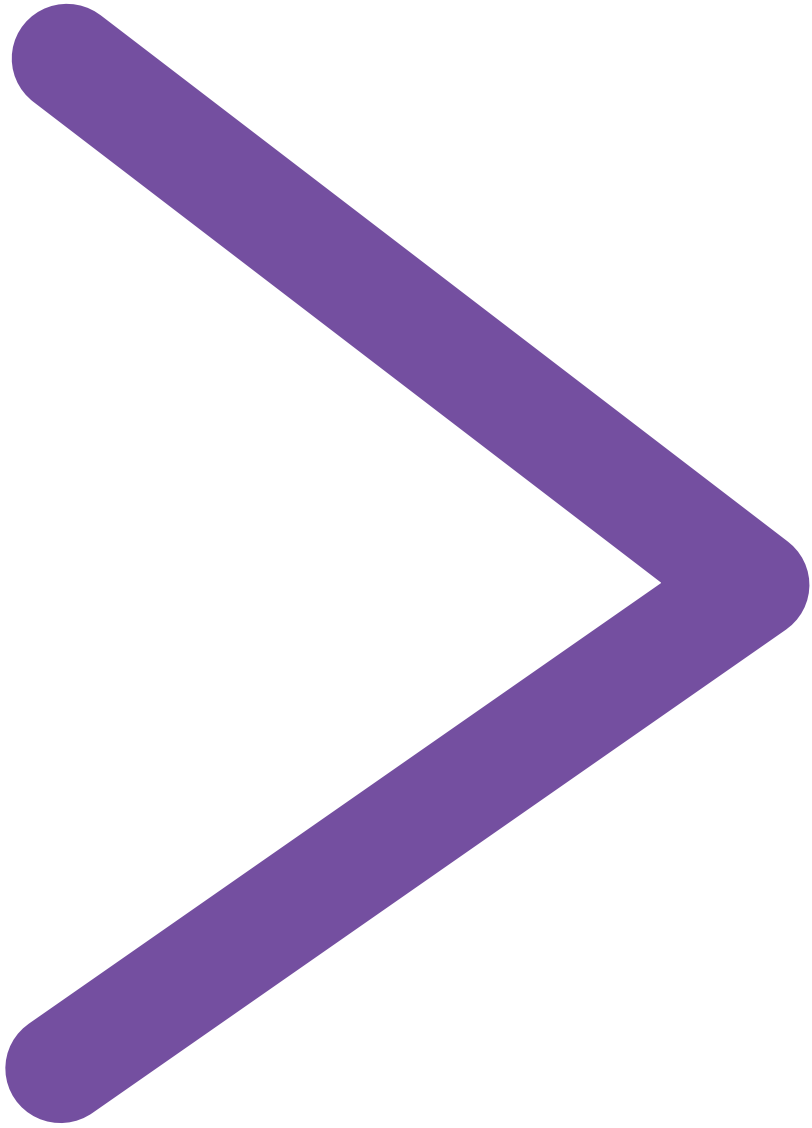


MANUAL FOR  
*INTRODUCING TEACHERS*  
*TO GENDER RESPONSIVE*  
*TEACHING METHODS*



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# PREFACE

*The purpose of this Manual is to introduce teachers to gender responsive teaching methods, and to develop increasingly inclusive and gender responsive education, particularly in science, technology, engineering, art, and mathematics (STEAM). The Manual is a result of the UNICEF programme implemented in cooperation with the Genesis Project association, and a group of university female and male professors who developed it.*

*The idea to create this type of instructional material originated in the understanding and observation that the instructional process in our schools has elements of gender stereotypes, which may have a negative impact on female and male students, on their self-respect, life choices (e.g. on their future profession), dysfunctional interpersonal relations, distorted perception of gender roles, etc. Gender stereotyping is manifested through certain methods of work in school, way specific topics in textbooks are presented, interaction and communication among all the stakeholders in school, etc.*

*The Manual has several chapters. The Introduction presents the basic concepts discussed in the Manual. It explains what gender, sex, strengthening mechanisms for gender equality, gender roles stereotyping and prejudice, patriarchy, sexism, gender responsive pedagogy, etc. are. The second chapter, titled Material for gender responsive teaching, among other things, points to the elements that require attention when phrasing text, illustrations, questions, and assignments in the context of promoting gender equality. This chapter is followed by Assessment criteria and proposals for improvement of lessons, containing a summary of the*

*preliminary analysis of ten selected teaching units in biology, chemistry, physics, art history, computer science, and technical education, as well as proposals for improvement of lessons. Chapter titled Gender sensitive interaction and communication in classes comprises proposals on how to appreciate gender sensitivity through various teaching methods, communication with students, interior design, and feedback to students. Key ideas and messages from these chapters have been summarised and additionally covered in the chapter Summary and recommendations for teachers on gender responsive teaching methods. The final part of the Manual offers a secondary teaching aid, an Annex with a tool for assessment and enhancement of lessons according to the principles of gender responsive teaching. There is also a list of References that may contribute to enhancement of classes, and professional development of the teaching staff. We hope that the texts in the Manual will contribute to gender sensitisation of the teaching staff, and to better understanding of the gender stereotyping, found in various aspects of the teaching process. In that context, teachers can have various roles, they can be additional instigators of gender prejudice, but also an indispensable factor in its reduction. We expect that the teaching staff will understand the importance and implications of this issue, and choose the right side and make their contribution to the development of increasingly inclusive education and gender equal society.*

***Authors, September 2021***

# ACRONYMS

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**LGBTIQ** – *lesbian, gay, bisexual, transsexual, intersexual, and queer*

**STEAM** – *science, technology, engineering, art, and mathematics*

**UNICEF** – *United Nations International Children's Emergency Fund*

**UNESCO** – *United Nations Educational, Scientific and Cultural Organization*





# INTRODUCTION

In the introduction to his Manual, we are explaining the basic concepts related to gender, gender responsive pedagogical approaches in STEAM education, impact of education and educational institutions in achieving gender equality, and the impact of socio-cultural factors on building gender and gender relations. Gender perspective is important in all aspects of education, including STEAM education, in order to ensure equal opportunities and fair access for girls and boys, and eliminate stereotypical content in textbooks and gender insensitive ways of teaching.

Considerable progress has been made internationally on gender equality issues, even though women are still underrepresented in leadership positions in politics, economy and society in general, and have disproportionately little representation in STEAM areas when compared to men. The situation in Bosnia and Herzegovina is similar, although, the Law on Gender Equality in Bosnia and Herzegovina (2003) improved the legal framework, as did the establishment of mechanisms for promotion and monitoring of the Law's implementation at various levels of authority. However, society, politics, and economy, and likewise, STEAM, continue to be dominated by men, and these are areas with the highest-paid jobs. Various forms of inequality, including gender inequality, continue to plague every segment of society. In addition to that, education as a professional field is "feminised", with women making up the majority of teaching staff in elementary schools. Nevertheless, majority of teaching staff is not sensitised and/or trained for gender responsive teaching and gender sensitive communication and interaction with male and female students, just as male and female staff in STEAM fields are likewise not sensitised and/or trained.

Commonly used arguments about the so-called neutrality are essentially damaging and discriminatory, because they always benefit the privileged ones, and additionally marginalise those already on the margins. Also, our language does not allow for neutrality, because all nouns related to people (their identities, occupation, traits, etc.) are of specific gender, mostly male or female, rarely neutral. Problem of our society is that official language is mostly not gender sensitive in case of job posts, positions, qualifications, and occupations, with the exception of jobs requiring lower qualifications, and thus, for example, in the qualification of occupations we do not have graduate female engineers, mathematicians, or holders of PhD (but male engineers, mathematicians, or holders of PhD), but we do have female cleaners and cooks. There is even an incorrect view that the languages in Bosnia and Herzegovina do not recognise gender sensitive categories, which is not true and refers only to the unfairly codified and broadly adopted but discriminatory and deeply masculinised language of state and numerous social institutions that many are used to.

When talking about gender inequality, we are not talking only about providing equal access to education for both girls and boys, but about them being equally encouraged and empowered through education to work on jobs perceived generally in society as typically male or female jobs (the term used for this is "gender division of labour"). Also, the proclaimed equity and equality do not mean the same for underprivileged girls and boys, whose parents do not have the resources or who did not grow up in an environment that stimulated equal participation of boys and girls in all spheres of life. That is why principle of fairness is just as important as equal access, that is, having affirmative measures in place to help those with different starting positions in terms of social success and progress. Gender responsive teaching is therefore extremely important, because not only that it insists on equality and fairness, but also helps girls and boys improve their knowledge, skills, self-confidence, and appreciation of others regardless of differences and despite prejudice.

# INTRODUCTION

## Definition of gender and sex

In order to explain the meaning of concepts gender and sex, and the difference between them (all the while taking into account the fact that there are numerous varying theoretical and institutional views on the manner of defining both), for the needs of this Manual, we will refer to the very clear and usable definitions by global and European institutions, UNESCO, and the European Commission section for promoting equal opportunities. UNESCO provides the following definition of gender

„**Gender** refers to the roles and responsibilities of men and women that are created in our families, our societies and our cultures. The concept of gender also includes the expectations held about the characteristics, aptitudes and likely behaviours of both women and men (femininity and masculinity). Gender roles and expectations are learned. They can change over time and they vary with in and between cultures. Systems of social differentiation such as political status, class, ethnicity, physical and mental disability, age and more, modify gender roles. The concept of gender is vital because, applied to social analysis, it reveals how women’s subordination (or men’s domination) is socially constructed. As such, the subordination can be changed or ended. It is not biologically predetermined nor is it fixed forever.” (2003: 1)

In the *100 words for equality - A glossary of terms on equality between women and men*, published by the European Commission section for promoting equal Opportunities (1998:25), a gender is a category that refers to social, cultural, and psychological traits attributed to one or the other sex. It is about social differences between women and men that have been learned and are changeable. Gender is what determines manness/maleness/masculinity and womanness/femaleness/femininity in a specific social and cultural context.

Most international and domestic institutions and socio-cultural systems find **sex** to be all those things that biologically make us a man or a woman, and is mostly given, because a person is born with it. It involves biological functions of women and men, which include distribution of chromosomes, hormones, anatomy, reproductive organs and other components of dominant sexuality in medical and biological sense. Even though the simplified division of sex into male and female is common in language and communication, the issue here is that some persons cannot be placed in either of these categories. Even though they have male or female sex characteristics, they do not feel as such, that is, they feel trapped in a wrong body and some of them undergo sex reassignment surgery. In addition to female and male sex and heteronormativity, there is a multitude of sexual and gender identities that do not fit into the binary picture of male and female sex, which is why we need the category of intersexuality.

**Intersexual person** is born with the sexual characteristics that do not fit into the binary picture of male and female sex, and intersexuality is a biological determinant, which was in the second half of 20<sup>th</sup> century mainly dealt with through surgical intervention. Monitoring of such children throughout their development showed that medically assigned sexual characteristic often did not match the sexual identity of the person, because (s)he felt trapped in such a body.

**Transgenderness** refers to the gender identity of a person who may have male, female, or intersexual characteristics, whose gender identity or gender expression is different from given biological characteristics. Transgender persons therefore may have heterosexual or homosexual orientation or something entirely different in the spectrum of LGBTIQ identities.

**Sexual orientation** means sexual and emotional attraction to any sex or sexes and is very variegated, that is, individual. Heterosexuality is sexual attraction between persons of male and female sex, homosexuality is attraction between persons of same sex, whereas bisexuality is attraction to both sexes. Sexual orientation is not chosen, while identity and behaviour are, and can, but do not have to be, in accordance with the sexual orientation (Hasanagić, 2012). There is a whole range of sexual attractions covered by the term queer, which is part of the acronym LGBTIQ (lesbian, gay, bisexual, transsexual, intersexual, and queer).

## Strengthening gender equality mechanisms

Even though gender equality is regulated by international norms and standards, and national effective laws, both men and women need to be empowered for gender equality. Most cultures continue to favour one sex over the other, and accept the dichotomy of gender roles, occupations and professions.

**Gender equality/gender equity** means that women and men have equal conditions for realizing their full human rights and for contributing to, and benefiting from, economic, social, cultural, and political development. Gender equality is therefore the equal valuing by society of the similarities and the differences of men and women, and the roles they play, which means women and men being full partners in their home, their community and their society, as well as in science, technology and art (UNESCO, 2003)

**Empowerment** is about people, both women and men, taking control over their lives: setting their own agendas, gaining skills, building self-confidence, solving problems and developing self-reliance. No one can empower another: only the individual can empower herself or himself to make choices or to speak out. However, every individual can do this only when there is a social framework, that is, institutions (such as school, scientific, and educational institutions) truly enabling, supporting and nurturing self-empowerment of individuals or groups (UNESCO, 2003)

Therefore, institutions, including schools, as well as the teaching staff, are obliged to assist a person in this process of empowerment and acquisition of social, as well as gender equality. Socialization process in school should be gender sensitive and gender responsive to specific the needs of every girl and every boy in order for girls and boys to equally develop their individual capacities and talents. School simultaneously reflects the society in which it operates and shapes it through the socialisation process of male and female students.

# Gender roles stereotyping and prejudice

**Gender roles** are learned and created in every cultural environment and represented unwritten social rules that govern people's behaviour in certain situations. However, social norms for women and men are different for the same situations, resulting in double moral standards. For example, if a man does not marry, it is less common to say that it is a pity that he did not marry because he is a good man, successful and hardworking, while people will often say for a woman that it is a pity that she is not married, and very often that something is certainly not OK with her or that she has a fault of some sort since she did not get married, particularly if she did not have any children (Spahić Šiljak, 2019). This prejudice about the "deficiency" of a woman who is not married or who is not someone's (biological or non-biological) mother is deeply patriarchal and dangerous. Although today there are no legal sanctions for not accepting the socially and culturally assigned gender role, women and men suffer stigma, victimisation, labelling and other types of pressure every time they are "outside the social norm".

**Stereotypes** are the result of unfair and often violent social norms, as well as double moral standards and norms for women and men. These are general images or ideas about a person or group and generalisations about members of that group. Human brain often uses generalisations as the so-called cognitive abbreviations because it has no time to process a large amount of information, so it draws conclusions based on a limited amount of information or pre-formed attitudes about a person or group (Spahić Šiljak, 2019). Stereotypes can be positive (for example, they very often come in the form of compliments addressed to women), but they are mostly negative. For example, a positive stereotype is that women are social, while a negative stereotype is that they are not effective; a positive stereotype for men is that they are determined, and a negative stereotype is that they are unreliable.

**Prejudice** is a negative feeling and attitude towards a person or group, which is built on stereotypes. Stereotypes and prejudices are dangerous because they do not take into account individual differences, abilities and achievements and not only describe what people are like based on a small amount of information, but also talk about what they should be like. Women are exposed to negative stereotypes more than men, so women are very often defined as emotional, unstable, unbalanced (which is attributed to biological factors, such as hormones). This is then the reason why women are considered as not capable of being on leadership positions or decision-making positions in society, and when they are, then they face numerous obstacles in doing their job due to such prejudice. Unfortunately, on the basis of pseudoscience and pseudo-belief, it was believed that the biological determinants, reproductive roles, and physical constitution of women and men determine their psychological profile and intellectual abilities (Spahić Šiljak, 2019). Although scientific research today shows that differences in intellectual capacity are not gender-based and that women and men can be equally talented, advanced, and successful in mathematics, technology, engineering, natural, and other sciences, STEAM field is still perceived as a dominantly male field. The problem is that the socialisation of girls and boys is not taken into account and that girls are not encouraged to be more involved in the STEAM.

# INTRODUCTION

## *Patriarchy and sexism in social and everyday life*

Patriarchy and sexism are an integral part everyday life of most societies, and likewise in Bosnia and Herzegovina's society. "Patriarchy" (Greek, patriarch - father) is a system of power in society or institutions in which a man has power over women and men from groups belonging in lower social stratification. Patriarchal society is a system of power in which men are privileged over women" (Spahić Šiljak, 2019: 19). Women and men are brought up in a patriarchal value system in which men need to fit into the norms of masculinity (e.g. strong, firm, and dominant), and women into the norms of femininity (e.g. weak, emotional, and subordinate). Through upbringing in the family and dominant attitudes of many religions, as well as through religious instruction and cultural customs present in the primary socialisation, established views and narratives that God first created a man to rule the world, while woman was created from him to be his assistant and be obedient to him have been and are still being relayed. Such views are usually uncritically accepted as a natural and fixed order of things in life with all the stereotypes attributed to both sexes. Although significant progress has been achieved in human rights of women, feminisation of occupations and jobs is still present, so women are stirred mainly toward those occupations that are an extended arm of work done in the private sphere of life: education, upbringing, assistance and care for the sick, and services. Men, on the other hand, are stirred towards occupations that do not have much in common with care for family or other people, as well as with raising children.



The patriarchal order is also maintained with constant repetition of sexist attitudes about women and their body and roles. Sexism is any form of expression based on prejudice and stereotypes that some people are inferior because of their sex. Through the repetition of sexist messages, women are made aware that they are less worthy than men. If such messages are not punished and publicly condemned, what happens in the patriarchal societies, then sexism continues to live and undermine gender equality, today much less openly, but certainly in forms that are hard to recognize, because they have the so-called benevolent content, which essentially normalises the status quo in gender inequality. We see this, for example, when women are told that they are the best educators, while men are protectors who need to provide for the family, or when women are called "queens-mothers" who deserve full attention. Many women do not recognize hidden sexism in this, because family or any kind of validation matters to them. "The problem arises when a woman, because of this important role of motherhood, is challenged to engage and express herself in other areas of activity, especially in decision-making and policy-making positions ..." (Spahić Šiljak, 2015: 109). When all this is taken into account, then it is clear how important it is to intervene in education and break down ossified and new forms of sexism, stereotypes and prejudice that openly and subtly send a message to the new generations of young people about their gender roles and desirable or regulated places in society. The fight against patriarchy and sexism is a humanistic goal of both educational and scientific work.

## Gender responsive pedagogy: towards empowering and equality

Gender responsive pedagogy relates to processes and teaching and learning materials that pays attention to specific learning needs for all girls and boys. We can identify these needs by assessing the challenges and failures when it comes to skills, competences and knowledge of children of a specific gender. For example, it may happen that boys need extra help to develop emotional intelligence or to read better, while may girls need extra support to speak or engage in school class, or to participate in STEAM fields. Given that this is just an example, every female and male teacher can study and determine specific needs of female and male students in their classroom and be sensitized to the gender component. This means that gender-sensitive pedagogy implies that teachers apply gender-inclusive approach in planning lessons, teaching methods, classroom management, and assessment of learning outcomes, that is, grading.

Gender-responsive pedagogy is closely related to feminist, critical peace pedagogies. For example, feminist and social activist under the pseudonym bell hooks unites postulates of feminist, critical, and peaceful pedagogies by advocating the idea of a classroom based on democratic participation goal and new types of education in order for female and male students to be taught critical thinking in a way that resists sexism and abolishes patriarchal norms (Hooks, 1994: 2000).

Paul Friere's critical pedagogy reminds us of the fact that the education process is never neutral and that it depends on the female and male teacher whether the classroom will be a place to practice freedom or a place of delivery of finished recipes (Reardon, 2006). The duty of every female and male teacher is to teach students to overcome, overrule, and transcend the boundaries imposed on them by sex, gender, ethnicity, race, or class identity. According to such a view, education is a practice of freedom that rests on critical, logical, and scientifically based attitude. Also, feminism is a policy of equality for all, because the abolition of sexism and gender-based violence and inequality is good for both women and men, that is, it is in their common interest. Progressive and holistic education is acquired through engaged pedagogy, which requires a lot from us, but in the end it represents the effort where teaching practices and methods truly emphasize the well-being of students, and put them at the centre. The reflections of bell hooks are related to the reflections on education, literacy, awareness, and attitudes towards marginalised groups developed by Paulo Freire (2000: 2005). His reflections were extremely important for peace studies, pedagogy, and peace education, because they fundamentally shape social and humanistic affirmative action in the classroom.

It has already been generally accepted that pedagogical approaches must not be such as to produce student passivity and conformism. Curricula and teaching methods must be innovative in order to promote student learning and cognition, as well as to promote gender equality, and this can only be done if female and male students are motivated to learn constantly and throughout life, that is, if their teachers select those teaching activities and methods that maximize their capacity for lifelong learning and critical education. Pedagogy, which is gender aware and gender responsive, uses experiential education and dialogue that empowers female and male students to critically reflect on the world around them by becoming engaged female and male members of society who contribute significantly to their communities. Children grow into such female and male citizens only when education implies inclusion, recognition and respect for all differences, that is, when each person is appreciated, recognized, and respected for their abilities, interests, ideas, needs, and diverse social identities (Tollesfson & Osborn, 2008).

Teachers must inspire and involve each individual female and male student in a way that eliminates gender inequalities and their reproduction, as well as all other forms of inequality that prevent thousands of children in Bosnia and Herzegovina from progressing. In a world where there is so much violence in every form, not just gender-based violence, and which is permanently normalised in everyday life, it is an ethical imperative for teachers to resist such a world by educating their female and male students in ways that are changing such a world, while students themselves are gaining competencies and skills, abilities and motivations to change it for the better.

We can say that the two main goals of such gender-responsive pedagogies in every field, including STEAM fields, are gender equality and empowerment of all female and male students. There are many educational and social arguments in favour of girls needing to be more and better involved in STEAM fields (UNESCO, 2006) through a comprehensive education that, regardless of gender, ethnic, sex, national, racial, class, and other differences, equally allows them to use educational opportunities and chances and educate themselves towards excellence and progress in an equal, modern and innovative way.

# MATERIAL FOR GENDER RESPONSIVE TEACHING

## Gender responsive teaching

### Think it through:

*On average, do boys and girls in my class have different needs in the learning process?*

*What am I doing to adapt my teaching to their different needs?*

Gender responsive teaching takes into account specific needs that all girls and all boys can have in the learning process. Those needs are possible identify by assessing their skills and knowledge. For example, boys more often need extra support for the development of reading skills, doc girls more often need extra support to have become more active in the areas of STEAM subjects. It is important to keep in mind that these are just examples which serve to better understand what it means identify special learning needs. Conclusion from these examples should not that all boys need additional support in mastering reading, just as not all girls need extra support to get involved in STEAM fields.

It is extremely important to keep in mind that **stereotypical attitudes, behaviours and expectations regarding gender can limit the choice of girls and boys regarding interest in different subjects in school, but also their potential future occupations.** Sociocultural norms and various forms of discrimination have a strong impact on social and economic the role that women and men have in everything societies, as well as their different participation in the labour market. Thus, a smaller number of women are engaged some of the STEAM areas can be linked to discriminatory social attitudes about it for which occupation women are capable or not, or what a "job for a woman" is. As a result of such deeply rooted attitudes in society, girls can grow up believing that women do not have the ability or intelligence to succeed in STEAM areas, and therefore avoid involvement in STEAM courses and careers.

Gender responsive teaching requires from teachers to take a gender inclusive approach in the planning of classes, teaching, classroom management, and performance appraisal. One of the important elements of gender responsive teaching is also the language we use in classes. The language that teachers use in the classroom

### Think it through:

*What is my view on occupations for women and occupations for men?*

*How does this view of mine reflect on my teaching?*

can strengthen discriminatory gender stereotypes, or can promote gender inclusion and equality. For example, teachers should strive to use both gender pronouns when quoting examples. **When planning lessons and teaching, teachers should take into account the different needs of students, arising from their different social backgrounds, learning styles, and deep-rooted social norms that affect the way they experience themselves, their interests and abilities.** For example, girls may think that physics is more for boys, while boys may think that literature is more for girls. Such stereotypes need to be analysed and critically questioned with children, and the teaching process needs to be adapted to the specific needs that arise from such beliefs. Gender-based teaching planning takes into account teaching materials, learning materials, work methods and techniques, and classroom design.

### **Think it through:**

*Did I already with my female and male students question social norms that affect their experience of themselves, their interests and their abilities?*

*How could I fit such a discussion in my classes?*

# MATERIAL FOR GENDER RESPONSIVE TEACHING

## Gender sensitive instructional material

### Think it through:

*How are women and men  
presented in textbooks  
and material I use?*

By teaching materials we mainly mean textbooks and workbooks, but also all the additional materials that teachers use in their practice in order to bring the material as close as possible to children. On the one hand, the materials used in the teaching process can influence the development of a just and inclusive society, but, on the other hand, they can support and even encourage discrimination and inequality in society. **A quick review of various textbooks for primary and secondary schools shows that gender stereotypes are relatively common in textbooks.** Textbooks portray women and girls as weak, passive and submissive, in the roles of housewives, caregivers, etc. In contrast, men are presented as powerful, capable and intelligent, in the roles of principals, doctors, scientists or other powerful people in society. In addition, the masculine gender (he, male student, male scientist, etc.) is most commonly used to denote both men and women or human beings.

Texts and illustrations in a large number of textbooks have long needed to be updated so as not to promote gender stereotypes. But until that long and slow process ends, **teachers themselves can develop gender-sensitive materials during the teaching process, and adapt existing materials to transform gender stereotypes into positive messages that promote and support gender equality.** Teachers have the opportunity to teach female and male students how to critically analyse gender representation and deconstruct gender stereotypes. In addition, teachers can revise learning materials to adapt them to the local context and show their students the many opportunities, roles and responsibilities that lie ahead. In this process, teachers should use gender-sensitive teaching methods and work techniques, making sure that all students are equally involved in the activities.

What should all teachers pay attention to when it comes to textbooks and gender-responsive teaching? Room for emphasising gender

stereotypes in textbooks is found in the textbook text itself, illustrations and tasks, orders and questions. In this part of the Manual, we will show you how gender stereotypes are presented in order to overcome them as effectively as possible through the teaching process.

**In a text**, it is important to pay attention to the following:

- Does the text provide relevant examples from everyday life?
- Are there pronouns for boys and girls in the text?
- Are there examples in the text that are equally encouraging for both boys and girls, and are boys and girls equally represented in the examples?
- Do men or boys always appear in the stories in the textbooks as heroes, and women or girls as helpless or those who need to be saved?
- Are there elements in the text that favour one sex over other?

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It is important to note the following in illustrations:

- Are boys and girls, men and women in equal numbers presented in the illustrations?
- Do the illustrations represent men and women, boys and girls in an activity, or are they more often passive observers?
- Are boys and girls, men and women presented as active in some non-traditional activities, e.g. that a woman drives a truck and that a man is washing the dishes?

With **questions, assignments and instructions**, it is important to pay attention to the following:

- Are the activities they require equally suitable for both boys and girls?
- Do the activities they require encourage different learning styles among students?
- Do the activities promote gender stereotypes, e.g., does the activity require boys to be leaders and girls to be part of a boy-led group?

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

Before presenting proposals for improving textbook lessons, it is necessary to briefly review **the preliminary analysis of ten selected teaching units in biology, chemistry, physics, art history, computer science, and technical education textbooks currently used in education systems in primary and secondary schools in Bosnia and Herzegovina**. This analysis was conducted in August 2021, organized by UNICEF, with the aim of providing preliminary information on the use of gender-responsive teaching methods in typical lessons from the STEAM area. As such, this analysis does not offer an exhaustive and detailed overview of the complete material covered in primary and secondary schools in Bosnia and Herzegovina, nor does it provide insight into the teaching methods used by teachers during teaching. However, it gives us a first impression of the presence or absence of basic principles of gender-responsive teaching in a typical textbook taught to children of different ages in Bosnia and Herzegovina, and is the initial step for a more comprehensive analysis. The analysis also included a broader context, which included the analysis of curriculum adaptation to individual styles and specific needs, and the recognition of gender diversity and sensitivity.

The analysis is based on the following general principles:

- **Diversity** – examining whether and to what extent gender differences are classified, analysed or addressed through information processing, whether awareness of gender equality is created in the field of work, and whether lessons take into account the different needs of all boys and girls in the learning process.
- **Fairness** – assessing whether the lesson promotes, through text and questions, assignments, and instructions, equal opportunities for girls and boys.
- **Availability** – which examines whether the prior knowledge needed to cover the lesson is equally available to boys and girls.



The analysis criteria obtained on the basis of these principles are divided into two groups:

**A - Wider context and curriculum**

**B - Gender responsive components of teaching units based on the principles of accessibility, diversity, equity, inclusiveness and equality**, which we will present below:

**A - Wider context and curriculum:**

**1. Adaptation of curricula to individual styles and specific needs:**

*Does the curriculum (to which the lesson belongs) motivate teachers and female and male students in general with their content or structure to process the material together in a way adapted to individual learning styles and specific needs of individual female and male students?*

**2. Gender responsiveness in the curriculum:**

*Do they recognize or practice the curricula that include individual lessons of gender responsive methods of STEAM pedagogy?*

**3. Relevance and contextualization of teaching topics in relation to the STEAM field and society in general:**

*Do the materials in the lesson explicitly link its theme or the wider STEAM context to its impact on society and the environment in general?*

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## **B - Gender responsive components of teaching units derived based on the principles of accessibility, diversity, fairness, inclusivity, and equality.**

### **Accessibility**

1. Are the background knowledge needed to cover the lesson equally available to boys and girls and why?

### **Fairness**

2. Is the content of the lesson such as to promote equal opportunities for girls and boys and why? How?

3. Do the teaching materials provide equal opportunities for female and male students to engage in a certain activity?

### **Inclusiveness**

4. Does the lesson motivate both boys and girls to get involved, encourage and empower themselves in acquiring knowledge? How?

5. Does the choice of topic, example, or language in the lesson take into account the interests of both girls and boys?

6. Does the content of the lesson represent women or men in a one-sided manner and how? Are there any sexist examples?

7. How are the values and ethics of the textbook author or the wider society presented in the lesson and do these values / attitudes have a gender component (positive or negative)?

### **Equality**

8. Does the teaching unit / lesson promote gender equality and why? How?

9. Are men and women equally represented in the lesson?

10. Is the language spoken in the lesson gender stereotypical and how?

11. *Are the images / visualizations used in the lesson gender stereotypical and / or Discriminatory and how?*

12. *Are women and men clearly presented or promoted in the lesson as equally proactive, capable, and successful?*

13. *Does the lesson show cases where there is a patriarchal division of labour, or are the given roles changed?*

### **Diversity**

14. *Are gender differences classified, analysed or addressed through the processing of information, data or analysis on learning examples within the lesson?*

15. *Is there a desire to create awareness of the gender division of labour and the need to work on gender equality in the field of work within STEAM? Why?*

16. *Does the lesson take into account the different learning needs of boys and girls, and is there room for problems within it to be addressed through individual approaches? (e.g. in the "Questions" section at the end of a lesson)*

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The analysed lessons belong to different curricula, and the analysis indicated that only one curriculum, in general parts of the document, notes the importance of an individual approach for each female and male student (for example, the overall goal of the educational process is the full development of children's potential and curiosity through active relationship and communication with the environment that surrounds him, while respecting the individuality of students), while other curricula do not deal with the individualization of the teaching process. However, a curriculum that promotes an individualized approach to teaching based on the needs and abilities of each female and male student does not take into account gender diversity and sensitivity.

The analysis indicates that the curricula to which the analysed lessons belong do not contain elements leading to a conclusion that they promote gender discrimination or stereotypes, and that these documents do not address gender sensitivity and responsibility at all, neither substantively nor methodologically. The only thing that was noticed in them are the terms they use, which are in the masculine gender, such as student, chemist, naturalist.

When it comes to the analysis of individual lessons, in the next section we will list some interesting findings.

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## Gender responsive aspects of teaching units sensitised based on the principles of accessibility, diversity, fairness, inclusivity, and equality

Although this is not directly apparent from the content of the lessons, we assume that, when it comes to gender differences, all the prior knowledge necessary to process selected lessons is **equally available to girls and boys at previous levels of education**. However, this does not exclude the fact that there are differences in the availability of materials at lower levels of education according to other criteria, such as belonging to different marginalized groups. For example, Roma children or children from socio-economically disadvantaged families may have limited access to the Internet and computers, which limits their access to knowledge compared to other children.

**The contents of the analysed lessons are not addressed explicitly by the question of equal opportunities for girls and boys**, but there are still differences between them, primarily when it comes to illustrations and examples found in the lessons. For example, although the content of a particular lesson does not address the opportunities that women and men have in the labour market, the fact that only men are portrayed as scientists or artists can be discouraging to girls. In two of the ten selected teaching units presented are both male and female characters, while all others have exclusively male characters, or the characters are divided according to traditional roles (e.g., a man is a doctor and a woman a patient) (see Figure 1). **However, there are no discriminatory images or visualizations.**

Among the ten analysed lessons, only two have concrete proposals for the active involvement of the child in the learning process, in the form of performing simple experiments. In fact, most of **the lessons are primarily focused on defining and**

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*Figure 1 Example of an illustration in which a man is a doctor; while a woman is a patient*

*Source: Pressfoto (Freepik)*

**explaining new material, and as such do not deal at all with motivating girls and boys to engage, encourage, and actively acquire knowledge.** The content is mostly focused only on the abstract, which does not take into account the interests of children, regardless of their gender. One example of relying on abstract explanations is the following: "Computer applications could be divided into the following groups: scientific and technical calculations and mass data processing." Female and male students are not further explained what these two groups mean or given examples of how they / they better understood and placed in context.

The contents of the lessons and all available teaching materials (problem books and workbooks) are **not at all focused on encouraging girls and boys to lead certain activities.** It would be desirable to supplement them with such elements that would explicitly encourage girls and boys to launch an initiative and lead certain activities within the STEAM fields.

Materials in five of the ten teaching units analysed **partly relate the lesson topic to the wider impact it has on society and the environment,** but there is no indication of a broader STEAM context, as lessons are in most cases presented in one subject, without linking to other areas and realities. life and social problems.

In two lessons dealing with children's interests by presenting potentially interesting content, **examples are more adapted to traditional boys' interests** (e.g. football, cars, weapons) (see Figure 2). **However, in most lessons the language is gender neutral** (e.g. do, fill in, etc.), except for the fact that only the masculine gender is used, e.g. student, teacher, cyclist, artist, etc., except in the case of one teaching unit.



*Figure 2 Illustration with make figures and traditionally boys' interests*

*Source: Pixabay (Pexels) / Garvin St. Villier (Pexels) / Caio (Pexels)*

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

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*Figure 3 Example of an illustration depicting a woman working on a scientific experiment*

*Source: Artem Podrez (Pexels)*

When it comes to the existence of one-sided portrayal or sexist examples, no sexist examples are observed, but it **indirectly gives the impression that men are and women are not engaged in art or science.** For example, in an art history textbook for high school in a 20th century art lesson, an example is given over twenty male artists, and no female artist. Likewise, young girls and girls reading a chemistry textbook in which only male scientists are mentioned and illustrated, without explaining why access to women in the scientific community has been difficult, can easily conclude that chemistry is not for women. Thus, although the selected sample of teaching units does not explicitly reflect the values and ethics of the authors of textbooks and the wider society, **implicitly in some lessons one may get the impression that men are more suitable for science and art.** However, there are also rare examples where women are shown as scientists, as in Figure 3, although it is not clear from the picture whether they are laboratory assistants or scientists.

**None of the analysed teaching units explicitly or implicitly promotes gender equality.** There is also no visible effort to raise awareness of the gender-based division of labour and the need to work on gender equality within STEAM. An exception is the lesson on the use of computers, which contains illustrations of women behind the computer, but even here we cannot talk about an explicit effort to create awareness because no question or incentive is offered for discussion on this topic. Where historically only men have made significant contributions to a field, there are no suggestions that women today can and should pursue science and the arts.

In addition to the lesson featuring women employed in the IT sector, **only men were portrayed and promoted as successful.** But these are mostly historical figures, not depictions of today's professions, as in the example of famous

chemists or great artists of the twentieth century. There is definitely room for improvement when it comes to, for example, mentioning women in science, technology and the arts who are **credited with great and important discoveries, but also the successful women of today in the field of STEAM**. Textbooks offer examples of traditional gender roles (eg a man is a doctor, a builder, a cyclist, a driver, etc.), and there are **no examples of replacing traditional gender roles** that would explicitly show children that, for example, a man can cook lunch and a woman can be a driver. Also, there are no examples of **classification, analysis or discussion of gender differences**.

No teaching unit deals either explicitly or implicitly with the specific needs of girls and boys, which are manifested through their interests. These specific needs of girls and boys, should be assessed by teachers contextually, in classrooms in the field, respecting all the differences among girls and boys we come across, which must not be a source of discrimination, but a starting point for justice and equality.

Overall, most teaching units do not respect the principles of gender-responsive teaching. Rare teaching units that take the gender perspective into account, at least minimally, do so by giving equal numbers of female and male characters in examples and offering illustrations that clearly show women's participation in scientific life. But there are no examples of explicit consideration or analysis of the causes of gender inequality in STEAM areas, nor are there explicit attempts to encourage, empower or involve girls more, so room for improvement is indeed visible. However, it should be borne in mind that, in most cases, disregard for gender perspective is in fact a reflection of the generally weak didactic organization of teaching units that does not provide for active participation, discussion or analysis for either girls or boys. Also, individual teachers could design gender-responsive teaching units based on these teaching units, and with adequate lesson preparation, so this analysis cannot simultaneously determine that the gender perspective is not taken into account during the teaching process.

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## Proposals for enhancement of teaching material

### Diversity – important to know!

As part of the lessons, more space should be devoted to the topic of gender differences in terms of classification, analysis or discussion about them by contextualizing the lessons in real life and creative circumstances, through educational and inspiring examples. Efforts should be made in the teaching units and individual lessons to create a critical awareness of the gender division of labour and the need to work on gender equality within STEAM. When taking into account the different needs of individual students, the lesson should provide space to solve problems through individual approaches by engaging and valorising both girls and boys in the process of learning and learning, while recognizing, acknowledging and respecting all their differences, including gender.

### Proposal for enhancement of teaching units

Lessons about male-dominated activities, such as lessons on construction from the subject of technical culture, are very challenging and can stereotypically present these jobs as "men's" jobs. The role of teachers is to draw the focus of female and male students to thinking about the role of women in these areas, and in our example - in construction. This issue can be worked out with the help of the "Problem tree" technique.

When formulating the problem, care should be taken to set the problem neutrally, as an observation, e.g. *a lower percentage of women professionals in the field of construction, rather than interpretation, e.g. women are not interested in the field of construction*. Using this technique motivates female and male students to think about what could be the causes of the lower presence of women in the field of construction, as well as the consequences of this problem.

After the "Problem tree" is made with the female and male students, it is beneficial to switch to the "Solution tree" technique. This technique is performed in the same way as the "Problem tree", except that where the problem was written in the previous technique, the problem is now reformulated into a solution. If our problem was: *The percentage of women professionals in construction is lower*, the solution will be: *The same percentage of women professionals and men professionals in the field of construction*. The work process is the same as in the "Problem tree" technique, so female and male students are now focusing on discovering the causes and consequences of this solution.

When the application of the "Solution tree" technique is completed, it is beneficial to analyse with students the causes listed on the "Problem Tree", with the causes on the "Solution tree". It is useful to do the same analysis with the consequences.



**„Problem tree“** is a technique that helps us to visually present and analyse a particular problem, discover the causes and consequences it can lead to. The first step in performing this technique is to formulate a problem. This technique is beneficial because it allows female and male students to think about the causes and consequences of some problems, and when doing so, they must analyse the problems and establish causal relationships. When creating a "Tree of Problems", it is important to encourage female and male students to make a deeper analysis, asking them additional questions - "And what causes this?" It is important that their analysis of the problem does not remain on the surface visible causes, but also secondary ones. The more times you ask, "What causes this?", the deeper you will be at the root of the problem. Also, it is necessary to repeat, and the consequence of that will be the question "And what will this lead to?" Motivate female and male students to look at both the short-term and long-term consequences of the issue.

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## **Fairness - important to know!**

The contents of the lessons may be fairer in the sense that they promote equal opportunities for girls and boys. In the existing lessons, this issue is either completely excluded or the contents normalize gender differences and inequalities through images, text, and numerous examples. Teachers should also explicitly address the issue of equal opportunities for all people, regardless of gender and gender. Lesson content and all available teaching materials (collections and workbooks) can be enhanced by focusing on equally encouraging both girls and boys to lead a particular activity. Numerous lessons can be more stimulating for all female and male students by offering relevant questions, examples, and exercises, rather than exclusively explanations of scientific concepts.

## ***Proposal for enhancement of teaching units***

In order to provide female and male students with equal opportunities, the "Puzzle" strategy is very interesting because it puts them in equal positions, and yet directs them to each other and to cooperation. The topics you can ask them can be different, related to the material being processed, but also related to the influence of women on the development of science, art, technology and more. One topic that male and female students could study in the subject of informatics is "The role of women in the development of information technology and the importance of the first programmers, who were actually female programmers."

**The Puzzle** is used as a strategy in cooperative learning. With this strategy we teach female and male students how to learn from each other, i.e. how to explain to each other or their views or certain theories, concepts, events, case studies, interventions, etc. Female and male students in this strategy are divided into parent and expert groups. The division can be done on the basis of the shape of the paper and their colours. If paper shapes are the criteria for forming expert groups, then colours are the criteria for forming parent groups. The number of shapes depends on how many expert groups we want to have, while the number of colours depends on how many parent groups we want to have.

How do we determine the number of expert groups? We determine them by knowing what the students in these expert groups will do. So how many topics, concepts, theories, events, case studies, etc. will be studied. When we determine this, then we also know how many expert groups we make.

We will now simulate the formation of expert and parent groups. For example, we choose to have four expert groups because we are working on understanding four concepts. For these four groups we make four shapes of paper, for example: a circle, triangle, square and hexagon. If we have 20 female and male students in the group we work with, it means that they will be divided into four expert and five parent groups, which means that we need five colours, for example: yellow, red, blue, green and purple. For each student, the shape is in a small envelope. Female and male students first form parent groups using the colours they have drawn. After forming parent groups, they are given the task of forming, using shapes, expert groups in which they consider given concepts or something else.

After completing this activity in the expert groups, they return to their home groups and explain their concepts to each other. The goal of this strategy is for female and male students to learn to present their knowledge to each other, i.e. to learn from each other.

It is very important to know that it is good to use this strategy when the students already have some knowledge about the material they are working on. It is not grateful that it is used in situations when a completely new area is being processed for them, because we are not sure that they will be able to understand it independently in an adequate way. That is why this strategy is beneficial when it comes to applying knowledge or considering some concepts and theories from different angles.

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## **Accessibility - important to know!**

It is not possible to conclude on the basis of the content of the lessons how much prior knowledge female and male students have for individual lessons from previous schooling, and whether such prior knowledge is equally available to them. But in methodological recommendations, it is necessary for teachers to point out the problem of accessibility, taking into account different forms of marginalization.

## ***Proposal for enhancement of teaching units***

The female and male teacher can work with female and male students to develop the problem of unavailability of the Internet for some children in school and help them find solutions to this problem. In this way, children are put in a situation to solve a real-life problem, while being aware of the consequences that the unavailability of certain resources can have in their community. It is desirable that the female and male teacher first models, i.e. shows the problem-solving process on an example, and then to divide female and male students into groups and monitor their development. The point of the technique is to become aware of a social problem and practice the real-life problem-solving process, so it is not crucial to actually come up with a workable solution during the class, although it is possible. The list of questions in the example of the problem-solving model is not exhaustive, so the female and male teacher can adapt it to the needs of the class and the specific problem.

## **PROBLEM SOLVING MODEL**

### **Let's define the problem!**

- What do we already know about the problem?
- Why is that so?
- What do we still not know and how can we find out?
- What are the potential difficulties in solving this problem?
- What is the ultimate goal - how will we know that the problem has been solved?

### **Let's think about the problem!**

- "Brainstorm"- let's list as many solutions as possible, regardless of whether they are possible...
- "And what would happen if ..."  
- let's think about as many possibilities as possible ...
- How have others solved similar problems?
- Consider all ideas and narrow the selection to feasible ones.
- Are there any mitigating circumstances we can take advantage of?
- Who / what could help us solve the problem?

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### **Let's plan a solution!**

- Which of the offered solutions could be the most feasible?
- How can we know if it will work?
- What do we need to do to try this plan?
- Make a to-do list for group members.
- Make a detailed plan and schedule of activities.

### **Let's try the solution!**

- We must be patient.
- We must be persistent.
- We have to make mistakes.
- We need to learn from mistakes to correct and avoid them in the future.
- We must not give up.

### **Let's evaluate the solution!**

- Have we managed to solve the problem?
- What exactly have we succeeded in, and what else can be improved?
- What helped us solve the problem?
- What were the biggest difficulties?
- What have we learned through this process?
- Could we have done something different?
- How would we proceed next time?

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## **Inclusiveness - important to know!**

Lessons should include concrete suggestions for the active involvement of each child in the learning process, not just definitions and explanations of new material. The contents of the lessons must put in the forefront the motivation of both girls and boys to engage, encourage and actively acquire knowledge. The aim is to overcome the generally tedious, uninspiring and / or overly technical or scientific presentation of the material, without taking into account the interests of children, regardless of their gender. Innovative, interactive and critical approach to learning, potentially interesting content for children, examples and language adapted to the interests of girls and boys, as well as their motivations to learn and progress regardless of traditional gender divisions in education, science, technology, art, engineering and mathematics - these are all elements that could significantly improve the teaching content. Lessons must present the material as something that is not separate from the context and real life, so as not to normalize gender stereotypes or inequalities, and to make visible women scientists and workers in various spheres of STEAM.

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## ***Proposal for enhancement of teaching units***

Teachers can enhance lessons that do not actively engage female and male students in the process of acquiring knowledge and skills in the following ways, using the technique of "Gallery tour". Thus, for example, female and male students in music classes can work on creating sounds with the help of various objects that we find around us, invent instruments and the like. Both girls and boys take part in the creation and are equally motivated to participate. Product creation can also be done in classes from other STEAM subjects, so that these products are related to the theory that female and male students are studying.

**"Gallery tour"** is a technique by which female and male students get acquainted with their products in a different way than the usual presentation of what has been done. This technique is performed by having female and male students hang their flipchart papers on the walls of the classroom, or arrange some other products on the tables, and go on a tour. It is important that during the product tour, two members of the group, a young boy and a young girl, a boy and a girl, stand next to each of them, in order to present the joint work to those who came to observe. It is very important to make sure that both boys and girls get an equal opportunity to present the works of their groups.

# ASSESSMENT CRITERIA AND PROPOSALS FOR IMPROVEMENT OF LESSONS

## Equality - important to know!

Lessons in textbooks should promote gender equality, and explain both historical and current injustices, i.e. why the privileges that arise in STEAM areas, and in life and society in general are based on gender differences and how to overcome them. Textbooks should equally represent women and men in the lessons, illustrations in the lessons should include women and men, and girls and boys, so that they are not divided according to traditional roles and gender division of labour. Images and illustrations, and various visualizations, not only must not be discriminatory or stereotypical, but must be affirmative in terms of equal participation of all. The lessons must also show successful women in various fields, not just men, and teachers need to affirm the non-traditional gender division of labour and reverse gender roles in every way.

## Proposal for enhancement of teaching units

40 Lessons in physics and chemistry, which in addition to descriptions, definitions of scientific terms, also contain texts about men who have studied these contents that children learn, it is necessary to enrich the conversation with students about why men dominated in the earlier period in these sciences. That conversation can be conducted with the help of a strategy called "Six hats". Using this strategy, you can discuss with students a problem called *Women are rarely mentioned as scientists in the theories we learn about*. Also, this strategy is beneficial to discuss with female and male students the layout of the textbook, its illustrations, if the textbook is rich in illustrations that are predominantly male characters, presented as scientists or artists and in the service of illustrating certain concepts that the lessons talk about. Then the problem can be formulated as: *The lessons of our textbook (state the name of the subject whose textbook is being commented on) are dominated by illustrations with male characters.*



**"Six hats"** is a strategy that allows looking at different aspects of a problem, taking into account multiple perspectives, encouraging both lateral and creative thinking. "Six hats" is not a strategy for direct problem solving, it helps us to see and analyse possible solutions or to better prepare for the upcoming changes. "Six hats" is a strategy that encourages the development of creativity, critical thinking, contributes to the improvement of communication in the team, helps solve problems and make decisions. It teaches us how to: share opinions in six different ways, explore each situation or problem from six different angles, and save time when it comes to looking at a problem, concept, theory, task. In the "Six hats" strategy, each of the hats has, in addition to its colour, its function and angle of view of the problem, situation, task and the like. Colour and function are interrelated.

**White hat** – white colour is neutral and objective, so the white hat is preoccupied with facts and numbers. When we put on a white hat we then ask some of the following questions: "What do we know about it?", "What information do we need?", "What should we ask?", "Is it a fact or an opinion?", "Do we have evidence for that claim?" A white hat is used to focus attention on information we have or lack.

**Red hat** – red is an indicator of anger, rage, i.e. emotions, so this hat allows us to look at things from the angle of the emotional side. When the red hat is in use, we have the opportunity to express our emotions and intuition without any explanation. Our emotions exist and the red hat gives you permission to express them. For example: "I feel excited at the thought of ..." "This idea scares me.", "I get angry at the thought of ..."

**Black hat** – black is a negative colour, so in this strategy, a black hat covers the negative aspects, i.e. the reasons why something cannot be done. The black hat urges us to be careful. It protects us from reckless decisions that could be harmful. The black hat warns us of the risk and possible shortcomings of our decisions and thinking. Without a black hat we would be in trouble all the time. Nevertheless, a black hat should not be used often, because then it can be dangerous for ideas and creativity.

**Yellow hat** – yellow is sunny and positive, so yellow hat is optimistic implies hope and positive thinking. Under the yellow hat we try to find everything that is positive. We can do this by asking some of the following questions: "What are the benefits?", "Who will benefit from it?", "How will the beneficial effects affect users?", "What are the other values of this idea?"

**Green hat** – green is the colour of grass, vegetation, which is abundant, and therefore green means creativity and the birth of new ideas. A green hat is a creative hat. It is intended for planning and creating new ideas. Under the green hat we can suggest changes and alternatives to the proposed ideas. It allows us to discuss different possibilities. When we use a green hat we all create.

**Blue hat** – blue colour is cool and the colour of the sky, which is above all else, so the blue hat is in charge of controlling and organizing the thought process, as well as the use of other hats. The blue hat is intended to consider the thought process itself. For example, we may wonder what we will do next or what we have succeeded in so far. We can use the blue hat at the beginning of the discussion to decide what we are going to discuss and what we expect from the discussion, and how the discussion will go. It can help us negotiate the schedule of using other hats. The blue hat can be used to consider what was done at the end of the discussion, i.e. to evaluate the whole discussion process.

# GENDER SENSITIVE INTERACTION AND COMMUNICATION IN CLASSES

## Teaching methods

### Think it through:

*What teaching methods dominate my style of teaching?*

*How could I improve them to be make them more focused on different needs of all my students?*

The frontal form of teaching in which the female and male student is a passive recipient of information, and the female and male teacher are those who are active can lead to development conformism in male and female students. **In order to for female and male students to develop adequately, it is important to use methods and techniques of work that improve the female and male students learning, impact the development of all segments of personality, but also promote gender equality.** During the schooling, female and male students should understand that learning is a lifelong process. In order for female and male students to understand this, teachers need to focus on their interests, abilities, talents and opportunities. That means they apply the teaching focused on the female and male student, which uses dialogue for the purpose of developing critical thinking in female and male students, so they would become engaged female and male citizens and contribute significantly to their communities. This kind of education includes respect for diversity, which means every female and male student should be recognized and respected for their own abilities, interests, ideas, needs. By involving all female and male students in the teaching process, the female and male teacher can prevent the emergence and support of gender inequality.

When it comes to interactive methods that are particularly important and useful in STEAM areas, we will single out the teaching model "5E", designed and promoted within the BSCS Centre (Biological Sciences Curriculum Study). This model promotes a constructivist approach to learning, based on five phases of learning: engagement, exploration, explanation, elaboration, evaluation). It is very suitable for encouraging active learning in the natural sciences, and is often used within the STEM / STEAM model. These are the phases of teaching that are monitored during the teaching process,

and these are the indicators that indicate the existence of each of the phases during teaching:

### **Engagement**

- Teachers question the prior knowledge and ideas that female and male students already have.
- Teachers integrate content from different scientific disciplines.
- Teachers present real problems to students.

### **Exploration**

- Teachers guide female and male students through the process of analysing and interpreting natural phenomena and social behaviour.
- Female and male students are encouraged to use scientific skills such as observing, questioning, researching, testing, predicting, assuming, and communicating with other students.
- Teachers encourage female and male students to ask questions, plan and pilot research.
- Encourages teamwork among female and male students.

### **Explanation**

- Teachers encourage female and male students to explain concepts in their own words, to offer evidence and confirmation in their explanations, and to participate in discussions.

### **Elaboration**

- Teachers encourage female and male students to apply science concepts and skills in real situations.

### **Evaluation**

- Teachers provide feedback and test female and male students knowledge, understanding and skills.

## **Think it through:**

*To what extent I already apply some of the 5E principles in my classes?*

*Which teaching units could I improve using 5E model?*

# GENDER SENSITIVE INTERACTION AND COMMUNICATION IN CLASSES

## Communication in classes

Language often determines how people understand and comprehend reality. It is one of the most powerful tools for defining and strengthening gender relations and can be used to promote inclusion and gender awareness or to strengthen gender prejudices and stereotypes. The language used by teachers is an important model for female and male students and the wider community. What we need to be aware of is that **teachers, like all human beings, are subject to gender prejudices and stereotypes, which arose on the basis of their socialization, education and experience. Thus, their communication, both verbal and nonverbal, may reflect unconscious assumptions about gender roles.** Through their verbal communication, they may inadvertently discourage girls from pursuing science by telling them, for example, that "robots and games are for boys" or that "literature is for girls". And nonverbal cues, such as rolling your eyes, raising your eyebrows, or laughing at the answers or questions the female and male student asks, may indicate the female and male teacher's gender stereotypes. Likewise, if a boy cries, the female and male teacher can tell him to stop acting like that, because that is how girls behave. From this, he can conclude that it is not good for a boy to express emotions, which will later affect his choices and behaviours, but also that girls are weak because only they cry. The expectation that all boys should love and play football, and that girls cannot get involved in a football game, directly limits the choice of both boys (who would rather do something else instead of football) and girls (who would rather play football). There are countless such examples that gradually, often without bad intentions, impose expectations and prejudices on children about what is "for boys" and what is "for girls", which narrows their ability to choose and realize personal potential, regardless of whether it is traditionally "male" or traditionally "female" interests.

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### Think it through:

*What are my views on gender roles and expectations?*

*Do I send, consciously or unconsciously messages to children that a colour, game or occupation is for boys only or for girls only?*

*How could I, through my own work, convince children that all games, sports, subjects, occupations, are equally suitable for both boys and girls?*

## Interior design

**In addition to adequate communication about gender roles and stereotypes, for adequate performance of the lesson, it is necessary to pay attention to the layout of classroom desks, ie the way in which communication between children and teaching staff is physically organized.** The big disadvantage of arranging desks in rows is that it can strengthen many traditional processes of socialization. The teacher is seen as an expert who "gives" knowledge to female and male students, instead of actively engaging them in building knowledge. they are likely to participate unless the teacher makes a special effort to involve them. A different arrangement, such as arranging benches in smaller groups or sitting in a semicircle or circle, can encourage all female and male students to participate actively. It is necessary to think about female and male students rotating in every class so everyone has a chance to sit at different positions during one school year. In addition to the layout of the desks, it is important in gender responsive teaching to take into account how girls and boys sit, whether they share desks, or are more homogenized. It is very important to encourage them to share desks, to sit with each other, to break down barriers, to understand and respect each other and to work together towards a common goal. For the development of respect and mutual respect, it is necessary that the female and male teacher nurtures a safe and inclusive environment for all female and male students, including the development of socio-emotional competencies.

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### Think it through:

*What layout do I use in my classroom?*

*Can I improve communication if I change something in the layout?*

# GENDER SENSITIVE INTERACTION AND COMMUNICATION IN CLASSES

## Feedback

Female and male students come to the classroom with values and gender constructs they acquired thanks to the family and society. Teachers duty is not to contribute to the development of gender stereotypical attitudes, not to use offensive language when giving feedback, because it can deepen the gender stereotypes, and not to let female and male students in any way think that they are not worthy of education. Contrary to that, teachers can improve their results and work on the development of female and male students self-confidence, providing constructive feedback in an encouraging way that stimulates their learning and critical thinking. Use of gender-neutral language in the classroom treats boys and girls as equal partners and provides a safe learning environment for all.

Constructive feedback is a two-way process involving both the female or male teacher and the female or male student. Teachers should attempt to create an environment for giving and receiving feedback in an appropriate manner allowing for improvement and progress of both sides. Female or male teacher should also encourage female and male students to give feedback in order to improve both the learning and the teaching process. For example, if the teacher is male, girls may have particular difficulties giving feedback. Therefore, teachers must make certain effort to provide feedback and encourage female and male students to give feedback, establishing trust and respect.

Appropriate feedback has several traits: it is specific and systematic, focused directly on a female or male student, provides information on the competency, describes the current achievement and motivates the female or male student to compare with one self, and indicates the invested effort. Teachers who are authoritative in giving feedback, and who are prone to generalisation and slight, can cause embarrassment and fear, which in no way suits adequate teaching and does not encourage learning among female and male students. Giving feedback that humiliates a female or male student (e.g. "You will never be able to do that.") impacts the lowering of her and his self-confidence. Also, feedback that's general, unspecified, is of no help to students (for example, "You did a great job.") Feedback that encourages competitive atmosphere in class can make some female and male students less valuable in comparison to others (for example, "You always complete assignment better than any other female and male student in class.").

Some advice on how you can give constructive feedback to a female and male student:

- **Tell them what they did well.**

When giving feedback on what the male and female student did well, clarification needs to be personalised and you need to point to a specific behaviour, skill, knowledge. Telling a female student: "Your essay shows how smart you are" is very encouraging, but the female student cannot know what exactly you were referring to in her answer. Appropriate feedback would be: *"Mirjana, I like the way you structured the essay. You have a very clear introductory sentence about the topic you are covering. The essay is packed with excellent arguments in the main part. You use different kinds of arguments, which is especially commendable."*

- **Use feedback to encourage a female and male student to change**

Female and male students will not always work correctly and give correct answers. Errors are an essential part of learning. When female and male students make errors, it is important to point them out and help them correct those without feeling embarrassed. Giving general feedback during the process is not good, such as: *"This answer is not logical."* With such feedback, the female and male student do not know which part of the answer should be corrected, because had they known better, they would have done it better. Therefore, the feedback should be as follows: *"Your answer shows that you put in the effort and learned about the systematization of animals. However, answers to the questions concerning mammals were not correct. Try mastering the lessons about this group of animals better."*

- **Point to the change process**

Guide your students to determine what steps they need to take to achieve a better result. For example, *"Pay attention to your essay and circle sentences that support your argument, and cross out those that do not. Then rewrite the essay so that each passage in it has a thematic sentence, relevant arguments and a final sentence."*

# GENDER SENSITIVE INTERACTION AND COMMUNICATION IN CLASSES

- **Teach female and male students to think about their efforts**

Asking strategic questions can help female and male students to evaluate and guide their own learning process. It helps them take ownership of their work and they know how to improve it. For example, *“What is the structure of the paragraph?”*, *“What aspects of this structure did you use in this passage?”*, *“Which ones did you forget?”*, *“What do you need to do in order to improve your work?”*

Finally, invite female and male students to give you feedback. This can be done in two ways, anonymously or publicly. At first, it is not a bad idea to do it anonymously, like having a box with suggestions in the classroom. If you're open to that, their feedback can help you overcome gender bias and improve your own teaching skills. Teach them how to give specific and constructive feedback and model your readiness to learn. You can ask them to think about different issues depending on what you want to know or observe, such as:

- What did they like in today's class?
- How did your feedback facilitate or block their learning?
- What manner of talking helps girls and boys to feel included?
- If they were teaching in class, what would they do differently?





# SUMMARY AND RECOMMENDATIONS FOR TEACHERS ON GENDER RESPONSIVE TEACHING METHODS

Gender sensitive pedagogy refers to the teaching and learning processes that emphasize specific learning needs of girls and boys. These specific needs can be identified by assessing challenges and gaps in skill level and knowledge for both sexes and for female and male students individually in each classroom. For example, boys may need additional support for development of reading skills or emotional intelligence, while girls will need extra support to speak in class or with STEAM subjects. Gender sensitive pedagogy calls on teachers to take an inclusive gender approach in planning classes, in teaching practice, class management, and performance appraisal.

## **Use of language in a classroom, during class, and in extracurricular activities**

Language used by teachers in classroom or in extracurricular activities can either strengthen the negative gender stereotypes or promote gender inclusion and equality. Female and male teachers should use both genders when stating examples and treat all students with respect regardless of their sex/gender.

## **Planning class/instruction**

When planning classes, gender responsive teachers take into account gender, as well as differences in learning needs of female and male students based on their different social background and learning styles. Gender-neutral classes plan takes into account the following elements: instructional material and learning material, teaching methods and techniques, class activity, classroom layout, and the classroom design.

## **Learning material – textbooks, problem books, workbooks, etc.**

Recommendations to all teachers are:

- Develop or adapt your materials to be gender-inclusive and ensure the promotion of gender equality in society.
- Use textbooks and materials that promote gender equality.
- If you do not have such textbooks available, you can involve the class in critical analysis of images or text through the gender perspective.

## **Existing teaching materials**

Teachers need to analyse the textual and visual elements of the lessons in the textbooks. This can be achieved by asking the questions that are presented in more detail in the Appendix to this Manual. Based on these questions, and depending on the answers received, it is necessary to consider revising or supplementing the teaching material.

## **Adaptation of teaching materials for gender responsible teaching**

Teaching materials for gender-responsive teaching are effective when participatory methods, collaborative work are used in the learning process and when they are focused on female and male students, taking into account their specific and different needs. Through a variety of methods that involve multiple types of intelligence and different learning styles, female and male students with different educational needs are more involved. Material that is culturally relevant to the lives of female and male students should also be used, with real-life examples, situations and community issues as the main materials for discussion. The use of stories, examples and images that reflect the local context involves female and male students in the learning process by connecting complex subjects and topics with things they know. Whenever they encounter gender-biased or discriminatory illustrations, examples or statements in a textbook or other teaching material, teacher should ask critical questions, provide a gender-responsive analysis of the problem and add their own examples showing the participation of women / girls and men / boys in various roles. Teachers need to work individually or in collaboration with their peers to develop their own gender-sensitive teaching and learning materials from magazines, books, movies, videos and a multitude of online sources. Positive images of both sexes can also be posted in the classroom or shared online to help create a gender-responsive environment.

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## **Classroom layout**

It is important to avoid a typical classroom layout based on traditional socialization processes. A different layout, such as dividing the class into smaller groups or sitting in a circle, can encourage all female and male students to participate actively. Where this is not possible, chair rotation should be considered to ensure that all female and male students are involved. What is the seating arrangement, and do girls and boys share desks? Encourage girls and boys to share a workspace to break down barriers, understand and respect each other, and work together toward a common goal.

## **Classroom management**

It is necessary to provide such classroom management that helps to develop mutually supportive interactions between female and male students, and teachers. This is done through systematic and structural steps that nurture a safe and inclusive learning environment for all female and male students, through the collective development of positive common norms. Activities that develop emotional intelligence and conflict resolution skills should be included in order for female and male students to work well together, and conscious steps should be taken to encourage the participation of all female and male students, and to promote all forms of equality, including gender equality.

# ANNEX: TOOL FOR ASSESSMENT AND IMPROVEMENT OF LESSONS ACCORDING TO PRINCIPLES OF GENDER RESPONSIVE TEACHING

Dear teachers, these instructions will help you to:

- Assess the extent to which the materials you use in your work with children adapted to the principles of gender responsible teaching,
- adapt, supplement or create teaching materials yourself enable gender responsive teaching.

First read and review the teaching material you want to use how to get a general impression of the following issues:

- Are women and men (girls and boys) equally represented in the teaching material?
- Does the material give the impression that the topic is equally fun and engaging for both girls and boys?
- Is the material equally encouraging to involving girls and boys in the active learning process?

Once you have gained a general impression, you can access a more detailed overview, based on the following questions. You may get surprised!

## **Frequency and order of appearance of male and female characters**

- How many men and how many women are mentioned or shown in text, assignments and illustrations?
- In what order are the examples of men and women presented? For example, are men always mentioned in the first place and women after them?

## What can I do?

If there are more men in the text and on illustrations and/or examples with men are always shown first, you can ask children the following questions and give the following assignments:

- What do you think, why are there more male than female characters in the text and on illustrations? (*Moderate the discussion in such a way that children in the end understand that access to education, science and art was very limited for women throughout history.*)
- Can you find as many examples of women working in this scientific field through history (*meaning field covered by the lesson at hand*) and present their life stories to the class?
- Can you find prominent women working in this field at present day (*meaning field covered by the lesson*)?

The goal of these questions and assignments is for children to understand that obstacles women faced throughout history have been mostly eliminated today, and that a larger number of men in the books does not mean that that field is not for women.

# ANNEX: TOOL FOR ASSESSMENT AND IMPROVEMENT OF LESSONS ACCORDING TO PRINCIPLES OF GENDER RESPONSIVE TEACHING

## **Manner of presenting female and male characters in text, assignments, and illustrations**

- What type of activity are the characters presented performing?
- Are women shown, for example through:
  - Caring roles (e.g. nurses, mothers, etc.)
  - Business roles (e.g. engineers, business women, etc.)
  - Leadership roles (e.g. executives, leaders of social movements, etc.)
  - Subordinate roles (e.g. secretaries, assistants, etc.)
  - Patriarchal roles (e.g. housewives, cooks, etc.)
  - Creative roles (e.g. artists, scientists, etc.)
  - and so on.
- What psychological traits were assigned to women, and what to men?
- For example, are they presented as diligent, intelligent courageous, gentle, persistent, etc.?
- How were the roles of women in a family presented? For example, do women always take care of children, help out, clean, cook, etc.?
- In which activities are girls engaged, and in which activities are boys engaged?
- For example, are girls shown in quiet, and boys in dynamic activities?
- Are girls/women shown in equal roles? For example, both a girl and a boy can be on an illustration, but the boy is performing an experiment, and the girl is only watching; or, man and a woman can be on an illustration, but the man is operating a machine, and the woman is shown as a secretary; or, the man is shown as a doctor, while the woman is shown as a nurse.
- Are there any examples of men doing traditionally "women's" work (for example, a man cooking or holding a baby) and women doing traditionally "men's" work (for example, a woman driving a bus or supervising construction)?
- Are there other signs indicating subordinate or unequal position of women?

## What can I do?

If female characters in the teaching material are mostly shown in traditional, patriarchal or subordinate roles, you can ask children the following questions and give the following assignments:

- What do you think, why are the female characters mostly shown in subordinate roles (*Moderate the discussion in such a way that children understand that the patriarchal role of a woman in today's society is still visible.*)
- Can you give as many examples of women from public and private life who are successful scientists, artists, leaders, etc.?
- Discuss in groups about what you think is "for girls/women", and what you think is for "boys/men". Is soccer boys-only, and dolls girls-only? Why do you think that? (*Moderate the discussion in such a way that children in the end understand that games, activities and jobs should not be chosen on the basis of sex, but on the basis of personal affinity and interests.*)

The goal of these questions and assignments is to build awareness on equal opportunities for boys and girls in any area of their interest, regardless of the traditional social frameworks and expectations.

# *ANNEX: TOOL FOR ASSESSMENT AND IMPROVEMENT OF LESSONS ACCORDING TO PRINCIPLES OF GENDER RESPONSIVE TEACHING*

## **Encouraging girls and boys to equally engage in the learning process**

- Are examples and assignments designed to be equally stimulating for both girls and boys (for example, all examples are about traditionally "boys" interests, such as weapons and cars)?
- Are the topics covered connected with the examples and issues from real life that are interesting to both girls and boys (for example, how an electric scooter moves, how a cell phone works)?
- Are there assignments encouraging both girls and boys to think and try out new ideas?



## What can I do?

If the examples and assignments are designed in a way that does not encourage girls and boys to engage in the learning process, you can try one of the following:

- Get children to find as many topics and issues that interest them, and together search for connections between the material and those topics and issues. For example, if they are interested in computer games, can we find lessons relevant for understanding the functioning of a game?
- Form mixed groups of boys and girls and discuss potential leaders of every group. Discuss the characteristics that a group leader should have, regardless of the leader's sex.
- Give children the following assignment: they themselves should identify an issue of interest to them and imagine as many possible, and impossible or unusual solutions to the issue. While they are working, observe and make sure that girls and boys are equally active in suggesting solutions.

The goal of these activities is to make both girls and boys interested in active engagement in the learning process.

# ANNEX: TOOL FOR ASSESSMENT AND IMPROVEMENT OF LESSONS ACCORDING TO PRINCIPLES OF GENDER RESPONSIVE TEACHING

## **Encouraging gender responsiveness through interaction with female and male students**

- What are my views on gender roles and expectations? How does this view of mine reflect on my teaching? Am I knowingly or unknowingly sending messages to children that a certain colour, game or occupation is good only for boys or only for girls?
- Do I talk with my students about gender roles, social expectations? Which part of my classes would be good for such a discussion?
- Do I react when a child shows gender roles prejudice and expectations (for example, if someone says that women are worse drivers, or that women belong in the house)? How could such a situation be used for a constructive discussion?
- Do I give enough examples and assignments encouraging engagement of every child in the active learning process?

## What can I do?

If you learnt from the answers to the above questions that there is room for improvement, you can try one of the following:

- Find or create an opportunity in your classes to initiate discussion on gender roles and expectations (for example, use the homeroom class for the discussion).
- With your personal example and clear attitudes explicitly demonstrate trust in the girls' and boys' abilities (for example, clearly emphasize that girls and boys are equally capable of learning and solving problems, particularly when it comes to natural science and art).
- Act clearly to publicly demonstrated prejudice and expectations (for example, if someone in class, even jokingly, says that "a woman's place is in the house", organise a discussion involving valid arguments that can challenge such an attitude).

The goal of these activities is that through personal example, views, and work, you clearly promote and encourage gender equality, as well as equal rights and options for all girls and boys.

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