

DOES FINNISH EDUCATION SYSTEM MATTER FOR CHOOSING FUTURE CAREER PATH? A COMPARATIVE STUDY AMONG THE EIGHTH GRADERS

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Abstract

The Finnish education system is one of the most effective educational systems in the world. It stands out for its strong emphasis on developing critical thinking and practical skills, as well as for its highly trained teachers and attention to student well-being. All these factors, along with others not previously specified, contribute to providing high-quality education for all students, regardless of their background. Since the world we live in is dominated by constantly evolving technology, students need an education that provides equal opportunities for everyone and helps them prepare for future careers in an unpredictable labor market. This study was motivated by the need to identify the particularities of the Romanian and Finnish education systems and how they influence the career choices of 8th-grade students. The study involved 68 students from two schools in Bucharest. Both schools follow the Romanian national curriculum, but one of them applies practices inspired by the Finnish education system. The purpose of this study was to explore whether Finnish-style education influences the career choices of 8th-grade students. The data for the study were collected using a STEM identity identification tool developed by researchers (STEMI – STEM Identification instrument). The results of the data analysis show that the Finnish education system has clear benefits and influences the way students develop their STEM identity. The study also presents certain limitations, including the small number of students and schools included, as well as the lack of longitudinal data. Finally, recommendations were made for pre-university teachers and educational policymakers regarding the improvement of the education system through the integration of STEM subjects and the implementation of methods and strategies that help students develop their STEM identity.

Keywords: *Finish education, career, eighth grade, Romania, STEM.*

1. Introduction

In recent years, digitalization has been shaping the overall structure of education worldwide, drawing the attention of researchers, practitioners, and decision-makers regarding educational development. Digital technologies can transform both the field of education and the labor market in terms of the skills required (Qureshi et al., 2021).

STEM workers (science, technology, engineering, mathematics) contribute to national innovation and competitiveness by generating new ideas, companies, or industries (Langdon et al., 2011). In this era characterized by rapid technological progress and a transforming global economy, preparing students for future jobs is essential. STEM education has become the foundation that provides students with the skills and knowledge necessary to excel in a competitive environment (Doly, 2024).

Finnish students have stood out for their performance in every field since 2000, from the first edition of the Programme for International Student Assessment (PISA). Finland was one of the countries that achieved the highest results and demonstrated an exceptional level of educational equity, with high academic and social inclusion as well as a large proportion of resilient students (Ustun & Eryilmaz, 2018).

2. Literature survey

Educational policies in Finland have been designed to enhance student performance and are built on concepts of sustainable leadership, with an emphasis on teaching and learning, intelligent responsibility, and encouraging schools to create optimal learning environments and implement educational content that motivates students to achieve the general objectives of education (Sahlberg, 2007).

The Finnish education system's main goal is to provide valuable learning experiences that develop communication skills, improve independent and critical thinking, broaden students' global perspective, and build self-confidence. Finnish methods encourage group learning, a reduced volume of homework, and a stronger focus on student well-being and collaboration. Thus, the Finnish educational approach values student-centered learning; the relaxed school environment fosters collaboration and gives students the opportunity to develop life skills and problem-solving abilities (Mandavkar, 2024).

In an era where society is becoming increasingly dependent on technology and science, a declining interest in STEM careers can be a cause for concern. A study analyzing predictors of students' interest in STEM careers using data collected from 601 students in Finnish general upper secondary schools showed that receiving career information from multiple sources can have a positive effect on interest in STEM careers. Furthermore, students' beliefs about their self-efficacy in mathematics positively correlate with interest in scientific subjects, which in turn contributes to their interest in STEM careers (Kaleva et al., 2023).

In Romania, 26% of students enrolled in tertiary education are in STEM fields, compared to an EU average of 32%. Therefore, identifying the factors that maintain student engagement and examining their motivations was the starting point for a study conducted on a sample of 548 students from a technical university in Bucharest. The data showed that intrinsic motivation (34.74%) and career opportunities (36.16%) drive the students' main choices. Additionally, 71.39% of the students associated STEM engagement with an enhanced sense of well-being (Dogaru et al., 2025).

A study analyzing the methods and strategies used to prepare students for successful careers in Romania indicated that integrating real-life experiences through practical training, developing critical thinking and problem-solving skills, promoting lifelong learning, and personal development have a significant impact on preparing young people for successful careers in a continuously changing society (Grigorescu, 2024).

Another study examining the quality of higher education, focusing on the question "Are graduates prepared for the labor market?", highlighted the employers' perspective. The results showed that while diplomas are valuable, graduates possess more theoretical knowledge than practical skills. To reduce this gap, universities need social engagement and well-designed strategies to support students in the employment process. Specifically, a stronger connection between the theoretical education provided by universities and the practical requirements of employers is necessary, achievable through programs that develop students' soft and applied skills, thus preparing them for the labor market (Stanciu & Banciu, 2012).

3. Methodological approach

The research methodology was quantitative and was designed to explore the impact of educational approaches on the career choices of eighth-grade students. The main research question was whether Finnish educational practices influence students' STEM identity and their preferences regarding future careers, compared to traditional education in Romania. The study involved 68 students from two schools in Bucharest, Romania, both following the national curriculum. One of the schools, hereinafter referred to as Group 1, operates based on certain practices inspired by the Finnish education system, emphasizing collaborative learning, reduced homework volume, participation in community events and extracurricular activities, and student-centered learning. The other school, hereinafter referred to as Group 2, is a traditional Romanian school. Group 1 included 31 students, and Group 2 had 37 students, all aged between 13 and 14 years.

Data were collected using a questionnaire developed by the authors, called the STEM Identification Instrument (STEMi). This instrument is designed to assess students' interest in exploration, experimentation, logic, and technical thinking (early STEM indicators), as well as evaluate communication, collaboration, autonomy, and strategic thinking skills, measure motivation and attitude toward STEM, and assess specific STEM competencies and knowledge (mathematical reasoning, problem-solving, etc.). The questionnaire included both closed and open-ended items. Some items allowed students the freedom to provide their own responses. It was structured into four dimensions, comprising a total of ten items. The first dimension measured students' interest in STEM, the second focused on students' attitudes toward STEM, the third assessed students' STEM-related competencies, and the final dimension consisted of questions on vocational reflection. The data collected from the two student groups were compared to determine whether students in Group 1, learning within a Finnish-inspired system, demonstrated a stronger STEM identity and greater interest in STEM careers.

4. Findings

To measure students' interest in STEM from childhood, they were asked how they preferred to spend their free time. Most of them—21 from the first group and 25 from the second group—chose “outside, in the open air, at the playground.” This response indicates that students favored physical and social activities, with exploring the surrounding environment serving as a foundation for developing later interest in science. Regarding structured STEM activities, such as Lego constructions, puzzles, and models, 6 students from the first group and 7 from the second group chose this option. For activities like reading, drawing, and coloring, only 4 students from the first group and 1 from the second group selected this. Additionally, 4 students from the second group preferred to create their own activities, such as sports, robotics, or video games. Therefore, during childhood, most students were oriented toward recreational outdoor activities, while STEM activities, even if chosen by fewer students, indicate that some displayed an early interest in this field and needed support to maintain and develop their STEM skills.

To assess students' interest in exploration and curiosity, they were asked what they think about when looking at a device. Most students from the first group (27) said they wondered how it works. Similarly, 23 students from the second group chose the same answer. This indicates that children had a high level of curiosity in childhood, which should be nurtured to sustain their interest in exploration.

Regarding students' communication and collaboration skills, they were asked what they prefer to do during a practical activity or experiment. Most students in the first group (20) preferred to collaborate with peers to achieve their objective. In contrast, most students in the second group (18) preferred to find a solution on their own. These results suggest differences in task approaches: students in the first group demonstrated more developed communication and collaboration skills, favoring teamwork, while students in the second group leaned toward independent problem-solving. This supports the idea that the Finnish educational system, by fostering a sense of community and emphasizing collaborative activities, helps students understand the importance and benefits of teamwork, thereby developing cooperation, communication, and mutual support skills essential in education and everyday life.

Next, students were asked to choose how they respond to obstacles in their activities. Most students in the first group (12) chose “I try to solve it on my own until I find a solution,” and the same option was chosen by most students in the second group (18). A notable difference was in the “ask for help immediately” option: only 2 students from the first group chose this, compared to 8 from the second group. This suggests that students in the first group have higher self-confidence and frustration tolerance. Another difference appeared in “seek additional information and resources to help me,” chosen by 10 students in the first group and 6 in the second. Regarding collaboration with peers to find a solution, 6 students in the first group and 4 in the second chose this. These small differences indicate that while most students prefer to try solving problems independently, students in the first group are more inclined to seek additional information and collaborate with peers to overcome obstacles.

The next section of the questionnaire measured students' interest and motivation in STEM. Students were offered statements to agree with. Although differences were not significant, the open-ended responses at the last item revealed that students in the first group aspired to careers in engineering, physics, biology, technology, construction, entrepreneurship, or sports. Some also mentioned wanting careers that allow them to help people, work with children, or develop their creativity. Students in the second group were more interested in careers in psychology, policing, acting, sports, or fields that provide opportunities to discover new things. Thus, both groups demonstrated interest and motivation toward STEM, but differences in career preferences were observed: students in the first group leaned more toward STEM careers, while those in the second group mentioned careers in other areas. These differences likely reflect the type of career guidance the students received.

The following section assessed students' logical thinking, mathematical reasoning, and problem-solving skills. Students were given three problems. The first problem measured mathematical competence and logical thinking. In both groups, most students correctly solved both requirements of the problem: 27 students in the first group solved the first part correctly and 28 the second, while 29 students in the second group solved both correctly. Therefore, both groups demonstrated well-structured mathematical and logical skills.

The second problem measured the students' ability to apply mathematical concepts in problem-solving, especially mathematical reasoning, geometry, and optimization skills. Differences emerged between the groups. For the first requirement, 4 students from the first group answered correctly, 4 partially correctly, 14 incorrectly, and 9 did not answer; in the second group, 2 answered correctly, 12 incorrectly, and 23 did not answer. For the second requirement, the first group had 20 incorrect and 11 unanswered responses, while the second group had 3 correct, 10 incorrect, and 24 unanswered. Thus, students in the first group demonstrated a medium level of understanding of geometry and optimization,

with more correct or partially correct answers, whereas students in the second group had more incorrect or unanswered responses, indicating greater difficulty in applying mathematical concepts in practice.

The final problem focused on students' ability to apply mathematical and physics concepts in real-world contexts. All students faced significant difficulties in applying math and physics knowledge practically, but students in the first group had more correct and partially correct answers for parts a, c, and d. Students in the second group had the highest percentage of unanswered questions, indicating a lack of understanding or hesitation in solving applied problems.

Table 1. Student results on practical math and physics problem.

	a		b		c		d	
SCORE	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
correct	19	8	2	2	2	-	16	3
partially correct	-	-	-	-	16	1	1	-
incorrect	1	2	17	7	1	7	1	3
no answer	11	27	12	28	12	29	13	31

The next section focused on questions related to vocational reflection. First, students were asked whether they were considering a career in STEM. Both groups included students who expressed interest (6 students from the first group and 8 from the second) as well as students who were not interested (16 students from the first group and 8 from the second). Additionally, in the first group, 6 students did not answer and 3 were undecided, while in the second group, 15 students did not provide a response. Therefore, these answers do not show major differences between the two groups, especially given the number of students who did not respond.

Finally, students were asked how they felt their school had prepared them for a career in STEM. Responses from the first group were varied, including the listing of STEM subjects studied at school, participation in various projects and experiments, extracurricular activities, and the development of resilience and critical thinking. However, in the first group, 7 students did not answer and 3 stated that their STEM preparation had been weak. Students in the second group mainly listed the STEM subjects they had studied. Additionally, 15 students did not respond, and 9 stated that they had not been prepared or did not know how to answer. Thus, students in the first group perceive their STEM preparation as more comprehensive, including projects, experiments, extracurricular activities, and the development of various necessary skills, whereas students in the second group mainly cited classroom subjects and had more negative or unanswered responses, indicating a more limited perception of the school's STEM preparation.

5. Limitations and further steps

The main limitations of the study are the small sample size (68 students) and the inclusion of only two educational institutions. These factors limit the generalization of the results to the entire student population in Bucharest or Romania. Additionally, the cross-sectional design of the study does not allow for monitoring long-term changes in STEM identity or career preferences. Nevertheless, the results obtained can be useful for teachers, students, parents, and educational staff in optimizing the career guidance process and fostering students' STEM identity. Future research should involve a larger sample and include longitudinal studies to identify trends over time, monitor skill and interest development, and evaluate the lasting effects of educational practices on career choices.

6. Discussions and recommendations

The study shows that educational practices inspired by the Finnish system promote student collaboration, problem-solving, autonomy, and increased interest in technical and scientific fields. Therefore, the authors' recommendations for teachers include fostering collaboration among students through classroom and extracurricular activities, project-based learning, encouraging learning through experimentation, developing critical thinking, and maintaining students' curiosity. Regarding recommendations for school leadership, these include offering a diverse range of extracurricular activities, emphasizing the balance between learning and student well-being, and promoting learning through experimentation. Additionally, educational policymakers should adapt curricular approaches to be student-centered, train teachers in innovative methods, and support research on long-term career impacts. Altogether, these measures can contribute to creating a better learning environment where students can grow personally and prepare effectively for future careers.

7. Conclusions

Thus, according to the results presented above, students exposed to educational practices inspired by the Finnish system (Group 1) demonstrate more developed communication and collaboration skills, greater frustration tolerance, and higher self-confidence compared to students in the traditional Romanian school (Group 2). They also show higher levels of autonomy and perseverance, more frequently seek additional information, and collaborate more effectively with their peers. The results of the math and physics tests indicate that both groups possess basic knowledge, but students in Group 1 provided more correct and partially correct answers, showing a better ability to apply concepts in real-world contexts. Regarding interest in STEM fields, students in Group 1 displayed greater motivation and a clearer orientation toward engineering, physics, chemistry, and construction, whereas students in Group 2 were more drawn to non-STEM fields. Furthermore, the preparation provided by the school for students in Group 1 is more diverse, including projects, experiments, and extracurricular activities, while students in Group 2 mentioned only the subjects studied during regular classes.

Therefore, practices inspired by the Finnish educational system contribute to the development of STEM identity and positively influence students' interest in STEM careers, providing them with better preparation for practical application of concepts and a clearer orientation toward a STEM career.

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