Section 7. General questions of philology and linguistics

GENDER REPRESENTATION IN ENGLISH MATHEMATICAL TEXTBOOK FOR 1st GRADE LEARNERS

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Abstract

In this article we have carried out a study of the mathematics textbook for the first graders, currently used in the US, so that we can present the complete picture of how gender is constructed with the help of texts of pedagogical discourse in the minds of primary school children. We offer a fragmented analysis that allows us to identify ways of constructing gender using various semiotic means, as well as the interaction of verbal and non-verbal means. Understanding the textbook as a polycode text allowed us to identify the implicit ways of constructing gender, which exist due to the interaction of the verbal and non-verbal code, as well as the hidden ways that define the algorithm of inferential knowledge, inference.

Keywords: *gender, discourse, masculinity and femininity, gender in pedagogical discourse, first grade students, mathematical textbook, gender stereotypes*

Introduction

Children learn the roles of men and women by imitating their parents in the family. At the same time, learning from peers and the media begins. Children acquire gender-specific codes and various behaviours through the advertisements, cartoons and series they watch on television. Later, they continue this learning process at school. Gender roles are taught through the curriculum applied in the school and other factors that serve it, namely teachers, administrators, materials and textbooks.

Various social factors prevent educational equality. One of them is gender discrimination. In every developed or developing country, women receive a lower level of education than men. Education programs constitute an essential part of the discussions on gender equality in education and access to education. The basic idea is that educators present genderist messages to learners through the

hidden curriculum. In this process, which primarily works unconsciously, the educational materials and textbooks used have an essential role, as well as the educators.

In each country's education system, objectives and achievements are determined following the grade levels for each school type and course. These gains are determined by the countries' education ministries, taking into account the type of school, the course content and the student's age. These determined acquisitions, contents and teaching situations are called curriculum. Countries act according to various purposes while determining the curriculum. At the forefront of these goals is the continuation of the existing social order. This is done from time to time in writing and in secret implicitly. When the textbooks are scrutinized, many elements that will constitute the content of the hidden curriculum can be noticed. For example, the images or written texts in the books may contain genderist elements. It is possible to encounter this situation in many books in many branches, from the first grade of primary school to the last year of high school.

In addition to the predetermined achievements according to the content of each lesson in the books, the elements related to gender discrimination, which are thought to be internalized by the reader without being aware of it, have been noticed by several researchers. Numerous studies have been conducted in many countries proving the existence of genderist elements in textbooks, and they are still being carried out. This situation, determined by these studies primarily related to the verbal field, could also be in science and mathematics books, and it was decided to carry out this study.

Materials and Methods

The texts of the textbook are inhomogeneous in the sense that they combine semiotic means (verbal and non-verbal) in different ways, and the intensity of presentation of gender-significant information (GSI) is different. The study of texts showed the presence of meta-gender and gender levels. Accordingly, all educational texts can be divided into two groups:

1. Containing gender-significant information (GSI);

2. Does not contain gender-relevant information.

The criterion for referring to a particular group was established according to the following criteria: 1) Absence/presence in the verbal part of the text as a subject or addition of nouns denoting a male or female person; 2) Absence/presence in the non-verbal part of the text of images of male or female persons, as well as objects that actualize the image of a man or woman in the mind of a first grader (for example, stereotypically female or male clothing items, toys for boys and girls).

We have divided educational texts with gender-sensitive information into: 1) Mono code (or verbal); 2) Polycode (consisting of two components: a verbal part and a video component).

The selection criterion for mono-code texts with gender-sensitive information is the presence in them of nouns denoting a person of masculine or feminine gender.

Criteria for selecting poly code texts containing gender-sensitive information: 1) The presence in the verbal part of the poly code text of a noun denoting a male or female person; 2) The image of a male or female person in the illustration for the task and the image of objects reflects the gender-role division of labour, ritualization and institutionalization of gender.
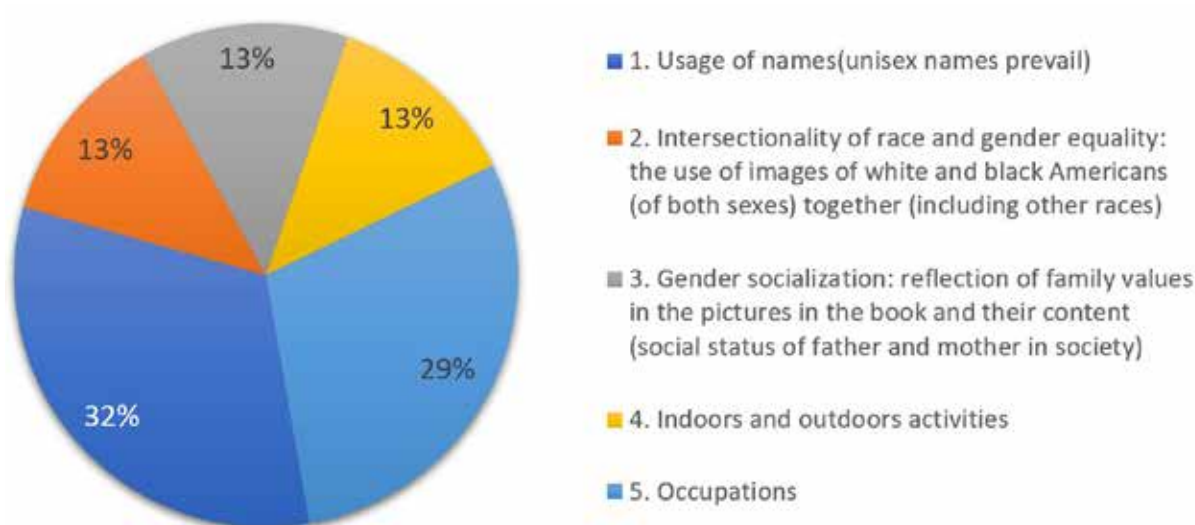
We have applied the following methods: quantitative method (the number of men and women, the number of subjects of actions of one gender or another, the particular actions of persons of both genders); qualitative analysis (analysis of various linguistic aspects: the subject, its characterization, plot, where males and females are classified as "active" and "passive", their actions are "stereotyped" and "non-stereotyped" in the interests of boys or girls); discursive method, which involves examining multiple perspectives and exploring different viewpoints in order to arrive at a deeper understanding of gender aspect in pedagogical discourse.

Result and Discussion

We analyzed gender from the frequency and activities of characters which appeared in the textbook illustrations and the role of adults.

We considered the following categories:

Figure 1. *The frequency of characters appearing in textbook illustrations on gender and their actions, as well as on the role of adults*

- 1. Usage of names(unisex names prevail)
- 2. Intersectionality of race and gender equality: the use of images of white and black Americans (of both sexes) together (including other races)
- 3. Gender socialization: reflection of family values in the pictures in the book and their content (social status of father and mother in society)
- 4. Indoors and outdoors activities
- 5. Occupations

In connection with the first category of the study, **"with whom the child figures are shown"** in the textbooks was also examined, and as a result, it was determined that boys and girls were mostly depicted together, respectively. This phenomenon is also determined in others' studies that girls and boys are mostly depicted with other children. A similar result was obtained in the current study, and both girls and boys were mostly depicted with children. The fact is that all children, whether boys or girls, are predominantly depicted as children seen as the result of spending most of their days at school and with their friends, and therefore it was thought that it was natural for children to be portrayed with their peers.

Figure 2. *Compositions of groups*
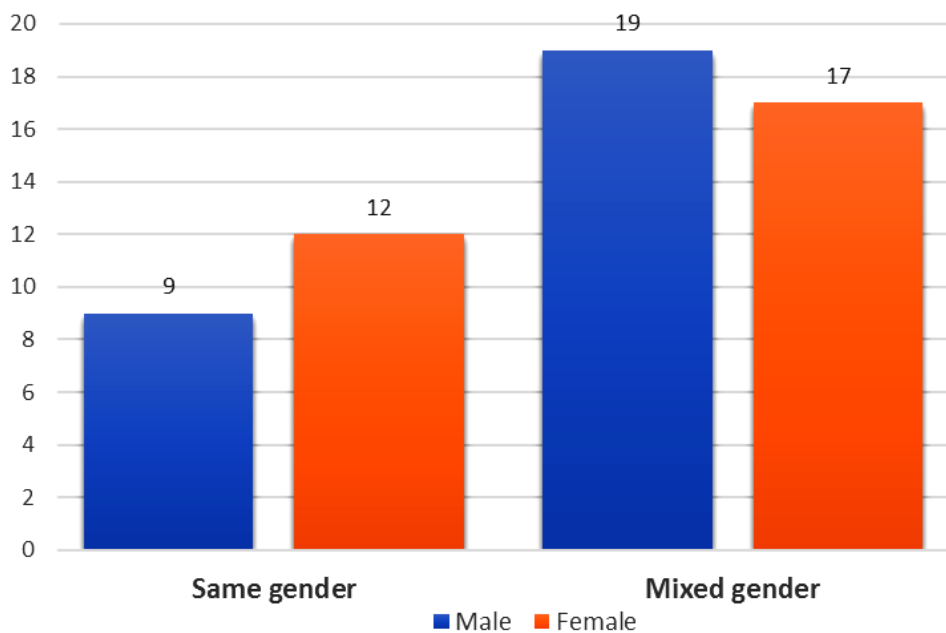
Another unusual situation is that the rate of girls is higher when the situation of being portrayed with their family is examined. Because when children grow up, if they are men, they can be free, walk alone, take various actions and act independently; however, it is seen that the social stereotype that it is not appropriate for girls to wander around

alone finds its answer here. This situation is evidence of the development in representing the idea of independence in girls in mathematics books.

When the textbooks on the **actions in which the child figures** are depicted are examined, it is seen that the number of children is almost equal in terms of gender. The figures of the girls are primarily depicted in the actions of culture/art, school/learning, sports, game/entertainment, then active and social, personal actions, and finally, in actions at home. On the other hand, boys are primarily depicted in actions for school/learning, actions for culture/art, actions for play/ entertainment, actions for sports, and active social, personal, and actions at home.

In general, there are similarities in the types of actions of the figures of girls and boys and the frequency of these actions. However, it was observed that the most significant difference was in home-directed actions, and boys were portrayed less frequently in home-directed actions than girls.

Figure 3. *Locations of genders*
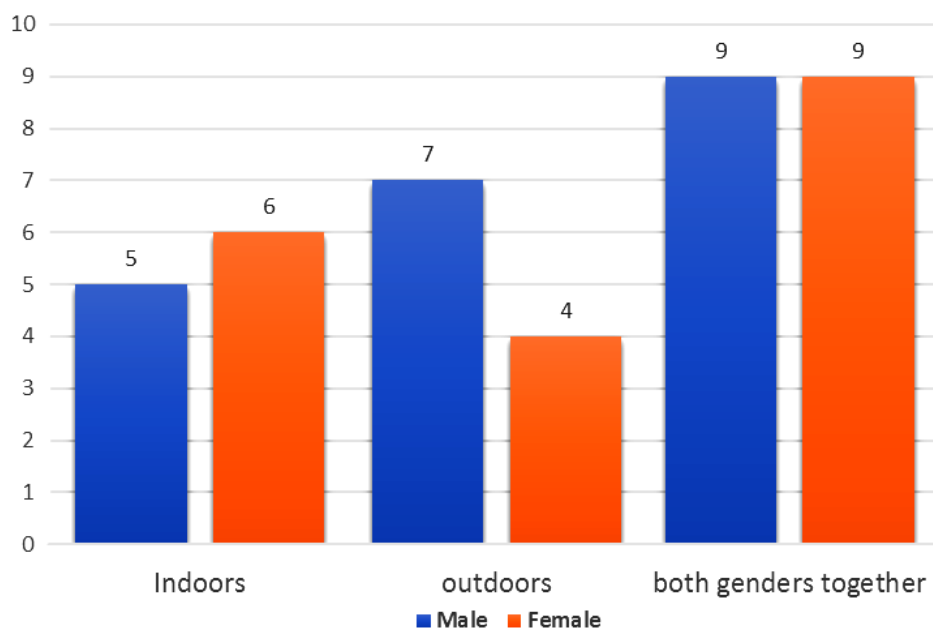
The roles of mother, father, grandmother and grandfather were directly incorporated into the coding system. The most direct influences on the socialization of children's gender roles are the grown-ups' family and professional roles. From the analysis, we found that the gender role stereotypes of adult males and females still exist. First, the male's and female's traditional family roles have not been broken through, specifically demonstrated in the activities of the "father", "mother", and other family members engaged in. The illustrations appear in the form of family (besides the illustrations using "height", "age", and other data as question backgrounds) and shopping. However, the feminine family roles mainly appear in shopping, caring for and accompanying the child at home, and making dinner. The frequency of male appearance in the illustrations is less than that of the female. Moreover, feminine actions such as shopping and accompanying children at home are consistent with traditional concepts.

According to McNaughton, women or men learn their roles and behave as expected. Women tend to care for their mothers, teachers, or nurses, while men are more active outside the home.

Figure 4.

This father walks his baby every morning at

However, in this picture, we can see a different vision. It is also possible to see the division of labour in the home and the roles attributed to men and women in business life outside the home.

School years is a transitional period from childhood to adulthood in which biological, psychological, mental and social development and maturation take place. Therefore, in this period, learners are in the transition phase from childhood to youth and are in search of finding their own identities.

They spend most of their time at school, in lessons, and with the help of the textbooks they use during the lesson, they gain identity characteristics of their gender without realizing it. In other words, by depicting images in primary school books, situations such as the place where they are depicted and the action and with whom they are depicted are conveyed to children searching for roles and identity through books.

We have found out that female names were used more often than male names. There were a total of 50 pure female names and 40 pure male names in the textbook. In addition, the researcher found 29 names that could be used for both genders.

Figure 5. *Frequencies of male/female names*
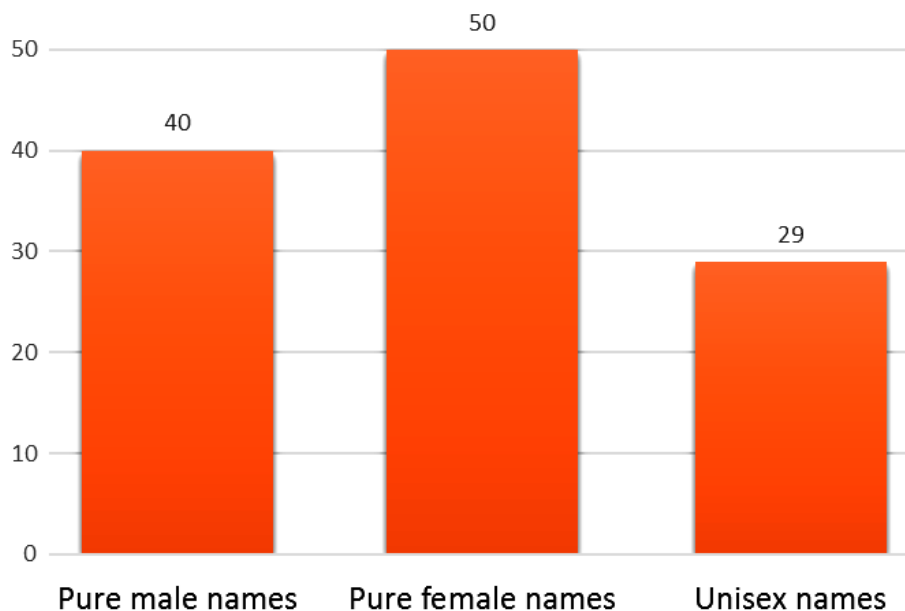
Names as proper nouns are essential for identifying individuals in everyday life. In this textbook, different names are used, and when one looks at them, one may remember some famous people with that name. There might be some good reasons, and we find it better if we analyze it further:

Using the names of famous people (scientists, entrepreneurs, celebrities, and movie and book characters):

a) as a role model for learners to follow and imitate;

b) in order to form a future profession in learners;

c) to develop talent in learners.

Learners may happen to learn the biography and life story of influential people, including presidents, leaders, inventors, women, civil rights activists, and more with those names. For example, Steve Jobs, Adam Smith and Henry Ford as famous entrepreneurs, economists and industrialists; Katy Perry, Shawn Mendes, Michael Jackson, Nina Dobrev, Zach Efron, Keith Urban, and Mariah Carey as celebrities; book characters such as Peter Pen and Elizabeth Bennet; famous writers as Oscar Wilde and others.

As we can see, unisex names are popular in many countries, and personal names are a *gendered process* (*doing gender*) with the display of individuality and connectedness. If we look at the history of unisex names, they become popular in the 1960 s, giving the male surname (Irish) *Cassandra* or *Acacia* to a girl. Also, there is some information that most unisex names were uncommon male names at first and then became popular girl names. Just as non-binary pronouns (using

"they" instead of "she" or "he") are becoming more commonly used in the English world, parents have been leaning toward more unisex names in recent years, believing the unisex names are typically chosen for people who do not identify as a male or female themselves or even can-do transgender in the future. In other words, there are some perspectives about using unisex names as one urge for LGBTQ. In order to improve gender equality and tolerance toward lesbian, gay, bigenderual, and transgender communities, several nations have promoted the use of gender-neutral pronouns, words, and names. As such, the unisex names pave the way toward the effects on public views of LGBT equality, and if this reasoning is correct, then gender-neutral names will heighten and even encourages more positive views of homogenderuals and transgender people. In turn, this will increase acceptance of females and LGBT groups in public life since the latter are also positioned in contradistinction to men (Wilkinson W. W., 2008; McGoldrick D., 2016).

Nevertheless, still, some people think that so-called unisex names are mostly an illusion.The reason is that parents genuinely seek a lifetime gender-free name for a child creating new names pretending them having no pre-existing gender association. For instance, we can observe it with the names *Sony* and *Ryan*. As a city name in different states (*Ryan*) and an international electronics and media company name (*Sony*) without obvious gender indicators, parents drew portraits of boys and girls in their minds. Parents think that those particular names sound fantastic, and in their minds, they fit the gender of their child.

Figure 6. *Occupations and sport*
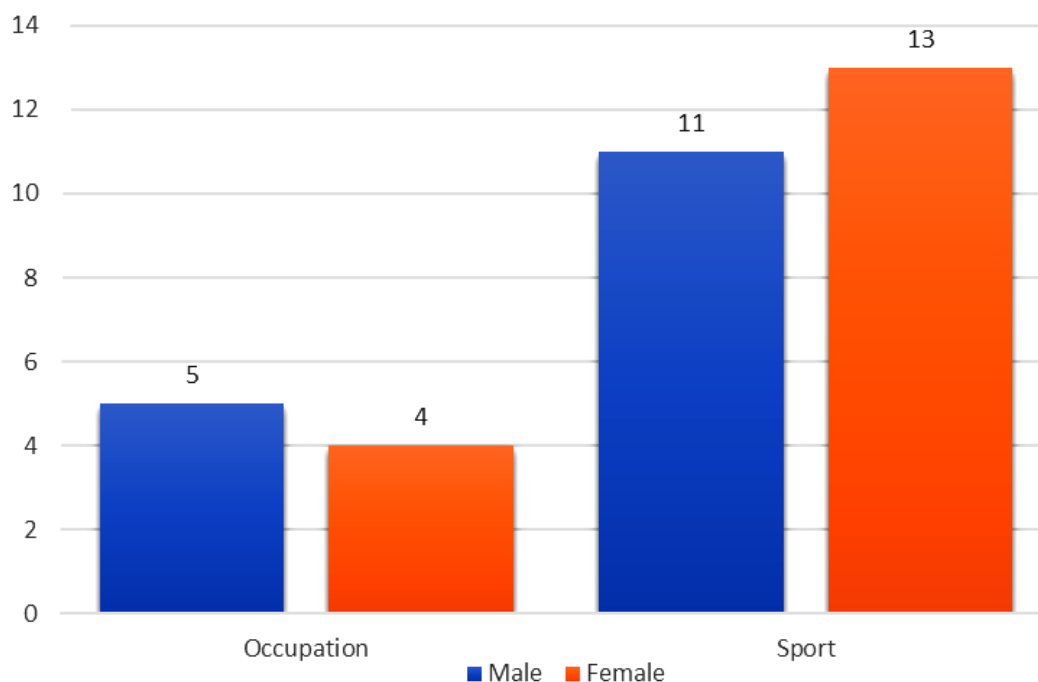
The other perspective is that some parents of girls deliberately search for androgynous or even masculine-sounding names, thinking they sound "stronger" or will give their daughters a competitive image (with male) and advantage in life (e.g., *Randy* (meaning: wolf, protector, shield) or *Tracy* (meaning: war-like, fighter; higher, more powerful, superior). However, traditionally, it is known that words with aggressive, powerful meanings are chosen as boys' names, and pretty, cheerful meanings are chosen for girls. The other mighty reason for that is the strong desire for equality of both genders in every path of life. As a result, it comes to the point of the overwhelming majority using unisex names.

Another reason is that using unisex names represents different cultures. For example, the word *Angel* is pronounced differently for males and females in various areas.

In the English Textbook on Mathematics, we identified several occupations for men and women.

Occupations of genders were also directly coded from the text. Moreover, when it was necessary, the pictures were used to determine the characters' genders.

We also considered activities that boys and girls were engaged in (activities that are written in italics indicate that in some context boys and girls play together).

Table 1. *Indoor/outdoor activities in terms of gender*

		Activities
1.	Boys	Sports: playing soccer, softball, basketball, baseball Outdoor: kite running Woodwork: making crafts Gardening Shopping
2.	Girls	Indoor: playing dolls at home Outdoor: Drawing pictures
3.	Boys and girls together	Classroom activities Doing homework Going on a field trip Spending money/ buying something Reading books Watching movies

In the present study, boy's and girl's activities were clearly contrasted again by displaying a boys' picture and a girls' picture close to each other. In the present textbooks, boy's and girl's activities are more mixed. Boys were sometimes involved in shopping and helping mothers, while girls were sometimes actively involved in sports.

Figure 7. *Activities in three categories*
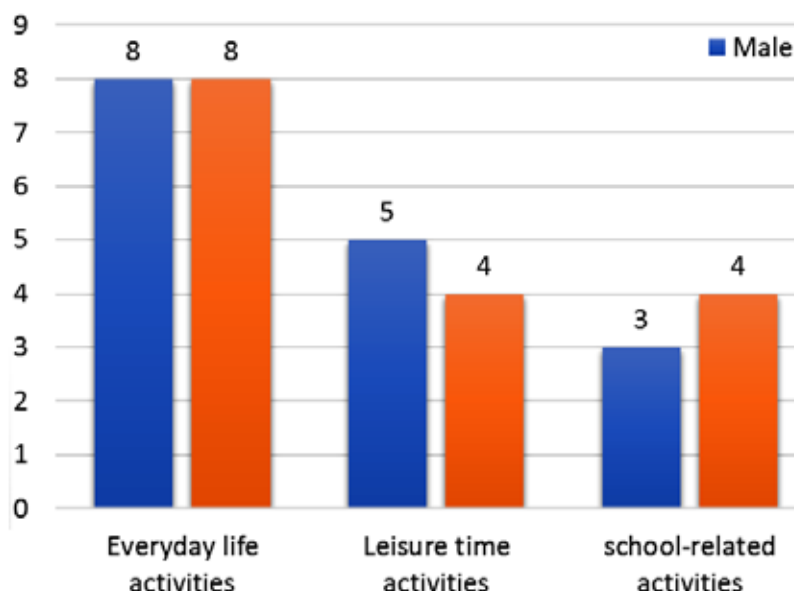
After analyzing the Mathematical textbook, presently used in the US, we found that the authors of mathematical textbooks have paid close attention to gender equality in the mathematical textbook. It may be the reflection of the gender roles which generally exist in people's subconsciousness and are conveyed through textbooks to the next generation. We found out that parents genuinely seek a lifetime (unisex) gender-free

name for a child creating new names pretending them having no pre-existing gender association. For instance, we can observe it with names *Sony* and *Ryan*. As a city name in different states (*Ryan*) and an international electronics and media company name (*Sony*) without obvious gender indicators, parents drew portraits of boys and girls in their minds. Parents think that those particular names sound cool, and in their minds, they fit the gender of their child. Taking into consideration all the surveyed categories, we came to conclusion that even though there were several assymetries in terms of gender representation, gender stereotyping in has almost vanished.

Conclusion

In modern European trends, gender is recognized as a pluralistic phenomenon, and as we discussed in previous chapters, there are the following ongoing manifestations concerning gender equality:

1. Creation of new lexical units (non-binary people, misgendering, pinkwashing).
2. Emergence of new affixes (womxn, Latinx, cisman).
3. Changing the reference and axiological specificity of lexical units that comprise the core of the gender concept

(same-sex parenting, toxic masculinity, a family of choice).
4. Emergence of new communication norms (sharing gender pronouns at work).
5. Gender neutralization (for example, gender-neutral treatment of all passengers Everyone).
6. Opportunity to opt out of gender selection in official documents (undesignated/non-binary).
7. Changing the specifics of using the personal pronoun they (at the moment, it can be used instead of he/she to refer to those people who position themselves as non-binary persons).

We see that the traditional binary opposition is presented in the texts, a man and a woman. No examples of non-binary personas have been identified. Traditional gender identification and relation are presented. Family relationships are presented as well traditionally, while it is shown that parents have the same responsibility and perform the same role in parenthood. No linguistic or semiotic unit has been identified that would actualize the modern idea of gender pluralism. Thus, we see that educational texts in English do not match current processes and events concerning gender equality and so far, reproduce the traditional idea of femininity and masculinity.

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