DEVELOPING TRANSVERSAL SKILLS IN PRIMARY EDUCATION: A COMPARATIVE INTERNATIONAL STUDY

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Abstract: One of the major challenges in 21st-century education is the development of transversal skills, which are essential for fostering students' adaptability, creativity, and critical thinking. This study is based on an international survey conducted in five countries (Belgium, Cyprus, Hungary, Italy, and Romania), analyzing the professional perspectives of primary school teachers on the implementation and challenges of transversal skill development. The study examines the demographic and professional characteristics of teachers and explores cross-country differences in the recognition and perceived importance of transversal skills. The findings indicate that while teachers widely acknowledge the significance of developing these skills, they face considerable obstacles, such as time constraints, a lack of methodological tools and resources, and students' lack of motivation. The policy and practical implications emphasize the need for targeted professional development programs for teachers and improvements in educational infrastructure to facilitate the effective integration of transversal skills into primary education.

1. Introduction

One of the central questions in global education systems is how students can be adequately prepared for the rapidly evolving social and economic landscape. Contemporary educational paradigms increasingly emphasize the development of transversal skills, which enable lifelong learning, complex problem-solving, conscious use of digital technologies, and effective collaboration. Policy documents from the European Union and the OECD underscore that the integration of these skills into education is fundamental for students to thrive in the labour market and broader society.

The development of transversal skills is particularly crucial in primary education, as this period lays the foundation for cognitive, emotional, and social competencies that significantly influence students' long-term academic performance and personal growth. However, teachers frequently encounter challenges in fostering these skills, including limited instructional time, inadequate methodological tools, and low student motivation.

This study presents the findings of an international survey analysing the perspectives and experiences of primary school teachers in Belgium, Cyprus, Hungary, Italy, and Romania regarding the teaching of transversal skills. The research aims to identify the instructional strategies employed by teachers, the barriers they perceive, and the cross-country variations in these aspects. The findings shed light on the opportunities and constraints associated with transversal skill development and offer policy recommendations to enhance pedagogical practice and institutional support.

2. Pedagogical and Theoretical Approaches to Transversal Skills

2.1 Transversal skills

Despite the fact that the concept of transversal skills is widely used in the literature, there is no complete consensus on its exact definition. It is common to use other terms related to the concept or to provide a classification of skills with categories that correspond to the transversal skills domain (see Kulman & Lewandowska, 2024). There is no doubt that the concept encompasses a number of skills, more or less strongly or loosely related to each other, that are relevant to 21st century life, contemporary challenges, success in the labor market and in personal life, as well as to well-being in general. Its use therefore draws attention to the expectations that can be placed on education today: the need to develop skills for future life and career development.

Joynes and colleagues (2019) argue that, although there are differences in the use of terminology, the different concepts provide a good representation of the range of skills in question. Transversal skills can be linked to life skills, soft skills, critical skills and digital skills. Their development can be linked to the development of skills and competences rather than to the acquisition of a specific subject matter in school. In words of Kulman and Lewandowska (2024), "*the development of transversal competences requires the specific preparation of teachers in order to create a learning environment that guarantees the acquisition of transversal competences*" (Kulman & Lewandowska, 2024: 68).

The conceptual diversity of transversal skills is also reflected in the formal frameworks that have laid down guidelines for school development work, based on how to extend current social trends and the challenges that education of the present and the near future must meet. UNESCO has captured the scope of development needed to build an adaptive future society under the concept of future literacy (Miller, 2018; UNESCO, 2019; 2020). Their recommendations include complexity and diversity as primary considerations, given the many uncertainties that the system must address; that is, multiple narratives of the future can be imagined, which build heavily on the expected complexity of social and technological processes.

The UNESCO recommendation discusses the transversal skills framework in terms of six main groups of skills, covering media literacy, intrapersonal skills, interpersonal skills, critical and innovative thinking, global citizenship, and a sixth group of skills that cannot be classified in the former but are also crucial for the future society as basic skills (Care & Luo, 2016). The framework aims to set out the directions for the development of skills in school-based teaching and learning, independently of the subjects.

In 2020, the European Union set up an agency called Skills Lab, which maps current and future skills needs by continuously assessing expectations in the Member States (European Training Foundation 2020). The Skills Lab's vision is to build on the diversity of European society (in terms of cultural complexity, diversity of mindsets and literacy) and to harness the capacity for collaborative action. According to Skills Lab, it is the collective intelligence of society that will enable it to meet the challenges of the future, providing it with the necessary creativity, innovation, experimentation and innovation.

The ESCO framework (European Skills, Competences, Qualifications and Occupations; European Commission, 2020) was also developed by the European Commission to meet the needs of the labor market. The ESCO framework aims to standardize the definitions of the skills required for different professions and occupations. At the same time, the framework can be linked to the LifeComp competences framework, which is no longer focused on the labour market, but rather on generic skills. These place a strong emphasis on core competences for personal fulfilment, social life and learning. The LifeComp includes nine key competences in three groups: self-regulation, resilience, well-being (for personal fulfilment), empathy, communication, cooperation (for social relationships), growth mindset, critical thinking, and learning management (for continuous learning) (Sala & Cabrera Giraldez, 2022).

In addition to the frameworks established by the official institutions, several other proposals have been made on the skills that need to be developed to meet the challenges of the future. A good summary can

be found in the work of Kotsiou and colleagues (2022), which examines almost a hundred competency frameworks. In their results, they summarize the relevant commonalities, thus presenting nine meta-categories of skills that will shape future literacy: higher-order thinking skills, dialogical skills, digital and STEM literacy, values, self-management, lifelong learning skills, entrepreneurship, leadership and resilience. In terms of the official frameworks, almost all of these nine categories can be classified as transversal skills.

The European Union's Recommendation for the Interpretation of Transversal Skills (European Commission, 2020) has been instrumental in this survey. The ESCO framework describes these skills according to six main categories: basic skills (e.g. language skills), thinking skills, self-management skills, social and communication skills, physical and manual skills, and life skills. Taking into account the overlaps, all are skills and competences that are generally necessary or beneficial for effective action in work, learning and other life activities. Thus, transversal skills cannot be exclusively linked to a single specific context (e.g. occupation, employment sector or community activity) and therefore allow for flexible adaptation (Cedefop, 2021). They are characterized by the fact that skills acquired in one context can be directly transferred to another context in which they can be beneficial.

2.2 The Role of STEAM in the Development of Transversal Skills

The acronym STEM has existed in the United States since the 1990s, as it was felt that fragmented knowledge could not address complex and global issues (Perignat & Katz-Buonincontro, 2019). An alternative, STEAM, which considers science, technology, engineering, arts/humanities and mathematics, has emerged. The addition of the arts/humanities to the original STEAM framework was intended to address its limitations (Perignat & Katz-Buonincontro, 2019) and thereby foster the creative and innovative ideas and solutions needed in the 21st century (Land, 2013). STEAM-based education adopts an interdisciplinary approach that holistically integrates the development of knowledge, skills and attitudes related to science, technology, engineering, arts/humanities and mathematics education (Monkeviciene et al., 2020).

Moore and colleagues (2014), after an extensive review of the literature, attempted to characterise STEAM education. They listed six key principles of quality STEAM education: (1) multidisciplinary content, including mathematics, science, and technology; (2) learner-centered pedagogy; (3) lessons are presented in an inviting and engaging context; (4) engineering design or redesign challenge is involved; (5) learning errors; and (6) teamwork and collaboration. STEAM education is designed to help the next generation of students solve real-world problems using knowledge from multiple disciplines and cross-cutting competencies such as critical thinking, collaboration, and creativity.

The multidimensional nature of competence development implies a profound methodological change in the way the teaching process is understood. STEAM-based education is a methodological approach that, according to the research of Ortiz-Revilla and colleagues (2021), results in students achieving high levels of competence in all key competences, with a particular focus on the level of competence achieved by girls in science skills. The results support the hypothesis that integrated STEAM education is effective as a possible way to improve competence development during the primary school years, as it is didactically appropriate to the complexity of today's world.

STEAM activities based on science and art education skills and content develop higher levels of thinking and learning in students (Bassachs et al., 2020; Cañabate et al., 2018). Through the activities, learning takes place in an environment where students' creativity, critical thinking and collaborative skills are developed (Perignat & Katz-Buonincontro, 2019). Cooperative learning in science and arts provides primary school students with the opportunity to develop their skills for interacting and communicating with peers and teachers (Cañabate et al., 2018).

The competencies that can be developed through STEAM-based learning can be categorized as: cognitive ability in the subjects (understanding and using convergent knowledge); advanced thinking ability (creativity, problem-solving ability, critical thinking, information use ability, and decision-making ability); ability to contribute to the community (communication ability, peer relations ability,

and cooperative ability); and individual emotional ability (self-esteem, positive emotions, thoughtfulness, and civic awareness) (Kim & Kim, 2016).

STEAM activities make children more active and proactive, as self-acquired knowledge increases their self-confidence (Wahyuningsih et al., 2020). However, STEAM activities must meet several criteria: the situation is generated by learning to concretely feel the need to solve problems, while the creative design encourages students to find a way to solve them by themselves, and the emotional touch generates students' enthusiasm to challenge new problems through interest, motivation, and the joy of success. Research has shown that enhancing children's natural curiosity, as well as providing positive childhood experiences of science learning and encouraging family educational participation, play an important role in learning outcomes (Monkevinciene, 2020).

One challenge for educators designing STEAM activities is to engage students in authentic science practices. These include observing, experimenting or conducting scientific investigations and communicating ideas, discussing the evidence supporting these ideas with peers, and supporting metacognitive operations (Crawford & Capps, 2018).

2.3 The Role of Games in the Development of Transversal Skills

Play in general, and games more specifically, have been considered as potential learning mechanisms throughout childhood (Piaget, 1951). Games may foster learning of various concepts and competences, including emotional competencies, through several mechanisms: they provide active and experience-based learning opportunities, elicit longer sustained attention, facilitate understanding, provide immediate feedback, and give children a sense of control (Howard-Jones et al., 2016). The presence of peers encourages players to persist longer while facing challenges and to be more creative during problem-solving. Moreover, games trigger intrinsic motivation and positive emotions (e.g., amusement, fun, and pleasure) (Hromek & Roffey, 2009).

Games also show promising results when used as educational tools and may be promising to promote emotional competencies (Hromek & Roffey, 2009). Researchers identify three levels on which board games may promote socioemotional learning skills: on the skill-level, children can practice a skill during game play. On the interactional level, children use the skill with each other. Finally, the mediated level further enhances learning with the help of facilitators (e.g., therapists and teachers). Interestingly, many educational games transmit knowledge in a question-answer manner (Conolly, 2012). However, to sustain the development of a competence, the game mechanics must go beyond transmitting knowledge and favor the use and training of specific competences during game play.

A game-based approach has the advantage of providing children with multiple opportunities to learn and practice social skills, to practice before testing it out in real life settings (Parsons, Leonard & Mitchell, 2006), and to augment the efforts of the teachers, rendering it possible to conduct the skills training with larger numbers of students in the classroom. The effectiveness of game-based learning (GBL) in relation to various learning goals and educational outcomes has been studied in different settings and pedagogical contexts. Results show that GBL tends to positively influence attitudes, promote better learning outcomes and cognitive gains, positively affect motivation (Connolly et al., 2012) and the acquisition of problem-solving skills (Li & Tsai, 2013). There is strong evidence that GBL impacts 21st century skill development (Binkley et al., 2012).

3. Methodology

3.1 Research Aims and Questions

The primary objective of the study conducted within the framework of the *"Skills of Tomorrow for Children of Present"* Erasmus+ project is to explore and compare the professional perspectives, experiences, and expectations of primary school teachers (educating children aged 6–10) in the participating countries regarding methods that foster the development of future competencies. The study specifically focuses on learning activities, traditional and game-based learning, and STEAM (Science, Technology, Engineering, Arts, and Mathematics) programs. The research was guided by the following key questions: 1) To what extent do teachers consider transversal skills essential for the development of 6–10-year-old students? 2) What difficulties and challenges do teachers face in skill development? By addressing these research questions, the study aims to provide a comprehensive overview of current pedagogical practices and identify factors that either facilitate or hinder the effective development of transversal skills.

Based on both national and international literature, the following hypotheses were formulated: 1) Kulman and Lewandowska (2024) emphasize that the development of transversal competencies requires specific teacher preparation in order to establish a learning environment conducive to the acquisition of such skills. This finding underlines the relevance of conceptual awareness in prioritizing transversal skills. Accordingly, it is hypothesized that *teachers who are familiar with the concept and terminology of transversal skills are more likely to rate their development as highly important for pupils aged 6–10*. 2) According to the OECD TALIS 2018 report, novice teachers tend to be more open to implementing new pedagogical strategies, including those aimed at fostering transversal competencies. In light of this it is hypothesized that *younger and less experienced teachers are more likely to apply innovative, skill-oriented methods – such as STEAM or game-based learning – compared to their older and more experienced colleagues*. 3) Previous studies have identified curriculum overload and rigid time constraints as key barriers to the implementation of innovative teaching practices (Kulman & Lewandowska, 2024). Consequently, we hypothesize that *teachers' perception of insufficient instructional time is negatively associated with the frequency of integrating transversal skills into their daily teaching routines*. 4) Hromek and Roffey (2009) demonstrated that game-based learning enhances social and emotional learning and increases student engagement, while Li and Tsai (2013) confirmed its positive motivational impact in science education. In line with these findings, it is hypothesized that *the application of STEAM and game-based learning methods contributes to greater student motivation, thereby reducing the barrier of perceived "student disinterest"*.

3.2 Research Design, Sampling Procedure and Measurement Tool

This study employs a quantitative, descriptive, and cross-sectional research design, utilizing a structured online questionnaire as the primary data collection tool. The survey was designed to gather insights from primary school teachers across the participating countries regarding their professional views and experiences with transversal skill development. The research design allows for a comparative analysis between partner countries while identifying both country-specific differences and common trends in transversal skill education.

The target population comprises teachers educating children aged 6–10 in the five participating countries: Belgium, Cyprus, Hungary, Italy, and Romania. A non-probability sampling method was applied, as the survey was conducted among teachers who were actively engaged in the project. The sampling process was characterized by the following key aspects: 1. targeted population: primary school teachers working with children aged 6–10; 2. accessibility: the survey was conducted via an online Google Forms questionnaire, distributed by project partners in each country; 3. voluntary participation and anonymity: participation was voluntary, and data collection adhered to the EU General Data Protection Regulation (GDPR) 2016/679. Responses were processed anonymously; 4. sample size: 100 teachers were surveyed in each country.

The study's primary measurement tool was a structured online questionnaire, divided into two main sections. Transversal skill development among 6–10-year-old students. This section investigated teachers' professional perspectives on transversal skills (e.g., adaptability, creativity, emotional awareness, conflict resolution), their perceived importance, and how frequently they are integrated

into daily teaching practices. The questionnaire explored teachers' knowledge of policy frameworks, their familiarity with transversal skill concepts, the methods and tools they use, and the barriers they face in skill development. Demographic and professional characteristics of teachers. This section collected data on teachers' country of employment, school region, school type, as well as personal demographic factors (e.g., gender, age, professional experience). Further questions addressed the institutional environment, the number of students enrolled, teachers' participation in professional development programs, and their motivation for further skill enhancement. The questionnaire combined closed-ended questions (e.g., Likert scales, multiple-choice questions) and open-ended questions, allowing for both quantitative analysis and qualitative insights.

3.3 Description of the research sample

Examining the demographic and professional characteristics of primary school teachers is crucial for understanding pedagogical practices and improving educational systems. The present study includes primary school teachers from Belgium, Cyprus, Hungary, Italy, and Romania, with a total sample size of N=437. The country-specific distribution is as follows: Belgium (16%; N=70), Cyprus (15%; N=66), Hungary (22%; N=97), Italy (20%; N=88), and Romania (27%; N=117). Variations in response rates across countries may be attributed to factors such as teacher accessibility, interest in the survey, and – particularly in the case of Cyprus – the size of the national education system.
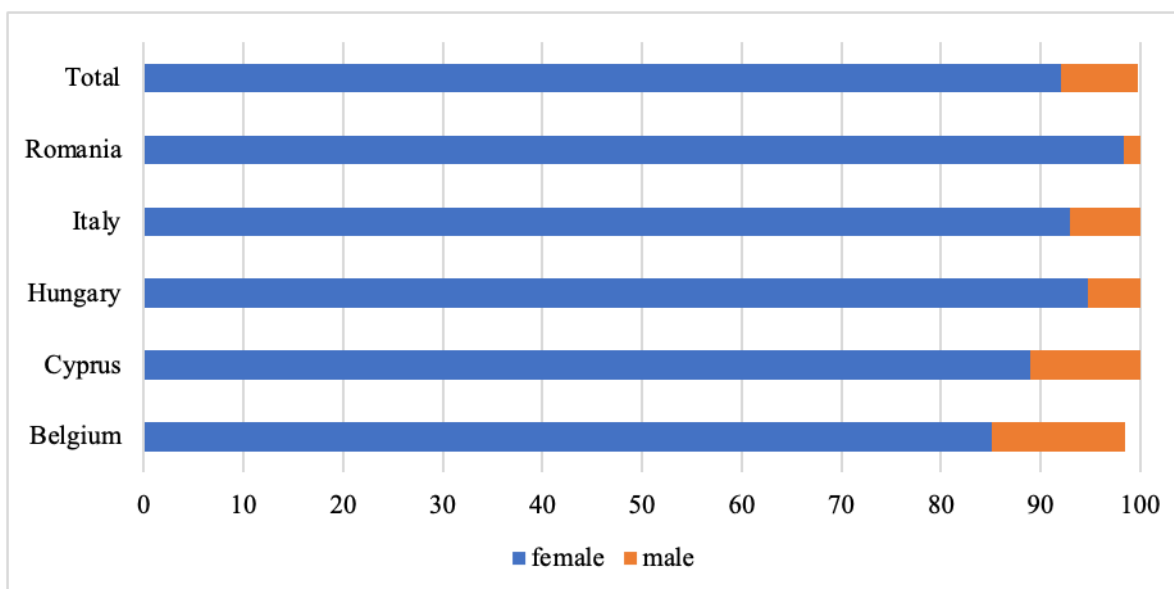

Figure 1. Gender distribution of primary school teachers (%; N=437)
Source: own database; author's own editing
The significance level of the correlation is: χ^2=17,121; df=8, p=0,029.

The survey results indicate that 92% of respondents were female, aligning with both national and international trends. However, significant country-specific differences were observed (Figure 1). In Romania, the proportion of female teachers was particularly high (98.3%), exceeding the OECD average and raising questions regarding gender balance in the teaching profession (OECD, 2018). According to the latest data from the Romanian National Institute of Statistics (2023), 93.56% of primary school teachers are female. In contrast, Belgium exhibited a significantly lower proportion of female teachers (85.1%), suggesting a relatively higher representation of men in the profession compared to other participating countries.
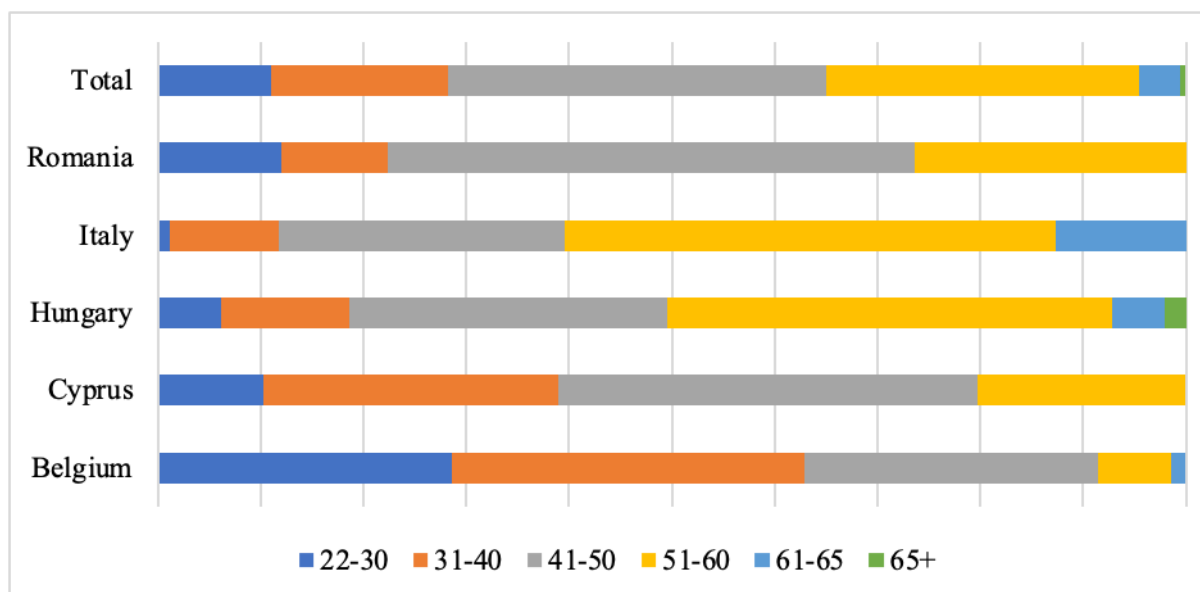
Figure 2. Age distribution of primary school teachers (%; N=437)
Source: own database; author's own editing
The significance level of the correlation is: $\chi2=124,600$; df=20, p=0,000.

The age distribution of teachers (Figure 2) showed statistically significant differences across countries, highlighting variations in workforce composition within the profession. In Belgium, the proportion of younger teachers (22–30 years old) was relatively high (28.6%), suggesting either a higher success rate in reaching this demographic in the survey or a greater appeal of the teaching profession to younger individuals. It may also indicate a more sustainable pipeline of new teachers entering the profession. In Cyprus, the 31–40 age group had the highest representation (28.8%), potentially reflecting the typical entry and stabilization period in the teaching career. In Romania, the 41–50 age group dominated (51.3%), indicating a workforce skewed towards mid-career professionals. Conversely, in Italy and Hungary, older teachers (51–60 years and above) represented the majority (Italy: 60%; Hungary: 50.6%), reinforcing concerns regarding the aging teaching workforce.
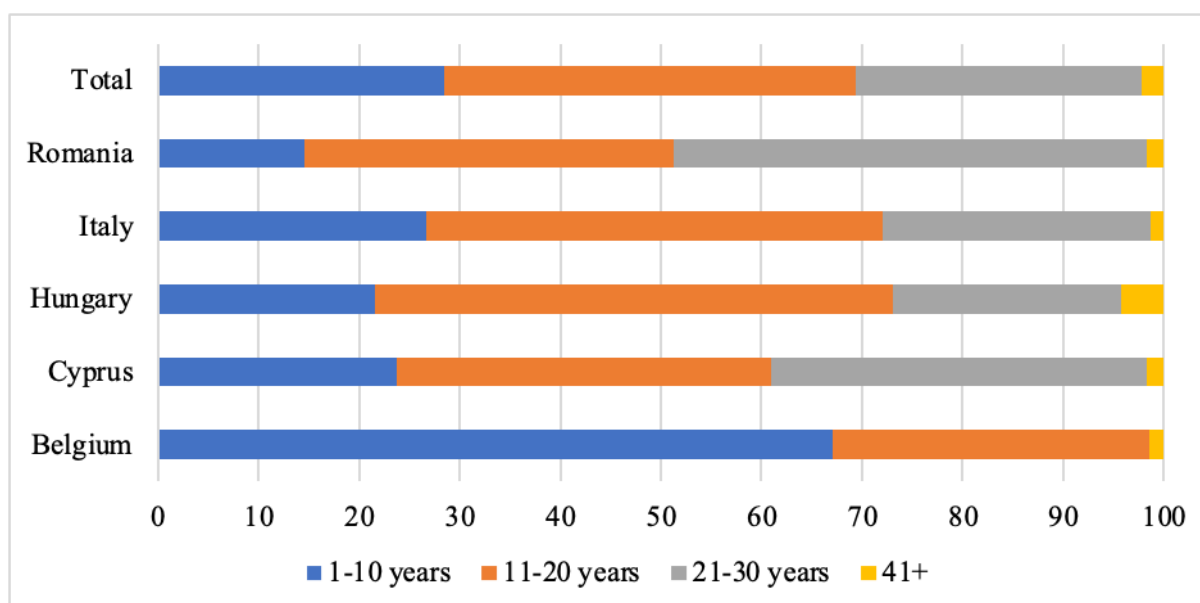

Figure 3. Teaching experience of primary school teachers by country (%; N=437)
Source: own database; author's own editing
The significance level of the correlation is: $\chi2=91,726$; df=12, p=0,000.

Significant differences were observed in teachers' years of professional experience across countries (Figure 3), a pattern that closely aligns with the previously discussed age distribution trends. In Belgium, 67.1% of teachers reported having 1–10 years of experience, whereas this figure was much lower in Romania (14.5%). Since teaching experience is closely linked to age, cross-country differences in this area exhibit similar patterns. In the Hungarian sample, teachers with 11–20 years of experience constituted the majority, suggesting that those who entered the profession in the past two decades have remained active in teaching. The distribution of experience levels may impact the flexibility of pedagogical methods, as younger teachers tend to be more open to innovative teaching approaches, while more experienced educators often rely on traditional methodologies.
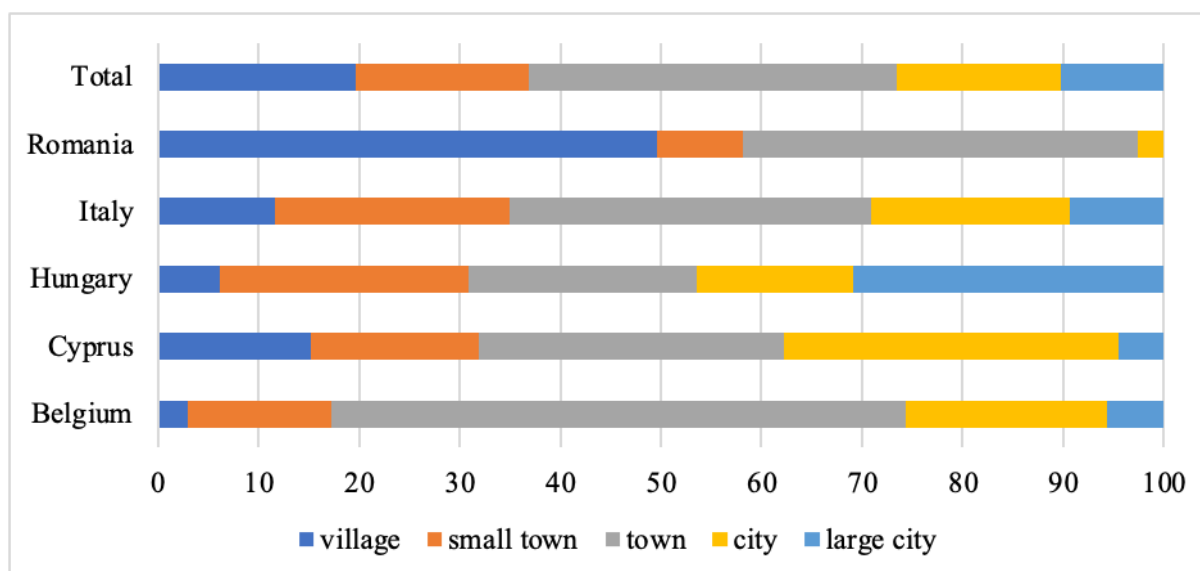

Figure 4. Distribution of primary school teachers by type of settlement (%; N=437)
Source: own database; author's own editing
The significance level of the correlation is: $\chi 2=182,441$; df=16, p=0,000.

The geographical distribution of teachers' workplaces also exhibited significant variations across countries (Figure 4), highlighting differences in the educational environment. In Romania, nearly half of the respondents (49.6%) worked in **r**ural schools (settlements with fewer than 3,000 inhabitants), whereas this figure was only 2.9% in Belgium. This suggests that Belgium's teaching workforce is predominantly urban-based, whereas Romania's education system relies heavily on rural schools. Belgium exhibited a notable concentration of teachers in medium-sized urban areas (15,000–100,000 inhabitants), representing 57.1% of the sample, pointing to the dominance of urban educational institution**s**. Conversely, in Cyprus, a significant proportion of teachers (33.3%) worked in large urban areas (100,000–1,000,000 inhabitants), emphasizing the role of metropolitan educational hubs. The Hungarian sample was characterized by a high representation of teachers in small towns (3,000–15,000 inhabitants) at 22.7%, as well as a notable presence in the capital city (30.9%).

These geographical differences align with previous research (e.g., OECD, 2019), which suggests that urban-rural disparities in educational resources significantly impact teaching quality and professional development opportunities. Teachers working in rural schools often face greater challenges due to limited access to educational resources, fewer professional training opportunities, and reduced digital infrastructure. In contrast, urban schools generally benefit from better infrastructure, greater institutional support, and more frequent training opportunities, facilitating continuous professional development and the integration of modern teaching strategies. Addressing these disparities is an essential policy priority for ensuring equity in education.

The analysis of the demographic and professional characteristics of the teachers participating in the survey within an international context revealed structural differences between the countries, which may have a significant impact on the functioning of educational systems and the implementation of

pedagogical innovations. A clear female predominance in the teaching profession was observed across all participating countries, with the highest proportion in Romania (98.3%). In terms of age and professional experience, younger teachers were more prominently represented in Belgium and Cyprus. With regard to the location of employment, the proportion of teachers working in rural schools was particularly high in Romania (49.6%), while urban educational institutions were dominant in both Belgium and Cyprus.

4. Results

One of the fundamental goals of 21st-century education is to develop transversal skills, which enhance students' adaptability, problem-solving abilities, and collaborative competencies. This section aims to define transversal skills, explore their pedagogical significance, and identify the key challenges in their development.

4.1 Definition and Recognition of Transversal Skills

Transversal skills are broad, cross-disciplinary competencies that contribute to students' flexible thinking, creativity, and ability to collaborate effectively. These skills include critical thinking, problem-solving, communication, social skills, and adaptability. According to policy documents from the OECD and the European Union, these competencies play a crucial role in preparing students for the demands of the 21st-century labour market and society (Oktatási Hivatal, 2013; Svecnik, 2011).

Table 1. *Recognition of Transversal Skills-Related Concepts by Teachers Across Countries* (%; N=437)

	transversal skills	transferable skills	21st century skills	global competences	transversal competences
Belgium	58,8	58,2	65,7	45,5	51,5
Cyprus	43,9	59,1	**81,8**	59,1	36,4
Hungary	50,5	44,7	**79,8**	72,9	54,3
Italy	**98,8**	**88,8**	64,1	71,4	**97,6**
Romania	60,7	**81,5**	77,6	**83,3**	58,9
Total	63,1	67,2	74,3	68,8	60,9

Source: own database; author's own editing

The significance level of the correlation is: χ^2=52,926; df=4, p=0,000.

The values in bold indicate that the percentage in the given cell is higher than expected in a random distribution (Adj. Stand. Res.: $\geq$ 2.0).

The findings of the survey (see Table 1) indicate significant cross-country differences in teachers' familiarity with the concept of transversal skills. In addition to transversal skills, the questionnaire included related terms such as transferable skills, 21st-century skills, and global competencies, whose overlapping meanings may complicate teachers' consistent interpretation and practical application in educational settings.

Across the entire sample, the most widely recognized concept was 21st-century skills (74.3%), while transversal competencies (60.9%) and transversal skills (63.1%) were less frequently identified. A notable country-specific trend emerged in Italy, where teachers reported an exceptionally high level of familiarity with transversal skills (98.8%) and transversal competencies (97.6%), suggesting that these concepts are deeply embedded in the Italian pedagogical discourse. Similarly, in Romania,

teachers demonstrated a high awareness of global competencies (83.3%) and transferable skills (81.5%), implying that these categories receive greater emphasis within the national education system.

In contrast, Cyprus exhibited the lowest recognition levels for transversal skills (43.9%) and transversal competencies (36.4%), whereas 21st-century skills were identified by 81.8% of Cypriot teachers, possibly reflecting the increased focus on digital education in the country. In Hungary, 50.5% of teachers recognized the term transversal skills, indicating a moderate level of familiarity, while global competencies were identified at an above-average rate (72.9%). This could suggest a recent shift in education policy priorities toward global education frameworks.

The results highlight substantial national variations in the conceptual understanding of transversal skills, which may influence how these competencies are integrated into teaching practices. The discrepancies suggest the need for greater alignment in terminology and teacher training programs to ensure a consistent and effective approach to transversal skill development across different educational contexts.

4.2 The importance of developing transversal skills

The relevance of transversal – or cross-curricular – competencies for pupils' long-term educational and socioeconomic trajectories is well documented (OECD, 2019; European Commission, 2020; Trilling & Fadel, 2009). Quantitative results presented in Section 4.1 corroborate this body of evidence: teachers in all five partner countries assigned a high overall priority to the cultivation of such skills (grand mean $M = 4.36$ on a five-point Likert scale). A one-way ANOVA ($F = 4.29$; $df = 4$; $p = 0.002$) nonetheless revealed statistically significant cross-national heterogeneity, with Italy reporting the highest perceived importance ($M = 4.67$; $SD = 0.694$) and Hungary the lowest ($M = 4.24$; $SD = 1.008$).

Table 2. *What Do the Numbers Mean? Emerging Interpretations*

Country	Mean	SD	Key Observation
Italy	4,67	0,694	The term *transversal skills* is explicitly embedded in policy documents and initial teacher-education syllabi; conceptual familiarity approaches 99%.
Cyprus	4,35	0,779	The national curriculum references transversal skills only implicitly; teacher familiarity and importance ratings are correspondingly moderate.
Belgium	4,29	0,705	Although the teaching force is comparatively young, fragmented policy directives appear to diffuse the sense of urgency.
Romania	4,28	0,753	Marked rural-urban resource disparities coexist with uneven conceptual awareness.
Hungary	4,24	1,008	A content-heavy national curriculum frames transversal skills as peripheral "soft extras", yielding the lowest importance score.
Total	4,36	0,788	

Source: own database; author's own editing

The significance level of the correlation is: Sum of Square: 11,066; F=4,29; df=4; p=0,002

Four mutually reinforcing mechanisms appear to structure teachers' perceptions. First, terminological clarity functions as a cognitive amplifier: in countries where the phrase *transversal skills* is codified in strategic documents – Italy's National Digital School Plan (Ministero dell'Istruzione, 2022) being a prominent example – a shared mental model emerges that elevates the construct's salience in everyday pedagogical discourse (Valk, 2023). Second, the scope and intensity of both initial teacher education (ITE) and continuing professional development (CPD) exert a formative influence; programmes in Italy and Belgium mandate at least one competence-based learning module (European

Schoolnet, 2021), whereas Hungarian respondents report only "marginal exposure" to such content during their training. Third, high-stakes assessment regimes that reward rote subject knowledge, as still prevalent in Romania and Hungary, effectively crowd out cross-disciplinary, process-oriented learning opportunities and thus attenuate the perceived utility of transversal competencies (Kis-Tóth et al., 2017). Finally, material and cultural resources shape practice horizons: EU-funded STEAM laboratories and in-house pedagogical coaches in Italian and Belgian schools foster a climate of experimentation, while limited bandwidth and outdated hardware in rural Romanian contexts curtail the operationalisation of transversal-skill frameworks (Fullan, 2013; Hromek & Roffey, 2009).

Recognizing the interdependence of these factors suggests a multilayered policy agenda. Codifying precise terminology in national frameworks would establish a common reference point for teachers and curriculum designers alike. High-quality, short-cycle CPD – financed through ring-fenced micro-grants – could accelerate the diffusion of game-based learning (GBL), STEAM, and design-thinking methodologies, particularly if younger teachers are incentivised to mentor senior colleagues in a flipped-CPD format (Li & Tsai, 2013). Introducing cross-disciplinary "innovation weeks," assessed through project portfolios rather than standardised tests, would relieve curricular congestion and create temporal space for skill-based pedagogy. Competency-oriented reporting instruments, such as digital badges, could legitimise transversal-skill instruction within high-stakes environments, while mobile STEAM labs and subsidised robotics kits would mitigate infrastructural inequities between urban and rural schools (OECD, 2019).

4.3 Challenges in the development of transversal skills

The integration of transversal skills into teaching practices presents multiple pedagogical and systemic challenges, which may limit their effective implementation in classrooms. The survey required teachers to select predefined barriers that they perceived as the most significant obstacles to the development of transversal skills (see Table 2).

Table 3. *Barriers to the Development of Transversal Skills* (%; N=437)

	Lack of time during classes	Missing toolboxes	Lack of resources	Lack of knowledge	Measurement of knowledge	Student disinterest
Belgium	80,6	**64,2**	41,8	**41,8**	13,4	10,4
Cyprus	**90,8**	40	52,3	20	0	16,9
Hungary	82,1	53,7	32,6	28,4	**30,5**	**25,3**
Italy	71,1	42,2	**54,2**	13,3	15,7	8,4
Romania	**91,4**	39,7	**52,6**	18,1	25	22,4
Total	**83,6**	**47,2**	**46,7**	**24**	**21,9**	**17,6**

Source: own database; author's own editing

The significance level of the correlation is: χ^2=52,926; df=4, p=0,000.

The values in bold indicate that the percentage in the given cell is higher than expected in a random distribution (Adj. Stand. Res.: $\geq$ 2.0).

The most frequently identified challenges were lack of time during classes (83.6%), missing toolboxes (47.2%), lack of resources (46.7%), lack of knowledge (24%), measurement of knowledge (21.9%) and student disinterest (17.6%). These differences across countries were statistically significant (χ^2=17.607; df=4; p=0.001). Time constraints were particularly pressing in Romania (91.4%) and Cyprus (90.8%), while in Italy (71.1%), this challenge was reported significantly less frequently. This finding is consistent with prior research indicating that curriculum overload and rigid

time structures hinder the adoption of innovative teaching methodologies (Kulman & Lewandowska, 2024). Lack of toolboxes was most pronounced in Belgium (64.2%), whereas in Romania (39.7%) and Cyprus (40%), this barrier was perceived as less problematic. The absence of well-defined pedagogical frameworks and teaching materials can significantly impede the systematic development of transversal skills (Kis-Tóth et al., 2017). Insufficient educational resources (e.g., teaching materials and technological tools) was a major concern in Italy (54.2%) and Romania (52.6%), whereas in Hungary (32.6%), this issue was reported with lower frequency. Limited access to instructional resources may restrict teachers' ability to integrate transversal skills into the curriculum effectively.

Lack of knowledge about transversal skills development was reported by 41.8% of teachers in Belgium, while in Italy, this concern was significantly lower (13.3%). Teacher training and professional development are crucial in addressing these gaps, as inadequate knowledge can hinder the effective implementation of transversal skill-oriented teaching strategies (Cseppentő, 2023). Student disinterest was a more pronounced issue in Hungary (25.3%) and Romania (22.4%), whereas it was least concerning in Italy (8.4%). Low student motivation may pose a significant barrier to implementing skill-focused pedagogies (Kulman & Lewandowska, 2024).

Interestingly, factors such as *"I am not able to integrate the skills development into the subject I teach", "I have tried and failed"* did not emerge as key barriers. The findings reveal that barriers to transversal skill development vary significantly across countries, reflecting differences in national education systems and pedagogical approaches. Time constraints and lack of resources were consistently identified as major challenges across all countries, highlighting the need for curriculum restructuring and increased institutional support. Methodological gaps in teacher training and resource availability remain critical obstacles in several countries, emphasizing the importance of providing educators with adequate tools and frameworks. Student motivation plays a key role in the effective implementation of transversal skills, indicating that engaging pedagogical strategies (e.g., game-based learning and STEAM approaches) could help increase student interest.

To enhance transversal skill development, education systems must focus on: adapting curricula to allow more flexibility for skills-based education; expanding teacher training programs to provide methodological support and concrete classroom strategies; investing in digital and instructional resources to facilitate the integration of transversal competencies into daily teaching practices. These findings underscore the structural, methodological, and pedagogical challenges associated with transversal skill development and emphasize the need for context-specific strategies to support teachers in overcoming these barriers.

5. Conclusion and discussion

The findings of this study clearly demonstrate that primary school teachers across the five examined countries recognize the fundamental importance of transversal skills development in early education. However, significant cross-country differences emerged regarding both the familiarity with transversal skills terminology and the practical implementation of these skills in daily teaching. For instance, Italian educators displayed a higher level of awareness regarding transversal skills concepts, whereas in Cyprus and Belgium, these notions appear to be less integrated into educational discourse.

The analysis also highlighted that teachers utilize a variety of methodological approaches to foster transversal skills, yet the effectiveness and frequency of application differ across countries. Game-based learning and STEAM activities were identified as particularly effective strategies in this area, whereas outdoor learning and activity-based teaching were typically employed as complementary methods. Among the most significant barriers to transversal skills integration were time constraints and a lack of adequate methodological support, both of which hinder the effective incorporation of these competencies into classroom practices.

A key conclusion drawn from this research is that the successful development of transversal skills is highly dependent on the educational policy framework and institutional support. The results confirm that in countries where transversal skills are emphasized in teacher education and curriculum

regulations, teachers tend to integrate these competencies more consciously and effectively into their teaching practices.

Future research should further explore the factors that facilitate the development of transversal skills in primary education, with a particular focus on teacher training content and the advancement of educational tools. Based on the findings, it is recommended that targeted professional development programs be designed for teachers, alongside the creation of curricular and methodological guidelines that support the effective integration of transversal skills into everyday teaching practices.

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