Gender Representation in Grade Six Science Textbook of Sri Lanka

U. Mathura[1*] and K. Piratheeban[2]

[1]*Kn/Iyakachchi Maha Vidyalayam, Kilinochchi, Sri Lanka,*

[2]Department of Education, Faculty of Arts, University of Jaffna, Sri Lanka.

uruthirathasan.mathura@gmail.com

Abstract

The contents of school textbooks serve as a reflection of the prevailing beliefs, values, and practices within a society. The prevalence of gender bias in school textbooks has been identified globally. This portrayal negatively impacts various facets of life; family dynamics, workplace, job interests and educational environments. Therefore, addressing gender bias in our textbooks necessitates a comprehensive approach aimed at creating a society that empowers both genders in all fields equally. This study aims to investigate the disparities present in grade six science textbooks regarding gender representation. Since statistics highlight a persistent gender gap in the field of science, the Grade 6 science textbook was selected for this study using purposive sampling, as students encounter science as a subject for the first time at the junior secondary level. Consequently, gender-related content within textbooks at this stage has the potential to shape their long-term career aspirations and beliefs. Further, visual contents in educational materials can transmit cultural ideologies to learners easily. Therefore, this study was designed as a quantitative analysis, wherein pictures, photos, and images of males and females in the textbook were counted across three themes: visibility, occupational roles, and general activities. The counts were then analyzed using inferential statistical methods specifically chi-square. The results indicate that 75% of the images represent male identity, while only 25% represent females. Hence, the difference in the visibility of genders is not statistically significant ($p = 0.199$). Additionally, only 33% of female characters show occupational depictions in the textbook, while 67% of images portray male occupational roles. Thus, the difference in the occupational representation of genders is not statistically significant ($p = 0.157$). Also, male characters are portrayed in heroic and active roles than females. In conclusion, these findings underscore the presence of gender inequality within the textbooks, perpetuating stereotypes and prioritizing male authority and leadership roles. This practice not only perpetuates gender stereotypes but also demotivates the potential for growth and development among women in every field, including the science stream. Therefore, curriculum designers and authors of textbooks should establish a systematic method to present gender equality within the textbooks, ensuring the inclusion of gender-neutral content.

Keywords: Gender in-equality, gender balance, gender bias, gender neutral curriculum

Background

Gender plays a significant role in shaping our self-image. It permeates various aspects of our lives, including our physical surroundings, upbringing, economic opportunities, psychological development, body image, and even our choice of clothing. As a result, gender becomes intertwined with our identity, with society imposing specific expectations and norms regarding social and verbal behaviors on its male and female members (Dabbagh, 2016). Gender stereotypes often devalue the worth of women and girls while exaggerating the importance of men and boys. Male and female characters are often portrayed in such stereotypical ways that the elevation of men unavoidably leads to the disparagement of women (Gayanandani, 2008). In the 1960s, feminist movements emerged, shedding light on the dominance of men over women and challenging patriarchal structures. Despite women's increasing participation in the workforce and contribution to family finances, they are still expected to bear the primary responsibility for domestic chores, while men are often exempt from these duties. This gender inequity permeates every aspect of our lives, and textbooks are no exception. Indeed, educational materials often reflect and perpetuate gender biases and stereotypes present in society. From the portrayal of male and female characters to the language used in textbooks, instances of gender discrimination are pervasive (Ahmad *et al*., 2023).

The UNESCO Global Education Monitoring (GEM) Report (2016) emphasizes the crucial role of textbooks in the teaching-learning process, highlighting that they are utilized for 70-95% of classroom time (Gayanandani, 2008). Textbooks serve as fundamental instruments of education, carrying both economic and ideological implications. They have long been recognized as essential agents of socialization, playing a crucial role in imparting knowledge and instilling values within society (Sachedva, 2018). Given the extensive use of textbooks for both schoolwork and homework, the report recommends the development of gender-sensitive books. Such textbooks can encourage children to address stereotypes and foster equitable behavior. Conversely, if textbooks perpetuate discriminatory gender norms and practices, it may negatively impact children's engagement in the classroom (Kadri, 2022). UNESCO's latest GEM Report highlights that women and girls are often underrepresented in school textbooks, frequently portrayed in traditional roles across numerous countries. This portrayal reinforces traditional gender roles and stereotypes, sending implicit messages about the capabilities and worth of each gender. By assigning men to high-status positions and heroic endeavors, while assigning women to lower-status roles and domestic chores, the curriculum may contribute to the perpetuation of gender inequality in society (Ahmad *et al*., 2023).

Meanwhile, according to data provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the representation of women in the field of research remains low, with less than 30 percent of the world's researchers being women. Additionally, UNESCO reports that only 30 percent of female students focus on STEM (Charlesworth & Banaji, 2019) related fields in higher education. These statistics highlight a persistent gender gap in STEM fields and research, reflecting broader societal challenges and disparities in educational and professional opportunities for women. Efforts to address these disparities often involve promoting gender equality in education, increasing access to STEM education and training for women and girls, and challenging stereotypes and biases that may discourage

female participation in these fields. Therefore, efforts to address these gender biases in educational materials are crucial for promoting gender equality and empowering individuals of all genders to pursue diverse career paths and opportunities (Ahmad *et al*., 2023).

As per the study done on English Language textbooks of Grade 9, 10 and 11 of Sri Lankan curriculum, sexism is present in gender visibility, firstness in expression, occupational and family roles, character attributes and linguistic (Wijetunga (2017). As per Wijetunga (2017), males are presented as powerful characters in the English language textbooks. Grade 10 English textbook of Ethiopian government also portray unbalanced gender equality in language use, illustration and occupational roles (Bachore, 2022).

With an understanding of gender portrayal in textbooks, it was noted that no research had been conducted on science textbooks within the Sri Lankan curriculum to examine gender representation. Consequently, the Grade 6 science book was chosen for this study using purposive sampling, as students at this level are introduced to science as a subject for the first time in junior secondary level. Therefore, gender-related content in textbooks at this stage could significantly influence their long-term career development ideologies.

Aim

To explore the representation of gender in Grade Six Science textbook of Sri Lankan Curriculum

Objectives

1. To examine the visual representation of gender in Grade Six science textbook
2. To evaluate the gender stereotypes portrayed in Grade Six science textbook

Research Questions

1. To what extent the gender is visually represented in Grade Six science textbook?
2. To what extent the gender stereotypes portrayed in Grade Six science textbook?

Methodology

Grade Six Science textbook (English Medium) was used to investigate the gender representation for this study. It was published by the Educational Publications Department in 2020. This book has 175 pages containing eleven science-related units.

This study was a purely quantitative analysis. The analysis used descriptive and inferential statistical method. With this purpose, pictures, photos, images of males and females were counted and categorized under three themes; visibility, occupational roles and general activities. Further, the chi-square test was used to analyze whether statistically significant differences existed between males and females regarding the visibility and occupational roles of gender in the pictures presented in the textbook.

Results and Interpretation

Visibility

The visibility of gender representation was analyzed by examining photos, images, and pictures presented in the grade six science textbook. To examine whether there is a significant different exist in the visibility between males and females; the following null hypothesis was used.

$H_0{}^1$: The differences are not statistically significant between males and females regarding the visibility in photos, images and pictures.

Table 1 Gender visibility in the textbook.

Hypothesis	Gender	Observed	Percentage	Pearson Chi-Square Value	Interpretation
$H_0{}^1$	Male	56	75%	0.199	Accepted
	Female	19	25%		

The textbook consisted 75 images, photos and pictures of males and females. Among that, 56 depicted males which is around 75% whereas, 19 were females with 25%. Furthermore, the chi-square test outcome indicates that the difference is not statistically significant as the calculated p-value is greater that the significant level of $p>0.05$ (p=.199) (table 1). Therefore, according to the findings, females were underrepresented in the illustrations and images in the Grade 6 science textbook. The portrayal of males as superior throughout the textbooks highlights a clear bias in gender representation. This significant difference underscores the perpetuation of traditional gender norms, wherein men as centric characters and erasing the presence and identity of females.

Occupational roles

To examine whether there is a significant different exist in the occupational roles between males and females, the following null hypothesis was used.

$H_0{}^2$: The differences are not statistically significant between males and females regarding the occupational roles in photos, images and pictures

Table 2 Representation of occupational roles in the textbook.

Hypothesis	Gender	Observed	Percentage	Pearson Chi-Square Value	Interpretation
$H_0{}^2$	Male	12	67%	0.157	Accepted
	Female	6	33%		

A total of 18 images were presented as occupational depictions in the textbook. Among them, six images portray females (33%). They are depicted engaging in activities such as cooking (2 females), washing clothes (3 females), and coconut scraping (1 female). Meanwhile, 12 images feature male characters (67%), representing occupations such as fishermen, grass cutters, tree fellers, welding workers, weather reporters, electricians, farmers, and scientists.

Furthermore, the chi-square test results indicate that the difference is not statistically significant, as the calculated p-value exceeds the significance level of $p > 0.05$ (p = 0.157) (see table 2). Therefore, according to the findings, female occupations predominantly revolve around household chores, which are often perceived as less important tasks by the society such as cooking and washing clothes, while male occupations are associated with outdoor work. It is noteworthy that only three scientists are mentioned in the textbook, and all of them are male. This perpetuates the stereotype that women's roles are confined to the home and undervalues their contributions.

General activities

Males' images are used for risky activities such as electrical work and playing with fire, as well as activities requiring more power and strength, such as rope pulling games. In contrast, females' images are depicted in household activities such as cooking and washing clothes (see figure 1).

The analysis of the textbook reveals a significant inequality in the portrayal of male and female characters in general activities including games. This discrepancy underscores a clear imbalance in representation, where male characters are more predominantly featured in heroic or active roles compared to their female counterparts. This, unequal depiction of male and female characters in participation in games reinforces traditional gender norms and stereotypes, where males are often associated with strength, bravery, and heroism, while females are relegated to secondary or supporting roles. This perpetuates the marginalization of women's achievements and contributions, reinforcing the narrative of male dominance and superiority.

Figure 1 General Activities

Discussion

Comparing the results of this study with other studies on gender equality, similar findings were presented in studies conducted in other countries. According to the literature, the underrepresentation of females in images was also observed in English language books in Ethiopia, India, and Iran (Ahmad et al., 2023; Bachore, 2022; Dabbagh, 2016). Males were depicted more frequently than females in occupational roles in Grade 9, 10, and 11 English textbooks in Sri Lanka, which aligns closely with the findings of this study (Bachore, 2022). A comparative study conducted on English language books in Europe, the USA, and Iran showed that males were portrayed as active participants in workplaces and outdoor spaces, while females were mostly depicted at doing house chores (Tageddin & Enayat, 2010). Similar results were obtained in the analysis of general activities in the grade six science textbook. Therefore, gender inequality exists in school curriculum textbooks not only in Sri Lanka but also in other parts of the world.

Conclusion

Images, as a form of communication, can carry ideological implications. The primary objective of the current study was to investigate the portrayal of gender in grade 6 Science textbook of Sri Lankan curriculum, focusing on gender bias and potential inequalities depicted in the images within these textbooks. In conclusion, grade 6 Science textbook presents unbalanced representation of gender in all aspects such as visibility, occupation and

general activities. This practice not only perpetuates gender stereotypes but also reinforces the male superiority and dominance within the educational context. Since, a textbook is the prime source for the education sector in the Sri Lankan curriculum; it has a vast role in shaping the society. Hence, it is necessary for the curriculum designers and textbook writers to be aware of these imbalances as this can impact social interactions negatively. Therefore, necessary actions should be taken to address gender-related issues, ensuring that the knowledge presented across various disciplines promotes principles of gender justice, equity, and equality.

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