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GENDER DISPARITIES IN PRIMARY AND SECONDARY EDUCATION IN THE EUROPEAN UNION: TRENDS, STRUCTURAL FACTORS AND INSTITUTIONAL CHALLENGES

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Abstract:
Gender disparities in primary and secondary education remain a key concern across the European Union, affecting educational outcomes and shaping future opportunities for girls and boys differently. This paper aims to provide a comprehensive, thematic analysis of gender disparities in compulsory education across the EU, focusing on trends, structural factors, and institutional challenges. By using descriptive statistics, secondary data sources (Eurostat, OECD PISA and PIRLS, Eurydice, UNESCO), and comparative policy analysis within a framework of educational science, the study explores regional, national, and European-level dimensions of gender inequality in education. It addresses variations in early school leaving, academic achievement gaps, STEM subject preferences, and socio-cultural influences. Special attention is given to examining the case studies of EU member states of Croatia and Sweden to illustrate diverse policy environments and contextual challenges. The primary objective is to identify key regional and socioeconomic factors that contribute to existing gender disparities and critically assess the strengths and weaknesses of current educational policies. The paper intends to highlight areas for targeted intervention, facilitate knowledge-sharing among EU member states, and inform policymakers and educators on strategies to promote equitable educational outcomes for all students.

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1. Introduction

As education is among the key factors for smart and inclusive growth, it has long been a cornerstone of the European Union's social and economic agenda. Since the 1970s, discussions on gender equality in education have largely centred on improving opportunities for women. By the 1990s, women in many countries had, to a certain extent, reached educational levels comparable to those of men, and soon after began to surpass some of them. In recent decades, this trend has resulted in a minor reversed gender gap, with women achieving higher educational attainment than the majority of men across much of the Western world and beyond (Stumbrienė *et al.*, 2025). Since the Maastricht Treaty (1992), education has been recognized as a European policy area, although initiatives such as the Erasmus Programme (1987) had already demonstrated EU involvement. The Lisbon Treaty (2000) and the frameworks "Education and Training 2010" ("ET 2020") strengthened this role by linking education to economic growth, social cohesion, and competitiveness. The "ET 2020" set EU-wide benchmarks on early school leaving, tertiary attainment, early childhood education, proficiency in basic skills, lifelong learning, and graduate employability, while remaining focused on general objectives rather than national practices (European Commission, 2020). Gender diversity and equality are explicitly integrated into the "ET 2020" framework as part of its core objectives on inclusion, equity, and active citizenship. The framework highlights the need to address gender gaps in education, particularly in early school leaving, academic performance, and subject choices, while also promoting more balanced participation in fields such as STEM. ET 2020 supports the exchange of good practices among Member States to reduce educational disadvantages and foster equal opportunities and implement responsibilities for both girls and boys at all levels of education.

This article undertakes a detailed comparative analysis of gender disparities within primary and secondary education. The strong focus is on national and regional dimensions, with particular attention to early school leaving, academic performance gaps, local area specificities, and socio-economic influences. Special emphasis is given to case studies of Croatia and Sweden as examples of contrasting educational systems and policy environments. The research makes extensive use of descriptive statistics, international secondary data sources (Eurostat, OECD PISA and PIRLS, Eurydice, UNESCO), educational development and didactics research, local reports, regional data and comparative policy analysis. Accordingly, the following specific research questions are addressed:

1) What gender disparities exist in primary and secondary education in the EU?
2) Which factors most significantly contribute to these disparities?
3) What policies and practices can address these gender inequalities?

The results of this analysis provide comparative data that could help governments and policymakers understand the strengths and weaknesses of their education systems, identify best practices internationally, and design reforms aimed at improving gender disparities in primary and secondary education.

The remainder of the paper is structured as follows. First, a frame of reference is presented with both EU policy and gender theoretical approaches. Thereafter, the method is described. The findings are presented in two parts from the perspective of (i) Croatia and (ii) Sweden. After the discussion, the paper is finalized with conclusions, policy implications and future research avenues.

2. Frame of References

2.1 Gender as a Social Construction

The field of research on gender is relatively young but rapidly growing. Gender can be an object to study in itself, but the research questions can be formulated in accordance with most human things and phenomena, which means that the field of research is extensive and complex (Swedish Research Council, 2004 and 2005).

Butler, with the book Gender Trouble (2007), contributes with tools for questioning the taken-for-granted norm system, that is, what is "*perceived to be natural*" based on unarticulated norms and discourses about gender. Gender theory contributes an important theoretical perspective for social work. In this paper, we define gender as the socially constructed factors that relate to how, for example, girls and boys and women and men are perceived to behave and act according to their biological sex. This means that "*a person's gender is not simply an aspect of what one is, but, more fundamentally, it is something that one does, and does recurrently, in interaction with others*"(West & Zimmermann, 1987, p.139).

2.2 Strategies for a Gendered Education System

The European Education Area (EEA) strategic framework was first endorsed by European leaders at the 2017 Social Summit in Gothenburg, Sweden, with the main idea to foster cooperation among EU Member States and to guide progress towards a common vision of inclusive and high-quality education. The EEA supports Member States (MS) in developing their national education and training systems in line with the shared priorities and strengthens transnational cooperation (European Commission, 2025). Central to this vision are a set of ambitious strategic targets for 25-34-year-olds by 2030, such as ensuring that fewer than 15% of 15-year-olds are low achievers in reading, mathematics, and science[ii], less than 15% of eight-graders should be low-achievers in

[ii] The indicator measures the share of 15-year-old students failing to reach level 2 ('basic skills level') on the PISA scale for the three core school subjects of reading, mathematics and science. The data stem from the Programme for International Student Assessment (PISA), which is a regularly conducted international survey which aims to evaluate education systems by testing the skills and knowledge of 15-year-old students (Eurostat, 2025a).

computer and information literacy, raising participation in early childhood education to at least 96%, reducing early school leaving to below 9%, and at least 45% of 25-34 year-olds should have a higher education qualification (Official Journal of the European Union, 2021). These goals, aligned with broader EU strategies, underscore the importance of education as a driver of democratic values, social cohesion, economic competitiveness, and equal opportunities.

While these benchmarks provide a roadmap for improving educational outcomes, they also highlight the need to examine persistent disparities - particularly those related to gender. Despite overall progress in access and attainment, differences between girls and boys remain evident across primary and secondary education in the EU, influencing not only academic achievement but also long-term opportunities in higher education and the labour market. Understanding these gendered dynamics is therefore crucial for assessing whether the EU is on track to achieve its educational objectives in an equitable and inclusive way. According to the *Gender Equality Strategy 2020-2025*, "*gender equality brings more jobs and higher productivity – a potential which needs to be realised as we embrace the green and digital transitions and face up to our demographic challenges*" (European Commission, 2020). A Union of Equality means that every individual - women, men, girls, and boys, in all their diversity - is valued and has an equal chance to reach their full potential.

According to the European Commission *EU Youth Report 2024,* it can be concluded that gender disparities in primary and secondary education still exist. While overall educational participation has risen, structural imbalances remain visible in both primary and secondary schooling, both among individual EU member states and by gender. In 2023, across the EU, young men were more likely than young women to leave education and training early, with a gender gap of 3.6% points (European Commission, 2024, p. 84). In 2024, the share among people aged 20-24 with less than primary or lower secondary level of education according to International Standard Classification of Education (ISCED) 2011 levels 0-2 – referred to as a low educational attainment level or low level of education - was 14.9% in the union of 27 EU member states (EU27). Even at the primary education level, a significant gender gap emerges with a 17.3% share for men and 12.3% for young women (Eurostat, 2025c). The attainment of at least an upper secondary qualification among young people aged 20-24 has been adopted as a supplementary indicator to the EU benchmark for early leavers from education and training (Eurostat, 2025b). In educational research and policy discourse, completion of upper secondary education is increasingly conceptualized as a critical threshold that secures the essential skills and competences required for labour market integration. In 2024, the average share of people aged 20-24 in the EU with at least an upper secondary and post-secondary non-tertiary education (ISCED levels 3 and 4) education was 84.3% (Eurostat, 2025c). More women than men have completed at least an upper secondary level of education. A higher proportion of women reached this level of education compared with men; 86.8% for women aged 20-24 and 81.8% for men in the same age group in 2024. The share for

women was higher than for men in all Member States except in Romania (Eurostat, 2025b).

The OECD report *Education at a Glance 2024* shows that girls and women consistently outperform boys and men in education across most available metrics. This includes higher test scores, grade repetition rates and better completion rates at both upper secondary and tertiary levels. The analysis of the results primarily refers to the outcomes of the PISA (Programme for International Student Assessment) test, a study conducted by the OECD every three years. PISA tests the skills and knowledge of 15-year-old students in mathematics, reading comprehension and science. International surveys show that boys are more likely to be poor performers in reading, whereas girls are more likely to be low achievers in mathematics in around one third of European education systems (Eurydice, 2020). The Progress in International Reading Literacy Study (PIRLS)[iii] - an international assessment conducted every five years since 2001 by the International Association for the Evaluation of Educational Achievement (IEA) - results lead to almost identical findings regarding gender disparities. While nearly all EU education systems participating in PIRLS 2021 performed above the international benchmark, none showed improvement compared to 2016, and the majority experienced a notable decline. Across all EU education systems, girls consistently outperform boys in reading competence, which was also observed in earlier PIRLS cycles. Those deteriorate results of PIRLS tests in 2021 in reading performance are mainly caused by the COVID-19 pandemic. Significant performance gaps remain linked to socio-economic status, and overall, to explain the ranking-wise added context, the highest-achieving education systems are not always the most equitable (European Commission, 2023).

According to the PISA 2018 results, the average gender gap in mathematics amounted to only 5 score points in favour of boys (as opposed to almost 30 score points in reading in favour of girls), on average across OECD countries (Encinas-Martín, Cherian, 2023, p. 23). Girls are also 28% less likely than boys to repeat a grade in primary and lower secondary school. Over the past two decades, girls have achieved remarkable progress in education. OECD data indicate that in nearly half of the countries examined, women are finally now more likely than men to attain an upper secondary qualification. Even in countries where men still hold an advantage, the gap has narrowed significantly since 2020 (Encinas-Martín & Cherian, 2023). The results from PISA 2022 show that the gender gap in mathematics performance did not change between 2018 and 2022 in most countries, typically because performance declined for both boys and girls. The gender gap narrowed the most (roughly 15 score points) in Albania and Baku (Azerbaijan) and widened the most (20 score points) in Israel, where girls' performance declined (by 15 score points), and boys' performance did not change (OECD, 2023).

This trend further extends to the tertiary level of education, because in all countries with available data, the gender gap in higher education completion often exceeds 10% points (OECD, 2024). Despite their higher educational achievement, not only young

[iii] The primary focus of PIRLS is to measure and compare reading literacy achievement among fourth-grade students (typically aged between 9 and 11) across different countries.

women continue to face significant disadvantages in the labour market (Pološki Vokić, *et al.*, 2019). The employment gap is particularly large for those who have not completed upper secondary education, where the employment rate for women (47%) is 25% points lower than for men. Even among women with a university degree, the employment rate of 84% is still 6% points below that of similarly qualified men (OECD, 2024). This injustice needs to be considered in the establishment of upcoming educational policy strategies, since it also contributes to the explanation to why girls at school are more motivated to manage their studies – and can be seen as a clue and part of the solution, when it comes to analyse why boys do not take responsibility to same amount for the school work, besides that this illuminate the gap in equity development among women and men nowadays.

The paper provides a general overview of gender disparities in primary and secondary education across the EU. Evaluating gender equality only at the national level can hide extreme situations, especially when disparities vary widely within a country. A subnational analysis, however, can reveal regions where gender gaps are most pronounced and highlight inequalities that demand targeted policy intervention (Aristovnik & Obadić, 2014; Stumbrienė *et al.*, 2025). Socio-economic status also continues to be a strong determinant of student achievement. It is essential to take family background into account, alongside gender, when providing support to underachieving children (Eurydice, 2010).

2.3 Gender Equality and Educational Patterns in the EU: Comparative Trends

The countries in the EU have, overall, a very good situation, focusing on how inclusive the education system is compared to global measurements. The 'HerAtlas' shows, for example, that countries in the EU have legally compulsory education, while unfortunately, several other countries outside the EU are not in the same favourable situation (UNESCO, 2025). The 'HerAtlas' bases the measurements on 12 indicators that capture factors in national legal frameworks that serve as drivers or barriers to the right to education for girls and women (UNESCO, 2025).

Also, the gender equality in general in the EU is positive in a global comparison. The World Economic Forum (2024) shows that Europe has the highest gender parity on the ranking list of global regions. Further, in a list of the top 10 countries with the highest gender equality, we find seven European countries. Four of them are the Nordic countries of Iceland, Norway, Finland, and Sweden (World Economic Forum, 2025).

Inside the EU, we also have reports on gender equality between the different countries.

The gender equality index gives the member state a score from 1 to 100, where 100 would indicate that a country has reached full equality between women and men (EIGE, 2025). The index is based on the following six core domains - Health, Knowledge, Money, Power, Time, Work and two additional domains – Violence against women, Intersecting inequalities, and 27 countries in the EU are ranked. The overall score for the EU is 71,0. The highest-scoring countries are Sweden (82,0), Denmark (78,8), the Netherlands (78,8),

Spain (76,7), Belgium (76,1), and France (76,1). The lowest scored countries are Romania (57,5), Hungary (57,8), Greece (59,3), Croatia (59,7), Czechia (59,9), and Slovakia (59,9).

The relation to education in the Gender Equality Index is, for example an indicator showing how many women or men fulfill different education steps in various education fields (EIGE, 2025). Trends in the EU show that, despite the positive position globally both in terms of (i) an inclusive education system and (ii) a favorable overall gender equality, there are still gender disparities in compulsory education. These disparities differ between higher-scored countries and lower-scored countries in relation to the gender equality index.

López-Martínez *et al.* (2022) show, for example, that the least equal countries are those that recently have joined the EU, together with some other southern countries such as Italy. Gender-based inequalities are also found among the former European communist bloc (Pirju *et al.*, 2024). Some of these countries have a more conservative view on gender factors, and this has implications also for the education system (Rédai, 2021).

A study of 27 European countries focusing on understanding how different social contexts moderate gender gaps in mathematics and reading in school confirms that the degree of gender equality in a country is positively related to girls' performance in mathematics (Bianchi *et al.*, 2025). Perceptions about performance in mathematics were studied in Kosovo's compulsory education (Mula & Sylhasi, 2024). Results show that around half of the 351 respondents believe that girls and boys perform equally well in both mathematics and reading. In addition, the other half favored boys as being more proficient in mathematics, which shows the existence of perceived stereotypes among the respondents (ibid.)

The trends in the EU that are seen in compulsory education also have consequences for the choices young women take in relation to Science, Technology, Engineering, and Mathematics (STEM) in higher education and STEM professions. For example, the renewable energy sector includes barriers for women entering the sector (Baruah, 2017; Hachem-Vermette, Ulvenblad, Garcia Melon, *et al.*, 2025). Overall, the gender disparity in the EU follows the same pattern as global measures – women are less represented in STEM education and professions than men. Beyond inspiring students to shape the world around them, STEAM (Science, Technology, Engineering, Art, and Mathematics) education fosters personalized, engaging, and creative learning, helping students innovate by integrating arts through an applied, transdisciplinary approach in the didactics and teaching methods for those four subjects.

3. Method

This study employs a mixed-method (Creswell, 2014) design combining descriptive statistical analysis of secondary data with comparative policy analysis. The approach is suited to the research objectives, which require both the systematic documentation of cross-national patterns and contextualised interpretation of institutional and policy environments. The use of secondary data is standard practice in comparative education

research (Eurydice, 2020; Encinas-Martín, Cherian, 2023) and is particularly appropriate when the unit of analysis spans 27 EU Member States and requires consistency of measurement across national contexts.

The primary data sources are: (i) Eurostat, providing harmonised EU-level and NUTS 3 regional statistics on early school leaving, upper secondary attainment, and enrolment disaggregated by gender and country; (ii) OECD PISA 2018 and 2022, used to assess gender gaps in reading, mathematics, and science among 15-year-old students; (iii) IEA PIRLS 2021, used to assess gender differences in reading literacy at primary level (Grade 4); (iv) Eurydice, which provides comparative structural information on European education systems, national policies, and gender equality measures; (v) UNESCO HerAtlas, used for a global contextualisation of EU legal frameworks on the right to education; and (vi) national statistical sources for Croatia (Croatian Bureau of Statistics - DZS) and Sweden (World Bank Gender Data Portal; Swedish National Agency for Education). These sources are triangulated where possible to cross-validate findings and mitigate the risk of single-source bias.

To the best of the authors' knowledge, this paper makes a distinct contribution to the literature by integrating three analytical dimensions that have typically been addressed in isolation: EU-wide comparative trend analysis, subnational regional analysis (NUTS 3 level for Croatia and regional data for Sweden), and a didactical perspective on educational policy. By combining quantitative secondary data from Eurostat, PISA, PIRLS, and Eurydice with comparative policy analysis and educational development research, the paper offers a multi-level framework that moves beyond national averages to reveal the heterogeneity of gender disparities within and across EU Member States. Furthermore, the parallel examination of Croatia - a post-transition economy with one of the EU's lowest early school leaving rates - and Sweden - a high-gender-equality Nordic country - illustrates that even in very different institutional contexts, structurally similar patterns of gendered subject choice and socio-economic mediation persist. This comparative design generates insights that are relevant both for countries at early and advanced stages of gender policy development.

4. Regional and Socio-economic Variations: Case Studies

4.1 National-Level Comparative Analysis – The Case of Croatia

Gender equality should be one of the fundamental principles of every educational system; however, numerous indicators reveal the persistence of significant differences in educational achievements and, consequently, in the choice of educational pathways between girls and boys. In Croatia, pronounced disparities exist in primary and secondary education and in the academic outcomes achieved by male and female students (Croatian Bureau of Statistics, 2024). Nevertheless, the past decades have shown a marked positive trend indicating an increasing orientation towards the education of girls in general (Table 1).

More than sixty years ago, 92.4% of women had attained only primary education or less, while the share of men with the same level of education was 77.8%. Although both genders showed a high proportion of individuals with primary or lower levels of education, the gender gap was evident. Over the years, there has been a strong positive trend in reducing the number of persons whose highest level of education is primary school; in 2021, 24.9% of women and 15.3% of men had completed this level. That year also marked the smallest educational attainment gap between men and women, reflecting broader social changes.

Table 1: Population aged 15 and over, by educational attainment and sex (Croatian Bureau of Statistics, 2024)

	Basic education or less, %			Upper secondary education, %			Higher education, %		
	Total	Women	Men	Total	Women	Men	Total	Women	Men
1961.	85,6	92,4	77,8	12,6	6,8	19,4	1,8	0,8	2,8
1971.	75,9	84,3	66,6	20,5	13,4	28,4	3,6	2,3	5,0
1981.	65,1	73,8	55,5	28,5	21,3	36,4	6,4	4,9	8,1
1991.	54,0	61,7	45,5	36,5	30,3	43,4	9,5	8,0	11,1
2001.	40,6	48,3	32,2	47,4	40,5	55,0	12,0	11,2	12,8
2011.	30,8	37,2	23,8	52,6	45,9	60,0	16,4	16,7	16,0
2021.	20,4	24,9	15,3	55,5	49,3	62,4	24,1	25,7	22,2

A similar pattern can be observed in secondary education. In 1961, only 6.8% of women had completed secondary school, compared to 19.4% of men. By 2021, 49.3% of women had attained secondary education as their highest level, compared to 62.4% of men (Croatian Bureau of Statistics, 2024). These figures, together with data on the share of illiterate persons (Figure 1), clearly indicate a growing inclusion of women in education and an overall shift in educational attainment patterns, reflecting broader transformations in career choices during the observed period.

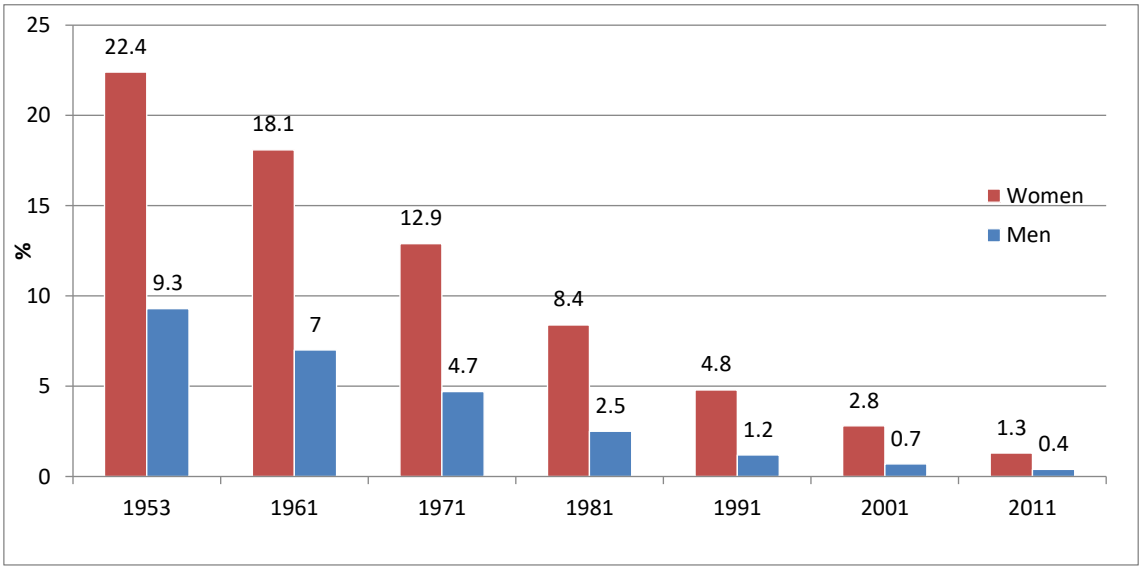

Figure 1: Share of illiterates, aged 10 and over (Croatian Bureau of Statistics, 2024).

Women make up 49.2% of all secondary school students, but their distribution across educational tracks is highly uneven (Figure 1). They constitute 62.9% of students in general education (gymnasium) programs and as many as 75.6% in arts schools, while they represent only 29% of students in vocational and industrial programs (Croatian Bureau of Statistics, 2024). Conversely, men dominate technical and vocational tracks (71%), while they are least represented in arts programs (24.4%) and gymnasiums (37.1%).

Table 2: Graduates from upper secondary school, by type of school, school year (Croatian Bureau of Statistics, 2024)

	Total	**Women**	**Men**	**Sex distribution, %**	
				Women	**Men**
	2022./2023.				
Total	37 259	18 313	18 946	49,2	50,8
Grammar schools	10 776	6 781	3 995	62,9	37,1
Technical and related schools	16 729	8 160	8 569	48,8	51,2
Art schools	1 075	813	262	75,6	24,4
Industrial and craft schools	8 379	2 432	5 947	29,0	71,0
Upper secondary schools for disabled youth	300	127	173	42,3	57,7

This horizontal segregation within the education system may be linked to persistent stereotypes about "male" and "female" professions and to societal expectations influencing career choices. The European Commission's *Education and Training Monitor* (2024) indicates that girls in Croatia more often choose fields such as biomedicine, healthcare, and social sciences, while boys tend to prefer engineering, computing, and technical fields.

When it comes to the results of the PISA assessment, it is evident that Croatian 15-year-olds perform below the OECD average in all measured categories: science, reading, and mathematics (PISA, 2018; Denoël *et al.*, 2017). However, gender differences are particularly pronounced in reading literacy: girls outperform boys by an average of 34 points, equivalent to roughly one year of schooling (OECD, 2023). The share of students below the basic proficiency level in reading is 16% among girls and 29% among boys, while the proportion of top performers (levels 5 and 6) is twice as high among girls (5% compared to 3%).

In mathematics and science, gender differences are not statistically significant on average, but the distribution patterns differ: among top performers, boys slightly outnumber girls, suggesting that boys more often reach higher levels of competence, while girls tend to achieve more consistent but less extreme results. Similar patterns are found in most other European countries.

Within the national school system, these differences are further reflected in other indicators of success. More than 60% of all grade repeaters in primary schools are boys, despite representing less than half of the total student population (DZS, 2024).

Gender disparities in education in Croatia stem from a combination of different factors. Although biological differences in ability between boys and girls are minimal, distinct patterns appear in self-perceived competence and interests. Girls often exhibit lower self-confidence in mathematics and technical subjects, even when their actual performance equals that of boys. This lack of confidence can lead to self-selection and avoidance of STEM fields, which subsequently affects career choices and labor market outcomes (Jugovic, 2017; Ghasemi & Burley, 2019; Adamecz *et al.*, 2023; Whitcomb *et al.*, 2020).

Conversely, boys are often exposed to lower academic expectations at an early age and show less motivation for reading and verbal activities. PISA results confirm that the gender gap in reading proficiency in favor of girls emerges early in adolescence, partly due to an educational environment that—often unintentionally—places greater emphasis on verbal and social skills than on spatial and mechanical ones (Denoël *et al.*, 2017).

Cultural factors further reinforce these differences. The Croatian education system is highly feminized: according to the CBS, 81.8% of primary school teachers and 74.9% of gymnasium teachers are women (CBS, 2024). This gender imbalance among teachers is not inherently negative; however, some scholars argue that it may reduce the visibility of male role models in early education, potentially affecting boys' motivation and identification with the learning process.

When it comes to the early school leaving rate, Croatia remains among the lowest in the European Union—only 2.0% in 2024, compared to the EU average of 9.5% (Eurostat, 2025d). However, this indicator also has a gender dimension: boys are more likely to leave education before attaining a secondary qualification, which is linked to lower primary school performance and a higher propensity to enter the labor market early. Leaving education prematurely has long-term consequences for both individuals and society since early leavers predominantly aren't employed (*Early leavers from education and training*, Eurostat, 2025d), with Croatia being ranked the third EU country with the highest share of unemployed early leavers – 80%.

In 2023, across the EU, young men were more likely than young women to leave education and training early, with a gender gap of 3.6 percentage points. The widest differences were recorded in Italy (5.5 pp) and Germany (4.8 pp). Romania was the only country where the pattern was reversed, as slightly more young women left education and training early than men (0.2 pp). In Croatia, the gender gap was 1.5 pp and in Sweden 2.4 pp, (European Commission, 2024, p. 84).

These patterns of gendered educational outcomes highlight the need for systemic and policy-level interventions. Understanding the roots of such disparities is therefore essential for designing effective strategies aimed at promoting equality and inclusiveness within the Croatian education system. To reduce inequalities and promote equal opportunities across genders, as well as to counter gender stereotypes, Croatia has adopted several strategic policy documents addressing gender equality in education. The most notable are the *National Plan for Gender Equality up to 2027* and the *National Plan for the Development of the Education System 2021–2027*, which focuses more broadly on

structural reforms such as increasing access to early and preschool education and the modernization of the educational system.

In 2024, the average share of people aged 20-24 in the EU with at least an upper secondary and post-secondary non-tertiary education (ISCED levels 3 and 4) education was 84.3%. The EU countries with the lowest shares were in Spain, Denmark and Germany, all below 80%. The highest shares were in Croatia (97,7%), Ireland and Greece, where it stood above 96%, and in Sweden, 89.3% (Eurostat, 2025c).

4.2 Regional Disparities in Educational Achievement in Croatia

Regional variation in educational achievement by gender represents a critical dimension of the broader study of equality of opportunity in Croatian compulsory education. Notwithstanding Croatia's position as a European Union (EU) member state with one of the lowest early school leaving (ESL) rates (2% in 2024), pronounced regional and gender-based disparities persist (Figure 1). These disparities are exacerbated by differences in educational infrastructure, economic development, and social attitudes at the county (NUTS 3[iv]) level. Understanding such geographical and gendered inequalities is essential for constructing targeted educational policy and achieving the EU's strategic objectives for social and economic cohesion (European Commission, 2025). The present analysis systematically explores county-level differences in key educational outcomes—focusing particularly on gendered trajectories—using recent national and international sources.

International large-scale assessments, notably the PISA survey, offer robust insight into the regional distribution of academic achievement. In PISA 2018, the average performance of 15-year-olds in mathematics and reading varied markedly between countries. The City of Zagreb (Grad Zagreb) exhibits the highest average scores (over 502 points), suggesting a considerable advantage over Ličko-senjska County, which is the lowest performing with an average of around 397 points (PISA, 2018; NCVVO, 2020). Northwest counties, including Međimurska and Krapinsko-zagorska, also outperform their eastern and central Croatian peers (NCVVO, 2020; Eurostat, 2025c).

Such differences are indicative of deeper structural issues. Urban and coastal counties tend to benefit from better economic prospects, school infrastructure, and teacher recruitment, favouring higher academic performance for all students regardless of gender (DZS, 2024; Eurostat, 2025c). Conversely, counties with pronounced depopulation and economic stagnation, particularly those across Slavonia and some mountainous areas, face multifaceted challenges, reflected in lower PISA scores.

[iv] The NUTS classification (Nomenclature of Territorial Units for Statistics) is a system for dividing the economic territory of the European Union for the purpose of collection, development, and harmonisation of regional statistics in Europe, as well as for socioeconomic analysis and comparison. The NUTS Levels are the following: (i) NUTS 1: major socioeconomic regions, (ii) NUTS 2: basic regions for the application of regional policies, (iii) NUTS 3: small regions for specific diagnoses (http://ec.europa.eu/eurostat/web/nuts/overview).

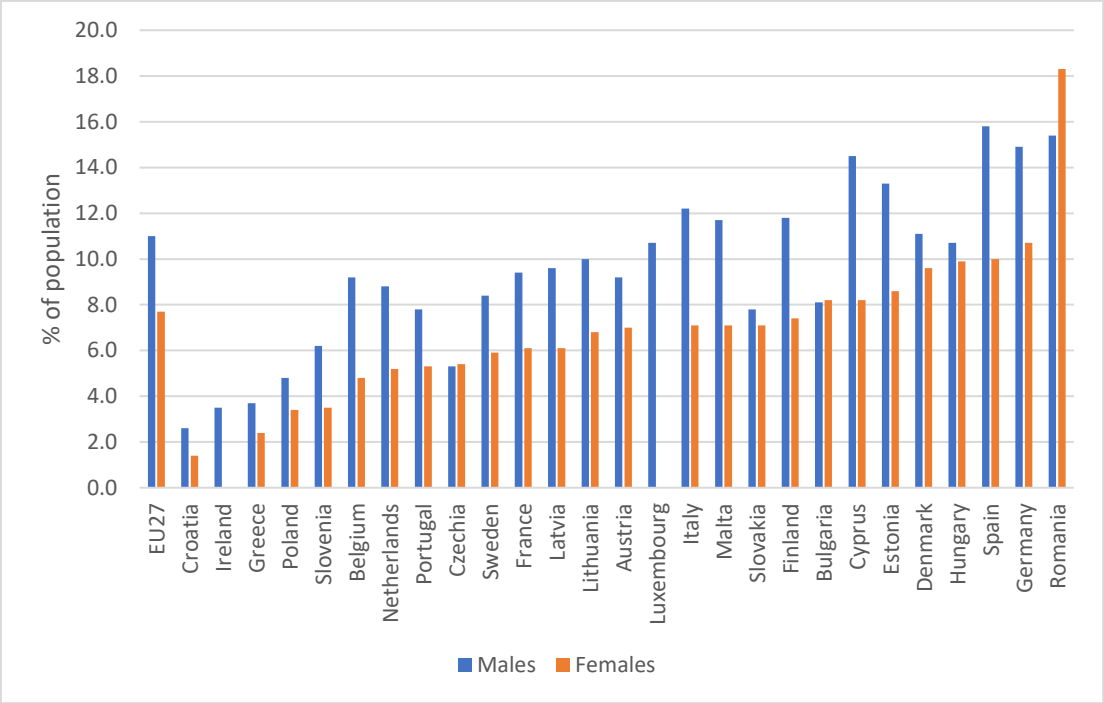

Figure 2: Early leavers from education and training (% of population) in 2024 (Eurostat, 2025c)

4.3 Gendered Educational Patterns in Croatia

Gender gaps in educational outcomes are evident throughout Croatian compulsory schooling. National statistics repeatedly show that girls outperform boys in reading and overall academic achievement at both primary and secondary levels (OECD, 2024; DZS, 2024). In contrast, gender differences in mathematics are smaller and often favour boys, yet this gap has narrowed over recent cycles of assessment (OECD, 2024).

Upper secondary and tertiary attainment demonstrates a clear female advantage: women are now more likely than men to complete both levels, with the latest data showing women constituting nearly 58% of higher education students (DZS, 2024). However, strong regional variation exists beneath these figures, with the female advantage most pronounced in developed, urban counties. In contrast, traditional gender norms, mobility barriers, and limited programme choice exert a stronger influence in rural and economically deprived regions (DZS, 2024; European Commission, 2024).

Significant gender segregation persists within secondary educational tracks (DZS, 2024). Girls predominantly enrol in gymnasiums (general academic high schools, 63%) and arts schools, whilst boys are overrepresented in vocational and technical schools (up to 71% in industrial/craft tracks). In rural counties where gymnasium places are limited, the lack of access to academic pathways disproportionately affects ambitious girls (PISA, 2018). This dynamic is reinforced by social expectations and economic pressures that encourage boys' earlier entry into the labour market, particularly in deindustrialising and agricultural regions (DZS, 2024; NCVVO, 2020).

Croatia's ESL rate is amongst the lowest in the EU for both genders, but the male-female gap persists (men: 10.9%, women: 7.7%), with the difference slightly less pronounced at the county level than in comparable EU contexts (Eurostat, 2025c).

Counties with high unemployment and demographic decline also exhibit elevated ESL rates, especially for boys, further restricting future educational mobility (European Commission, 2024).

The counties of Slavonia – Osječko-baranjska, Vukovarsko-srijemska, Brodsko-posavska, Požeško-slavonska, and Virovitičko-podravska – exemplify the accumulative disadvantage of regional and gendered barriers. These counties lag behind in nearly all educational and labour market indicators and face intersecting issues of poverty, depopulation, and unequal access to quality schooling. For girls, traditional expectations regarding family and care roles further reduce the likelihood of participating in upper secondary and tertiary education (European Commission, 2024; DZS, 2024).

Coastal counties (Primorsko-goranska, Istarska) and the City of Zagreb benefit from more diverse educational provision and a modernised labour market. Female students in these regions have higher-than-average tertiary completion rates, although occupational gender segregation is still evident in university and vocational programme choices (DZS, 2024; OECD, 2024). Internal migration also plays an important role: for instance, more than half of students from Zagrebačka county move to Zagreb for secondary education, with girls more likely to seek academic advancement in urban settings (Jutarnji list, 2025).

Economic prosperity, demographic structure, and school infrastructure are tightly linked with regional educational outcomes (DZS, 2025; European Commission, 2025). In rural and deindustrialised counties, families frequently prioritise sons' immediate employment or daughters' domestic roles over continued education. Additionally, minorities, especially Roma populations concentrated in Međimurje and eastern regions, experience acute interaction effects, with only one in three Roma women completing secondary education and NEET (Not in Employment, Education or Training) rates exceeding 80% (World Bank, 2020).

To address the dual challenge of regional and gendered educational inequality, multi-level interventions are essential. These may include: (1) targeted investment in school infrastructure and teacher recruitment in underperforming counties; (2) digital education platforms designed for rural populations sensitive to both gender and minority group needs; (3) policy frameworks for gender-sensitive curriculum design and support for girls' STEM participation; (4) robust monitoring and data collection, with regular impact evaluations disaggregated by region and gender (DZS, 2024; OECD, 2024). Only through coordinated, evidence-based policy can Croatia move towards both regional cohesion and gender equality in educational outcomes.

4.4 National-Level Comparative Analysis – The Case of Sweden

Sweden's Human Capital mirrors gender disaggregation components in socio-economic data. The Human Capital Index (HCI) shows that a child born in Sweden today will be 80% as productive when she grows up as she could be if she enjoyed complete education and full health. This conveys the productivity of the next generation of workers, which, when compared worldwide, is expected to be 56%, on average (World Bank, 2020). This

is higher than the average for Europe. In Sweden, a child who starts school at age 4 can expect to complete 13.9 years of school by her 18th birthday. When it comes to differences across gender in Sweden, the HCI for girls is higher than for boys. In Sweden, there are not sufficient data to disaggregate HCI by socio-economic groups, but data shows gender disaggregation for the components; *Expected Years of School* which are 14.0 for boys and 13.9 for girls, *Harmonized Test Scores* which are 512 for boys and 527 for girls, and *Learning-adjusted Years of School* which are 11.4 for boys and 11.7 for girls (Sweden Human Capital Index Worldbank/Sweden, 2020).

Academic achievement gaps, subject preferences, and socio-economic influences are recognised in Sweden. STEM education in Sweden exists for students from their initial engagement with compulsory education at the age of 6, and is during nine years mandatory and cohesive for all students until they enter upper secondary level. The importance of STEM education is highlighted through the impact of STEM on the Swedish economy and can be further seen through government investment in STEM-related research activity, according to Hartell and Buckley (2022). They also emphasize that "STEM education in Sweden predominantly relates to a teacher supply shortage, gender differences in performance and STEM uptake, and the refinement and updating of STEM education provision in response to societal needs" (Hartell & Buckley, 2022, p. 306).

Swedish female students continue to outperform male students in compulsory school. Hartell and Buckley (2022) provided data illustrating that female students outperformed male students in virtually all subjects in both years 6 and 9 in compulsory education in the 2020/21 academic year. Year 9 performance impacts eligibility for programs in upper secondary level and thus is considered high stakes. In the 2020/21 academic year, female students outperformed male students in all but the Physical Education and Health subject. This grade distribution was the same for the 2019/20, 2018/19, and 2017/18 academic years. In the 2016/17 academic year, female students outperformed male students on average in every subject, including in the Physical Education and Health subject. According to Hartell and Buckley (2022), this is of special interest as "*there is often a narrative that males outperform female students in STEM education, but as these subjects are mandatory for all Swedish students,* it *is particularly insightful as there are no confounding factors associated with selecting into STEM education influencing these results*" (Hartell & Buckley, 2022, p. 355).

It is time for ethical aspects, critically assessing the weaknesses of current educational policies for a change in the narrative. Innovative practical interventions ought to increase and equalize motivation and engagement in STEM for both boys and girls. Cultural stereotypes contribute to educational inequities, but scientists, educators, and policymakers should work together to make a difference to reduce stereotyping and boost girls' interest in STEM as in and via integrated teaching methods for the subjects Science, Technology, Engineering, Art, and Mathematics in STEAM projects (Nordén, 2024b). In each section, the project participants need guidelines to be able to link scientific findings with educational applications. By relying on research and in an effort to build a

bridge between psychological science, ethics, educational science, educational didactics and educational practice and policy (Master & Meltzoff, 2016; Nordén, 2024b). Dissemination of the research-based guidelines as an ethical and mutually beneficial ground for further development of procedures for equality in gender representation in the governing and advisory bodies of the STEAMBRACE project (Nordén,, 2024b) should be highlighted and transparent (cf. FEB's Gender Equality Plan 2022-2025). In other words, it is time to critically assess the strengths and weaknesses of current educational policies, by starting to address ethical aspects to teachers and parents and above all, changing the narrative.

4.5 Regional Disparities in Educational Achievement in Sweden

When it comes to identifying key structural and institutional factors that contribute to existing gender disparities and critically assessing the strengths and weaknesses of current educational policies, Angervall and Simonsson (2025) have found that the dominating discourse about internationalisation in Swedish higher education give base to the justification of contemporary academic structures, meritocracy, competition, and individualisation. Autonomously, these findings shed light on the re-contextualisation between internationalisation and gender discourses on governmental and local policy levels, at least partly reinforcing a gender divide in the academic structure and career by, for example, emphasising generic and gender 'neutral' definitions of international relations, or work opportunities rather than stressing variance or local conditions. The prevailing gender divide is thereby legitimised.

Geopolitical affiliation constrains academics from both claiming and gaining 'epistemic authority', when various 'knowers' are distinguishing the credibility in academic bodies as being a 'knowledge worker' or a 'knowledge producer'. Angervall and Simonsson (2025) conclude that even though national policy refers to the importance of local autonomy and local context, and the university (e.g. tertiary education) explicitly addresses the need for faculties and departments to routinely include international collaboration and exchange in all their work, the hegemonic nature of these discourses is strong. For example, by repeating the importance of internationalisation in terms of how it generates rewards, reputation, and a higher level of knowledge, a strong base for academic competitiveness is emphasised on all levels. A comparable image is rendered in recent years of EU documents on higher education (Chang Rundgren *et al.*, 2019), which signals how these discourses create tensions also globally.

However, tensions become evident in the local university strategy when national discourses collide with departmental needs and resources, according to Angervall and Simonsson (2025). The governmentality behind departmental policy on internationalisation is that it seems to mostly include staff who represent the notion of the successful "career subject", even though these career subjects are rare in the department. "*In national university contexts, these career subjects are often described as established researchers (often male) who are already part of the international community with external research funding rather than someone with rare opportunities to obtain external funding,*

who is heavily involved in caring responsibilities and teaching workloads" (Angervall & Simonsson, 2025, p.14).

Geopolitical belonging and social background both interact with and condition academics' access to, and use of – a not equally distributed – resource, inherently issues of power (Stromquist, 2007). A Swedish/Portuguese study analyses institutional resistance to gender equality initiatives in academic institutions in Sweden and Portugal. The results illustrate how, in Swedish academic institutions, with their relatively strong formal institutional support for gender equality, institutionalised resistance to gender equality initiatives has been identified in an unwillingness to recognise the needs and take responsibility for the necessary change (Petersen *et al.*, 2022).

4.6 Gendered Educational Patterns in Sweden

The gender data landscape highlights opportunities for enhancing gender equality outcomes in Sweden to support productivity and wealth gains, reduce poverty and increase shared prosperity. Stronger and more resilient human capital highlighted are *Learning poverty: Share of children at the end-of-primary age below minimum reading proficiency* (2021): Female 4.18 % resp. Male 6.35 %; and *School enrollment, tertiary* (2022): Female 108 % resp. Male 62.3 % and *Female share of graduates from STEM programs, tertiary* (2017) 35.5 %. Finally, *Share of youth not in education, employment or training* (% of youth population) Female 5.14 % resp. Male 5.08 % in the year 2023 (World Bank, 2025-09-28). Sweden is part of the Europe and Central Asia (ECA) region and a high-income country as classified by The World Bank Group (World Bank, 2025-09-28). For girls and women, digital connectivity can unlock and accelerate access to finance and jobs. By increasing access to technology for inclusion and using digital solutions to address barriers to female entrepreneurship, valuable toolkits may be developed, according to the *World Bank Group Gender Strategy 2024-2030.*

Gender stereotypes are limiting the STEM careers for girls and women within the EU, as well as worldwide. According to Starr & Simpkins (2021), adolescents and socializers may believe that males and females have equal abilities, but hold other stereotypes that are limiting to girls and women, such as the stereotype that females are less suitable for careers in STEM (Cheryan *et al.*, 2015), are less interested in STEM (Master & Meltzoff, 2016), or that to be successful in STEM you have to be a genius (which is often viewed as incongruent with women and girls).

In a nationally-representative, longitudinal sample of high school students, their parents, and their teachers, Starr & Simpkins (2021) investigated the prevalence of math and science gender stereotypes among high school students, their parents, and teachers, and changes in gender stereotypes among adolescents from 9 to 11th grade in the U.S.A. According to Starr & Simpkins (2021), few studies have investigated explicit gender ability stereotypes among adolescents in relation to their math and science identities, and in turn, outcomes such as advanced coursework. Explicit stereotypes are conscious stereotyped beliefs that a person holds (e.g., believing that men are better at math than women). Conversely, implicit stereotypes are automatic and often unconscious

associations that people quickly make (e.g., more quickly matching a picture of math equations to a man when compared to a woman). It is valuable to explore the relation between explicit stereotypes and identity because they are conceptually different from implicit stereotypes and may relate to different outcomes. The unconscious central socializers´ stereotypes work as intruders in adolescents' identities.

Another complementary theory, which has frequently been used to explore social factors related to gender differences in science and math, is situated expectancy-value theory (Eccles & Wigfield, 2020). According to this theory, identifying with a domain, for example, seeing oneself as a math person, is an important contributor to individuals' academic and career outcomes. These self-perceived social identities are influenced by individuals own beliefs, such as an adolescent's gender stereotypes, as well as their socializers' beliefs (for instance, parents' gender stereotypes). Two central socializers of adolescents' academic-related beliefs, including gender stereotypes, are their parents and teachers. Thus, parent and teacher gender stereotypes should predict adolescents' gender stereotypes, and in turn, predict their science and math identities, which should be strongly considered in the design and when conducting various parts of the STEM education in general, and the STEAMBRACE project (Nordén, 2024b), in particular.

To ensure lifelong learning for sustainable development and achieve a transition to a sustainable society, Education for Sustainable Development (ESD) must be a fundamental part of formal, informal, and non-formal education (Nordén, 2024a). ESD concerns everyone: government agencies, civil society organizations, and local communities. It is, therefore, incorporated into regulations at all levels of the Swedish education system. Education should promote the development and learning of all children, as well as a lifelong desire to learn. It must also instill respect for human rights and democracy and promote gender equality (Nordén, 2024a). ESD lays the foundation for active participation in civic life by explaining how society's different functions and people's ways of living can adapt to promote sustainable development. ESD must be available throughout life through formal, informal, and non-formal learning opportunities. ESD is incorporated into governing documents at all levels of the Swedish education system, including the curriculum for the compulsory school and the Swedish Higher Education Act. Children and young people have a critical role in the implementation of the 2030 Agenda, both in formal and informal learning environments (Nordén, 2024a). The National Council of Swedish Youth Organizations works to strengthen the participation of young people in decision-making processes related to the 2030 Agenda. The target for SDG 4.7 is to ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, the promotion of a culture of peace and nonviolence, global citizenship, and appreciation of cultural diversity, according to Nordén, (2024a). Academia provides new knowledge and tools through research and cross-sectoral collaboration (Government Offices of Sweden, Goal 4: Quality Education, 2015).

5. Discussion

This study addressed three core research questions: (1) What gender disparities exist in primary and secondary education in the EU? (2) Which factors most significantly contribute to these disparities? and (3) What policies and practices can address these gender inequalities? The comparative analysis across EU Member States, supported by detailed case studies of Croatia and Sweden, demonstrates that gender gaps are shaped by a combination of socio-economic conditions, school-level practices, regional disparities, and entrenched social norms regarding subject choice and career pathways. By synthesising EU-level indicators, national datasets, and international assessments, the results provide comparative evidence that can help governments and policymakers identify strengths and weaknesses within their education systems, recognise successful international practices, and design targeted reforms aimed at reducing gender disparities in primary and secondary education. Since this is not enough, didactical research needs to be recognised to be applied for educational "deep learning" development and increased understanding of the motivating factors and parameters influencing encouragement at schools and among teachers, parents and pupils to avoid the lack of responsibility among boys – and girls (Öhman & Sund, 2021).

With respect to *the first research question* — what gender disparities exist in primary and secondary education in the EU? — the evidence consistently shows that girls outperform boys in reading and overall academic achievement across virtually all EU Member States and at both primary and secondary levels. Boys maintain a marginal and statistically often non-significant advantage in mathematics, which has further narrowed in recent PISA cycles. Boys are significantly more likely to leave education early: the EU-wide gender gap in early school leaving stood at 3.6 percentage points in 2023, a pattern evident in all Member States except Romania. Girls are also less likely to repeat a grade and more likely to complete upper secondary education on time. Conversely, girls remain underrepresented in STEM tracks at the upper secondary level, while boys are concentrated in vocational and technical pathways. These patterns are observed in both Croatia and Sweden, despite their different overall gender equality standings, confirming that subject-based gender segregation is structurally embedded across diverse European educational systems.

Addressing *the second research question* — which factors most significantly contribute to these disparities? — the analysis identifies four interconnected clusters of drivers. First, socio-economic status and regional development are strong mediators: in Croatia, the PISA score gap between the highest- (Zagreb) and lowest-performing counties (Ličko-senjska) exceeds 100 points, and early school leaving is concentrated in economically depressed, rural, and depopulating regions of Slavonia. Second, cultural norms and gender stereotypes reinforce subject choice segregation and shape self-efficacy beliefs, particularly in mathematics and STEM fields, with parents and teachers identified as key transmitters of such stereotypes to adolescents (Master & Meltzoff, 2016). Third, institutional track structures — especially early vocational streaming —

interact with gender to consolidate occupational segregation: in Croatia, boys constitute up to 71% of industrial and craft vocational tracks, while girls dominate gymnasium enrolment. Fourth, national and regional policy environments moderate the magnitude of these gaps: Sweden's comparatively stronger formal gender equality framework reduces — but does not eliminate — STEM subject gaps, while countries with more conservative gender norms, particularly among EU post-transition economies, exhibit wider and more entrenched disparities.

On *the third research question* — what policies and practices can address these gender inequalities? — the comparative analysis of Croatia, Sweden, and EU-level frameworks suggests that effective interventions need to operate simultaneously at multiple levels. At the system level, gender-sensitive monitoring frameworks — with indicators disaggregated by gender, region, and socio-economic background — are a prerequisite for evidence-informed policymaking; the current EU Education Area framework lacks explicit targets for STEM gender parity and citizenship education. At the school and curriculum level, inclusive approaches to STEM and STEAM education that challenge cultural stereotypes from the earliest stages of compulsory schooling show promise, as evidenced by the Swedish experience with mandatory, gender-neutral STEM instruction and projects such as STEAMBRACE (Nordén, 2024). At the regional level, targeted investment in school infrastructure, teacher supply, and digital learning platforms in underperforming regions is essential for reducing the overlap of regional and gender disadvantage, particularly in areas facing demographic decline. Finally, engaging parents and teachers in gender-awareness programmes is a cost-effective lever for reducing the intergenerational transmission of subject stereotypes. The value of mutual learning across EU Member States — particularly between high-equality and lower-equality contexts — should be institutionalised within the European Education Area framework to facilitate the transfer of effective practices.

In most EU Member States, gender gaps emerge from the earliest stages of schooling: girls' advantage in reading proficiency is substantial and consistent across international assessments, whereas boys' advantage in mathematics remains small and often statistically insignificant. These asymmetrical gaps underpin persistent differences in grade repetition, early school leaving, and track selection observed in Croatia, Sweden, and the wider EU. International assessments such as PISA and PIRLS confirm these patterns, with reading proficiency showing the widest gender gap in favour of girls. Girls are more likely than boys to complete upper secondary education on time and to achieve higher grades. Boys are consistently more likely than girls to leave school early, with the gender gap evident in almost all European Member States. Although early school leaving rates have decreased overall in the past decade, there are needs to understand this situation even more, particularly among students from disadvantaged socio-economic backgrounds and migrant families. Girls remain underrepresented in STEM tracks at the upper secondary level, while boys are less likely to pursue languages, humanities, and health-related fields. These patterns reinforce later gender segregation in tertiary education and the labour market (Cf. European Commission, 2025, pp. 17-18).

6. Conclusions, Policy Implications and Future Research Avenues

Based on this study, there are needs to continue to emphasize the importance of studying and analysing how natural science and technology, popularly referred to as STEM (science, technology, engineering, and mathematics), and gender are constructed and learn the established interdependencies. Although the equality in Europe is in a more favourable situation in comparison with several other countries, there are still calls for improvements in terms of both (i) the creating of awareness for and (ii) the reduction of socially constructed gender stereotypes. This is important since it has implications for girls' and boys' education and professional choices.

This study shed light on limitations preventing the full realisation and monitoring of impact and reforms in gender education and skills. The European Commission is committed to supporting the continuous improvement of the European education area and its strategic framework (European Commission, 2024). This is needed to ensure awareness of the urgency in the gender perspectives within the education and gender training community, to be mobilised in driving the necessary change promoting Europe's competitiveness, social cohesion, preparedness and democracy. Policy recommendations for education system change and improvement within gender disparities in academic achievement should therefore make extensive use also of research on educational development content and processes, teaching and learning didactics, and focus on STEM and STEAM, in particular.

Gaps hamper evidence-informed policymaking must thereby be focusing and tracking reforms and in informing EU-level cooperation and mutual learning. Still, such targets are according to European Commission (2024) missing for some key longstanding or emerging priorities (e.g. STEM, equity, citizenship skills). Evidence of national reforms following up on EU initiatives remains scattered. EU-level monitoring in any open method of coordination requires systematic evidence of the outcome and impact of national policies in response to flagship EU initiatives. Such evidence would be needed for the European Education Area (EEA) to live up to its full potential to support evidence-informed policy (European Commission, 2024) through mutual learning and to inform a smart combination of available EEA implementation instruments. The knowledge gained from the EU-level monitoring can feed into a stronger evidence base and the EU-27 Recommendation on human capital, which would help to guide investments in education and skills and link EU funds to structural reforms (European Commission, 2024).

Filling knowledge gaps, a successful knowledge broker between policy, evidence and education is needed to fulfil the request for indicators in the areas of equity, the teaching profession, and learning for sustainability. To focus and steer the policy debate for the 2026-2030 cycle, discussion is needed on bringing together the sectoral targets of the EEA 2021-2025 cycle and the thematic targets of the Union of Skills. The Council review could consider completing the set of targets with two new EU-level targets on equity and citizenship education. This would help to recognise their crucial role in promoting basic skills and quality, inclusive education (European Commission, 2025).

Accordingly, this research stresses the need for EU and national education systems to tackle both boys' underachievement in basic skills (three core school subjects of reading, mathematics and science) and girls' underrepresentation in STEM. It calls for gender-specific teaching, early interventions to support struggling students, and initiatives that challenge stereotypes in subject choices. Ensuring equal opportunities in education is presented as essential for reducing later labour market inequalities.

Future research avenues could include studying a broader community, as some are seldom represented in contemporary research. Further, we hope that this study can inspire reflection on flexibility concerning methodology. On multiple occasions, we found it highly beneficial to adapt our methodology and approach when working on this study by letting the method unfold along the way, instead of controlling and adjusting it to fit an original strategy, which meant that the gender disparities experienced were opened up more through the mixed-method applied. In addition, it would be relevant to explore specific examples pertaining to the gendered history of STEM in order to analyze and understand current practices in research and development across multiple fields. Using historical, sociological, cultural, sustainable, and philosophical aspects of the shaping of STEM, participants are challenged to look at their own role as policy makers, educational developers, researchers and the current paradigm in STEM.

This study has some limitations. One limitation is that the term gender disparities as related to gendered education in this study covers multiple services, and the term was open to interpretation among the references used in the various contexts. Another limitation is that the data analysis material (two countries) was a relatively heterogenous choice in terms of representation of gender equality and socioeconomic context.

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