Bahiyah *et al*., 2007, 2008, 2009; Yuen *et al*., 2008). The scanning process produced a JPEG format of the textbook page. From the JPEG format, the data were converted into a word document file and then into text files.

The text files of the 43 Qatari primary school science textbooks were processed using WST to create a wordlist. From the wordlist, the frequencies of the occurrences of words denoting gender stereotyping and linguistic sexism in the five predetermined categories were extracted. The collocation of words for each identified gender biased word was also provided by the list.

The research design is summarized below (see Fig.1). However, in this paper, only the findings of the quantitative textbook analysis carried out byWST are discussed.

FINDINGS AND DISCUSSION

The overall frequencies of the male, female and gender neutral characters identified from the corpus are described, followed by brief discussions alongside the findings. Gender neutral characters are defined here as those that cannot be readily identified/ differentiated as males or females (Bahiyah *et al*., 2009, p. 46). With regards to specific vs. general reference, English itself lends
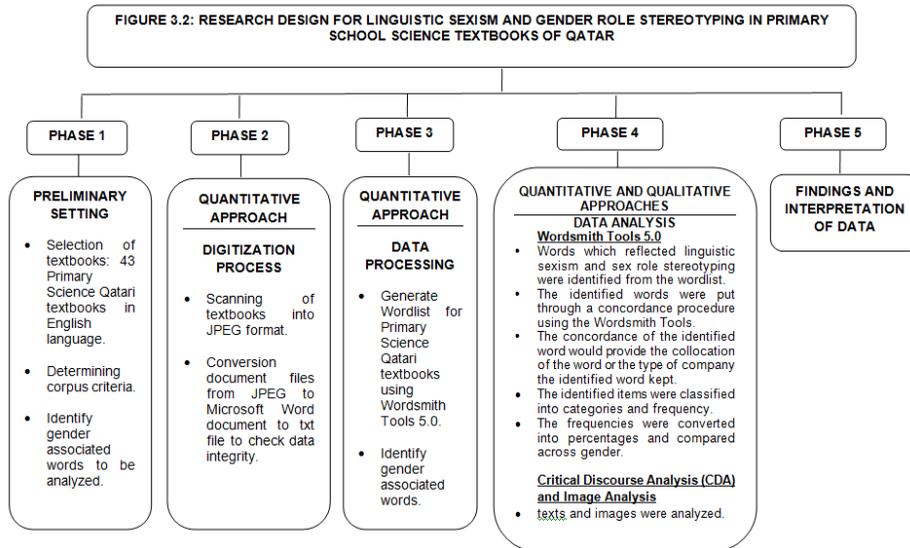
Fig.1: Research Design for Linguistic Sexism and Gender Role Stereotyping in Primary School Science Textbooks of Qatar (Adapted from © Bahiyah *et al.*, 2007, 2008 & 2009)

to the difficulty of identifying between males and females especially when the identity of the subject is hidden within discourse but could be retrieved from examining the context of use and using clues such as images/pictures that accompany the discourse or by examining the use of indexicals. The use of lexical items like "teachers", "dentists", "miners", etc. related to professions (see Table 4a. in the Appendix) and "child/children", "parent/s", "baby/ies", etc. related to kinship terms (see Table 5a. in the Appendix) that are used in general reference rather than to those that relate specifically to the subject can be problematic. This also holds true to understanding what lexical items related to hobbies and interests are gender neutral or gender specific (although it becomes very apparent as to the designated gender in gender specific professional nouns such as

"seamen" and "milkmaid") when used in the textbooks (see Table 6b. in the Appendix related to hobbies and interests). In such cases, the Concordance Tool in WST, which shows the environment in which the lexical items occurred, was used to verify the gender of the subject/s referred to. Once verified, the distribution of the items was designated accordingly.

The male, female and neutral gender characters were identified in all 43 science textbooks. Overall, as illustrated in Table 1, neutral gender dominated the frequency, with 787 occurrences (47%). The frequency and percentage of males were 479 (29%) respectively, while those for females were 401 (24%). The relatively lesser depiction of females in science textbooks is largely due to the educational system itself, as reported by Walford (1983) and Bertilson *et al*. (1982) which resulted in the well-

known fact that fewer girls than boys take courses in Science and Technology (S & T, henceforth). Warren and Rogers (1988) exemplified how students are instilled with expectations and beliefs that occupational aspirations and opportunities are determined by gender through education causing females to avoid highly competitive and prestigious areas (Britton, 1973) in S & T.

TABLE 1
Overall Frequency of Gender Representations in Qatari primary school science textbooks

Gender	Number of occurrences
Male	479
Female	401
Neutral	787

It is apparent that almost half of all the identified characters in the Qatari primary school science textbook corpus are gender neutral. This contradicts the results of other researchers (e.g., Mineshima, 2008; Mukundan & Nimehchisalem, 2008; Mohamad Subakir *et al*., 2012) who revealed absolute gender bias with males outnumbering females in their findings. This study echoes the results of the majority of the previously conducted studies if the focus is only on male and female as the occurrence of female words recorded is 20 percent lesser. To Rolin (2004, p. 881), the rationale for the preference towards gender neutral words in S & T is the following, "Gender plays a negative role when gender bias interferes with scientists' evaluations of their colleagues' trustworthiness or when the gendered dynamics of communication function as obstacles to inclusive and critical dialogue, thus impeding scientists' ability to realize their epistemic goals."

Pronouns

The English language is male-oriented, i.e., the human race is equivalent to *man*, the individual *he*, with the constant assurance that man, *he*, *his*, *him*, and *himself* are the generic terms where women as well as men are included (DeShazer, 1981). Thus, it is not surprising to obtain the following results.

The pronouns investigated were 'he', 'him', 'himself', 'his', 'she', 'her', 'herself', 'me', 'my', and 'myself'. The data in Tables 2 and 3 reveal that the pronouns analysed were higher for males with a frequency of 279 (49.03%) vs. 255 occurrences (44.82%) for females. This finding is consistent with those of Habibah *et al*. (2011) and Mohamad Subakir *et al*. (2012). Bahiyah *et al*.'s (2008 & 2009) findings in the study of Malaysian English language textbooks of Years 3 and Year 6 also depicted a similar trend. The neutral pronouns stood at 35 occurrences (6.15%).

TABLE 2
Frequency of Occurrence of Male/Female Pronouns

	Male	Female	Neutral
Frequency	279	255	35
Percentage	49.03%	44.82%	6.15%

Interestingly, the use of the third person female object pronoun 'her' is significantly higher in the textbooks studied with a frequency of 99 as compared to the male

TABLE 3
Frequency of Types of Pronouns

Pronoun	Male		Female		Neutral	
	Freq.	%	Freq.	%	Freq.	%
He	134	48.03	0	0	0	0
She	0	0	110	43.14	0	0
Him	32	11.47	0	0	0	0
Her	0	0	99	38.83	0	0
Himself	2	0.71	0	0	0	0
Herself	0	0	1	0.39	0	0
His	79	28.32	0	0	0	0
My	26	9.32	42	16.47	27	77.14
Me	6	2.15	2	0.78	8	22.86
Myself	0	0	1	0.39	0	0
TOTAL	**279**	**100**	**255**	**100**	**35**	**100**

object pronoun 'him', with a frequency of 32. Even though the numbers seem to be positive, grammatically in English, object pronouns are back-grounded as subject pronouns are fore-grounded, as illustrated by Bahiyah *et al*. (2008, p. 56) below:

> *"He/She (subject pronoun – fore-ground) saw (verb) her/him (object pronoun – back-grounded)."*

Macaulay and Brice (1997) discovered that females appeared slightly more often as direct objects (43%) than as subjects (41%), while males appeared much more often as subjects (84%) after analysing a grammar reference book and this seems to substantiate Bahiyah *et al*.'s assertion.

In the case of reflexive pronouns, the use of 'himself' and 'herself,' albeit very limited usage in the textbooks (see Table 3 above), also showed a slight bias toward males. One possible reason could be due to the difficulty of young learners in grasping reflexive pronouns as "reflexive pronouns are used to replace nouns or pronouns that refer to the same person/s or thing/s in the same clause acting as the subject of the sentence" (Bahiyah & Wijasuriya, 1998, p. 20). Thus, only 3 incidences of reflexive pronouns (2 'himself' and 1 'herself') were found.

Subject pronouns are given more prominence than object pronouns as they are also the actors of the verb form and have more volition than the object pronouns. Sydney (2004) stated that children who are exposed to a constant flow of information about 'him' appear to conclude that the typical person ('him') is a male. From the analysed data, however, females are more significant. Therefore, it is important to implement gender neutral language as it will enhance the development of appropriate and flexible gender association, especially in learning materials of readers who are

primary students. Moreover, according to Blumberg (2007) textbooks take up most of the class time for both teachers and students, and this will in turn reflect a nation's curricula.

In summary, the use of masculine pronouns is slightly higher in Qatari science textbooks. Although the frequency of female pronouns is significantly high, the overall difference in the use of males and female pronouns is almost equal. In other words, male and female pronouns are not evenly distributed in Qatari textbooks. Unfortunately, the depiction of dominant males in the society portrayed in the science textbooks studied is still apparent.

Professions

Based on the data presented in Table 4 below, professions related to males occurred 72 times (or 20.17%), while those related to females occurred 27 times (or 7.56%) and those related to neutral gender appeared 258 times (or 72.27%). Although professions related to neutral gender were the highest compared to those of males and females, stereotypes persisted between male and female professional roles. Undoubtedly, one common profession, i.e., 'scientist' recorded the highest number of occurrences in both genders as well as in the gender neutral list owing to the context of investigation.

TABLE 4
Overall Professions

	Male	Female	Neutral
Frequency	72	27	258
Percentage	20.17%	7.56%	72.27%

From Table 4a in the Appendix, the professions for females accounted for 13 types as opposed to 33 types for males. Thus, it is clear that the professional roles for females are more restricted and less diverse compared to those of males. Males were found to be depicted in a wide and varied range of professions such as 'cyclist/s', 'sailor', 'rider', 'footballer', 'miner', 'archer/s', 'guitarist', 'astronomer', 'parachutist' and 'police' (see Table 4a in the Appendix) and they seemed more active, aggressive, and dynamic. Yang (n.d.) made a similar claim by quoting studies by Gupta and Lee (1989) in Singapore and Lee and Collins (2008) in Hong Kong, who disclosed the limited range of roles given to females in the society. Furthermore, females were depicted in professions such as 'teacher', 'scientist', 'gardener', 'doctor/s', 'athlete', 'nurse', and 'captain'(of a netball team). Although some of the professions can be perceived as active (for instance, 'athelete' and 'gardener') and some professions like 'scientist' and 'doctor/s' can be seen as improvement on the part of women, contradicting the usual gendered steorotype, they merely merited a cursory description. Half of all the female professions found in the textbooks were that of 'teacher', 'scientist' and 'nurse'. It is interesting to note that pink-collar jobs, which are traditionally related to women like teaching and nursing, are still being fore-fronted and offered to females in the textbooks alongside 'doctor/s', but the cursory treatment of 'doctor/s' as females in a non-traditional occupation in the textbooks may not leave a

lasting mark on students in terms of equality and as valid professional role models for girls if their treatment is only cursory in nature.

With regards to the position of males in the textbooks, it was surprising to observe the considerably high occurrence of male teachers. This signals the acceptance of discrepancy in traditionally male roles and professions. Although the textbooks have clearly defined male and female occupations, we are however now seeing a positive trend towards being more gender balanced where females in the textbooks generally mirror the accomplishments of those in Qatari society today. In comparing Qatari women with those in other Arab countries, Qatari women are more progressive and advanced in the participation of politics, equal opportunities, education and voting rights. Women are allowed to vote and also run for elections. The first woman to be elected was in 2003 and in the latest elections in 2007, three women held seats in the council. In tertiary education, more than 70 percent of all students are female (Jamilah, 2011). Textbooks that have females in non-traditional occupations are surely a good step in reducing gender stereotyping (Dominguez, 2003).

Kinship Terms

With regards to kinship terms, the distribution of gender roles is rather balanced (see Table 5 below), with 55 male (21.57%) and 49 female (19.21%) occurrences. Just like the two previously pre-determined categories, gender neutral terms remained the highest, while more than half of all kinship related terms are not assigned any specific gender.

TABLE 5
Overall Kinship Terms

	Male	Female	Neutral
Frequency	55	49	151
Percentage	21.57%	19.21%	59.22%

The equal representation of both genders can be explained due to the female oriented themes presented by the textbook writers. However, sex role stereotypes of both genders prevail particularly in the performance of activities for the family well-being and for the home. In the textbooks analysed, in a typical household, 'fathers' are depicted as heads of the family and are shown to be outdoors, while 'mothers' are confined to indoor spaces. As Acker argues, an ideal type that most closely fits the life experience of male heterosexuals is from their social location, sexuality, emotionality, and reproductive labour that can be identified with the presence of women and divided from the work-place into a "separate sphere" of the family (Acker, 1990, cited in Ferree & Hall, 1996). This division is commonly regarded as a norm in most communities, including Qatar rather than as part of a social stratification process.

In terms of ranking, 'mother' is third with 33 occurrences after 'children/child' (gender neutral 114 occurrences) and 'baby/ies' (gender neutral 39 occurrences). The role of a mother is highly significant in the family compared to the role of a father, with only 23 occurrences (see Table 5a in the Appendix). In other words, mothers are given the most

central family role and are depicted as carrying heavier burdens than fathers in a family setting. Hence, much of the domestic work such as 'cooking', 'sweeping', and 'washing' are associated with mothers as homemakers. These stereotypical roles of mother and homemaker in the traditional organization of the family reveal that women are presented to take limited roles and duties such as being wife, mother and housewife. Although females are portrayed as active participants in S & T as shown in the number of occurrences in the textbooks, the connotation implied is indeed undesirable.

On the surface, it may appear that the writers of the Qatari science textbooks studied have taken the issue of underrepresentation of women in S & T and depictions of their roles in the textbooks seriously. However, there is a great deal of variation between these science textbooks that can be attributed to tokenism. As such, we concur with Warrens and Rogers (1988) that it is necessary for teachers and gatekeepers to be aware of the role of subtle messages in text materials that may affect the number of future women scientists and the utilisation of human potential.

Hobbies and Interests

For Hobbies and Interests (Table 6), females outnumbered males with 44 (11.08%) occurrences compared to 39 (9.82%) occurrences, while the gender neutral terms occupied almost three quarter of the overall results. In this category, there is overt portrayal of females with males being overshadowed. While the large numbers of female occurrences can be deemed positive, upon checking concordances, the female characters in the textbooks are sometimes negatively depicted.

TABLE 6
Overall Hobbies and Interests

	Male	Female	Neutral
Frequency	39	44	314
Percentage	9.82%	11.08%	79.10%

Most males are illustrated in active activities involving the outdoors such as 'parachuting', 'playing snooker', and 'cycling' unlike females who were involved in 'drawing', 'talking', and 'sunbathing', as depicted in Table 6a. Compared to females, males are not mentioned as frequently as the females. This may serve to modify children's ideas of conventional active male figures.

Although females in the textbooks analysed are linked to 'riding', 'football', and 'marathon', all active activities, female characters are not consistently depicted as actively participating in these activities. However, we agree with Mineshima (2008) that this is sufficient to depict very active and outgoing female characters, which will eventually help to deconstruct stereotypical images of female hobbies such as 'sewing', 'baking', 'cooking' and many more which are less extreme. Surprisingly, signs of inadequate contribution by males in household chores could not be identified as the involvement of females was equally small.

Furthermore, the high incidence of

TABLE 6a
Distribution of Words Related to Hobbies and Interests

Genre	Male	Female
Sports	Racing (1), Swimming (1), Cycling (3), Jogging (1), Climbing (1)	Running (1), Exercising (2), Ridding (2), Football (2), Marathon (2), Aerobics (3), Jogging (1)
Entertainment	Playing (8), Snooker (2), Singing (1), Television (2)	Playing (9), Party (2)
Household pursuit	Cooking (1)	Cooking (1), Washing (1)
Personal pursuit	Eating (4), Collecting (1), Walking (1), Planting (1), Fishing (1), Listening (2), Polishing (1), Pond dipping (1), Carving (1)	Writing (1), Resting (1), Drawing (2), Eating (1), Collecting (1), Drinking (2), Talking (2), Studying (1), Sunbathing (5), Gardening (1)
Others	Smoking (1), Parachute (4)	Digging (1)
Total	**39**	**44**

neutral roles of 79.10 percent seemed to suggest that efforts were being made by the textbook writers and publishers to promote neutrality in the choice of hobbies and interests for both genders. As a whole, the textbook writers appeared to have succeeded in portraying characters, both females and males, with diverse hobbies and interests.

Salutations

In this last category (Salutations in Table 7), male terms of address occurred much higher compared to those of females and neutral gender. Males recorded 56.73 percent as compared to 37.29 percent for females and 5.08 percent for neutral salutations. These huge gaps reveal an obvious bias of males over females in salutations.

TABLE 7
Overall Salutations

	Male	Female	Neutral
Frequency	34	22	3
Percentage	56.73%	37.29%	5.08%

No local address forms were used exclusively for male and female Qatari characters as textbooks are mainly imported from the United States and United Kingdom with the exception of Singapore. The terms 'Mr.', 'Miss', 'Mrs.', 'Sir', 'Lord, 'Lady' and 'Master' were used in conjunction with non-Qatari characters (see Table 7a). The use of 'Master' and 'Lady' overwhelmingly referred to the characters of English origin. The analysis showed that the use of salutations for honour is associated mostly with males. Moreover, Hartman and Judd (1978) investigated the order of the mentioning of two nouns paired for sex such as 'Mr. and Mrs.', 'husband and wife', and 'Sir and Madam' and they discovered that the masculine reference always comes first (except "ladies and gentlemen"). Thus, they argued that "such automatic ordering reinforces the second-place status of women."

The overall distribution of words for the five pre-determined categories

TABLE 7a
Distribution of Words in Salutations

Token	Male		Female		Neutral	
	Freq.	%	Freq.	%	Freq.	%
Mr	17	50.0	-	0	-	0
Captain	5	14.71	4	18.18	-	0
Miss	-	0	6	27.27	-	0
Mrs	-	0	7	31.81	-	0
Sir	5	14.71	-	0	-	0
Dr	2	5.88	-	0	-	0
Lord	2	5.88	-	0	-	0
Professor	1	2.94	1	4.55	-	0
Lady	-	0	1	4.55	-	0
Master	1	2.94	-	0	-	0
Queen	-	0	1	4.55	-	0
Dear	1	2.94	2	9.09	3	100.0

is summarised in Fig.2 below. It can be clearly seen that the occurrences of male and gender neutral characters surpass female occurrences in all the categories investigated. Generally, males are given additional emphasis in the textbooks as indicated by the relatively greater frequency of occurrence. However, an exceptional instance was detected under the hobby and interest category, where a slightly higher occurrence of females was recorded. Another peculiar pattern was observed in the pronoun and salutation categories as the female characters prominently outnumbered gender neutral characters.
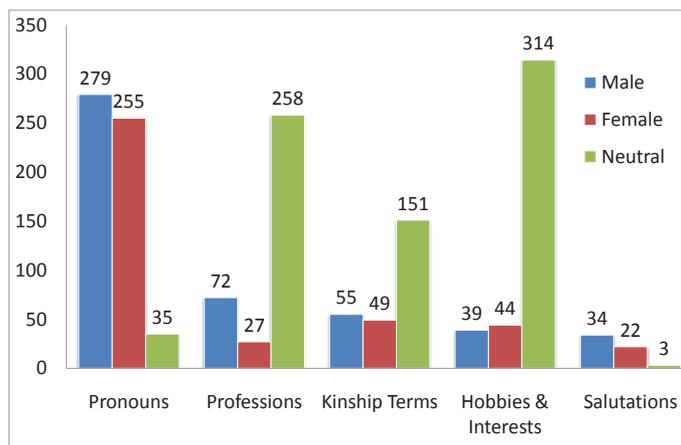
Fig.2: Distribution of Words in Pronouns, Professions, Kinship Terms, Hobbies and Interest and Salutations found in Qatari Science Textbooks

CONCLUSION

Article 35 of the Qatari constitution (Bertelsmann Stiftung, 2009, p. 14) states that, "all people are equal before the law. There shall be no discrimination on account of sex, origin, language, or religion." At first look, the quantitative analysis above seems to confirm this, as revealed by the existence of a large number of neutral gender roles which seem to indicate that the textbook writers were making a conscious effort to promote gender equality. However, further analysis of gender portrayal confirms a clear gender imbalance in the texts studied, and that male and female characters are assigned to different roles, professions, hobbies or interests, kinship terms, as well as salutations. The corpus-based analysis carried out confirms that the Qatari primary science textbooks written in the English language conveys gender stereotyping and linguistic sexism. There is indeed a masculine bias where the language used often reinforces males as the standard and foregrounds males. It is evident that the writers of the textbooks analysed did not deviate much from the traditional patriarchal notion of placing importance to males and masculinity. Males are portrayed as successful and powerful in the social domain and occupy higher positions in society. In the public sphere, although females are depicted similar to males, their roles and positions are less varied and they occurred less than the males. In these depictions, the view of the second-place status of females is still deeply rooted in the Qatari textbooks investigated.

Women in Qatar receive education and vocational training despite being stereotyped as wives and mothers. However, Qatar ranks 117 out of 134 countries in the 2010 Global Gender Gap Index (GGGI) conducted by the World Economic Forum specifically to identify gender equality in terms of economic participation and opportunity, educational attainment, political empowerment and health (Global Gender Gap Report, 2010). Although Qatar is ranked low, Qatari females have made much progress in terms of gender equality. They are now more visible in the fields of politics and education than ever before. In fact, females are increasingly filling important ministerial positions with currently three women holding seats in the council. They are contributing to society by taking bigger roles in the public sphere and have made a mark in all spheres of society; so in textbooks and elsewhere, they should no longer be stereotyped as housewives and be confined to passive occupations. Future studies must take into account the varied roles of Qatari women and the inroads to their success in the public sphere must be studied and documented. Textbook writers, editors and illustrators should take note of the changing roles of Qatari females and their realistic contributions to the society so that whenever possible, females can be represented as equally as males in textbooks. There should be equal opportunities given to both genders via texts and images, especially in the presentation of the scientific subject matter that will encourage females to build awareness not only to the fact that they too

can contribute significantly to scientific knowledge and innovation but also that they too have as much access and rights to careers in the sciences just as much as their male counterparts. In doing so, this could positively impact the effort to accentuate the active roles of Qatari females in the fields of science as well as in research and development (R & D, henceforth). Future research endeavours should not look into just corpus-based text analysis but should now concentrate on the complementary analysis of corpus-based text and images in meaning making. Images can be powerful not only in assisting comprehension but they can also deliver powerful meanings to students.

Qatar has put much emphasis on S & T and R & D for nation building and for its socioeconomic development plans cognisant of the fact that it cannot be overtly dependent on expatriate expertise and has put into place pathways for developing and training S & T as well as R & D qualified individuals and knowledge based workers. Thus in this endeavour, both genders must commit equally to the economic and social well-being of the country. This must be highlighted in all Qatari textbooks so that students learn that like males, females cannot be judged on biological terms alone but on their capability, credibility and qualifications (Bahiyah *et al.*, 2009).

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APPENDIX

TABLE 4a
Distribution of Words Related to Professions

Male	Frequency	Female	Frequency	Neutral	Frequency
Teacher	9	Teacher	6	Teacher/s	47
Scientist	16	Scientist	5	Scientist/s	52
Gardener	1	Gardener	2	Dentist/s	21
Sailor	2	Astronaut	1	Farmer/s	18
Pupil	1	Doctors	2	Gardener/s	14
Doctor	1	Driver	1	Smokejumpers	9
Player	4	Managing		Astronaut/s;	12
Miner	1	Director		Cosmonaut	9
Cyclist/s	4	Runner/s	1	Sailor/s	9
Director	2	Captain	3	Pupil/s	9
Rider	2	Nurse	2	Doctor/s	8
Detectives	2	Athlete	1	Driver/s	7
Firefighters	1	Milkmaid	1	Player/s	5
Caretaker	2	Musician	1	Miners	4
Explorer	2		1	Crew	4
Footballer	2			Engineers	2
Goalie;				Cyclists	1
Goalkeepers				Directors	3
Bungee jumpers	3			Diver	1
Police	1			Rider	1
Archer/s	2			Runners	4
Artist	2			Worker/s	1
Astronomer	1			Detectives	2
Coroner	1			Fire fighters	1
Guitarist	1			Explorers	1
Interviewer	1			Bungee jumper	1
Prime Minister	1			Nurse	2
Environmental	1			Reporter	2
health officers				Students	1
Parachutist				Astronomers	1
Seamen	1			Builder	1
Soldier	1			Designers	1
Staff	1			Car makers	1
Swimmers	1			Road planners	1
	1			Racer	1
	1			Rescuers	1
				Shopkeepers	
Total	**72**	**Total**	**27**	**Total**	**258**

TABLE 5a
Distribution of Words of Kinship Terms

Token	Male	Female	Neutral
Children/Child	10	3	101
Baby/babies	-	1	38
Dad/Father	23	-	-
Mum/Mother/Mothers/Mommy	-	33	-
Parents/Parent	-	-	11
Grandma/Gran	-	9	-
Granddad/Grandpa/ Grandfather	16	-	-
Daughter	-	2	-
Grandparents	-	-	1
Grandson	1	-	-
Sister	-	1	-
Sons	2	-	-
Brother	3	-	-
Total	**55**	**49**	**151**

TABLE 6b
Distribution of Words Related to Hobbies and Interests

Token	Male	Female	Neutral
Watering	-	-	2
Writing	-	1	7
Play; Playing	8	9	39
Drawing	-	2	15
Eating	4	1	24
Collect; Collecting	1	1	22
Thinking	-	-	36
Cooking	1	1	7
Drinking	-	2	11
Parachuting	4	-	16
Washing	-	1	5
Exercising	-	2	15
Reading	-	-	1
Smoking	1	-	13
Talking	-	2	10
Walking	1	-	9
Travelling	-	-	1
Racing	1	-	1

TABLE 6b (Continue)

Swimming	1	-	3
Resting	-	1	5
Running	-	1	4
Snooker	2	-	-
Riding	-	2	4
Studying	-	1	7
Bungee jumping	-	-	3
Football	-	2	-
Planting	1	-	6
Fishing	1	-	1
Listening	2	-	4
Party	-	2	2
Shop	-	-	1
Sing; Singing	1	-	5
Polishing	1	-	4
Sunbathing	-	5	-
Marathon	-	2	2
Aerobics	-	3	-
Cycling	3	-	-
Dancing	-	-	2
Digging	-	1	2
Jogging	1	1	1
Climbing	1	-	-
Hopping	-	-	2
Hopscotch	-	-	2
Plucking	-	-	2
Watching Television/ TV	2	-	4
Pond dipping	1	-	6
Carving	1	-	-
Celebrating	-	-	1
Clapping	-	-	1
Filming	-	-	1
Gardening	-	1	-
Painting	-	-	1
Practising	-	-	1
Researching	-	-	1
Showering	-	-	1
Skipping	-	-	1
Total	**39**	**44**	**314**