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Abstract: Achieving the targets and indicators outlined in Sustainable Development Goal 4 (SDG 4) presents significant global challenges, particularly in countries like Serbia, where diverse socio-economic contexts and policy planning shape educational outcomes. SDG4 focuses on providing inclusive and fair access to quality education for everyone and encourages lifelong learning opportunities for people of all ages. It comprises ten specific targets. This paper focuses on the complexities and challenges associated with measuring five of these targets, which were not analyzed in Serbia's official report on SDGs. By using Serbia as a case study, the paper systematically examines national policies, educational data, and assessment frameworks, identifying persistent barriers that impede progress toward the SDG4 objectives. A comparative analysis was conducted to better understand Serbia's progress in achieving these targets. This analysis compares Serbia's performance with that of neighboring countries in the region as well as with more developed nations. Methodological limitations in data collection and monitoring further complicate efforts to accurately assess SDG 4 indicators. Through specific examples of non-measurable indicators, the paper illustrates these challenges and explores potential strategies for improving measurement accuracy and policy effectiveness. By evaluating Serbia's experience, this study offers insights that are valuable for finding ways to start measuring targets that currently lack data, considering the close deadline for achieving the goals.

Keywords: sustainable development goals (SDGs); quality of education; policy implementation; quantitative assessment; data gaps; Serbia

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1. Introduction

1.1. The Role of Education in Sustainable Development

The significance of education becomes evident when observing the multitude of conferences, agendas, and studies dedicated to its intersection with sustainable development. The evolution of this relationship over time is also clearly defined. One of the key outcomes of the United Nations Conference on Environment and Development in 1992 was Chapter 36 of Agenda 21, which aimed to advance sustainable development through education [1]. In this chapter, education was emphasized as pivotal for promoting efforts to expand learning opportunities, eliminate unsustainable practices, and improve global quality of life. Moreover, in recent years, sustainable development has been portrayed not only as a principle or strategy for the economy, society, and environment but also for peace and

partnership, ensuring universal benefits [2]. Sustainable development is often equated with nature protection, but it is only one segment of this approach. On the other hand, some authors consider that the concept of sustainable development favors people and the economy more, while ecology is left behind, so there is a need to build environmental awareness, education about ecology and ecologically aware citizens [3–5]. Thus, the approach to human development through sustainable development and education as its foundation and binder is also a kind of social justice. It is necessary to create strategies for specific areas, which will be applied to other regions based on the type of issues and solutions. Also, it is necessary to include the majority of stakeholders who will benefit from it and whose influence in the implementation of the strategy will be significant [6,7].

Chapter 36 outlined three program areas: (a) shifting education towards sustainable development, (b) raising public awareness, and (c) promoting training initiatives [8]. Subsequently, these three programs evolved into the four pillars of education for sustainable development, now encompassing the importance of quality education [9]. The multitude of goals and targets dedicated to this issue in the current century underscores the critical role of education in the context of sustainability. The international community recognizes education as one of the foundations of society, evidenced by the fact that it was declared the UN Decade of Education for Sustainable Development [10]. The fact that there are strategies through both the Millennium Goals and Sustainable Development Goals (SDGs) means that the work on education is constant. One of the United Nations' Sustainable Development Goals emphasizes equipping learners with the knowledge and skills necessary to promote sustainable development [11]. The primary objective is to integrate sustainable development knowledge across all educational levels, ranging from preschool to higher education. According to Oltra-Badenes and others [12], students are generally aware of the SDGs and targeted educational activities are crucial to help them understand how their future professions can specifically contribute to achieving these goals, particularly within the context of business organizations. Some experts highlighted the importance of students' inclusion in education for sustainable development [7,13]. Universities play a crucial role in accomplishing the SDGs (de Amorim). Increased enthusiasm for global citizenship and numerous causes for development, including the activities of international development organizations and the growing multiculturalism of societies, have contributed to the growth of education [14,15].

1.2. Challenges and Progress in Measuring SDG4 Targets

To monitor progress towards SDG 4 targets, the SDG-Education Steering Committee suggested that governments establish comprehensive national evaluation and learning assessment systems, as well as conduct international educational assessments [16,17]. On the other hand, attempts to gauge progress in relation to the SDGs have uncovered significant obstacles and fault lines regarding the issues faced by local data providers in meeting global objectives, as well as the restricted applicability of global information for domestic purposes [18].

The research area of this paper is Serbia, and the highlight is on target 4.4. (to increase the number of youth and adults who have skills for employment, decent jobs and entrepreneurship), 4.7. (ensure that all learners acquire the knowledge and skills needed to promote sustainable development), 4a (build and upgrade education facilities that are child, disability and gender sensitive), 4b (expand globally the number of scholarships available to developing countries), and 4c (increase the supply of qualified teachers). We also discussed the situation in neighboring countries and these targets, but also in some developed EU countries. These five targets were not evaluated in annual national SD reports due to a lack of data. Additionally, the research conducted on these targets is presented, along with the challenges associated with measuring them.

If target 4.4 is actually achieved, it will help the circular economy and other related business models become more widespread. Additionally, this would immediately help to achieve the SDG3 (Good health and well-being) and SDG8 (decent work and economic

growth) objectives [19]. Target 4.4 is crucial in today's society since youth unemployment continues to increase and the job market is unstable. This target, focusing on access to skills relevant to decent work, will be evaluated using a specific indicator related to information and communication technology (ICT). This simplifies the concept of skills relevant to livelihoods and the transition to adulthood, a topic extensively debated in the literature. It is important to note that this focus is on just one aspect of decent work, which is not universally applicable in all contexts [20]. Although it does not provide a global trend measurement, it does provide a general understanding of the indicator's appearance [21]. Additionally, this will significantly influence some other targets, such as a lower percentage of young people who are not in paid jobs, education, or training (goal 8.6), but also targets 10.2. (empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic and other status) and 12.7 (promote public procurement practices that are sustainable, in accordance with national policies and priorities) [22].

Numerous papers and studies have been written regarding target 4.7 [23–25]. Questions were raised about whether knowledge and abilities should be measured, and if so, which ones. Also, the demographic target groups and timeframes should be determined [26]. However, in that regard, several suggestions were offered, such as publications and the work of the Bridge 47 Network initiative [27]. Skills relevant to this target encompass cognitive abilities (such as literacy and numeracy), technical competencies (including ICT and professional skills), and 'soft skills' (like teamwork, initiative, planning and organization, entrepreneurial mindset, self-management, and continuous learning) [28].

One key aspect of target 4a involves the UN Convention on the Rights of Persons with Disabilities, adopted in 2006, which advocates for ensuring inclusive education systems at all levels [29]. In practice, three-quarters of countries have adopted this, and on the European continent, all countries have embraced inclusive education [30]. It should be emphasized that these are data for European countries for 2016 and that they include 30 countries/regions, but there are no data for Serbia. There are varied perspectives on the definition and implementation of inclusive education. Not everyone agrees that it is the definitive solution to addressing special education challenges, especially when some can cite instances of inclusive practices that have not yielded positive outcomes [31–33]. To avoid exclusion and marginalization within educational systems for vulnerable groups such as persons with disabilities, indigenous peoples, those in remote rural areas, ethnic minorities, the poor, women and girls, migrants, refugees, and displaced persons (due to conflict or natural disasters), inclusive education is advocated as a rights-based approach [34].

Campbell and Mawer [35] analyzed 4b targets through three theories—human capital (HCT), human rights (HRT), and human capabilities, and according to them, HCT and HRT are the main ones in the framing of this target. One of their suggestions is that 4b should be more based on human capabilities and less on HCT. The World Bank's Africa Centers of Excellence initiative prioritizes science, technology, engineering, and mathematics (STEM), often at the expense of other fields of study and research [36]. Nevertheless, humanities, social sciences, and other disciplines are crucial, as higher education serves broader purposes beyond just cultivating job-ready skills.

Research has shown that 27 out of the 168 other SDG targets are directly positively influenced by target 4.c [37]. Additionally, targets that significantly support target 4.c include 4.3 (equal access to higher education), 4.4 (acquiring relevant skills), 4.5 (gender equality), 4.7 (integration of global citizenship education and education for sustainable development); and 4.a (promoting non-violent, inclusive, and effective learning environments), as well as 4.b (expanding scholarships). According to the study, 27 objectives that have an impact on this goal are familiar, so they should be improved, but there are also other influences. The legal component, as well as concrete actions for the implementation at the local or regional level, should be examined.

1.3. Serbia's Contribution, Research Gap and Objectives

Serbia is actively working to enhance the role of education in achieving sustainable development goals. This is evidenced by annual reports and numerous scientific papers. It is worth noting that Serbia was one of the lowest-ranked countries using the GDP-based strategy, but that improved dramatically under the SDG-based approach, where it surged to seventh place among the explored countries. The comparatively high level of socially connected metrics, one of which is public education expenditure, can explain Serbia's large gain in position [38]. Other findings about SD in Serbia revealed that organizing the chapters into clusters and regrouping the indicators accordingly produced better results, so Ristanović [39] proposed conclusions that can be used to make decisions about the best approach to SD for individual countries. There are also scientific works on education in Serbia in general [40–42], but there is a dearth of works that evaluate SD targets and quantify the indicators within them or provide alternative recommendations for how they can be measured. This study makes a valuable contribution to SDG4 and lays a solid groundwork for future research in this field. When discussing the smaller number of studies on the subject of SDGs in developing countries, it is important to note that, over the past five years, every sixth paper was from China, every eighth paper from the USA, and every tenth paper from the UK, which implies that approximately 83% of the papers were from the top ten countries in the world [43]. This highlights the significance of this topic's research in developing nations.

Learning about sustainable development is a new vision that should produce generations who will consider the welfare of future generations on all development-related bases and who will experience a sustainable future, the pillars of which have already been damaged. Insufficient knowledge poses the primary obstacle to taking thoughtful action. Therefore, it is crucial to evaluate the public's awareness and education regarding the new worldview that should have been embraced and implemented long ago. How well do they live in accordance with their knowledge of these significant subjects, and where do they find information about these subjects? In what stage of progress are the state and society in reaching this objective? What are the main obstacles, and how may they be avoided or overcome? This research aims to tackle critical issues, and its findings should guide future endeavors to promote sustainable development education and advance SDG4 more broadly.

One of the issues with indicators is that they were developed during a period when they were not measurable in some countries. There is a midpoint of the United Nations' 2030 Agenda, and Serbia lacks the data for half of the targets for Goal 4. This study has analyzed whether there are alternatives to describe and evaluate these variables for the next six years in order to acquire a picture of the trends and compare them to the surrounding countries. The aim of this paper is actually twofold. The primary goal was to show that there is a database to evaluate some of the targets that are not monitored and evaluated in the national report and to start measuring them as soon as possible, all with the aim of measuring the SDGs more accurately. Another objective is to contribute to the complicated global evaluation system for sustainable development. Any indication of measurement constraints helps future assessments of this system.

2. Methods and the Structure of the Paper

The methodology of this study is carefully structured to systematically assess Serbia's progress towards SDG 4 and to compare these findings with the achievements of twelve other countries, ensuring consistency and accuracy across diverse datasets. This section provides a detailed explanation of the methods used, the sources of information, the criteria for analysis, and the framework for comparing Serbia with other nations. The experts discuss the main challenges in validating new indicator methods and data for global SDG reporting, highlighting the limitations of current guidelines and the need for more support from the Inter-Agency and Expert Group on SDG indicators while proposing a mechanism to improve data validation and reporting [44]. SDG indicators were categorized into three

tiers based on their methodology and data availability, with Tier 1 having established methods and good data, Tier 2 lacking sufficient data, and Tier 3 lacking both, highlighting that only about 80% of indicators have at least some data coverage [45]. The issue of measurement is being addressed in an increasing amount of literature [46–50], which also poses questions about how to measure, whether to use only positive and negative changes in indicators over time, whether to give some indicators more weight, whether to use geometric or arithmetical methods, and whether indicators be relative. Other study addresses missing data by focusing on the five-year period, when the data is most comprehensive, and using the UN SDG database [51] and similar was the objective of this paper.

The research examined how far SDG4's targets have progressed, especially in Serbia and the region, and has proven that inclusive education and global perspectives are among the major challenges to be measured. All target definitions are taken from the United Nations' official webpage on the SDGs [52], ensuring consistency with global standards. SDG4 has ten targets, five of which were evaluated in Serbia's National Report [53], which leaves a substantial portion of goal 4 unaddressed. To bridge the target gaps, the study employs data from two primary sources: the UNESCO database [54] and the Statistical Office of the Republic of Serbia's 2022 census data [55]. To determine whether the indicators that have not been formally monitored are on the correct track to meeting the targets, they were not only examined over time but also compared to other countries. For Serbia, both databases (national and UNESCO) were used, and for other countries, only the UNESCO database was used. This comparative analysis was divided into two distinct groups:

- neighboring countries in the region (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Montenegro, North Macedonia, and Romania),
- and countries that have made significant strides towards achieving the SDGs (Austria, Germany, Iceland, and Norway).

These countries were chosen based on their geographical proximity to Serbia and their global standing in SDG achievements, offering a balanced comparative framework. Since 2016, progress toward reaching the SDGs has been the primary focus of the assessment and analysis of SDGs above the national level [56–58]. The methodology used in the comparative analysis is carefully designed to ensure accuracy despite potential data variations. Serbia's data reflects the most recent year available. For other countries, the study selected data from the same year as Serbia's if available; if not, data from the closest available year was used. There are minor variations in values over time; therefore, this method is thought to provide suitable and accurate data for comparison. For instance, indicator 4.c.4, which pertains to the availability of qualified teachers, uses data from 2022 for Serbia. However, the 2021 data is used for comparison with Albania, as the latest available data for Albania is from 2021, and the data for Serbia in 2022 is nearly identical to that of 2021. This decision underscores the methodology's emphasis on consistency and accuracy in data comparison. Our initial assessment shows that the database comprises data from various sources, each contributing a significant number of country-year-indicator observations. Identifying these different sources and addressing any inconsistencies would be an important task that would require considerable time and resources, which is beyond the scope of this paper. Therefore, we assume for now that all the data are comparable, and we focus on the more manageable task of identifying any missing data. For this purpose, we only consider the most recent available data.

First, a review of the literature on this SDG has been provided, followed by a focus on Serbia and the gap that exists in a more extensive analysis of the targets and indicators within the goal itself. This gap highlights the need for a more nuanced and data-driven evaluation of the progress towards these goals. The introduction starts with the role of education in SD and the evolving concept of SD. Also, United Nations initiatives and Education for SD have been described. To address this shortfall, a summary of the rated targets is provided initially in the Results section, and then its emphasis is shifted to those targets that have not been rated in the national report. The purpose was to identify the

missing data and to determine whether Serbia is on the correct route, especially since the -following indicators are not officially recorded and monitored: 4.4 (skills for work), 4.7 (education for sustainable development), 4a (education facilities), 4b (scholarships), and 4c (teachers). These indicators were chosen following a thorough gap analysis, which revealed significant data deficiencies in Serbia's official SDG reporting. The selection was also informed by existing literature on the challenges of monitoring inclusive education and the global perspective. The analysis extends beyond a mere national assessment, as the study compares Serbia's progress with twelve other countries. This further implies that five targets were analyzed for those countries that are listed as the subject of the paper, and not all targets. It should be noted that this is not a comparative analysis between Serbia and the mentioned countries for the entire SDG 4; rather, this comparison helps to understand Serbia's position in the region and generally for the targets that are the focus of this work.

After the exhaustive results and discussion, the conclusion section was processed. The study's comparative approach is vital for understanding Serbia's progress in a broader context, offering insights into how Serbia fares against both its regional peers and countries that are global leaders in education. By identifying the missing data and assessing the progress of unmonitored indicators, the study aims to provide a clearer picture of Serbia's trajectory toward achieving SDG 4. Four simple formulas were applied in order to quantitatively measure the indicators for which the data presented in this paper were not monitored in the aforementioned SD national report of Serbia. The first formula measures the absolute difference (A_i) between the last year for which data are available (C_i) and the beginning of the observed period (2015, the year since Agenda 2030 was implemented) (C_{15}):

$$A_i = C_i - C_{15}$$

The second formula analyzed relative difference (R_i):

$$R_i = C_i / C_{15}$$

The following hypothetical example from Easterly [59] effectively illustrates the various effects of utilizing either the absolute difference or the relative difference to measure progress. Sometimes, it is more adequate to measure the change per year and use the Δ to denote the change:

$$\Delta D_i = (C_i - C_{15})/t$$

where ΔD_i is the progress between last year and the year 2015, and t is the number of years in between. Standardizing the numerator and denominator of the fourth equation by their respective differences from the minimal value is an alternative to the first two formulas. Another name for this strategy is the distance-to-the-frontiers approach [60]:

$$R_i^s = (C_i - C_{min})/(C_{max} - C_{min})$$

where C_{min} is the minimal value for the observed period and C_{max} is the maximal value for the observed period. It should be noted that for the aforementioned measurements, we used all of the available data, which is limited. As a result, relative indicators are used in addition to absolute ones, with some indicators having four observed years and others having six or seven. The statistical results are presented in the Appendix A. The formulas were used in similar research [51]; they were only adapted to the data of this paper.

According to some experts, the aim is to create a comprehensive global evaluation system for sustainable development, improving upon the limitations of existing indexes and providing accurate measurements of sustainability levels worldwide [38,61]. It will emphasize the importance of sustainable development over economic growth, offer policy recommendations based on index rankings, and analyze differences among countries to identify common challenges and guide those at various stages of development. This work is essential to lay the groundwork for future efforts to ensure that all targets under SDG

4 are effectively monitored and achieved and make the base for further research with innovative methods [62,63].

3. Results

3.1. Monitoring the Progress of the Implementation of SDG4 Based on the Existing Reports

Five targets, or six indicators within them, could be monitored, according to the 2020 and 2022 reports. This objective has 10 targets and 12 determining indicators, leaving half of them unrated (Figure 1). It should be noted that some of the indicators presented in the reports rely on the data collected over one year or on the comparison of two years, yet they still provide a reliable and realistic picture. The reports evaluated the following targets:

- Target 4.1, concerning accessible, fair, and high-quality elementary and secondary education, can be partially attained. Data on the first-grade completion rate of elementary school is required; however, this data is only available for 2019. The percentage of boys and girls who finish primary school is high, although the percentage of girls completing secondary school is slightly lower compared to boys.
- Target 4.2 is one of the three fully traceable targets focused on equitable early childhood development and preschool education standards. There has been a slight improvement, in both reports, in the proportion of children aged 24–59 months by sex meeting developmental milestones in health, learning, and psychosocial well-being. The report 2020 showed less short-term progress and more long-term progress (2009–2019) for the second indicator, "Participation rate in organized learning (one year before the official primary school entry age), by sex". The 2022 report noted a slight decline in short-term participation of male children.
- Target 4.3 is fully measurable based on the existing database and refers to quality and gender equality at all levels of education. The trend is inconsistent. In particular, the report for 2020 indicates moderate improvement among young people (ages 15 to 24) and a moderate departure from the objective among the adult population (ages 25 to 64). The 2022 study reveals a decline in the percentage of people under 25 while the percentage of adults is rising. In both cases, women outnumber men, a trend particularly evident among young people.
- Target 4.5—to eradicate gender disparities and inequalities across all levels, particularly for vulnerable groups—is partially measurable due to the need for parity indices. Data from 2014 and 2019 shows minimal gender differences; however, the disparity index increased in primary school (0.96) in favor of boys, while gender parity was observed in middle schools, and the disparity decreased (0.99) at the upper secondary level. Both reports have similar results, with no additional data available for subsequent periods.
- Target 4.6, the third fully measurable target, focuses on achieving literacy and numeracy for all ages and by sex. The 2020 report includes data from before Agenda 2030. Discrepancies in the performance of 15-year-old pupils on the PISA test in three subjects were noted from 2006 to 2012. Although there was an increase in the number of students performing at or below the basic level in reading, science, and mathematics, a minor decline was observed between 2009 and 2012. The report 2022, covering the period from 2012 to 2018, noted a departure from the objective in all three subjects, with mathematics showing the smallest gap and science and reading showing larger gaps.

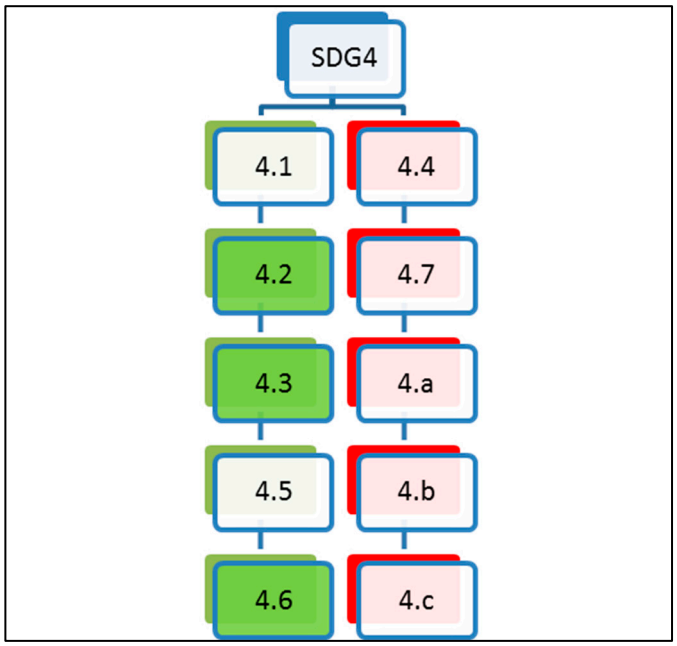

Figure 1. Targets accessed (left) and unrated targets (right) of SDG4 in the National Report of the Republic of Serbia. Blue color is for the goal, green is for measured targets (light for partly measured and dark for full measured), and red is for unrated targets.

3.2. Monitoring the Progress of the Implementation of SDG4 Based on Additional Data

The following targets were not examined in the yearly reports due to insufficient data. This paper focuses particularly on these targets. Identifying data from various sources was crucial to obtain at least a rough estimate of Serbia's progress in achieving these targets. Figure 2 lists the indications that were examined, while the paper includes a list of indicators and sub-indicators lacking data to highlight other factors needing measurement.

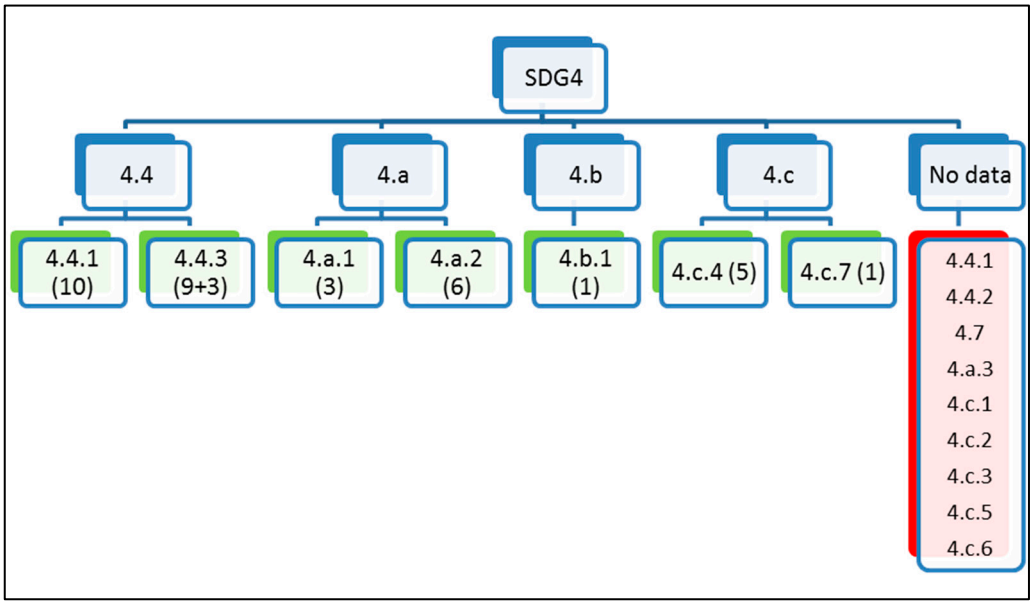

Figure 2. Accessed indicators and the number of sub-indicators in parenthesis and the lack of data for some indicators for Serbia in the UNESCO database. Blue color is for the goal and targets, green is for measured indicators and sub-indicators, and red is for indicators and sub-indicators lacking data.

Target 4.4—to enhance the number of youth and adults equipped with pertinent skills such as technical and vocational expertise—is essential for employment, decent jobs, and entrepreneurial opportunities. The assessment should not be limited to ICT skills alone, as they may not be universally applicable. Instead, a broad range of skills relevant to decent work and entrepreneurship must be evaluated. Training initiatives aimed at older persons, ex-offenders, and care leavers address the growing skills gap. Tables 1 and 2 present the dataset for this target.

Table 1. Some indicators of the 4.4 target for Serbia.

	2014	2015	2016	2017	2018	2019	2020	2021
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill								
Proportion of youth and adults who have copied or moved a file or folder, both sexes (%)	46.89	47.30	53.40	53.64		58.14		
Proportion of youth and adults who have connected and installed new devices, both sexes (%)	29.78							
Proportion of youth and adults who have created electronic presentations with presentation software, both sexes (%)	15.39	16.80	24.92	25.02		26.84		
Proportion of youth and adults who have used copy and paste tools to duplicate or move information within a document, both sexes (%)	44.15	33.98						60.68
Proportion of youth and adults who have sent e-mails with attached files (e.g., document, picture, video), both sexes (%)	38.50	43.07						
Proportion of youth and adults who have used basic arithmetic formulae in a spreadsheet, both sexes (%)	28.06	25.10	29.18	24.48				23.75
Proportion of youth and adults who have found, downloaded, installed and configured software, both sexes (%)	19.03							49.16
Proportion of youth and adults who have transferred files between a computer and other devices, both sexes (%)	36.50	38.33	46.99	37.59		43.17		
Proportion of youth and adults who have wrote a computer program using a specialised programming language, both sexes (%)	3.71	2.67	5.48	4.13		4.50		1.71
Proportion of youth and adults who have verified the reliability of information found online, both sexes (%)								11.11
4.4.3 Youth/adult educational attainment rates by age group and level of education								
Educational attainment: at least some primary (ISCED 1), population 25+ years, both sexes (%)	97.33	97.96	98.21	98.40		98.86		
Educational attainment rate, completed primary education or higher, population 25+ years, both sexes (%)	93.68	96.99	97.44	97.69		98.53		
Educational attainment rate, completed lower secondary education or higher, population 25+ years, both sexes (%)	86.73	88.64	89.49	89.90		91.79		
Educational attainment rate, completed upper secondary education or higher, population 25+ years, both sexes (%)	68.57	70.90	71.41	71.64		73.64		
Educational attainment rate, completed post-secondary non-tertiary education or higher, population 25+ years, both sexes (%)	20.35	21.74	22.58	22.58		23.25		
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+ years, both sexes (%)	18.98	19.96	20.69	20.78		21.70		
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+ years, both sexes (%)	12.65	13.58	14.51	14.90		15.52		
Educational attainment rate, completed Master's or equivalent education or higher, population 25+ years, both sexes (%)	1.50	1.87	2.18	2.18		2.21		
Educational attainment rate, completed Doctoral or equivalent education, population 25+ years, both sexes (%)	0.41	0.37	0.48	0.39		0.26		

Table 2. Populations aged 15 and above are categorized by computer literacy, comparing data from the 2011 and 2022 censuses.

Serbia	**2011**	**2022**
Computer literate persons %	34.21	45.73
Persons with partial computer skills %	14.78	29.62
Computer illiterate persons %	51.01	24.19

* Note. Adapted from [64,65].

Data for Serbia on the following two indicators aren't available:

- 4.4.1 Percentage of young people and adults who have adjusted privacy settings on their devices, accounts, or apps to restrict the sharing of personal data and information (such as names, contact details, and photos), disaggregated by gender,
- 4.4.2 Percentage of young people and adults who have implemented robust security measures (like strong passwords and login attempt notifications) to safeguard their devices and online accounts, broken down by gender,

4.4.3 Percentage of youth and adults who have attained a basic level of proficiency in digital literacy skills (taken from other sources and presented in Table 2).

Target 4.7 aims to ensure that every learner gains the knowledge and skills essential for advancing sustainable development, including education on sustainable lifestyles, human rights, gender equality, and cultural diversity. While data for the indicators of this aim exist for some countries in the region, they are unavailable for Serbia. These indicators are listed in the UNESCO database [54] for further research.

Target 4.a aims to construct and enhance education facilities sensitive to children, disabilities, and gender, ensuring safe, inclusive, non-violent, and conducive learning environments for all. Table 3 outlines several indicators for tracking progress toward this goal. Data for Serbia are unavailable for indicator 4.a.1, which assesses the proportion of primary, lower secondary, and upper secondary schools with access to essential resources

such as electricity, internet for educational use, adapted infrastructure and materials for students with disabilities, basic drinking water, single-sex basic sanitation facilities, and basic handwashing facilities. Additionally, there is no data for indicator 4.a.3, which tracks the number of attacks on students, personnel, and educational institutions.

Table 3. Some indicators of target 4a for Serbia.

	2015	2016	2017	2018	2019	2020	2021
4.a.1 Proportion of primary schools with access to computers for pedagogical purposes (%)	27.06				27.00		42.02
4.a.1 Proportion of secondary schools with access to computers for pedagogical purposes (%)				99.76			
4.a.1 Proportion of secondary schools with access to Internet for pedagogical purposes (%)				94.86			
4.a.2 Percentage of students experiencing bullying in the last 12 months in primary education, high socio-economic status, both sexes (%)	60.39				53.17		56.18
4.a.2 Percentage of students experiencing bullying in the last 12 months in primary education, low socio-economic status, both sexes (%)	55.77				50.22		52.80
4.a.2 Percentage of students experiencing bullying in the last 12 months in primary education, both sexes (%)	58.00				51.83		54.55
4.a.2 Percentage of students experiencing bullying in the last 12 months in lower secondary education, low socio-economic status, both sexes (%)				45.27			
4.a.2 Percentage of students experiencing bullying in the last 12 months in lower secondary education, high socio-economic status, both sexes (%)				40.99			
4.a.2 Percentage of students experiencing bullying in the last 12 months in lower secondary education, both sexes (%)				43.14			

4.b–to increase worldwide the availability of scholarships for developing countries, particularly least developed countries, small island developing states, and African nations–supports enrollment in higher education, vocational training, and programs in ICT, technical, engineering, and scientific fields, in both developed and developing countries. Data for Serbia is sparse, with all relevant information shown in Table 4. Sector-specific data is lacking, preventing a deeper analysis.

Table 4. Indicator 4.b.1 for Serbia.

2014	2015	2016	2017	2018	2019	2020	2021
7,448,049	5,958,278	9,436,292	13,415,283	8,790,343	15,197,227	12,333,533	9,812,183

Note. Adapted from [54].

4.b.1 Amount of official development assistance allocated to scholarships, categorized by sector and type of study, adjusted for inflation in US dollars.

Target 4.c aims to boost the number of well-trained teachers, including through international partnerships for teacher education in developing nations, particularly in least-developed countries and small islands. The lack of qualified teachers compromises hopes for quality education in many regions. Tables 5 and 6 present data for this target. For the next two indicators, there are no data for Serbia (pre-primary/primary/lower secondary/upper secondary/secondary):

- 4.c.1 Measure the percentage of teachers meeting minimum qualifications across different education levels.
- 4.c.2 Assess the ratio of pupils to trained teachers across various education levels.

Table 5. Indicator 4.c.4 for Serbia.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Pupil-qualified teacher ratio in pre-primary education	12.74	12.14	11.92	11.91	11.64	11.66	11.35	10.77	10.80
Pupil-qualified teacher ratio in primary education	15.71	15.24	14.52	14.28	14.29	14.09	13.75	13.77	13.66
Pupil-qualified teacher ratio in lower secondary	8.34	8.35	8.15	7.97	7.80	7.60	7.17	7.20	7.15
Pupil-qualified teacher ratio in upper secondary	8.99	8.56	8.32	8.22	8.12	8.21	8.12	8.09	7.85
Pupil-qualified teacher ratio in secondary	8.65	8.45	8.23	8.08	7.95	7.88	7.60	7.61	7.47

Note. Adapted from [54].

Table 6. Indicator 4.c.7 for Serbia.

2014	2015	2016	2017	2018	2019	2020	2021
	84.03				85.21		89.41

* Note. There is also an indicator for lower secondary education, but there is no data for Serbia.

4.c.3 Determine the percentage of teachers meeting national standards, categorized by education level and institution type—all indicators show full compliance across all levels of education. 4.c.4 Evaluate the ratio of pupils to qualified teachers based on headcount across different education levels (Table 5).

Data for the following two indicators are also unavailable for Serbia (pre-primary/primary/lower secondary/upper secondary):

- 4.c.5 Compare the average salary of teachers to that of other professions with similar qualification levels.
- 4.c.6 Track the rate of teacher turnover across different education levels.

4.c.7 Detail the percentage of primary education teachers who underwent in-service training in the past 12 months, categorized by training type, as shown in Table 6.

In the 2022 report, Serbia ranked 35th among 163 countries on the SDG Index, scoring 75.9 (with Finland leading with 86.5). Figures 2.11 of the report [65] illustrate Serbia's progress on each goal, with only two goals—falling into the "SDG achievement" category (one of those two is SDG4), indicating that Serbia is on the right track in terms of poverty reduction and educational development. One goal falls into the "challenges remain" category, while 12 goals are in the "significant challenges remain" category, one in the "major challenges remain" category, and one with no data. In terms of trends, four goals are on track, while the majority (10) are increasing significantly, one is stagnating, one is decreasing (climate action), and one has no data.

The official report used the following four indicators for SDG4:

- Percentage of children aged 4 to 6 participating in structured pre-primary education—92.7% (2020);
- Primary school enrollment rate (%)—97.1% (2020);
- Completion rate for lower secondary education (%)—95.2% (2020), and
- Literacy rate among individuals aged 15 to 24 (%)—100% (2019).

3.3. Data Used for Comparative Analysis

As previously mentioned, the comparative analysis between Serbia and the remaining twelve countries does not utilize all indicators of Goal 4 of Sustainable Development; rather, it focuses solely on those indicators pertinent to the study of this paper, contingent upon the availability of data for the aforementioned countries. The following figures illustrate the given parameters, allowing for a clearer comparison of the differences among the countries presented. Figure 3 presents ten indicators for twelve countries related to Target 4.4, which are subsequently compared with the data in Table 1, referring specifically to Serbia, in the discussion below.

Figure 4 also focuses on the indicators of Target 4.4 and is compared with the data in Table 1, which will be discussed later. This analysis involves nine indicators, and there is no data available for Croatia.

As indicated by the title of Figure 5, these data pertain to Target 4a, and five indicators have been measured, whereas Table 3, which relates to Serbia, includes more indicators. Additionally, data for Iceland are available for only one indicator.

Data for almost all indicators of Target 4c are available only for Albania, as presented in Figure 6. The corresponding data for Serbia are shown in Table 5, allowing for a comparison solely between these two countries. An exception is one parameter depicted in Figure 7, which was measured in ten countries and pertains to the percentage of teachers who attended professional development courses in the past year and taught in primary schools.

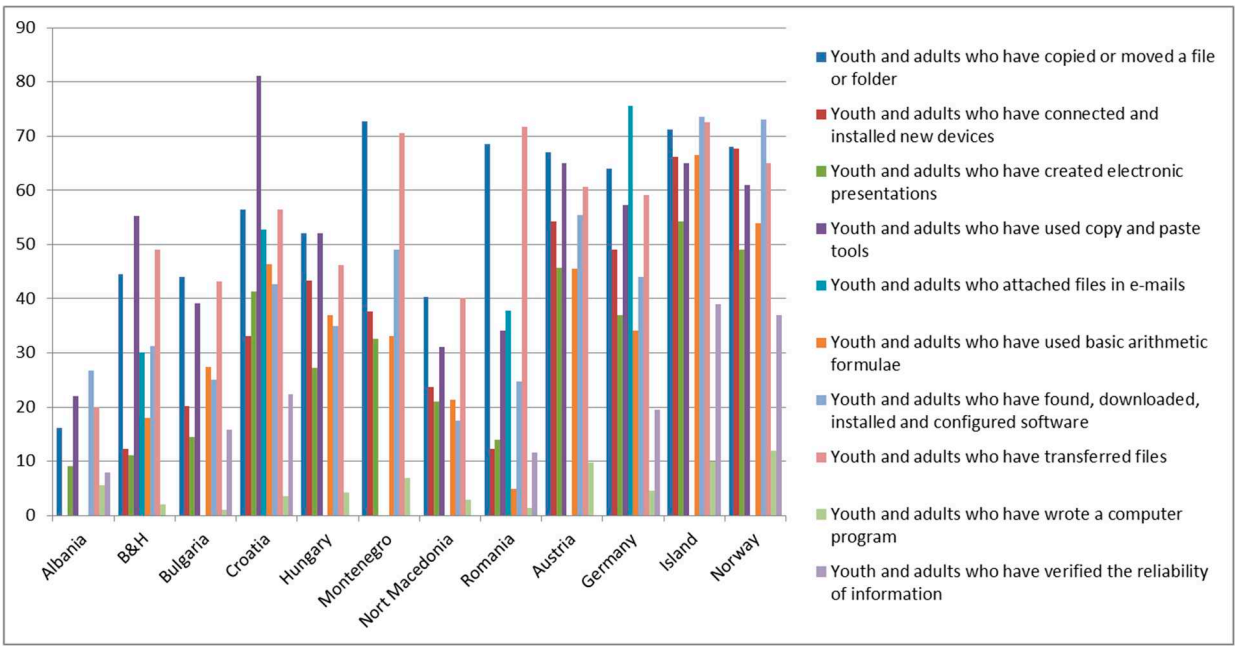

Figure 3. Indicator 4.4.1. The proportion of youth and adults with information and communications technology (ICT) skills by type of skill. Note. See the full names of subindicators in Table 1.

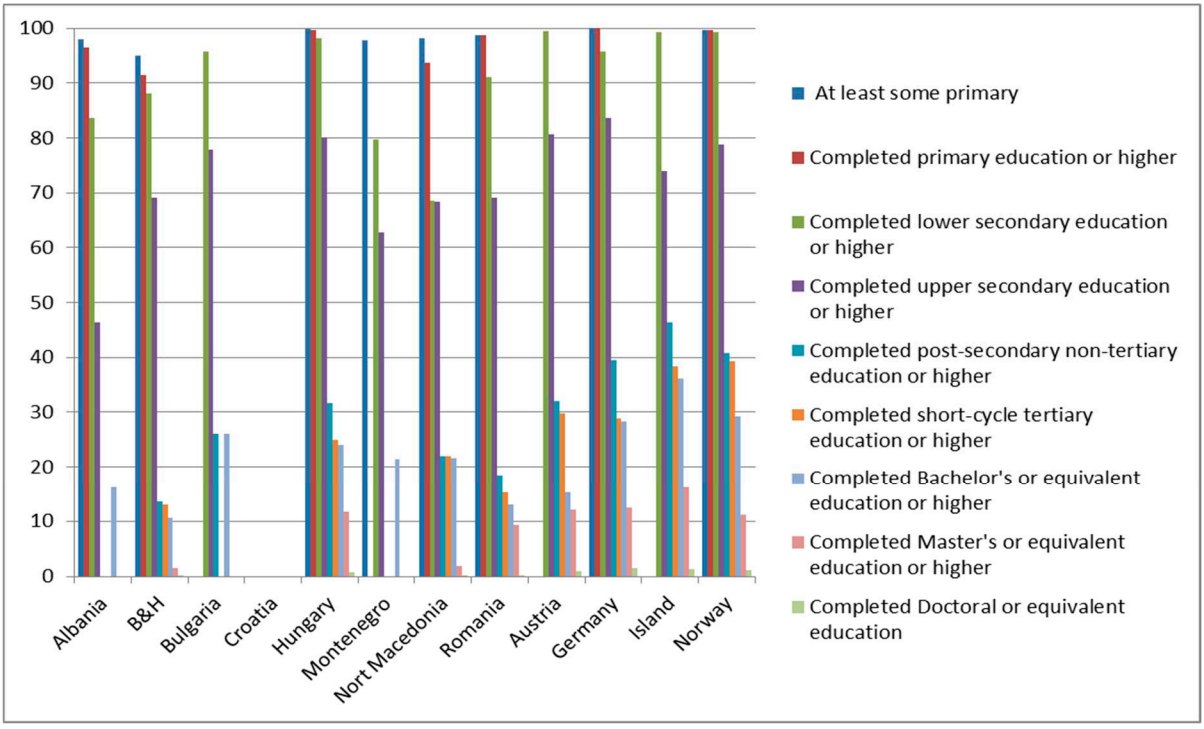

Figure 4. Youth/adult educational attainment rates by age group and level of education. Note. See the full names of subindicators in Table 1.

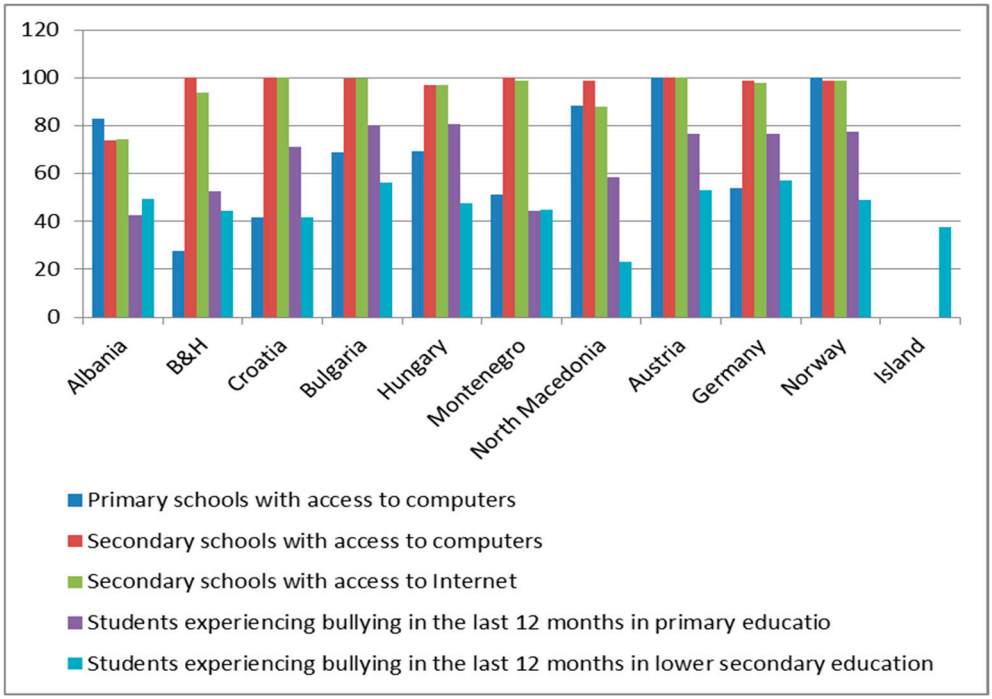

Figure 5. Some indicators of target 4a. Note. See the full names of subindicators in Table 3.

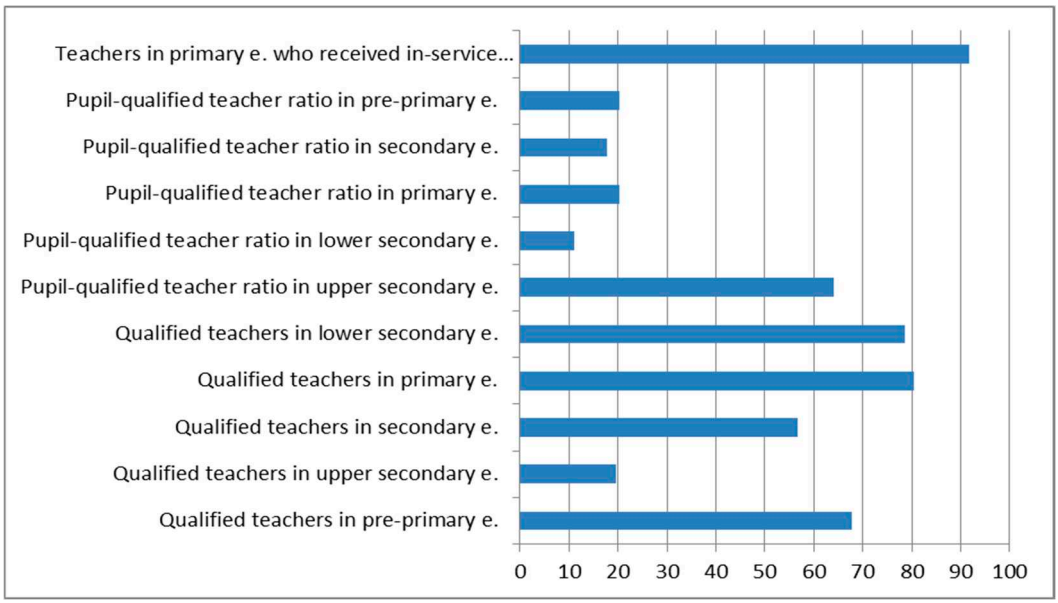

Figure 6. Indicators of 4c target for Albania. Note. See the full names of indicators in text for 4.c.3 and Tables 5 and 6 for 4.c.4 and 4.c.7.

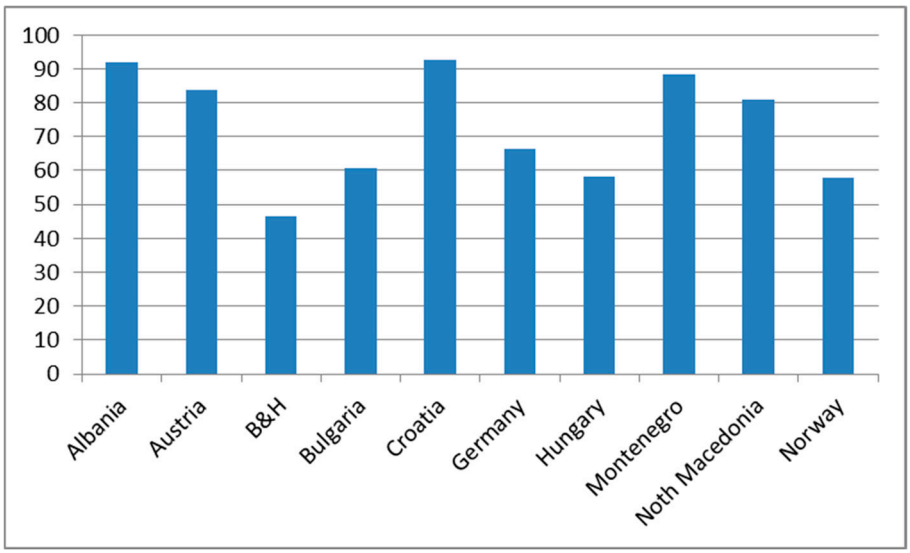

Figure 7. Subindicator of 4.c.7 indicator—Percentage of teachers in primary education who received in-service training in the last 12 months by type of training, both sexes.

4. Discussion

According to the 2022 SDG Report, Serbia still faces challenges in altering educational trends, yet it stands out as one of the top-performing countries in the region, alongside Croatia. Croatia achieved a higher overall score of 78.8, ranking 23rd, while Bulgaria is positioned 42nd, followed by North Macedonia at 57th place [65]. Because many of the aims are not on a national level, these findings suggest that regional solutions may be required. SDG4 is one of the highest-ranking goals for Serbia, with a tangible possibility of achievement by 2030. However, the lack of data for half of the targets within this goal points to gaps that this study aims to address. As Fontdevila [18] highlighted, global databases often lack the granularity necessary for domestic education planning.

4.1. Educational Attainment and ICT Skill Development

A significant observation is that approximately half of the population is computer literate, which is a critical prerequisite for the acquisition of new skills, accessing information, and engaging in online learning, which is increasingly available to the public. This literacy also facilitates retraining for emerging professions. As a result, education and training programs must align with market demands for new or enhanced skills [66]. The current share of computer-literate people is 12% higher than in the 2011 census. Skill development is recognized as essential for sustainable development, with lifelong learning widely accepted as necessary for adapting to new market demands and professions for which individuals were previously untrained.

Global initiatives by policymakers aimed at expanding broadband Internet access can help mitigate disparities in employment opportunities that arise from technological advancements altering job requirements [67]. Consequently, it is essential to provide Internet access to socially disadvantaged individuals and those residing in remote regions [68]. Vigdor et al. [69] have a different opinion, considering that the digital divide may inadvertently benefit disadvantaged groups, as existing evidence suggests that improving access to technology could exacerbate the existing achievement gap in math and reading between affluent and low-income individuals. On the other hand, proficiency in technological skills is highly valued and rewarded in today's job market. Although ICT skills are vital, some experts [20] argue that other relevant abilities remain untested. To effectively navigate the growing digitization and automation, individuals must possess not only digital skills but also social and non-cognitive abilities and foundational competencies [70]. These include the capacity for lifelong learning, problem-solving, critical thinking and creativity [71]. An analysis of educational attainment reveals that while most levels show slight

and steady increases, the completion rate for Doctoral or equivalent education exhibits a consistent decline.

4.2. Analysis of SDG 4.4 and Serbia's Progress Towards Educational Objectives

Tables 1 and 2 present a range of indicators for target 4.4 for the period 2014–2021 and 2011–2022. Despite some data gaps, the majority of parameters show consistent improvement. Notably, in 2021, the percentage of youth and adults of both sexes with basic mathematical skills was the lowest in the monitored period, as was the percentage of those who have developed a computer program using a specialized programming language. This parameter reflects both specific computer tasks and the level of completed education.

Using the UNESCO database, this study shows that Serbia is making progress toward achieving objective 4.4. Another way to see where Serbia stands in relation to the studied indicators is to compare it to other countries. A comparative analysis with other countries in the region, including Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Montenegro, North Macedonia, and Romania, as well as developed European countries such as Austria, Germany, Iceland, and Norway, provides further insight.

Looking at the ten indicators 4.4.1, it could be concluded that Croatia and Montenegro outperform Serbia in the region. In 2019, 58% of youth and adults in Serbia reported having copied or moved a file or folder, similar to the percentages in Croatia. However, the share of 45% and lower was in Bosnia and Herzegovina, Bulgaria, and North Macedonia, and significantly lower in Albania (16%). In developed countries, this percentage ranged from 64 to 71%, and Montenegro and Romania had the same shares. Although data on the percentage of young people who connected and installed new devices are only available for Serbia in 2014 (30%), this figure was lower in other regional countries, except for Croatia (33%), Montenegro (38%), and Hungary (43%). Developed countries showed much higher percentages, ranging from 49 to 68%. Table A1 provides quantitative measurements for the six indications 4.4.1. If we look at absolute statistics, the population's knowledge of how to copy electronic files has improved the most, rising to 27% in just six years. The worst outcome is the percentage of people who utilize formulas in documents, which has somewhat declined from 2015 to 2021. Results from other measurements are similar. When the numerator and denominator are standardized, it becomes clear that during the recorded time, the values of the first three indicators climbed steadily, the fourth indicator declined, and the fifth indicator fluctuated.

The remaining indicators similarly position Serbia among the leading regional countries, through outcomes in developed nations, is markedly superior and should be emulated. Two exceptions where Serbia had low results are the percentages of young people who have written a computer program using a specialized programming language and those who verified the reliability of information found online. The former decreased from 5.5% in 2016 to 1.7% in 2021, with Bulgaria and Bosnia and Herzegovina showing similar percentages. Other explored countries had better results, and the best were Austria (10%), Iceland (10%), and Norway (12%). The latter showed 11% in Serbia, close to Albania's 8% and Romania's 12%, but significantly lower than in Germany (20%), Croatia (22%), Norway (37%) and Iceland (39%). There are no data for Bosnia and Herzegovina, Hungary, Montenegro, North Macedonia, and Austria.

For educational attainment (4.4.3), Serbia performs well in primary and secondary education completion rates, with notable trends showing in higher education levels. There are no data available for Croatia and Bulgaria. While a high percentage of children complete primary education across all studied countries, Bosnia and Herzegovina (91%) and North Macedonia (94%) have slightly lower rates. Upper secondary education completion rates were 74% in Serbia, with only Hungary surpassing this in the region (80%). The lowest percentage was in Albania (46%), and in the developed countries, it varies from 74% (Iceland) to 84% (Germany). However, doctoral education rates have declined, and Serbia trails behind developed countries in the attainment of bachelor's, master's, and doctoral degrees. In 2019, 16% of individuals completed a bachelor's or equivalent education or

higher, comparable to Albania (16%) and Austria (15%). Bosnia and Herzegovina (11%) and Romania (13%) had a smaller share, but most other countries had higher ones. Iceland leads with 36% in this category. Master's or equivalent education completion rates in Serbia, Bosnia and Herzegovina, and North Macedonia were around 2%, while other countries ranged from 9% (Romania) to 16% (Iceland). The completion rate for Doctoral or equivalent education in Serbia has declined over the years, reaching 0.26% in 2021, with higher percentages observed in Hungary (0.7%) and developed countries (1–1.5%). Research [19–22] has shown how the achievement of this target positively influences the realization of other goals and targets. Therefore, strategic efforts should be made to improve these results. For the years 2015–2019, changes were quantified for nine indicators. 4.4.3 for Serbia is in the Appendix Table A1. The absolute changes are not large. They are slightly higher for the share of the population that has completed higher and lower secondary education and amount to about 3%. For every indicator, the relative change is roughly 1%. With the exception of the percentage of the population with a doctorate, which shows stagnation, all indicators show a rise in value with time.

4.3. Challenges in Measuring and Achieving Target 4.7: Education for Sustainable Development

The analysis of educational development levels aligns with Target 4.7, which focuses on education reforms and the integration of sustainable development education at all levels. However, data challenges persist, particularly in measuring informal education's impact and improving formal education. It could be concluded that the abilities indicated in this target extend beyond employment to include technical, non-technical, and other basic skills required for life and work. Experts [51] evaluation of how global citizenship education and education for sustainable development are integrated into national education policies, school curricula, teacher training, and student evaluations indicate similar objectives for SDG indicators 4.7.1 and 12.8.1. On the other side, the study reveals that students generally have a low perception of their ability to contribute to the SDGs through their professions, highlighting the need for increased awareness and education on how their future work can impact global sustainability [72].

Despite being halfway to the 2030 deadline, Serbia has yet to produce measurable data for any of the 4.7 indicators, raising concerns about the adequacy of previous measurements and the absence of recent initiatives. Non-governmental organizations, such as JAZAS, could contribute data through their annual campaigns on topics like sexual and HIV education. Additionally, subjects like global citizenship, sustainability, geoscience, and environmental science are taught in some high schools; further research is needed to establish a database for evaluating 4.7 targets. Mochizuki [25] explored Target 4.7 across 22 Asian countries, identifying the common themes in curricula and education policies: the nation as a central reference for identity, analytical thinking, culture and heritage, issue resolution, personnel growth, innovative thinking, compassion, and cooperation. The paper suggests that administrative self-disclosure and monitoring for the inclusion or omission of key phrases in official documents—two primary monitoring methods—have notable limitations. Achieving sustainable development through education requires addressing interconnected issues related to promoting freedom, sustainability, and global citizenship, and these findings should be universal application.

4.4. Target 4a, 4b and 4c: Access to Resources, Scholarships and Teacher Training

The analysis of target 4a is based on three indicators: how many children have access to a computer, how many have access to the Internet, and how many are victims of peer violence. To assess Serbia's progress, comparisons were made with seven neighboring countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Montenegro, and North Macedonia) and three developed European countries (Austria, Germany, and Norway). By 2021, computer access in Serbian primary schools increased to 42%, matching Croatia's percentage, although Bosnia and Herzegovina's percentage remained lower (although the most recent data are from 2019 when it was 28%, and Serbia also had the

same rate that year). Other regional countries show higher percentages, while access is nearly universal in secondary schools (100%), with Hungary (97%) and Albania (74%) being an exception.

Internet access follows a similar trend, with Bosnia and Herzegovina (94%), North Macedonia (88%), and Albania (74%) lagging slightly behind. These data, corresponding to indicator 4.a.1, are generally satisfactory and show consistent growth over time. The data provided for 4.a.2, which pertains to the percentage of learners in primary and secondary schools who have experienced violence in the past year, are both unexpected and concerning. The percentage of students experiencing violence in Serbia decreased slightly but remained concerning at 55%; in Croatia, the increase was 11%, while in Norway, it was 8%. Only Montenegro (44%) and Albania (43%) report rates below 50% of learners who have experienced violence in primary school, whereas in Bosnia and Herzegovina, as in Serbia, every second primary school pupil experienced some kind of violence. These percentages are even higher in other nations, which is especially remarkable in developed (77%), with well-organized social systems and strong SDG4 rankings. Bulgaria and Hungary have the highest rates (80%), followed by Croatia (71%) and North Macedonia (59%). In secondary schools, the situation is similar, though data for Serbia exist only for 2018, making it difficult to analyze trends over time. One can only deduce that the percentages are lower in Serbia and elsewhere. Approximately 43% of secondary students in Serbia experienced violence, similar to rates in Bosnia and Herzegovina, Croatia, and Montenegro. The lowest rate was in North Macedonia (23%), based on 2014 data and the only available for this country. This demographic group comprises about half of the population in Albania and Hungary and up to 56% in Bulgaria. Developed countries do not differ in this regard, with shares ranging from 49% in Norway to 57% in Germany. These findings indicate that Serbia is likely to achieve this target in the upcoming years. Table A1 measures indicators 4.a.1 and 4.a.2 as well. During the six years under observation, the percentage of elementary school pupils with computers rose by 15% or roughly 3% annually. The 4.a.2 indicator's values reflect negative absolute values. The distance-to-the-frontiers technique reveals that the values vary during the observed time, although the relative values and changes per year indicate that these changes are minor.

Another significant challenge is the issue of inclusivity, particularly in ensuring that education systems are accessible to all, regardless of disability, gender, or social background. Inclusive education remains a key goal, but its successful implementation requires more than just policy; it demands real changes in how education is delivered, particularly in Serbia, where data on these issues are often scarce [29,30]. However, it is crucial to note that the implementation of these strategies has been met with certain challenges, particularly in the realm of inclusive education. Despite global advocacy for inclusive education systems, there is still debate about its effectiveness, particularly regarding the education of marginalized groups such as those with disabilities or people from remote areas. On the one side, Florian [31] examined the difficulties in preparing educators to address issues of diversity and difference, advocating for a comprehensive, rights-based approach to inclusive education that may solve the challenges posed by the evolving demographics of 21st-century education. On the other side, Gilmour [32] suggests that research has provided only limited evidence of the benefits of inclusion for students with disabilities while also pointing to the inadequate preparation of general education teachers to meet the specific behavioral and intellectual needs of these students. This issue needs to be addressed carefully to avoid exclusion and marginalization in the pursuit of sustainability [33,34].

Drawing conclusions for target 4b is challenging due to limited data on the distribution of official development aid flows specifically for scholarships across sectors and study types. The data have changed over time and are only available for nine European countries, five of which are in Serbia's neighboring region. In 2021, Serbia and Albania received approximately 9 million USD, North Macedonia and Bosnia and Herzegovina received around 3 million USD, and Montenegro received approximately 2 million USD. However, drawing conclusions based solely on these figures is challenging. A more nuanced analysis

is required comparing these scholarships in relation to population size, the number of scholarship recipients, the proportion of individuals with advanced education, and the distribution across various scientific disciplines, among other parameters. The SDGs insufficiently address higher education; the only targets that do so to some extent are 4b and 4.3. While it makes sense to prioritize ensuring equitable access to high-quality primary and secondary education for all, it is equally important to recognize that accessible, high-quality higher education—especially when it integrates knowledge of sustainable development across disciplines—is crucial for advancing these targets and for educating decision-makers who will implement these ideas.

Target 4c focused on teacher training (4.c.3), which showed that Serbia consistently maintained 100% qualified teachers, but the percentage of adequately trained teachers has declined, particularly at the secondary level. Data comparison with other countries is limited, with Albania being the only country for which data is available. In Albania, as of 2021, the percentages of adequately trained teachers were 68% for pre-primary education, 80% for primary education, and 57% for secondary education. When analyzing the pupil-qualified teacher ratio (headcount basis) for 2021, Serbia had a ratio of 11 for pre-primary education and 14 for primary education, compared to Albania's ratios of 20 for pre-primary and 18 for primary education. For indicator 4.c.7, data was available for all the explored countries except Iceland and Romania. In Serbia, 89% of primary education teachers had undergone in-service training within the past 12 months by 2021, indicating a slight increase since 2015. Higher percentages were only in Albania (92%) and Croatia (93%). Over 80% of teachers participated in training in Austria, Montenegro and North Macedonia. In contrast, the percentages were approximately 60% in Bulgaria, Hungary, and Norway and 67% in Germany. The lowest percentage was recorded in Bosnia and Herzegovina (47%). Overall, Serbia's performance on all three indicators of target 4.c. is satisfactory.

The table in the Appendix A additionally measures the indicators of aim 4.c. The relative indicators further support the conclusion that the five indicators 4.c.4 show that the absolute changes throughout the 2015–2022 timeframe are negative but very low. Throughout the period under study, the value decreases steadily. There are three indicators for the 4.c.7. In actuality, it is one, but gender analysis was also done. It is observed that among primary school teachers who got in-service training, the rise is greater for male teachers (13%) than for female teachers (5%). Relative indices support this, and growth is steady over time. The lack of comprehensive national reports and data points to a need for better monitoring and evaluation mechanisms. By improving these systems, Serbia could ensure a more accurate assessment of its progress and contribute more effectively to global sustainability goals [37]. Non-experimental studies indicate that school resources beyond a certain minimum threshold do not significantly contribute to effectiveness; instead, the quality of teachers is the key factor [73]. The 2023 SDG Report indicates that Serbia has seen change since the previous year, but stagnation was noted in achieving the fourth goal of SD [74].

5. Conclusions

It is critical to measure as many indicators as possible, as well as the targets that are dependent on them, in order to gain a clear picture of how far a country has come in attaining its goals and which areas need more attention. It is also stated that attaining a large number of targets by 2030 is concerning, but on the other hand, there are six years until the deadline, and many things cannot be monitored in order to assess how far some countries have come in achieving particular goals. Since universal guidelines for measuring each indicator were not possible, data collection from scientific works, non-governmental organization projects, and other relevant sources began.

For SDG4, it is possible to conclude that Serbia is on the correct track and that the indicators evaluated in the official report and other sources examined in this article are adequate. According to the Report on Sustainable Development, Serbia and Croatia were among the few countries (8 out of 27) in Eastern Europe and Central Asia region

in 2022 that had this target rated as an 'achievement' and a trend 'on track'. The 2023 report [74] was recently released, and Serbia fell one place down. Only Russia remains in this category for the last year. Croatia is 'achievement' but decreasing, and Serbia is 'challenges' and stagnating. The deadline for SDGs is not very far, but Serbia is in the category of 'significant challenges remain' for many goals. The difficulty is that 169 targets are comprised of 232 indicators, some of which are impossible to measure in a large number of countries, where priorities that are more important to monitor should be established, and some indicators are not even relevant for some countries. To measure all variables and provide a generally common framework for all countries to compare is ambitious and an outstanding success.

This paper aims to contribute to Goal 4 and offer a more comprehensive view of education to identify which indicators should be prioritized. One of the main limitations is Target 4.7, which has not been measured in any form, and some case studies should be performed to make a base for assessment. According to the results of target 4.4, more work should be done on higher education, not only because poorer results have been found there over time but also in comparison to the other studied nations. Overall, Target 4a is satisfying, but it indicates that it's necessary to work on reducing violence in schools, primarily in primary schools, because the percentages are higher, and the assumption is that if positive results are achieved in primary schools, those generations will be more likely to suffer less violence in secondary schools as well. There is also insufficient data to draw conclusions for target 4b, which should be researched more deeply. Target 4c can be evaluated positively based on the available facts. The full image of the indicated targets serves as the foundation for working on the evaluation of targets whose databases are lacking, as well as for deepening some analyses by other categories: level of education, gender, age, and economic development level. It has been found that meeting the 4.4., 4.7., and 4b targets at the national level is challenging. Therefore, the question is: Are there truly high expectations that all of the activities that have been allocated will be measured and, if needed, improved throughout the remaining time? This is still an issue that needs to be studied further.

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Appendix A. Additional Table

Table A1. Statistical processing of indicators for Serbia's data.

Indicator	Indicator's Description	A_i	R_i	ΔD_i	R_i^s
4.4.1	Proportion of youth and adults who have copied or moved a file or folder, both sexes (%)	10.84	1.23	2.71	1
4.4.1	Proportion of youth and adults who have created electronic presentations with presentation software, both sexes (%)	10.04	1.60	2.51	1
4.4.1	Proportion of youth and adults who have used copy and paste tools to duplicate or move information within a document, both sexes (%)	26.7	1.79	4.45	1
4.4.1	Proportion of youth and adults who have used basic arithmetic formulae in a spreadsheet, both sexes (%)	−1.35	0.95	−0,23	0
4.4.1	Proportion of youth and adults who have transferred files between a computer and other devices, both sexes (%)	4.84	1.13	1.21	0.59
4.4.1	Proportion of youth and adults who have wrote a computer program using a specialised programming language, both sexes (%)	−0.96	0.64	−0.16	0
4.4.3	Educational attainment: at least some primary (ISCED 1), population 25+ years, both sexes (%)	0.9	1.01	0.23	1
4.4.3	Educational attainment rate, completed primary education or higher, population 25+ years, both sexes (%)	1.54	1.02	0.39	1
4.4.3	Educational attainment rate, completed lower secondary education or higher, population 25+ years, both sexes (%)	3.15	1.04	0.79	1
4.4.3	Educational attainment rate, completed upper secondary education or higher, population 25+ years, both sexes (%)	2.74	1.04	0.68	1
4.4.3	Educational attainment rate, completed post-secondary non-tertiary education or higher, population 25+ years, both sexes (%)	1.51	1.07	0.38	1
4.4.3	Educational attainment rate, completed short-cycle tertiary education or higher, population 25+ years, both sexes (%)	1.74	1.09	0.44	1
4.4.3	Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+ years, both sexes (%)	1.94	1.14	0.49	1
4.4.3	Educational attainment rate, completed Master's or equivalent education or higher, population 25+ years, both sexes (%)	0.34	1.18	0.09	1
4.4.3	Educational attainment rate, completed Doctoral or equivalent education, population 25+ years, both sexes (%)	−0.11	0.70	−0.03	0
4.a.1	Proportion of primary schools with access to computers for pedagogical purposes (%)	14.96	1.55	2.49	1
4.a.2	Percentage of students experiencing bullying in the last 12 months in primary education, female (%)	−6.16	0.89	−1.03	0.10
4.a.2	Percentage of students experiencing bullying in the last 12 months in primary education, high socio-economic status, both sexes (%)	−4.21	0.93	−0.70	0.42
4.a.2	Percentage of students experiencing bullying in the last 12 months in primary education, male (%)	−0.85	0.99	−0.14	0.84
4.a.2	Percentage of students experiencing bullying in the last 12 months in primary education, low socio-economic status, both sexes (%)	−2.97	0.95	−0.50	0.46
4.a.2	Percentage of students experiencing bullying in the last 12 months in primary education, both sexes (%)	−3.45	0.94	−0.58	0.44
4.c.4	Pupil-qualified teacher ratio in upper secondary (headcount basis)	−0.71	0.92	−0.10	0
4.c.4	Pupil-qualified teacher ratio in lower secondary (headcount basis)	−1.2	0.86	−0.17	0
4.c.4	Pupil-qualified teacher ratio in primary education (headcount basis)	−1.58	0.90	−0.23	0
4.c.4	Pupil-qualified teacher ratio in secondary (headcount basis)	−0.98	0.88	−0.14	0
4.c.4	Pupil-qualified teacher ratio in pre-primary education (headcount basis)	−1.34	0.89	−0.19	0.02
4.c.4	Percentage of teachers in primary education who received in-service training in the last 12 months by type of training, male	12.47	1.15	2.08	1
4.c.4	Percentage of teachers in primary education who received in-service training in the last 12 months by type of training, female	4.77	1.06	0.79	1
4.c.4	Percentage of teachers in primary education who received in-service training in the last 12 months by type of training, both sexes	5.38	1.06	0.90	1

Note. Since some indicators 4.4.1, 4.a.1, and 4.a.2 only exist for a single year, their data is not included in the table because they cannot be compared over time. Additionally, because the maximum has been reached since the start of the monitored period, indicators 4.c.3 have been left out.

References

1. UNCED (United Nation Conference on Environment and Development). Agenda 21. Rio de Janeiro, Brazil, 3 to 13 June 1992. Available online: https://sdgs.un.org/publications/agenda21 (accessed on 16 August 2024).
2. Sachs, J.D. From Millennium Development Goals to sustainable development goals. *Lancet* **2012**, *379*, 2206–2211. [CrossRef]
3. Washington, H.; Taylor, B.; Kopina, H.; Cryer, P.; Piccolo, J. Why ecocentrism is the key pathway to sustainability. *Ecol. Citiz.* **2017**, *1*, 32–41.
4. Washington, H. Education for wonder. *Educ. Sci.* **2018**, *8*, 125. [CrossRef]
5. Kopnina, H. Education for the future? Critical evaluation of education for sustainable development goals. *J. Environ. Educ.* **2020**, *51*, 280–291. [CrossRef]
6. D'Adamo, I.; Gastaldi, M. Monitoring the Performance of Sustainable Development Goals in the Italian Regions. *Sustainability* **2023**, *15*, 14094. [CrossRef]
7. Biancardi, A.; Colasante, A.; D'Adamo, I.; Daraio, C.; Gastaldi, M.; Uricchio, A.F. Strategies for developing sustainable communities in higher education institutions. *Sci. Rep.* **2023**, *13*, 20596. [CrossRef]
8. United Nations Educational, Scientific and Cultural Organization. *Shaping the Future We Want: UN Decade of Education for Sustainable Development (2005–2014) Final Report*; UNESCO: Paris, France, 2014.
9. McKeown, R. Progress has been made in Education for Sustainable Development. *Appl. Environ. Educ. Commun.* **2002**, *1*, 21–23. [CrossRef]
10. UNESCO. *Report on the UN Decade of Education for Sustainable Development*; UNESCO: Paris, France, 2012. Available online: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf (accessed on 16 August 2023).

11. UNDP. Sustainable Development Goals. 2015. Available online: https://www.undp.org/sustainable-development-goals (accessed on 16 August 2023).
12. Oltra-Badenes, R.; Guerola-Navarro, V.; Gil-Gómez, J.-A.; Botella-Carrubi, D. Design and Implementation of Teaching–Learning Activities Focused on Improving the Knowledge, the Awareness and the Perception of the Relationship between the SDGs and the Future Profession of University Students. *Sustainability* **2023**, *15*, 5324. [CrossRef]
13. Leal Filho, W.; Shiel, C.; Paço, A.; Mifsud, M.; Ávila, L.V.; Brandli, L.L.; Molthan-Hill, P.; Pace, P.; Azeiteiro, U.M.; Ruiz Vargas, V.; et al. Sustainable Development Goals and sustainability teaching at universities: Falling behind or getting ahead of the pack? *J. Clean. Prod.* **2019**, *232*, 285–294. [CrossRef]
14. Baily, F.; O'Flaherty, J.; Hogan, D. Exploring the Nature and Implications of Student Teacher Engagement with Development Education Initiatives. *Ir. Educ. Stud.* **2017**, *36*, 185–201. [CrossRef]
15. O'Flaherty, J.; McCormack, O.; Gleeson, J.; O'Reilly, B.; O'Grady, E.; Kenny, N. Developing the Characteristic Spirit of Publicly Managed Schools in a More Secular and Pluralist Ireland. *Camb. J. Educ.* **2017**, *48*, 317–333. [CrossRef]
16. McFeely, S. *The 2030 Agenda—An Unprecedented Statistical Challenge*; Friedrich Ebert Stiftung: Bonn, Germany, 2018; Available online: http://library.fes.de/pdf-files/iez/14796.pdf (accessed on 16 August 2023).
17. Holland, C.; Bennett, D.; Mughal, A.; Ni, H. G20 Collaborative Strategy for SDG 4 Target 4.7: Monitoring Progress in Education for Sustainable Development and Global Citizenship Education. Global Solutions the World Policy Forum. 2020. Available online: https://www.global-solutions-initiative.org/policy_brief/g20-collaborative-strategy-for-sdg-4-target-4-7-monitoring-progress-in-education-for-sustainable-development-and-global-citizenship-education/ (accessed on 8 November 2023).
18. Fontdevila, C. Still waiting for the (data) revolution. Examining supply-demand mismatches in the production of SDG4 metrics. *Int. J. Educ. Dev.* **2023**, *103*, 102928. [CrossRef]
19. Schroeder, P.; Anggraeni, K.; Weber, U. The Relevance of Circular Economy Practices to the Sustainable Development Goals. *J. Ind. Ecol.* **2019**, *23*, 77–95. [CrossRef]
20. King, K. Lost in Translation? The Challenge of Translating the Global Education Goal and Targets into Global Indicators. *Comp. A J. Comp. Int. Educ.* **2017**, *47*, 801–817. [CrossRef]
21. Redman, A. Harnessing the Sustainable Development Goals for businesses: A progressive framework for action. *Bus. Strategy Dev.* **2018**, *1*, 230–243. [CrossRef]
22. Raiden, A.; King, A. Social value, organisational learning, and the sustainable development goals in the built environment. *Resour. Conserv. Recycl.* **2021**, *172*, 105663. [CrossRef]
23. GALM. Measurement Strategy for SDG Target 4.7. Madrid. 2017. Available online: http://uis.unesco.org/sites/default/files/documents/gaml4-measurement-strategy-sdg-target4.7.pdf (accessed on 8 November 2023).
24. Sandoval-Hernández, A.; Miranda, D. *Exploring ICCS 2016 to Measure Progress Toward Target 4.7. (Background Paper Prepared for the 2019 Global Education Monitoring Report)*; UNESCO: Paris, France, 2018.
25. Mochizuki, Y. Rethinking Schooling for the 21st Century: UNESCO-MGIEP's Contribution to SDG 4.7. *Sustain. J. Rec.* **2019**, *12*, 88–92. [CrossRef]
26. Gallwey, S. Capturing Transformative Change in Education: The Challenge of Tracking Progress towards SDG Target 4.7. *Policy Pract. A Dev. Educ. Rev.* **2016**, *23*, 124–138.
27. Bridge 47 Network Initiative. 2023. [Data Base]. Available online: https://www.bridge47.org/ (accessed on 25 September 2023).
28. Bourn, D. *Understanding Global Skills for 21st Century Professions*; Springer International Publishing: Berlin/Heidelberg, Germany, 2018.
29. UNESCO. Education for All 2000–2015: Achievements and Challenges. EFA Global Monitoring Report. 2015. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000232205 (accessed on 8 November 2023).
30. European Agency for Development in Special Needs Education. *Disability and Development Report: Realizing the Sustainable Development Goals by, for and with Persons with Disabilities*; United Nations Publication: New York, NY, USA, 2018.
31. Florian, L. Teacher Education for the Changing Demographics of Schooling: Inclusive Education for Each and Every Learner. In *Teacher Education for the Changing Demographics of Schooling (8–21)*; Florian, L., Pantić, N., Eds.; Springer: Dordrecht, The Netherlands, 2017.
32. Gilmour, A. Has Inclusion Gone too far? Weighing its effects on students with disabilities, their peers, and teachers. *Educ. Next* **2018**, *18*, 8–16.
33. Kauffman, J.; Hallahan, D. *Special Education: What It Is and Why We Need It*, 2nd ed.; Routledge: New York, NY, USA, 2018.
34. UNESCO. 2. Global Education Meeting, Brussels Declaration, Document ED-2018/GEM/1. 2018. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000366394?posInSet=1&queryId=f00bbeb5-caf0-495d-9782-e4caad1e9e0f (accessed on 8 November 2023).
35. Campbell, A.C.; Mawer, M. Clarifying Mixed Messages: International Scholarship Programmes in the Sustainable Development Agenda. *High. Educ. Policy* **2019**, *32*, 167–184. [CrossRef]
36. World Bank. *Higher Education for Development: An Evaluation of the World Bank Group's Support*; Independent Evaluation Group; World Bank: Washington, DC, USA, 2017.
37. Ishida, Y. How Does the Newly Added DAC Evaluation Criterion "Coherence" Contribute to Achieving the SDG Target 4.c1 for Teachers? *J. Int. Coop. Educ. CICE Hiroshima Univ.* **2020**, *22*, 15–29.

38. Lior, N.; Radovanović, M.; Filipović, S. Comparing sustainable development measurement based on different priorities: Sustainable development goals, economics, and human well-being—Southeast Europe case. *Sustain. Sci.* **2018**, *13*, 973–1000. [CrossRef]
39. Ristanović, V. Sustainable development in the new EU methodology of Serbia's accession to the EU. *Int. Probl.* **2023**, *31*, 7–37. [CrossRef]
40. Stoilković, A.M. Can border municipalities count on education as a resource development? *J. Geogr. Inst. "Jovan Cvijić" SASA* **2016**, *66*, 433–448. [CrossRef]
41. Matović, S.; Lović, O.S. Assessing socio-economic vulnerability aiming for sustainable development in Serbia. *Int. J. Sustain. Dev. World Ecol.* **2021**, *29*, 27–38. [CrossRef]
42. Matović, S.; Lović, O.S. Are there any differences between men and women in Serbia's Human resources for sustainable development? *Ann. Econ. Ser.* **2023**, *3*, 89–97.
43. D'Adamo, I.; Di Carlo, C.; Gastaldi, M.; Rossi, E.N.; Uricchio, A.F. Economic Performance, Environmental Protection and Social Progress: A Cluster Analysis Comparison towards Sustainable Development. *Sustainability* **2024**, *16*, 5049. [CrossRef]
44. Gennari, P.; Navarro, D.K. Validation of methods and data for SDG indicators1. *Stat. J. IAOS* **2019**, *35*, 735–741. [CrossRef]
45. United Nations. Tier Classification for Global SDG Indicators 2019. Available online: https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_4%20April%202019_web.pdfhttps://unstats.un.org/sdgs/indicators/database/ (accessed on 7 November 2024).
46. Nilashi, M.; Keng Boon, O.; Tan, G.; Lin, B.; Abumalloh, R. Critical data challenges in measuring the performance of sustainable development goals: Solutions and the role of big-data analytics. *Harv. Data Sci. Rev.* **2023**, *5*, 3–4. [CrossRef]
47. Bidarbakhtnia, A. Measuring sustainable development goals (SDGs): An inclusive approach. *Glob. Policy* **2020**, *11*, 56–67. [CrossRef]
48. Mugellini, G.; Villeneuve, J.P.; Heide, M. Monitoring sustainable development goals and the quest for high-quality indicators: Learning from a practical evaluation of data on corruption. *Sustain. Dev.* **2021**, *29*, 1257–1275. [CrossRef]
49. Guo, H.; Liang, D.; Sun, Z.; Chen, F.; Wang, X.; Li, J.; Zhu, L.; Bian, J.; Wei, Y.; Huang, L.; et al. Measuring and evaluating SDG indicators with Big Earth Data. *Sci. Bull.* **2022**, *67*, 1792–1801. [CrossRef]
50. Diaz-Sarachaga, J.M.; Jato-Espino, D.; Castro-Fresno, D. Is the Sustainable Development Goals (SDG) index an adequate framework to measure the progress of the 2030 Agenda? *Sustain. Dev.* **2018**, *26*, 663–671. [CrossRef]
51. Dang, H.-A.H.; Serajuddin, U. Tracking the sustainable development goals: Emerging measurement challenges and further reflections. *World Dev.* **2020**, *127*, 104570. [CrossRef]
52. United Nations Department of Economic and Social Affairs. Sustainable Development [Data Set]. 2023. Available online: https://sdgs.un.org/goals/goal4 (accessed on 15 November 2023).
53. Statistical Office of the Republic of Serbia (SORS). Progress Report in the Implementation of Sustainable Development Goals by 2030 in the Republic of Serbia. 2023. Available online: https://sdg.indikatori.rs/media/1621/izvestaj-o-napretku-u-ostvarivanju-ciljeva-odrzivog-razvoja-do-2030-godine-u-srbiji-2022.pdf (accessed on 23 September 2023). (In Serbian).
54. UNESCO Institute for Statistics Technical Cooperation Group. SDG4 Indicators Dashboard [Data Set]. 2023. Available online: https://sdg4-data.uis.unesco.org/ (accessed on 15 November 2023).
55. Statistical Office of the Republic of Serbia (SORS). Educational Attainment, Literacy and Computer Literacy. In *2022 Census of Population, Households and Dwellings*; SORS: Belgrade, Serbia, 2023.
56. Allen, C.; Nejdawi, R.; El-Baba, J.; Hamati, K.; Metternict, G.; Weidmann, T. Indicator based assessments of progress towards the sustainable development goals (SDGs): A case study of the Arab region. *Sustain. Sci.* **2017**, *12*, 975–989. [CrossRef]
57. Campagnolo, L.; Eboli, F.; Farnia, L.; Carraro, C. Supporting the UN SDGs transition: Methodology for sustainability assessment and current worldwide ranking. *Economics* **2018**, *12*, 20180010. [CrossRef]
58. Huan, Y.; Liang, T.; Li, H.; Zhang, C. A systematic method for assessing progress of achieving sustainable development goals: A case study of 15 countries. *Sci. Total Environ.* **2020**, *752*, 141875. [CrossRef]
59. Easterly, W. How the millennium development goals are unfair to Africa. *World Dev.* **2009**, *37*, 26–35. [CrossRef]
60. Sachs, J.; Schmidt-Traub, G.; Kroll, C.; Durand-Delacre, D.; Teksoz, K. *SDG Index and Dashboards Report*; Bertelsmann Stiftung and Sustainable Development Solutions Network: New York, NY, USA, 2018.
61. Peng, Y.; Zhang, H. Global Sustainable Development Evaluation Methods with Multiple-Dimensional: Sustainable Development Index. *Front. Environ. Sci.* **2022**, *10*, 957095. [CrossRef]
62. Clark, C.M.A.; Kavanagh, C. *Sustainable Progress. Index. 2017*; Social Justice Ireland: Dublin, Ireland, 2017.
63. Mateusz, P.; Danuta, M.; Malgorzata, L.; Mariusz, B.; Kesra, N. TOPSIS and VIKOR methods in study of sustainable development in the EU countries. *Procedia Comput. Sci.* **2018**, *126*, 1683–1692. [CrossRef]
64. Statistical Office of the Republic of Serbia (SORS). Educational Attainment, Literacy and Computer Literacy. In *2011 Census of Population, Households and Dwellings*; SORS: Belgrade, Serbia, 2013.
65. Sachs, J.; Lafortune, G.; Kroll, C.; Fuller, G.; Woelm, F. *Sustainable Development Report*; Cambridge University Press: Cambridge, UK, 2022.
66. Nogueiro, T.; Saraiva, M.; Jorge, F.; Chaleta, E. The Erasmus+ Programme and Sustainable Development Goals—Contribution of Mobility Actions in Higher Education. *Sustainability* **2022**, *14*, 1628. [CrossRef]

67. Acemoglu, D.; Rastepo, P. The race between man and machine: Implications of technology for growth, factor shares, and employment. *Am. Econ. Rev.* **2018**, *108*, 1488–1542. [CrossRef]
68. Zuo, G.; Kolliner, D. Weird and hierd: Employment effects of subsidized broadband internet for low-income Americans. *Am. Econ. J. Econ. Policy* **2021**, *13*, 447–482. [CrossRef]
69. Vigdor, J.L.; Ladd, H.F.; Martinez, E. Scaling the digital divide: Home computer technology and student achievement. *Econ. Inq.* **2014**, *52*, 1103–1119. [CrossRef]
70. Alan, S.; Boneva, T.; Ertac, S. Ever failed, try again, succeed better: Results from a randomized educational intervention on grit. *Q. J. Econ.* **2019**, *134*, 1121–1162. [CrossRef]
71. Stifterverband. Future Skills: Welche Kompetenzen in Deutschland Fehlen. Future Skills—Diskussions Papier 1. 2018. Available online: https://www.stifterverband.org/medien/future-skills-welche-kompetenzen-in-deutschland-fehlen (accessed on 15 June 2024).
72. Oltra-Badenes, R.; Guerola-Navarro, V.; Gill-Gomez, H.; Botella-Carrubi, D.; Gil-Gomez, J.A. Analysis of the contribution that university students believe they can make from the development of their future profession to the achievement of the SDGs. In Proceedings of the 17th International Technology, Education and Development Conference, Valencia, Spain, 6–8 March 2023. [CrossRef]
73. Rivkin, S.G.; Hanushek, E.A.; Kain, J.F. Teachers, schools, and academic achievement. *Econometrica* **2005**, *73*, 417–458. [CrossRef]
74. Sachs, J.; Lafortune, G.; Kroll, C.; Fuller, G.; Drumm, E. *Sustainable Development Report*; Dablin University Press: Dublin, Ireland, 2023.