
| RESEARCH ARTICLE

Issues of Gender in the First-Grade IT Textbook in Oman

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| ABSTRACT

The objective of this study is to conduct an analysis of gender representation within the Information Technology (IT) school textbook utilized in Grade 1 across all public schools in Oman. The investigation of categories such as images, names, and gender firstness is commonly conducted using quantitative and qualitative content analysis. The study findings indicate that the IT school textbook utilized in Grade 1 demonstrates gender balance and equality. The textbook exhibited a nearly equal representation of males and females, both in terms of quantity and quality. The outcomes of the study also indicate that females exhibited greater visibility compared to males in the areas pertaining to images, names, and gender precedence in terms of speaking order. On the other hand, males exhibited a higher level of visibility within the gender-firstness category, which pertains to the order in which individuals are depicted in images. Overall, the school textbook demonstrated an equitable and unbiased portrayal of both genders. The results of the current investigation are expected to serve as a catalyst for authors to generate educational materials that exhibit a more equitable representation of genders within the school curriculum.

| KEYWORDS

Gender balance, gender equality, IT education, Gender firstness, Gender representation.

| ARTICLE INFORMATION

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1. Introduction

Gender equality refers to the equal rights, responsibilities, and opportunities of women and men, girls and boys. It does not mean that women and men will become the same, but that their rights, responsibilities, and opportunities will not depend on whether they are born male or female (UN Women, 2001). In addition, gender equality implies that the interests, needs, and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men. Gender equality is not a women's issue but should concern and fully engage men as well as women. It is a matter of human rights and is considered a precondition for, and an indicator of, sustainable people-centered development (UNICEF, 2014).

Gender equality in school curricula is of particular importance to children and young learners. It is essential to consider the cognitive and affective formation of gender identity, which develops in early childhood. Incorporating a gender perspective into early childhood teaching unlocks children's potential at the very foundation of their development (Chi, 2018). It is also worth mentioning that evidence shows that educators need to have gender awareness to be open to girls' and boys' choices in learning and development, help children explore who they are, and make connections to people around them, as well as gain self-confidence, well-being, peer acceptance, and social support (Hennessey, 2022). In addition, Gender biases and stereotypes are frequently reproduced in teacher-student interactions, play, pre-primary education curricula, and teaching and learning materials. Pre-primary teachers and educators play a crucial role in supporting gender equality at the preschool level. Gender equality should be a high

priority in pre-primary curricula to ensure that girls and boys have equal opportunities to learn and that teaching materials and textbooks do not reinforce gender norms and stereotypes (UNICEF, 2022).

The manner in which gender is represented in children's textbooks can impact attitudes and perceptions of gender-appropriate behavior in society (Mburu & Nyagah, 2012). In addition, sexism in textbooks can reinforce gender images and predispose children not to question existing social relationships. Therefore, gender equality in school textbooks can help promote positive attitudes towards gender and encourage students to pursue their academic aspirations regardless of gender (Mburu & Nyagah, 2012). Textbooks are powerful factors in the construction of gender identities, as they transmit knowledge and present social and gender norms, shaping the worldview of children and young people (UNESCO, 2020). Gender bias in textbooks can also form stereotypical male and female characters, thinking models, family roles, and career choices, which can affect students' gender consciousness and ultimately affect their gender roles. Therefore, gender equality in school textbooks can help promote a healthy and equal study environment for students (Rong et al., 2021).

On the other hand, gender inequality in textbooks can have negative effects on children's learning and development. Gender bias and stereotyping in textbooks are among the biggest challenges on the road to gender equality in education (UNICEF, 2022). Textbooks are powerful factors in the construction of gender identities, and they transmit knowledge and present social and gender norms, shaping the worldview of children and young people. Gender norms and values not only shape attitudes and practices but also influence aspirations and dictate expected behaviours and attributes for males and females (UNESCO, 2020). Moreover, Gender biases and stereotypes are frequently reproduced in teacher-student interactions, play, pre-primary education curricula, and teaching and learning materials. For example, teachers may attribute academic achievement in girls to hard work but in boys to natural ability or competency in certain subjects. This can lead to girls being discouraged from pursuing certain subjects or careers, and boys being overconfident in their abilities (UNICEF, n.d.). It is also important to point out that gender inequality in textbooks can lead to a lack of gender awareness among educators, which can result in gender biases and stereotypes being perpetuated in the classroom. Educators need to have gender awareness to be open to girls' and boys' choices in learning and development, help children explore who they are, and make connections to people around them, as well as gain self-confidence, well-being, peer acceptance, and social support (UNICEF, 2022 & Nduagbo, 2020). Overall, gender equality in school textbooks is crucial for promoting a healthy and equal study environment for students, ensuring equal access to education, and challenging discriminatory norms and values.

This study aims to analyze gender equality in an IT school textbook used in Omani public elementary schools for grade 1 students. To fulfill this purpose, the present study will address two main research questions:

1. Is gender equality present in the selected Omani IT school textbook?
2. What is the nature of gender equality/or gender bias associated with men and women in the designated textbook?

1.1 Importance of the Study

The present study is expected to offer various contributions to IT curriculum writing and design. It provides deep insights into the nature and scope of gender representation in the current IT curriculum. Consequently, it will help in producing a more gender-balanced curriculum in schools for future IT curriculum writers and designers. Due to the lack of studies in IT contexts, the present study is also expected to shed some light on the importance of analyzing IT school textbooks in terms of gender representation. In the context of IT school textbooks, it is important to address gender bias to create a healthy and equal study environment for students. Gender bias in IT school textbooks can influence students' perceptions of gender roles and their career choices. Therefore, efforts to eliminate gender bias in IT school textbooks are crucial to promoting equitable behavior and encouraging all students to pursue their interests in the field of IT.

2. Literature Review

The presence of gender bias in textbooks is a prevalent concern that has a significant impact on students' views and expectations. Research findings indicate that gender bias is not confined just to the broader educational system, but rather extends to the content of university textbooks as well (Bachore & Semela, 2022). According to Benavot (2022), there continues to be a pervasive presence of bias in textbooks across various countries, including high-income nations like Australia, despite efforts made to achieve more gender balance. Furthermore, it is worth noting that textbooks hold considerable importance in molding students' educational experiences, as they possess the potential to shape their awareness of gender and therefore impact their adherence to gender roles (Rong et al., 2021). According to Agarwal (2021), a study conducted by UNESCO revealed a significant under-representation or absence of women in school textbooks, including those used in high-income nations. Furthermore, the study highlighted that these textbooks tend to perpetuate old gender stereotypes. Furthermore, it is important to acknowledge that textbooks play a significant role in the formation of gender identities and have the potential to influence the perspectives and beliefs of children and adolescents (UNESCO, 2020).

According to recent research, gender representation in textbooks has consistently reported that males are overrepresented and dominant in the textbooks examined (Amini & Birjandi, 2012; Bataineh et al., 2023; Dong & Li, 2023; Foroutan, 2022; Shah, 2019; Ullah & Haque, 2016). Mukundan et al. (2008) conducted a study to investigate the representation of gender in Forms 1, 2, 3, and 4 English language textbooks used in Malaysian secondary schools. The study results identified a clear gender bias in Malaysian secondary school English language textbooks, with males outnumbering females and often representing negative characters. In addition, Lee (2018) examined gender representation in some Japanese English as foreign language textbooks to identify if improvements of gender representation are present or not. Lee (2008) reported some evidence of gender equity in Japanese EFL textbooks, but noted the prevalence of the "male-first" phenomenon, suggesting the secondary status of women. In other words, women are still underrepresented and less visible than men. Jannati (2015) analysed adjectives and pictures in the ILI pre-intermediate series to identify how social gender identity is reflected. Jannati (2015) found a gender imbalance in favor of males in the ILI pre-intermediate series, indicating the need for further research and material design considerations. Moreover, Sulaimani (2017) performed critical discourse analysis of gender representation in an international English as a Foreign Language (EFL) textbook used in Saudi Arabia. He examined the following categories: gender relations, subject positions, and contents. Sulaimani (2017) stressed that the study's clearly indicated that "the textbook is biased in terms of gender. Women are underrepresented in the textbook. They have been totally excluded from half of the units in the textbook". It is also worth mentioning that Bataineh et al. (2023) investigated the presence of gender bias in the Islamic education textbook (Grade 3) used in all government schools in Oman. Qualitative and quantitative content analysis was used to examine images, adjectives, occupational roles, gender firstness, and names. Bataineh et al. (2023) indicated that the study findings "show that gender bias is still strongly visible and ingrained in the four Islamic education school textbooks used in Grade 3. Men were dominant in almost all school textbooks". Last but not least, Foroutan (2012) used content analysis to study gender representation in school textbooks in Iran. The results indicate that men are dominant in all the textbooks. The results also show that "the association between 'gender and language' is more strongly influenced by social and ideological structure" Foroutan, 2012.

On the other hand, only few studies have shown that gender representation in textbooks is balanced and gender-friendly (Abidah & Sutama, 2019; Bataineh, 2017; Mineshima, 2008). Abidah & Sutama (2019) used content analysis to examine how gender is represented in an English textbook published by the Indonesian Ministry of Education and Culture for senior high school students. The results showed that gender equality is visible. It revealed that the textbook is also gender friendly. It is also worth mentioning that Mineshima, (2008) investigated how the two genders are portrayed in an EFL textbook used in upper secondary English classes. Quantitative and qualitative content analysis was used to analyze pictures, character attributes, and gender visibility. It was found that "the text finely balanced appearances of both genders were observed in the numbers of male and female characters, their utterances and their first appearances" (Mineshima, 2008). The study results also indicated that men and women were roughly assigned the same number of "school subjects, occupations, interests and family roles" (Mineshima, 2008). In addition, Bataineh (2017) examined gender representation in the Pre-Intermediate Market Leader: Business English Practice File. Occupational roles, gender visibility, and gender firstness were analyzed to identify the presence of gender bias against women. The study results indicated that males and females were almost equally visible in the textbook. In other words, gender equality was achieved in the textbook.

3. Methodology

The purpose of the present study is to analyze gender representation in the Grade 1 IT school textbook taught to all students in government schools in Oman.

3.1 Material

The sample of the present study consists of one IT school textbook used to teach IT basics to Grade 1 students at all public schools in Oman.

3.2 Data Collection Analysis

3.2.1 Mixed Content Analysis

Mixed content analysis is a research methodology that combines qualitative and quantitative data analysis techniques to provide a more comprehensive understanding of a research topic. Mixed content analysis has several advantages in research. Firstly, it can provide a more comprehensive and nuanced understanding of a research topic by combining both quantitative and qualitative data in a single study (Wasti et al., 2022). Secondly, it can also combine quantitative and qualitative data in a single study, providing stronger inferences than using either approach on its own (Wasti et al., 2022). Thirdly, it can capitalize on the complementary strengths of each method, mitigating their respective shortcomings and improving the quality of data collected (Kuhn, 2013). It is also worth mentioning that mixed-method research allows for triangulation, which is the use of multiple sources of data to confirm or refute research findings. This increases the validity and reliability of the results and helps identify inconsistencies or contradictions in the data (Kuhn, 2013). Last but not least, Mixed-method research is more flexible than using a single method of research, allowing researchers to adapt their approach to fit the needs of the research question and the data collected. For example,

if quantitative data does not provide enough information, qualitative methods can be used to provide more context and detail (Kuhn, 2013). Overall, mixed-methods analysis is important because it provides a more comprehensive and nuanced understanding of the research subject by combining the strengths of both quantitative and qualitative research methods. This approach is particularly valuable in health research, as it can help enhance the description and understanding of health phenomena, improve the quality of data collected, and increase the validity and reliability of the results (Wasti et al., 2012).

However, mixed content analysis can also present challenges, such as complexity and time-consuming, integration challenges, and validity and reliability. Mixed content analysis involves integrating quantitative and qualitative data, which can be complex and time-consuming. It requires expertise in both methods and may demand more resources and time compared to using a single method (Castro et al., 2022). In addition, ensuring the validity and reliability of the integrated analysis poses a challenge. Researchers need to address the potential biases and limitations associated with combining different data sources and analysis techniques (Hamad et al. 2016). Integrating different types of data and analysis methods can also be challenging. Researchers need to carefully plan and execute the integration to ensure the validity and reliability of the findings (Hamad et al. 2016)

Quantitative data is employed to analyze the frequency and proportion of images, names, and gender primacy. Furthermore, the utilization of qualitative analysis is employed as a means to analyze the underlying meanings that are present within the texts.

3.3 Sampling

Purposive sampling, also known as judgmental, selective, or subjective sampling, is a non-probability sampling technique in which units are selected based on the specific characteristics that the researcher needs in the sample (Nikolopoulou, 2023). This method is commonly used in qualitative research and mixed methods research, as it allows researchers to focus on specific areas of interest and gather in-depth data on those topics (Dovetail, 2023). In addition, purposive sampling can be advantageous in certain situations, such as when time and resources are limited, and the researcher has a clear idea of the characteristics or attributes they are interested in studying (Singh & Jadhav, n.d.). In summary, purposive sampling is a non-probability sampling technique that relies on the researcher's judgment to select cases based on specific characteristics or attributes.

3.4 Description of the Sample

The sample textbook is Information Technology (IT) for Grade 1. It was published by the Omani Ministry of Education in 2021. It has 127 pages. The IT textbook contains a plethora of visual representations pertaining to the field of information technology. The visual representations possess a commendable level of clarity and are pertinent to the subject matter expounded upon inside the textbook. The textbook exhibits a noteworthy design, featuring two youthful characters named Ahmed and Sarah. Additionally, each unit is accompanied by IT terminology. The final unit is the smallest in size. The textbook aims to serve as a basic introduction to grade 1 students. It has three units. Topics and concepts taught in the textbooks include *My Computer*, *Let's Draw*, and *Let's Browse*. Table 1 shows the number of units, lessons, and pages in each textbook.

Table 1
Number of Units, lessons and Pages in IT Grade- 1 Textbook

Units	Lessons	Pages
My Computer	6	32
Let's Draw	10	38
Let's Browse the Internet	4	19

4. Results and Discussion

The results of the current study suggest that there is gender equality between males and females in the information technology school textbook that is taught in all public primary schools in Oman. The findings from both quantitative and qualitative analyses provide evidence supporting the existence of gender equality across various categories, including images, male and female names, and gender prominence.

4.1 Quantitative Analysis

4.1.1 Images

The present study used quantitative analysis to examine the frequency and proportion of images depicting males and females in the information technology school textbook, demonstrating a state of gender parity. Table 2 illustrates the lack of a disparity between genders in the IT school textbook. The textbooks contain a total of 43 photographs depicting males, which accounts for 48.9% of the overall image count. Conversely, there are 45 images representing females, constituting 51.1% of the entire number of images. The presence of gender equality is clearly stated in the specified textbook.

Table 2
Number of Images in IT Grade- 1 Textbook

Males	Females	Total
43	45	88

4.1.2 Gender Firstness

The findings of a quantitative analysis conducted on the two categories pertaining to words and pictures in the IT textbook, concerning the concept of gender primacy, yielded disparate outcomes. The analysis focused on the primacy of gender, examining the individual who initiated verbal communication and whose image was presented first in the IT textbook exercise or page.

According to the data presented in Table 3, it is evident that females exhibited a higher frequency of initiating verbal communication in the textbook, with a rate of two instances. Conversely, males did not demonstrate any instances of initiating verbal communication in the IT textbook. In other words, men are commonly perceived to rely more on verbal communication than women. The current study's findings contradicted the prior claim. Put simply, it improves the likelihood of attaining gender equality in educational materials. This demonstrates that women are increasingly being more visible in educational courses.

Furthermore, it was observed that male individuals were depicted ten times in photos before their female counterparts. In contrast, women were depicted before men in graphics four times within the IT school textbook. This suggests that males continue to hold a position of power and are given preference over women. The gender disparity in this area is significant, but the strong representation of females in the other category (e.g. Initiating verbal communication) somewhat contributes to a gender-balanced nature of this IT textbook. Put simply, the IT school textbook currently being discussed provides to an extent a fair and balanced portrayal of both males and females.

Table 3
Gender Firstness in IT Grade- 1 Textbook

Category	Males	Females
Speaking	0	2
Images	10	4

4.1.3 Names

The quantitative analysis of the Grade 1 IT school textbook revealed a higher frequency of female names compared to male names. The textbook made two references to females, but only one reference was made to males. The limited occurrence of proper names in the IT textbook can be attributed to its nature as a scientific publication. In scientific literature, the significance attributed to individuals' names is relatively less in comparison to language learning textbooks utilized in educational institutions. In essence, it can be observed that girls exhibited greater visibility compared to males, so making a significant contribution towards achieving gender equality. This is particularly noteworthy considering the prevailing gender bias against females in the bulk of school textbooks, as previously noted in the Literature Review section.

4.2 Qualitative Analysis

The present analysis of the textbook has yielded qualitative findings indicating that the textbook demonstrates, to a certain degree, a balanced representation of both males and females. The qualitative analysis will be performed on a unit-by-unit basis to discover distinct themes within each unit about both males and females.

4.2.1 Unit 1

To a certain degree, this unit demonstrated a fair representation of both males and females. Ahmad, a male individual, was observed demonstrating the operation of desktop computers, engaging in online gaming activities, imparting knowledge regarding the many components of desktop computers, composing written content on digital files, and composing significant electronic mail messages. In contrast, Sarah, a female individual, was observed engaging in a conversation with a robotic entity, wherein she demonstrated the process of activating a desktop computer and initiating the learning process. In addition, she provided explanations regarding the various components of the computer's system unit, engaged in the creation of musical compositions and digital image files, captured photographs of a butterfly, utilized the computer mouse, and explained the learning outcomes upon completion of the unit.

Unit 1 emphasized a specific theme that favoured females over males. A single lesson covered the functions of the Recycle Bin and the Internet Browser. Sarah was responsible for elucidating the diverse functionalities of the Internet Browser, whereas Ahmed was tasked with elucidating the functionalities of the Recycle Bin. This example demonstrates a deliberate effort by textbook authors

to attain gender balance by assigning more difficult tasks to females rather than males. Put simply, elucidating the functionalities of the Internet Browser is more challenging compared to the Recycle Bin.

Furthermore, the school textbook included a significant piece of material that emphasizes the fact that females possess IT skills comparable to males. For instance, Sarah was observed engaging in activities such as listening to music, conversing, storing, and displaying photographs and videos from her camera on a smart television. Conversely, Ahmed was observed solely engrossed in typing on his iPad. There is compelling evidence that females possess the same level of proficiency as males in handling contemporary technologies. Furthermore, it signifies that women can be autonomous and self-sufficient.

Based on the aforementioned data, it can be inferred that while males and females were assigned distinct responsibilities in the textbook, the central focus revolved around computers and IT matters for both genders. To put it otherwise, Unit 1 exhibited a discernible presence of gender balance overall. It is noteworthy to mention that certain aspects of Unit 1 did indicate, to some degree, a preference for males over girls. For instance, Ahmad was observed engaging in the composition of significant electronic correspondence, while Sarah was observed capturing photographic images of a butterfly. An additional illustration may be observed in the portrayal of Ahmed as an individual exhibiting high levels of energy and engaging in physical activities, whereas Sarah is depicted as being seated in a wheelchair. It is worth noting that Sarah's desk was observed to be tidy, whilst Ahmed's desk was found to be unclean. To clarify, the presence of gender disparities inside the IT school textbook is rather limited.

4.2.2 Unit 2

The second unit in the textbook of the IT school provided a noteworthy illustration of gender equality. The tasks related to IT were distributed nearly evenly between Ahmad and Sarah. Furthermore, the tasks exhibited a high degree of similarity. As an illustration, Ahmad was observed engaging in digital sketching on his desktop computer, whereas Sarah was observed engaging in manual painting. A further illustration involves Sarah engaging in a discussion regarding the attributes and benefits of traditional painting, whereas Ahmad focused his discourse on the topic of pixels. Additionally, it is noteworthy to add that Sarah demonstrated the process of opening and editing images, while Ahmad was observed instructing on the method of saving an image. Sarah was observed again, as in Unit 1, addressing Unit 2 learning outcomes which is a crucial element of the learning process. In other words, assigning Unit 2 learning outcomes to Sarah serves as an explicit message about the central role of females in the learning process. Furthermore, it indicates that women are capable of managing significant obligations in life, a concept that is often overlooked in many educational programs.

Additionally, it is noteworthy that Sarah achieved the top position in all IT textbook tasks in Unit 2. She presented the latest IT topics for learners to study. Furthermore, she was facilitating the learning process by consistently reiterating the word "let's". It serves as an indirect incentive for learners to actively participate in classroom activities. This suggests that the textbook exhibits a greater level of tolerance and concern for gender equality.

Furthermore, it is worth mentioning that Sarah exhibited more expressive smiles compared to Ahmed across all units of the textbook. For instance, Sarah had a wider smile compared to Ahmed. It signifies and strengthens the notion that females possess a higher inclination towards social interaction compared to males, hence making them more adept at establishing emotional connections with others. This is highly consequential and crucial to the educational process for young students, especially those in grades 1-6, as smiles foster a happy environment that improves learning. Therefore, it is imperative to embrace smiling in the classroom without exception. Put simply, the constant depiction of Sarah with a wide smile in the textbook helps to a favourable portrayal of women.

4.2.3 Unit 3

A higher level of visibility was seen among females in Unit 3 compared to males. The subject matter explored in this module pertains to the matter of exercising prudence when utilizing the Internet. Sarah was observed on three occasions within this unit, in contrast to Ahmed who was observed only once. Sarah was instructing kids on the principles of Internet safety. Additionally, she was observed engaging in activities related to pet care and summarizing the learning outcomes at the conclusion of the teaching session. In contrast, Ahmad's observed behavior primarily involved providing guidance on the utilization of the Internet. Unit 3 served as a remarkable illustration of the promotion of gender equality and the reduction of gender bias within educational curricula, particularly with regard to addressing the needs and challenges faced by female students.

It is also imperative to note that the IT school textbook displayed a discernible gender bias favoring males over females. An illustrative instance can be seen in Unit 1, whereby Ahmed and Sarah engage in a discussion regarding the distinct components of a desktop computer. Ahmed was allocated a substantial number of pages, whilst Sarah was limited to just a single page to discuss the identical subject matter. Another illustrative instance is the stark contrast between Ahmed's consistent utilization of computer-based drawing techniques and Sarah's unwavering preference for hand-painting methods. The aforementioned

instances serve as evident manifestations of the prevailing traditional gender perspectives within the IT school textbook. Essentially, the majority of school textbooks depict females as skilled in manual tasks such as sewing, while boys are portrayed as inclined towards analytical pursuits. Consequently, this portrayal diminishes the significance of females in comparison to males. Furthermore, it implies that males possess superior technological skills compared to females. The persistent occurrence of this motif in the current school textbook is concerning, as it fosters gender bias against females.

5. Conclusion

The primary objective of this study was to examine the portrayal of gender in an information technology (IT) textbook utilized within the context of Omani public elementary schools. The results of the study indicate that the IT school textbook exhibits a gender representation that is equitable and well-distributed. The representation of females in the IT textbook is comparable to that of males. The results of the study indicate that there is gender equality in the representation of images, gender firstness, and names. In the context of representation, females were depicted at a comparable level to males in both quantity and quality.

6. Recommendations

In order to achieve equitable gender representation within school curricula, it is recommended that book designers and publishers consult contemporary research pertaining to the portrayal of males and females. For instance, it is advisable to refer to scholarly studies in the disciplines of psychology and sociology to gain insights into the career orientations of males and females, as well as the impact of gender bias on young learners, particularly youngsters, in relation to the formation of their future expectations and goals. Furthermore, it is recommended that the Ministry of Education in the respective countries establish a task force with the purpose of informing book publishers about recent regulations about gender bias, sexism, male dominance, female marginalization, and female inferiority as portrayed in educational textbooks. A valuable recommendation entails conducting periodic evaluations of educational textbooks every three to four years in order to ensure gender equality. In order to optimize the advantages and address the pressing matter of gender bias, it is imperative that the assessment of school curricula incorporates the perspectives of both male and female educational professionals. It is also imperative to provide instructors with education regarding the significance of gender equality within educational settings, as well as equipping them with strategies to address difficulties pertaining to the gender gap between male and female learners in classrooms.

7. Study Limitations and Future Research

The primary limitation of the study resides in its limited scope, which only concentrates on a single IT textbook. Although the findings provide insight into the gender biases and lack of representation in that specific resource, they may not accurately reflect the overall situation in IT instructional resources. To obtain a more thorough comprehension, future studies should broaden the analysis to include a wide array of IT textbooks and instructional resources that are used in different educational institutions and areas. Furthermore, it would be beneficial to investigate the potential influence of these biases on students' perspectives, professional ambitions, and overall involvement in the subject. Moreover, doing research on effective strategies for fostering gender inclusion and fair representation in IT curricula and teaching methods could offer practical knowledge for both educators and policymakers.

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