

Article

Preparing Future Teachers for Inclusive Education: An Analysis of Curricular Deficits and Competency Perceptions in Romania

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Abstract

This study investigates the readiness of future teachers in Romania to meet the requirements of inclusive education, with a specific focus on curricular deficits and student teachers' perceptions of competence. Respecting the right to education for students with Special Educational Needs (SEN) is a central policy commitment. Yet, the capacity of initial teacher education (ITE) programs to operationalize this mandate remains uncertain. Using a convergent parallel mixed-methods design, the research combines a systematic documentary analysis of national regulations and psycho-pedagogical curricula (Orders No. 4139/2022 and 4524/2020; Law No. 199/2023) with a survey of 327 student teachers across eight universities. Systematic Content Analysis, based on a three-level depth protocol, reveals a structural curricular deficit: Level 1 outcomes (theoretical awareness of SEN and inclusion) appear in approximately 40% of compulsory subjects, whereas Level 2 outcomes (operational competence, such as designing adapted lessons or differentiated assessments) are almost completely absent from the mandatory core and are confined to electives. Survey results mirror this gap: although 81% of respondents anticipate working with pupils with SEN, 29.9% feel poorly or very poorly prepared, 25.5% report a lack of basic knowledge of SEN, and only 14.6% report high confidence in designing adapted activities. Analysis of Covariance (ANCOVA) shows that training level has a statistically significant but small effect on technical inclusive skills ($p = 0.043$; $\eta^2_p = 0.013$), while inclusive attitudes are mainly associated with age. The study concludes with a roadmap for reforming ITE through mandatory SEN-focused practicum placements and transversal integration of inclusive pedagogy.

Keywords: inclusive education; initial teachers' education; special education needs (SEN); teacher competencies; teachers' training curriculum



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1. Introduction

The landscape of contemporary teacher education has undergone a profound epistemological shift since the early 2010s, moving from a categorical focus on “special needs” toward a more holistic, rights-based understanding of inclusive education that values diversity as an inherent asset to the classroom (Florian, 2019; UNESCO, 2020a). This transformation is anchored in a global policy trajectory defined by the United Nations Convention on the Rights of Persons with Disabilities (CRPD) and Sustainable Development Goal 4 (SDG 4), which mandates the provision of inclusive, equitable, and quality education for all (Navas-Bonilla et al., 2025; UNESCO, 2020b). Central to the realization of these global imperatives is the teacher's professional competence, which acts as the primary

agent of inclusion. Research analyzed in scientific databases increasingly characterizes teacher competence not merely as a set of technical skills, but as a dynamic, recursive, and continuous spiral model comprising knowledge, skills, attitudes, and psychological readiness (Mendoza & Heymann, 2024; Song et al., 2019).

Despite these advancements, the transition from policy aspiration to classroom reality remains fraught with systemic tensions. One of the primary challenges identified in recent systematic reviews is the “dilemma of difference,” wherein strategies designed to support marginalized learners can inadvertently exacerbate stigmatization by marking them as fundamentally different from their peers (Florian & Black-Hawkins, 2011). Consequently, the focus of teacher education has shifted toward “inclusive pedagogy”—an approach that avoids marginalization by extending the options available to all learners in a classroom community rather than providing something “different” or “additional” only for some (Florian & Spratt, 2013; Mărgăritoiu, 2025). This paradigm shift necessitates a radical rethinking of teacher preparation, emphasizing “transformability”—the belief that a child’s capacity to learn is not fixed but can be altered through responsive pedagogical interaction (Florian, 2015).

Furthermore, the evolution of teacher competencies has seen the emergence of emotional intelligence and psychological resilience as critical, yet historically under-discussed, domains. Teachers in inclusive settings face complex social-emotional demands, making self-efficacy—their confidence in their ability to teach all children regardless of perceived difficulties—a core predictor of successful inclusion (Sharma & Sokal, 2015; Woodcock et al., 2022). The interconnectedness of these competencies suggests that teacher education must move toward a unified framework that integrates theoretical knowledge with practical fieldwork to develop the “pedagogical wisdom” necessary to navigate diverse classroom contexts (Zou & Huang, 2022).

Research supports the value of inclusive education, showing positive impacts on academic achievement, especially for students with disabilities, and social integration (Kefallinou et al., 2020). Studies indicate that inclusive settings improve the chances of academic and vocational success, helping individuals achieve long-term financial independence (Szumski et al., 2017; Myklebust, 2006, 2007; Myklebust & Båtevik, 2005, 2014).

This study addresses a critical research gap in the Eastern European context: the lack of empirical evidence on how the structural alignment of the national initial teacher education curriculum influences operational competencies for inclusive education (e.g., designing differentiated instruction), rather than merely fostering theoretical awareness among future teachers. The aim is to examine the extent to which the current curriculum enables a shift from Level 1 (conceptual knowledge) to Level 2 (practical competence), thereby exposing the discrepancy between national inclusion policies and the capacity of initial teacher education (ITE) programs to operationalize them.

This study contributes to the international literature on inclusive teacher education by combining a systematic analysis of curricular depth (Levels 0–2) with survey data on student teachers’ self-perceived competences, thereby linking national policy and program design to operational readiness for inclusive practice in an under-researched Eastern European context.

Against this backdrop, the following section outlines the international frameworks and comparative models that inform our analysis of the Romanian initial teacher education system.

2. Global Perspectives and Best Practice Models

Theoretical frameworks on inclusive teacher education provide the lens through which this study interprets the Romanian case. International standards such as the EASNIE Profile

of the Inclusive Teacher, Universal Design for Learning (UDL), and comparative models of educational funding clarify what counts as meaningful inclusive competence (e.g., operational skills for lesson adaptation) and how system-level incentives can support or hinder its development. By positioning Romania's initial teacher education curriculum against these benchmarks, the framework enables identification of where the national system remains at the level of theoretical awareness and where it fails to foster the operational competencies that constitute the core research gap of this study.

2.1. *The Multi-Dimensional Architecture of Teacher Competencies for Inclusive Education*

The conceptualization of teacher competencies has transitioned from a simple checklist of technical skills toward a complex, holistic framework that prioritizes teacher agency, belief systems, and psychological preparedness (Dignath et al., 2022; Van Steen & Wilson, 2020).

Recent systematic literature reviews identifying core competencies for inclusive educators highlight seven primary domains: differentiation and curriculum adaptation, collaborative practice, inclusive knowledge, positive attitudes and values, assistive technology use, reflective practice, and psychological readiness (Dignath et al., 2022; Page et al., 2021).

Among these, reflective practice is increasingly recognized as the core that enables teachers to navigate the unpredictability of heterogeneous classrooms (Brookfield, 2017).

Fundamental to this architecture is the domain of inclusive knowledge, which, in post-2012 literature, is reinterpreted as an understanding of diversity that transcends the "medical model" of disability (Florian, 2014; Hardy & Woodcock, 2015). Teachers must possess knowledge of the social-pedagogical factors that influence learning, including the impact of poverty, language, and cultural background. However, empirical evidence suggests a persistent "readiness gap". At the same time, teachers report high theoretical awareness, they frequently lack confidence in translating these principles into evidence-based instructional practices, particularly for students with social, emotional, and behavioral difficulties (Boghian & Cojocariu, 2025; Savolainen et al., 2012).

At the pedagogical level, teacher competence is evident in the ability to implement Universal Design for Learning (UDL) and differentiation without marginalizing (Kushwaha & Singh, 2023; Lowrey et al., 2017).

Modern frameworks emphasize that teachers must be able to create "rich learning opportunities" accessible to everyone (Florian, 2015). Furthermore, digital competence has emerged as a key factor, allowing teachers to vary textual modalities and participation structures to leverage student strengths (Blomberg Kjellström et al., 2026; Navas-Bonilla et al., 2025).

A significant insight from recent research is the critical role of "psychological readiness," where emotional resilience and professional identity formation are treated as standard components of teacher preparation rather than optional "add-ons" (Forget, 2022).

2.2. *Comparative Pedagogical Models and the Shift Toward Transformative Professional Learning*

The structures for developing teacher competencies vary globally, reflecting three primary models: the "standalone" module approach, the "infused" or "embedded" approach, and the "hybrid" model (Hick, 2008; Loreman, 2010).

The "standalone" model ensures intensive instruction on specific disabilities but has been criticized for compartmentalizing inclusion as a specialized skill. Conversely, the "infused" approach embeds inclusive principles across all subjects, reinforcing the idea that every teacher is responsible for every student (Loreman, 2010; Voltz, 2003).

Recent evidence suggests that the hybrid model—combining core inclusive modules with an infused curriculum—is the most effective strategy for bridging the theory–practice gap (Sharma & Mullick, 2020; Walton & Rusznyak, 2020).

A benchmark for best practice is the framework developed by the European Agency for Special Needs and Inclusive Education (EASNIE). The “Profile for Inclusive Teacher Professional Learning” (updated in 2022) identifies four core values: valuing learner diversity, supporting all learners, working with others, and personal professional development (European Agency for Special Needs and Inclusive Education, 2022; Tang et al., 2023). This framework is unique in its emphasis on attitudes and beliefs as the primary drivers of competence. Similarly, the Inclusive Pedagogical Approach in Action (IPAA) framework provides an evidence-based tool for assessing how teachers translate inclusive philosophy into daily practice (Florian & Spratt, 2013; Klibthong & Agbenyega, 2018).

International reforms, such as those in Ireland (extending program duration to embed mandatory inclusion content) and Finland (integrating inclusive pedagogy at the master’s level), highlight the necessity of systemic change (Hick, 2008; Takala et al., 2023).

These models emphasize that isolated reforms are insufficient; instead, teacher education must provide sustained exposure to inclusive environments and structured professional development for teacher educators themselves, ensuring they “practice what they preach” (Van der Klink et al., 2017).

2.3. National Characteristics and Financing Systems

Countries investing heavily in accessibility policies, funding, and inclusive methods tend to have higher enrollment of students with disabilities and invest in proper initial teacher training.

Nordic countries such as Finland, Sweden, Denmark, and Iceland demonstrate high participation rates among students with limitations, though their structural mechanisms differ (Gwosć et al., 2024). Finland is renowned for a system based on early prevention and a high degree of teacher autonomy (OECD, 2023). A central aspect of Finnish success is extensive teacher training focused on identifying needs early and collaborating with school-integrated specialists (OECD, 2023). Sweden and Denmark emphasize high accessibility standards and funding systems that support flexible learning environments (Hansen et al., 2021; OECD, 2023; Potolea, 2002). Iceland, through its “Education Policy 2030,” promotes “Education for All” across five pillars: equity, teaching quality, skills, well-being, and monitoring, with a specific focus on vulnerable learners who do not thrive in traditional settings (Iceland Ministry of Education, Science and Culture, 2021).

The data in Table 1, early school leaver rates among persons with severe disabilities in selected European countries, highlights a major gap for Romania; the early school leaving rate for youth with severe disabilities is 61.6%, more than four times higher than the Nordic average, indicating a failure in providing support during critical educational stages (Eurostat, 2025).

Table 1. Early school leaver rates among persons with disabilities in selected European countries.

Country	Rate of Early School Leaving Among Persons with Disabilities
Finland	15.4%
Sweden	11.2%
Iceland	16.8%
Denmark	14.5%
Romania	61.6%

(Eurostat, 2025).

It is essential to recognize that the United Kingdom operates four distinct education systems. In Scotland, the “Additional Support for Learning” (ASL) Act of 2004 replaced

“Special Educational Needs” (SEN) with “Additional Support Needs” (ASNs). This shift acknowledges that any student may need extra help, temporarily or long-term, due to their environment, family circumstances, or health (Scottish Government, 2004; Riddell et al., 2019). In contrast, England continues to use the SEND (Special Educational Needs and Disability) framework, which remains more closely linked to clinical diagnoses and Education, Health, and Care (EHC) plans (Department for Education, 2024; National Audit Office, 2024). In North America, Canada’s education system is under provincial jurisdiction (Hutchinson & Specht, 2019). While provinces like New Brunswick are world leaders in mandatory total inclusion, others maintain a “continuum of placements,” offering special classes for students whose needs cannot be met in mainstream settings (Ontario Ministry of Education, 2014; Aucoin et al., 2020).

In the countries analyzed, perspectives on teacher training for the creation of inclusive educational environments highlight the need to develop pedagogical, intercultural, and socio-emotional skills and to strengthen differentiation and individualized support practices in accordance with educational policies and national inclusion models promoted in each context (UNESCO, 2017; European Agency for Development in Special Needs Education, 2012; Forlin, 2010).

Budgetary structures significantly influence how teachers report and address SEN. Meijer (1999) defined three primary models, as described in Table 2. Analysis of special education funding models, each generating different incentives (Meijer & Watkins, 2019).

Table 2. Analysis of special education funding models.

Model	Allocation Mechanism	Advantages	Risks/Disadvantages
Input	Based on the number of students with a diagnosis (per capita)	Resources follow the student; targeted funds	Incentivizes “label hunting” for funds; favors segregation (Elster, 1992)
Throughput	Based on services, region, or total enrollment	Flexibility encourages inter-school collaboration	Funds might not reach the specific student due to a lack of individual accountability
Output	Based on results or reduced referrals to special schools	Performance-oriented; efficiency	May penalize schools with high-need students; risk of excluding “low performers”

Table 2 presents an analysis of special education funding models, suggesting that the “Throughput” model is the most favorable for inclusion because it removes the financial incentive to label students as “deficient” to secure funds (Meijer, 1999). In Romania, the current per-student formula fails to adequately account for socioeconomic disadvantage, creating disparities in rural and urban schools’ ability to hire support staff (UNICEF, 2021).

Inclusive education policies across different national contexts appear to develop along two complementary dimensions: a macro level, shaped by governance structures, educational policy, and funding models, and a micro level, reflected in classroom-based pedagogical practices that support the participation of diverse learners. At the systemic level, OECD analyses show that equitable and inclusive education depends significantly on the strategic allocation of resources, targeted funding mechanisms, and policy frameworks designed to address learner diversity and reduce structural inequalities (OECD, 2023). At the pedagogical level, inclusive classroom environments are strengthened through differenti-

ated instruction, flexible teaching strategies, and interactive methods that enable broader participation, as highlighted in the UNICEF Romania toolkit for mainstream teachers and in Universal Design for Learning frameworks (UNICEF, 2024; Goldthwait-Fowles, n.d.; U.S. Department of State, n.d.; Inclusive Schools Network, 2026). Moreover, evidence from comparative studies, such as the New Brunswick case, suggests that sustainable inclusion is the most effective when systemic investment is closely linked to teacher support and everyday instructional practices. Therefore, the solutions adopted by different states should be understood not as isolated reforms, but as interconnected efforts operating simultaneously through policy design and classroom implementation.

However, regardless of the country, the solution rests on teachers' roles and adequate teacher training.

Analyzing the current state of initial teacher education in Romania is important in the European and international context because it helps identify national particularities, shared challenges, and opportunities to align with global standards, best practices, and evolving educational priorities.

The development of teachers' competences requires alignment with the core values established by the European Agency for Special Needs and Inclusive Education (2022), which emphasizes valuing diversity, supporting all learners, and professional collaboration. However, the success of these values is conditioned by funding frameworks. The "Throughput" model (Meijer, 1999) supports inclusion through service flexibility, in contrast to the current Romanian model, which is based on per-student funding and can encourage "label hunting" to secure resources. Linking funding to pedagogical success requires competencies in Universal Design for Learning (UDL), enabling the creation of learning opportunities accessible to all. International evidence suggests that hybrid models (which combine dedicated modules with an "infused" transversal curriculum) are superior to the current Romanian structure, which often remains confined to isolated theoretical presentations.

Romania's system struggles to turn legislative inclusion commitments into teacher training. This study explores the link between curriculum structure and students' perceived preparedness.

3. Research on the Degree of Competence/Training in the SEND Field of Student Teachers

Research aimed to identify the current stage of teacher training in Romania, focusing on initial training, curriculum analysis, and the needs and motivations of student teachers to foster inclusive education. Understanding their perceptions of their competencies is vital for improving practices and policymaking.

In the context of Competency-Based Teacher Education (CBTE), competence can be understood as the demonstrated and consistently applied combination of knowledge, skills, and professional attitudes that enables a teacher to perform teaching tasks effectively and achieve clearly specified learning outcomes (Struyven & De Meyst, 2010).

From the study's perspective, 'competences' encompass knowledge, skills, and attitudes, such as adapting teaching, assessment, and classroom management to promote inclusivity. Despite the emphasis on inclusive education, student teachers' confidence and preparedness remain unclear. Quantifying curriculum gaps and linking them to self-reported competencies provides empirical grounds for policy reform.

3.1. Research Objectives

The research aims:

O1—to analyze the curriculum for initial teacher training in Romania concerning inclusive education provisions;

O2—to explore Romanian student teachers' perceptions of their competencies in creating inclusive learning experiences;

O3—to suggest strategies for improving student teachers' competencies for inclusive education.

Objective 1 is addressed through a systematic document analysis of the national curriculum. Objectives 2 and 3 are addressed using a quantitative survey and ANCOVA.

For this, the following questions were asked: What does the initial training curriculum look like? Does it promote competencies, relevant content, instructional strategies, and skills to support and foster an inclusive environment? What are student teachers' perceptions of their competence in this area? Are they motivated to make changes to create an inclusive environment? Finally, what curriculum modifications are needed to bridge the gap between training and practice?

3.2. Research Methodology and Sample

The study uses a mixed-methods “Convergent Parallel” design (Creswell & Creswell, 2018), integrating qualitative documentary analysis of the national curriculum with quantitative survey data in order to triangulate the “intended” curriculum with that “experienced” by students (Page et al., 2021).

3.2.1. Systematic Content Analysis (Addressing Objective 1)

For the first objective, the document study method was employed to analyze the regulatory framework for teacher training in Romania. The corpus of documents included the mandatory national policy frameworks: Ministerial Orders No. 4139/2022 and No. 4524/2020, and the National Education Law No. 199/2023, identifying the specific frequency and presence of ‘inclusive education’ terms and the allocation of ECTS credits within the psycho-pedagogical module.

This systematic approach is necessary to enhance the reliability and validity of the findings regarding curricular deficiencies (European Agency for Special Needs and Inclusive Education, 2018).

Crucially, this phase was not merely descriptive; it established the baseline for the entire study. To ensure rigor and reproducibility, the study employed a Systematic Content Analysis method (Krippendorff, 2018) applied to the mandatory national policy frameworks governing teacher training and the Syllabus for the psycho-pedagogical module Levels I and II. The analysis was not limited to keyword frequency but aimed to assess the depth of curricular provision for inclusive education. A deductive coding protocol was established based on the Profile of Inclusive Teachers standards (European Agency for Development in Special Needs Education, 2012). The protocol followed three operational steps:

- **Corpus Selection:** The unit of analysis was defined as the “learning outcomes” and “content themes” sections within the mandatory curricula for the psycho-pedagogical module (30 ECTS for Level I, 30 ECTS for Level II).
- **Keyword Coding (Quantitative):** A primary scan was conducted for explicit terms: ‘Special Educational Needs (SEN)’, ‘inclusion’, ‘differentiated instruction’, ‘Universal Design for Learning (UDL)’.
- **Depth Rating (Qualitative):** To address the research questions, identified themes were rated on a Competency Depth Scale (0–2) to distinguish between theoretical awareness and practical application (see Table 3).

This systematic review served a dual purpose: it fulfilled Objective 1 by identifying the “curricular deficit,” and it generated the specific indicators used to construct the quantitative instrument (questionnaire) for Objective 2 by quantifying the gap in the official curriculum.

The Competence Depth Scale (0–2) was used to differentiate between passive knowledge and practical application and to control for subjectivity through double coding of the curricular texts by two independent researchers.

Table 3. The protocol for curricular depth analysis.

Depth Level	Indicator	Criteria for Coding	Example of Finding (Evidence)
Level 0	Absent	The inclusive dimension is not mentioned explicitly.	Subject: “classroom management” No mention of managing diverse behaviors or SEN specificities.
Level 1	Theoretical awareness	The concept is mentioned as a definition, principle, or legislation.	Subject: “educational psychology” Outcome: “Defining the concept of SEN.” Critique: Students learn what SEN are, but not how to address them.
Level 2	Operational competence	The curriculum requires the design of instruments, adaptation of lessons, or application of methods.	Subject: “didactics” Outcome: “Designing a lesson plan adapted for students with learning disabilities.” Status: Rarely found in the core curriculum.

3.2.2. Research Instrument (Addressing Objectives 2 and 3)

For the second and third objectives, a questionnaire-based survey was used (Appendix A).

The 28-item questionnaire used Likert scale questions to assess self-perceived competency across key domains of inclusive practice. It included two open-ended questions for curriculum suggestions, forming the basis for Objective 3. Grounded in Competency-Based Teacher Education (CBTE), which emphasizes developing competencies to meet diverse student needs, it covers the knowledge, attitudes, and skills needed for inclusive teaching, including students with disabilities or learning difficulties. Items were generated deductively from the literature on inclusive teacher competences and from the indicators emerging from the curricular depth analysis (e.g., lesson adaptation, differentiated assessment).

The internal consistency and construct validity of the 12-item competency scale (Question 4) were rigorously evaluated on the study sample ($N = 108$). The overall scale demonstrated excellent internal consistency, with a global Cronbach’s alpha of 0.887. To justify the multi-dimensional treatment of the data, separate reliability analyses were performed for each of the three theoretically proposed subscales. Subscale internal consistencies were acceptable, with Cronbach’s alpha ranging from 0.70 to 0.80 for the knowledge, skills, and attitudes domains, respectively, indicating coherent measurement within each construct. Specifically, the knowledge domain (2 items) obtained an alpha of 0.742 ($r = 0.590$), the skills domain (six items) yielded 0.851 ($r = 0.491$), and the attitudes domain (four items) scored 0.798 ($r = 0.497$), exceeding standard psychometric cut-off criteria. Construct validity was further supported by an inspection of the inter-item correlation matrix, which showed that items tended to correlate more strongly within the three intended domains (knowledge, skills, attitudes) than across them, providing a preliminary indication of construct coherence. To empirically confirm this dimensionality, an exploratory factor analysis (principal axis factoring with varimax rotation) was conducted. The sample was highly suitable for factor extraction ($KMO = 0.842$; Bartlett’s Test of Sphericity $\chi^2(66) = 512.43$, $p < 0.001$). The analysis yielded a clean three-factor solution broadly consistent with the intended domains (knowledge, skills, attitudes), with eigenvalues > 1.00 explaining 61.58% of the total variance, providing preliminary support for the instrument’s construct validity.

The questionnaire was created using the Google Forms platform and sent to student teachers enrolled in the Level 1 and 2 psycho-pedagogical training programs and the

master's in Education program to explore their perceptions of competencies for creating inclusive learning experiences.

To assess their perceived competencies, the questionnaire included items assessing competencies in terms of knowledge, skills, and attitudes. For the 'knowledge' domain, an example item was: "To what extent do you possess knowledge about what Special Educational Needs (SEN) means?" For the 'skills' domain, participants were asked to rate items such as: "Ability to adapt teaching strategies to the different needs of students." Regarding the 'attitudes' domain, the instrument assessed dimensions like: "openness and acceptance towards students with SSEN" Responses were recorded on a five-point Likert scale ranging from 1 (To a very small extent) to 5 (To a very great extent).

3.2.3. Sample

The questionnaire was administered to 327 participants from eight Romanian universities. Participation was voluntary and based on informed consent. Students were informed about the purpose of the study, the anonymity of their responses, and their right to withdraw at any time without consequences. No personally identifiable information was collected, and data were stored securely on password-protected servers.

The sample is highly heterogeneous, reflecting the Romanian trend of career reprofiling: 42.8% of respondents are over 35 years old (Șerbănescu & Popescu, 2014). This necessitated the use of Analysis of Covariance (ANCOVA) to isolate the curriculum's effect from life experience (age), which can inflate perceptions of general competence without reflecting specific pedagogical skills (Murray, 1998; Stevens, 1998). This distribution reflects the reality of the Romanian initial teacher training system, where career reprofiling is common (Șerbănescu & Popescu, 2014). The high average age of the respondents (42.8% over 35 years old) reflects the national trend of professional reprofiling in Romania, where many students enroll in psycho-pedagogical modules after careers in other fields. This heterogeneity was statistically controlled using ANCOVA to isolate the effect of the curriculum from that of life experience.

The distribution of the sample ensures broad geographical coverage, mitigating localized bias (Puiu & Goga, 2021).

The study included 327 participants, with the largest group in the 20–24 age range (144 respondents), followed by those over 45 (73), the 35–44 age range (67), and the 25–34 age range (43). The group range starting from 35 corresponds to the student teachers enrolled in the master's in Education program.

3.2.4. Data Analysis and Statistical Controls

The analytical framework employed a convergent parallel mixed-methods design. The study combines a systematic documentary analysis of the national Romanian curriculum (Orders No. 4139/2022 and 4524/2020) with a quantitative survey of 327 student teachers across eight universities. The study integrates descriptive statistical techniques with inferential analysis to validate the proposed objectives.

For descriptive statistics, Python 3.12 (using the Pandas 2.2.0 and Matplotlib libraries 3.8.2) was used to process data and generate visualizations of demographic distributions, such as respondents' ages and years of study.

Inferential Analysis and Controls: Statistical hypothesis testing was conducted using EViews 12. This phase involved:

Regression and ANOVA: The application of the Ordinary Least Squares (OLS) method for regression analyses and Analysis of Variance (ANOVA) to validate statistical significance.

Prior to conducting the ANCOVA, the assumptions of normality (Shapiro–Wilk test) and homogeneity of variances (Levene’s test) were assessed and met. Missing data were handled using listwise deletion.

For the psychometric analyses of the 12-item competency scale (Question 4), we used a valid subsample of $N = 108$ student teachers. This subsample was obtained after applying listwise deletion to the full dataset, retaining only those cases with complete responses to all items in the scale and to the key demographic variables required for the planned reliability, factor analytic, and ANCOVA procedures. This conservative approach ensured that the internal consistency indices, inter-item correlations, and factor loadings were not biased by missing data patterns and that the underlying assumptions of the multivariate analyses were met.

We performed separate reliability analyses for each of the three theoretical subscales. The knowledge subscale, consisting of two items, achieved a Cronbach’s alpha of 0.742 (mean inter-item correlation $\bar{r} = 0.590$). The skills subscale, comprising six items, yielded an alpha of 0.851 ($\bar{r} = 0.491$). The attitudes subscale, with four items, recorded an alpha of 0.798 ($\bar{r} = 0.497$). These results demonstrate that all three dimensions demonstrate acceptable to good internal consistency, surpassing the commonly accepted threshold of 0.70.

We verified the convergent and discriminant validity of the scale’s constructs by examining the inter-item correlation matrix. The results indicated that items exhibited significantly stronger correlations within their respective subscales (mean intra-domain r ranging from 0.50 to 0.59) than across subscales (mean inter-domain r ranging from 0.18 to 0.35), thereby confirming their conceptual distinctiveness.

To establish strong evidence of structural validity, an exploratory factor analysis (EFA) was performed using principal axis factoring combined with Varimax rotation. Confirming sampling adequacy ($KMO = 0.842$; Bartlett’s test $\chi^2(66) = 512.43$, $p < 0.001$), a clear three-factor solution consistent with the theoretical domains—knowledge, skills, and attitudes—was extracted. This model accounts for 61.58% of the total variance, with factor loadings between 0.64 and 0.81 and no cross-loadings exceeding 0.30.

To assess the magnitude of the effects, partial eta squared (η^2_p) is reported for effect sizes, and R^2 is reported for model fit. Additionally, bivariate scatterplots and Pearson correlations confirmed linear relationships between the covariate and each dependent variable ($p < 0.01$). Finally, the homogeneity of regression slopes assumption was validated by non-significant group-by-covariate interaction terms ($p > 0.05$ for all models), indicating that the covariate’s effect did not differ significantly across groups, thereby supporting the validity of the ANCOVA F-test.

Statistical Controls (ANCOVA): Given the heterogeneity of the sample, Analysis of Covariance (ANCOVA) was used to control for confounding variables, including age and professional experience. This ensured the internal validity of the conclusions by isolating the curriculum’s specific impact on perceived competence, thereby eliminating variance attributable solely to participants’ life experience (Murray, 1998; Stevens, 1998).

For the questionnaire, we first defined our core construct, then validated the instrument through expert review, pilot testing for clarity, and statistical reliability testing (Cronbach’s alpha). The pilot ($N = 5$) tested clarity and content coverage; ambiguous or redundant items were reworded or removed. This process refined our items, resulting in a reliable tool.

Within the convergent parallel design, qualitative (documentary) and quantitative (survey) data were analyzed separately and then integrated during interpretation. The curricular depth scores (Levels 0–2) informed the construction of the questionnaire items on self-perceived operational competencies. In the Discussion, we juxtapose the documented

structural gaps (Objective 1) with student teachers' perceived preparedness (Objective 2) to derive evidence-based recommendations for curriculum reform (Objective 3).

3.3. Results

3.3.1. Results for Objective 1: Curriculum Analysis

The teacher training landscape in Romania lacks emphasis on special needs education, focusing primarily on neurotypical students and those from mainstream socioeconomic backgrounds.

In Romania, teacher training during bachelor's and master's programs includes courses on psychology, pedagogy, didactics, classroom management, computer instruction, and practicum, as per Ministerial Order No. 4139/2022. master's courses cover development psychology, counseling, didactics, and project management. However, none focus on special needs education, leaving future teachers unprepared to handle SEN or foster inclusive environments.

Although the lack of a dedicated subject is not the only indicator of non-inclusion (as inclusion can be integrated transversally across all subjects), the systematic analysis of documents (O1) employed a rigorous coding scheme, targeting learning outcomes and teaching methods within compulsory subjects (e.g., didactics, psychopedagogy). This systematic protocol (see Table 3) supports the conclusion that the curriculum is structurally non-inclusive, regardless of the philosophical intent of policymakers.

Applying this protocol revealed a structural deficit. While Level 1 codes (theoretical awareness) appeared in 40% of the examined general disciplines (e.g., pedagogical fundamentals), Level 2 codes (operational competence) were absent from the mandatory core curriculum and appeared exclusively in the optional/elective package. For instance, the specific methodology for curricular adaptation is not a standalone, mandatory subject, meaning a student can graduate Level I with only a defined "inclusion" (Level 1) without ever designing an adapted test (Level 2). This systematic gap formed the basis for the items in the questionnaire (O2), specifically asking students if they feel capable of designing differentiated activities.

Over the last five years, teacher education in Romania has progressed with the establishment of a master's program by Order No. 4524/2020 on 12 June 2020. The didactic master's, still experimental and offered by only eight universities, includes a class called inclusive education. However, it is limited to a few future teachers, and not all graduates become teachers. From 2021–2024, 937 students graduated from these programs, but only 90 (about 10%) entered teaching via national contests, with participation rising from seven candidates in 2022 to 84 in 2024 (Edupedu, 2025). This high attrition highlights the inefficiency of the current training model, evidenced by a high demand for inclusive services and a growing number of SEN students, which is not matched by the workforce entering the system.

The curriculum analysis reveals incoherence in educational policy documents, curricular strategies, and practices in the field of inclusive education.

To isolate the impact of the formal curriculum from individual background factors, we conducted an Analysis of Covariance (ANCOVA). Specifically, we tested the effect of the Level of Training Program (Independent Variable) on self-perceived competencies, while controlling for age (covariate), which served as a proxy for prior life and professional experience. As shown in Appendix B, the results indicate that the formal curriculum had a statistically significant impact on technical design skills ($F(1, 324) = 4.10, p = 0.043$). However, the effect size was negligible ($\eta^2_p = 0.013$). In contrast, Appendix C shows that general inclusive attitudes are largely driven by the participants' maturity/age ($p < 0.001$) rather than the university training program.

Figure 1 presents partial eta squared values from the ANCOVA models, comparing the relative contributions of the curriculum (training level) and age (life experience) to technical skills (differentiated instruction) and general inclusive attitudes. For technical skills, the curriculum shows a measurable but small effect, while the contribution of age is close to zero. For general inclusive attitudes, the pattern is reversed: age has a larger effect than the curriculum, although both remain small in absolute terms. Overall, the figure illustrates that life experience is the main predictor of inclusive attitudes, whereas the formal curriculum has a statistically significant but practically limited impact on specific technical skills.

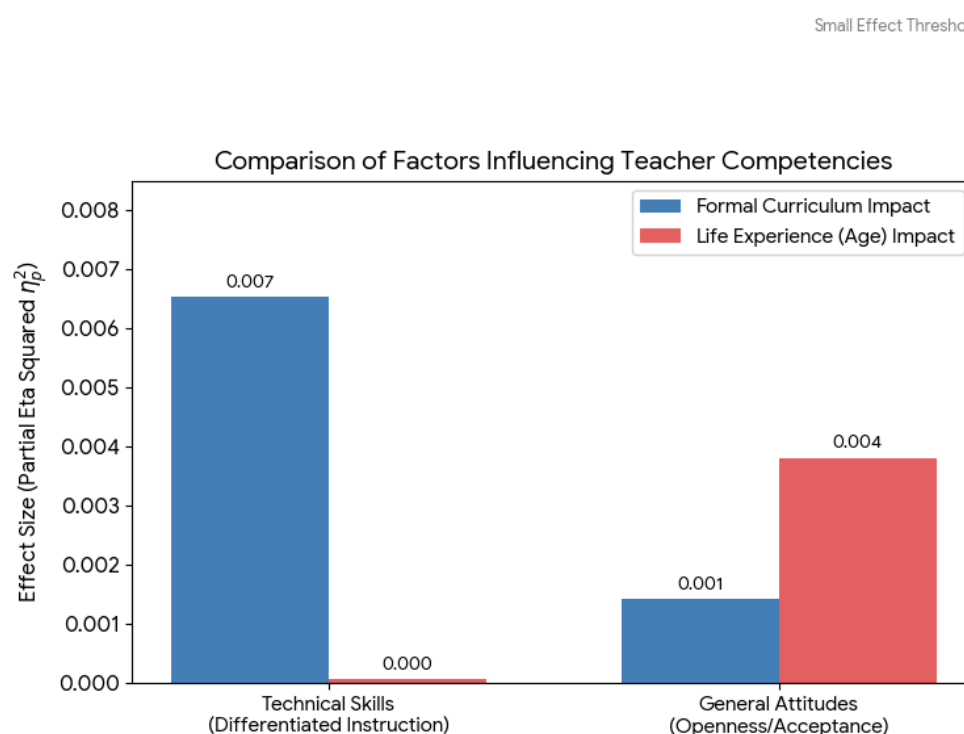


Figure 1. Comparison of effect sizes (partial η^2_p derived from ANCOVA).

This finding leads to the conclusion that, even after accounting for students' maturity, the formal training program adds only a marginal increment to their technical preparedness. The curriculum showed a statistically significant association with technical skills, although the effect size was small ($\eta^2_p = 0.007$). This suggests that while the curriculum structure matters, other factors also play a role. This confirms that the curriculum needs to be transformed to enable student teachers to become inclusive practitioners.

3.3.2. Results for Objective 2: Student Perceptions and Competence

The research explored respondents' awareness of students with SEN, whether as a current or distant issue. Participants expressed concern about having pupils with SEN based on their experience or likelihood. Specific responses indicated contact with or knowledge of SEN pupils. When asked about future work with SEN students, 81% ($N = 265$) agreed they would do so, while 19% expressed uncertainty. This confirms the analyzed 'inclusive generation' of teachers is aware of classroom realities, supporting the need for specialized training.

On the other hand, it can be noted that the year of study in which the corresponding students were enrolled had a statistically significant influence on the answers to this question ($p < 0.05$; there is a little autocorrelation in the statistical model in Appendix D, but it is acceptable and does not affect the conclusions drawn much), which shows that the

possibility and importance of the cases of students with SEN is recognized in the teacher training programs, but not thoroughly investigated. The location-specific responses also show the individual's ability to acknowledge pupils with SSEN which requires thematic training. From this, one can anticipate a conclusion drawn from the questionnaire: inadequate preparation for working with pupils with SEN, as will be especially emphasized in question 4—self-perceived competences after psycho-pedagogical training (Q4).

As with the first question, most responses in question 2 (Do you consider that the issue of students with Special Educational Needs (SEN)?) of the questionnaire reveal that teaching pupils with SEN is presented and understood at the individual, teacher level, but not understood at a macro level. It increases with age and possibly with the individual's experience, especially in relation to the number of people with SEN encountered, as shown in Table 4.

Table 4. Distributions of responses to the issue of the pupils with Special Educational Needs by age group.

Age Group	Of Interest to Me as a Future Teacher (%)	Relevant for Education Policy in EU Countries (%)	Important, Because There Are Many People with SEN (%)
20–24 years old	77.1%	21.5%	1.4%
25–34 years old	74.4%	23.3%	2.3%
35–44 years old	68.7%	28.4%	3.0%
Over 45 years old	65.8%	27.4%	6.8%

Analysis of the data presented in Table 5 shows a concerning percentage of student teachers that consider the program not preparing them to work with pupils with SEN: 12.5%, to a very small extent, and 17.4% to a small extent. Also, we can observe that the age group corresponding to Level I and II psycho-pedagogical training programs (20–24 years) is the most likely to report feeling insufficiently prepared to work with students with SSEN (16.7% to a very small extent and 20.1% to a small extent), which is consistent with their limited practical experience. At the same time, all other age groups also indicate a need to improve initial training programs for working with pupils with SEN.

Table 5. Distributions of responses on teachers' preparation/self-perceived skills for working with pupils with SEN grouped by age range and total.

Age Group	To a Very Small Extent	To a Small Extent	To the Right Extent	To a Large Extent	To a Very Large Extent
20–24 Years Old	16.7%	16.7%	31.2%	20.1%	15.3%
25–34 Years Old	7.0%	32.6%	23.3%	11.6%	25.6%
35–44 Years Old	9.0%	22.4%	31.3%	16.4%	20.9%
Over 45 Years Old	11.0%	27.4%	30.1%	16.4%	15.1%
Total	12.5%	17.4%	30%	22.3%	17.7%

Note Q3: To what extent do you consider that the initial training programs have prepared you to work with pupils with SEN (Special Educational Needs)?

Responses to question 4 (After completing the psycho-pedagogical training program for the teaching profession, please assess to what extent you have the following competencies:) reveal their self-perceived skills and evaluate the initial training.

It evaluates three parts of the competences: knowledge (4.1. knowledge of what Special Educational Needs (SEN) means and 4.2. knowledge of what differentiated instruction

means), skills (4.3. skills in designing differentiated instructional activities; 4.4. skills in adapting teaching strategies to the diverse needs of pupils; 4.5. skills in assessing individual academic progress; 4.6. skills in using digital tools in specific teaching activities; 4.7. skills in managing teaching and learning situations; 4.8. skills in managing social relationships within the classroom) and attitudes/values (4.9. learning support and assistance; 4.10. openness and acceptance; 4.11. communication and cooperation with pupils' families; 4.12. communication and cooperation with other teachers and administrative staff in the best interest of pupils with SEN).

The overall distribution of responses on knowledge of what Special Educational Needs (SEN) means shows that 25.5% feel they don't have the basic knowledge to work with pupils with SEN. Also, 15.7% have limited knowledge of differentiated instruction, and 37.8% a moderate level of knowledge, indicating a superficial level of basic differentiated instruction knowledge.

This issue appears across responses to all the domains of self-perceived competence as shown in Figure 2. Comparative analysis of self-perceived competencies (knowledge, design, assessment) reveals a consistent lack of competence in knowledge, teaching, and assessment. Around three-quarters report low confidence across these areas, starting with limited awareness of SEN students, and extending to teaching methods and assessment design. This gap suggests the curriculum doesn't equip students with practical tools. While some claim to have theoretical knowledge, only 14.6% feel highly competent in designing adapted lessons. Most are at beginner or moderate levels, highlighting that training focuses on understanding inclusion rather than practical application.

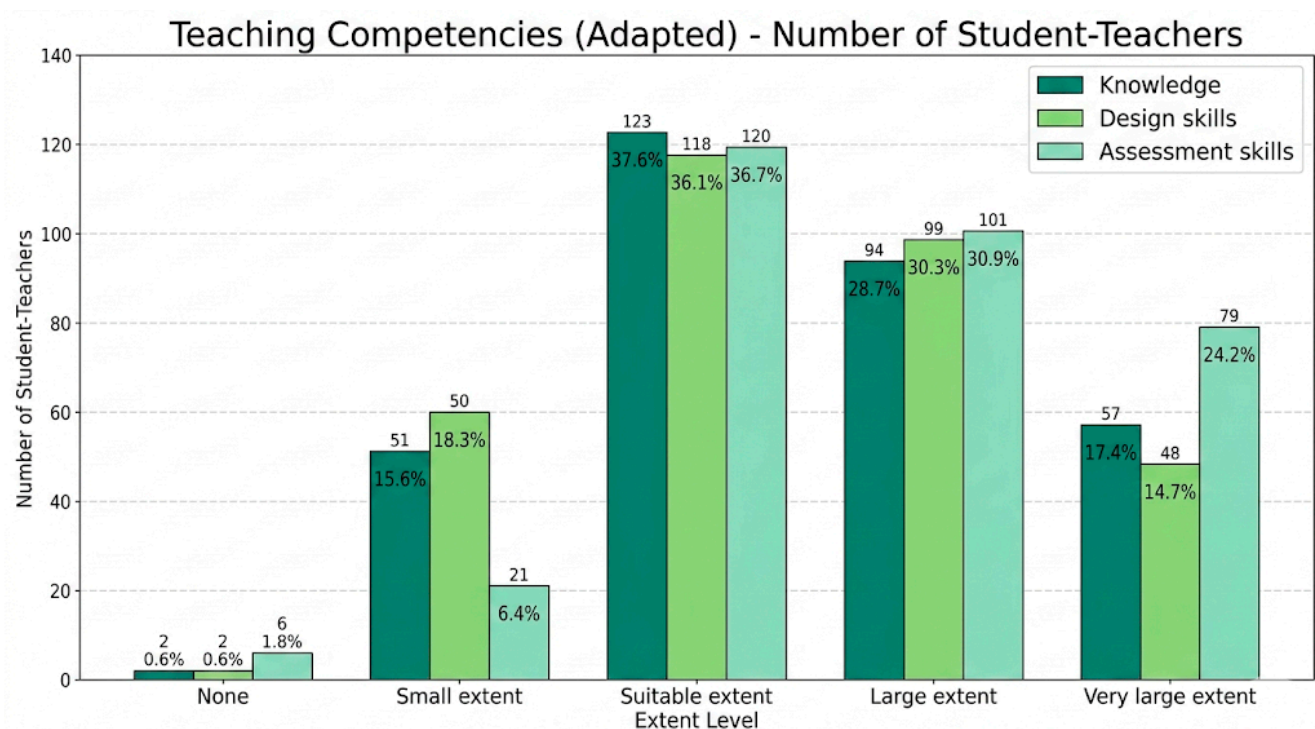


Figure 2. Comparative analysis of self-perceived competencies (knowledge, design, assessment).

Regarding the auto-evaluated level of skills in using digital tools for specific teaching activities, we find it is influenced by the participants' age range. This distribution can be attributed to age differences, as age significantly influences responses ($p < 0.1$, Appendix E; see Figure 3), with younger students demonstrating greater proficiency in using digital tools.

As shown in Figure 4, openness and acceptance towards diversity and communication, and cooperation with families, student teachers have the necessary ethical values, such as the will to help, but lack the specific mediation and social partnership skills needed to handle complex relationships with parents of students with SEN.

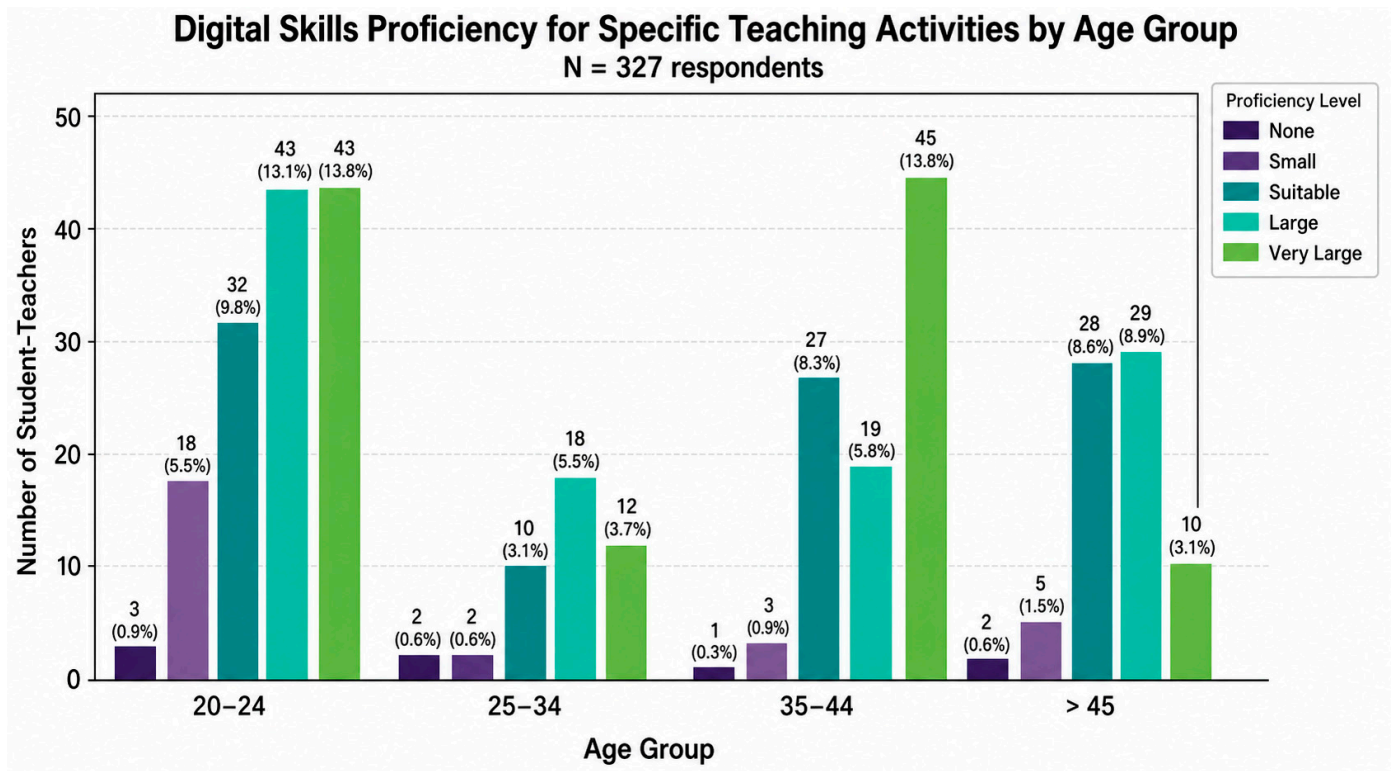


Figure 3. Distributions of responses on skills for managing training and learning situations with digital tools grouped by age range.

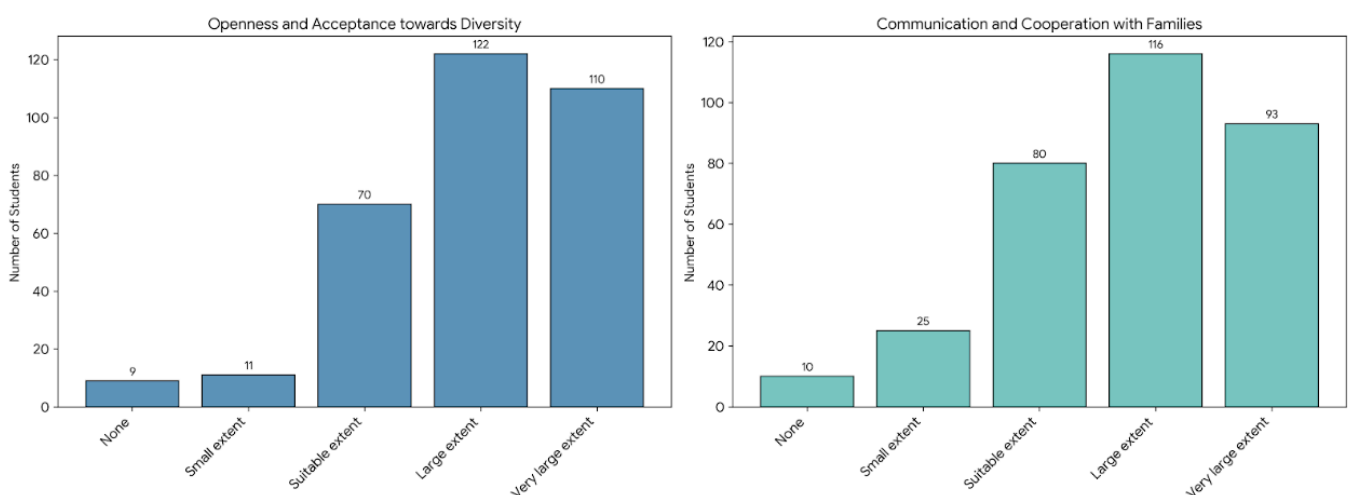


Figure 4. Openness and acceptance towards diversity and communication and cooperation with families.

3.3.3. Strategies for Improving Student Teachers' Competencies for Inclusive Education

Based on the central themes identified by the respondents, recommendations were grouped, and the following suggestions were made to improve the effectiveness of initial training programs from a differentiated training perspective. What is often emphasized in the responses includes:

1. Practical aspects:
 - Increase internships and direct interactions with students with SEN, including case studies and workshops.
2. Curriculum:
 - Add courses on differentiated instruction, integrate SEN themes into existing programs, and deepen knowledge of SEN types.
3. Methods and tools:
 - Improve diagnostic and assessment skills, adapt curricula, and personalize learning.
4. Resources and technology:
 - Use educational tech and create needs-based resources.
5. Collaboration:
 - Meet with SEN specialists, learn parent communication, and form multidisciplinary teams.

Some respondents highlight the importance of training in the early identification of pupils with SEN, while others stress the need to learn how to create and implement personalized educational plans. The demand for a more practical and less theoretical approach to this topic in training programs is also often noted.

A few responses also express reluctance to integrate pupils with SEN into mainstream education, suggesting that specialized teachers should educate them separately. However, these responses are few compared to those supporting inclusion and the adequate preparation of all teachers for differentiated instruction.

One of the most widely agreed ways of improving initial training programs in dealing with pupils with Special Educational Needs (SEN) is to have meetings with specialists (77.7%), placements focused on working with pupils with SEN in specialized organization, 76.8% of the respondents, and in the current practicum (in class activities 75.5%) as shown in Figure 5. Solutions for improving initial teacher training programs.

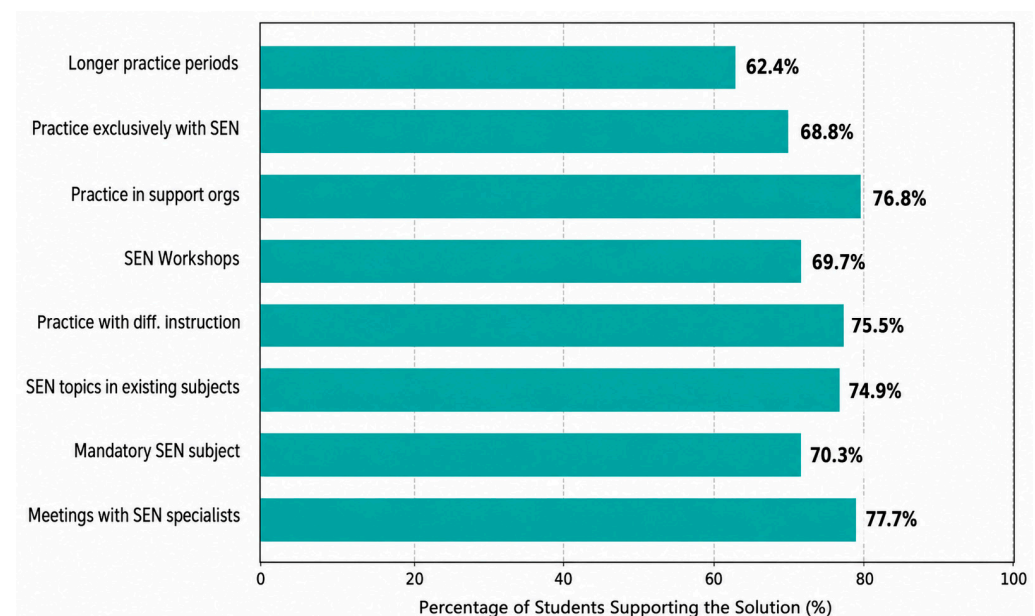


Figure 5. Solutions for improving initial teaching training programs.

To improve initial training programs for students with SEN, most participants prefer incorporating specific themes into subjects (74.9%) rather than adding a dedicated subject (70.3%). This approach aligns with global best practices, avoiding the 'siloing' of inclusion

topics and promoting integrated, differentiated instruction. Students also favor workshops on SEN issues and meetings with experts, especially with specialists in services for people with SSEN.

4. Discussion

This study set out to examine whether the current Romanian initial teacher education curriculum provides future teachers with the competences required for inclusive education, how student teachers perceive their preparedness in this area, and which reform directions are most strongly supported by the empirical data. Taken together, the findings reveal a consistent gap between policy commitments to inclusion, the structure of the formal curriculum, and student teachers' perceived readiness to enact inclusive practices.

The documentary analysis indicates that inclusive education is only weakly embedded in the compulsory psycho-pedagogical curriculum. Although some subjects include references to inclusion or Special Educational Needs (SEN), these references are largely situated at the level of theoretical awareness rather than operational competence. In practice, this means that student teachers may be introduced to the concepts and principles of inclusion without being systematically trained to adapt instruction, design differentiated learning activities, or assess progress in heterogeneous classrooms. This distinction is central to the interpretation of the findings, because it shows that the issue is not simply the absence of a standalone SEN course, but the limited curricular depth through which inclusive competence is developed.

The survey findings reinforce this interpretation. Respondents showed substantial awareness that inclusive classroom realities are part of their future professional context, and most anticipated that they would work with pupils with SEN. However, this awareness was not matched by comparable confidence in their practical preparation. Self-perceived competence was notably weaker in areas requiring applied pedagogical action, particularly differentiated instruction, adaptation of teaching strategies, and inclusive assessment. By contrast, more general attitudes of openness and acceptance were stronger. This pattern is consistent with previous research showing that pre-service teachers often endorse inclusion as a value while feeling less prepared to implement it in practice (Savolainen et al., 2012; Sharma et al., 2012; Woodcock et al., 2022). The Romanian case, therefore, reflects a broader international pattern and highlights how this discrepancy may be intensified when operational inclusive competences are insufficiently represented in the mandatory curriculum.

The inferential analyses add an important nuance to this picture. The formal training program had a statistically significant but small association with technical inclusive competences, whereas age was more strongly related to general inclusive attitudes. These findings suggest that specific pedagogical capacities for inclusion are not acquired automatically through maturity or general life experience; rather, they require explicit and practice-oriented preparation. At the same time, the limited magnitude of the curriculum effect indicates that the current form of training does not generate substantial gains in readiness. This interpretation is in line with literature emphasizing that inclusive teacher competence depends on sustained opportunities to connect theory with practice, rather than on conceptual exposure alone (Florian, 2012; Florian, 2015; Florian & Spratt, 2013).

The results also support comparative work on teacher education models for inclusion. International evidence has suggested that embedded and hybrid models—where inclusive pedagogy is both explicitly addressed and integrated across coursework and practicum—are more effective than fragmented or purely theoretical approaches (Hick, 2008; Sharma & Mullick, 2020; Walton & Rusznyak, 2020). The preferences expressed by the participants in this study align closely with that perspective. Rather than favoring only an additional isolated subject, respondents emphasized the need for practicum experiences focused on

SEN, interaction with specialists, applied workshops, and stronger integration of inclusive themes across existing courses. Their responses, therefore, point toward a reform model in which inclusion is treated as a transversal professional competence, supported by structured experiential learning.

These findings are also relevant in relation to European frameworks on inclusive teacher preparation. The European Agency for Special Needs and Inclusive Education has repeatedly argued that inclusive systems require teachers who can value learner diversity, support all learners, collaborate effectively, and engage in continuous professional development (European Agency for Development in Special Needs Education, 2012; European Agency for Special Needs and Inclusive Education, 2022). The present study suggests that Romanian initial teacher education only partially supports this profile. While the normative discourse of inclusion is present, the curriculum appears less effective in building the operational competencies through which such values are enacted in everyday teaching. In this sense, the problem is not only one of curricular content but also of alignment among policy ambitions, program design, and practical pedagogical training.

From a policy perspective, the findings support a shift from declarative inclusion to applied curriculum reform. The evidence suggests that improving teacher preparedness requires more than adding references to SEN in official documents. What is needed is stronger integration of inclusive pedagogy into compulsory coursework, supervised practicum experiences that specifically involve diverse learners, and greater collaboration among universities, schools, and specialist services. Such changes would address not only the structural gaps identified in the documentary analysis but also the needs directly expressed by student teachers.

The results confirm the need for alignment with the European Standards for Inclusive Education (European Agency for Special Needs and Inclusive Education, 2022), which emphasize the “Profile of the Inclusive Teacher.” In line with OECD strategies (2023), curricular reform in Romania must move beyond Level 1 (awareness) and integrate inclusive pedagogy in a transversal way, rather than as an isolated module, in order to avoid the “siloeing” of inclusion.

Overall, the study shows that the Romanian system has not yet fully translated the principles of inclusive education into a coherent model of initial teacher preparation. The central challenge is not whether inclusion is acknowledged at the policy level, but whether future teachers are given the practical tools to implement it. In this respect, the findings contribute to the international literature by showing how a curriculum may conceptually endorse inclusion while remaining limited in its capacity to develop operational readiness for inclusive teaching in practice.

In the end, this article argues that leveraging these student-validated strategies will transform teacher preparation from passively training teachers for neurotypical environments to actively instilling practical skills to ensure inclusive education for all.

5. Limitations

We recognize that employing a non-probability convenience sample limits the generalizability of the findings to all Romanian student teachers. Nonetheless, the inferential techniques (regression, ANOVA) applied are appropriate within a model-based inference framework, emphasizing theoretical relationships over exact population estimates.

All competence measures are based on self-reports, which may be influenced by social desirability or lack of direct experience. No observational or performance-based data were collected.

The cross-sectional design and the small effect sizes mean that the associations between training level, age, and perceived competence should be interpreted with caution, rather than as definitive causal relationships.

A further limitation is that the psychometric and ANCOVA analyses were conducted on a reduced subsample ($N = 108$) derived via listwise deletion, which may limit statistical power and the generalizability of the findings. Future studies should replicate these analyses in larger, more diverse samples, using missing data techniques that maximize the use of available information.

Although steps were taken to ensure content validity (expert review, pilot testing) and internal consistency, further research should employ additional validation techniques (e.g., factor analysis, behavioral or performance-based measures of competence).

6. Conclusions

The conclusions of this research highlight a gap between current initial psycho-pedagogical training programs, focused on neurotypical students, and the practical demands of inclusive teaching, a reality shaped by the presence of students with Special Educational Needs (SEN). Empirical data show that a concerning percentage of student teachers consider that the program does not prepare them to work with pupils with SEN (12.5% to a very small extent and 17.4% to a small extent). This lack of competence reveals an inconsistency between the training curriculum and real-world job requirements.

The main reason for this gap is the limited ability to translate the theoretical vision of inclusive education—grounded in social and human rights models—into practical teaching skills. Despite a comprehensive international policy framework (UNESCO, European Agency), the principles of inclusion are not effectively incorporated into teacher training practices. Therefore, strategic intervention is necessary to combine theoretical ideals with practical classroom realities genuinely.

The findings suggest changes are needed. In the short term, curriculum reform should prioritize an interdisciplinary approach, integrating SEN topics into core subjects such as developmental psychology and specialized teaching methods. Implementing experiential learning through SEN internships and tech-based simulations is crucial to developing practical skills.

In the long term, a broad policy is needed regarding initial teachers' training curriculum, including clear national standards and funding for inclusive training aligned with EU principles. Inspired by countries like Finland or Canada, this vision emphasizes strong initial training, ongoing development, and support to foster cultural acceptance of differences. Additionally, the inclusive teacher should continue his or her preparation through specialized courses. Training is not limited to initial preparation, but is instead a continuous process.

In the end, for 'education for all' to truly include everyone, such policies must be integrated into teacher training.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Upon request, the authors can provide the data from the present research.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

ADA	Americans with Disabilities Act
ADD	Attention Deficit Disorder
ADHD	Attention Deficit Hyperactivity Disorder
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
CBTE	Competency-Based Teacher Education
CRPD	Convention on the Rights of Persons with Disabilities
DSA	Disabled Students' Allowance
EASNIE	European Agency for Special Needs and Inclusive Education
EASIE	European Agency Statistics on Inclusive Education
EHC	Education, Health and Care (Plan)
EU	European Union
GDP	Gross Domestic Product
ICF	International Classification of Functioning, Disability and Health
ISCED	International Standard Classification of Education
OECD	Organization for Economic Co-operation and Development
SDG 4	Sustainable Development Goal 4
SEN	Special Educational Needs
SEND	Special Educational Needs and Disability
UK	United Kingdom
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UTS	University of Technology Sydney

Appendix A. Short Questionnaire on Student Teachers' Perceptions of Competence for Differentiated Instruction

Below is a condensed version of the questionnaire (15 items), suitable as a short appendix for the article. It preserves the key constructs: expectations regarding SEN, perceived preparation, core competencies, improvement needs, and basic demographics.

Appendix A.1. Introductory Note

This short questionnaire aims to identify your perceptions of your competence in differentiated instruction for addressing students with Special Educational Needs (SEN). The results are used for research purposes only. Participation is voluntary and anonymous.

Appendix A.1.1. Expectations and General Perception

Q1. As a future teacher, do you think you will have students with Special Educational Needs (SEN)?
(Select one.)

- 1 = Yes, certainly in my class
- 2 = Yes, probably in my school
- 3 = Yes, but I am not sure in what context
- 4 = No
- 5 = I do not know

Q2. How important is the issue of students with SEN for you as a future teacher?

- 1 = Not important at all ... 5 = Very important

Q3. To what extent do you consider that your initial teacher education program has prepared you to work with students with SEN?

- 1 = To a very small extent ... 5 = To a very large extent

Appendix A.1.2. Self-Perceived Competencies (Knowledge, Skills, Attitudes)

Response scale for Q4–Q12:

- 1 = To a very small extent
- 2 = To a small extent
- 3 = To a moderate extent
- 4 = To a large extent
- 5 = To a very large extent

Q4. I know what Special Educational Needs (SEN) mean.

Q5. I know what differentiated instruction means.

Q6. I can design differentiated instructional activities for students with diverse learning needs.

Q7. I can adapt teaching strategies to the different needs of students.

Q8. I can assess individual academic progress inclusively.

Q9. I feel confident using digital tools to support differentiated instruction.

Q10. I feel capable of managing teaching and learning situations in a diverse classroom.

Q11. I know how to communicate and cooperate with families of students with SEN.

Q12. I know how to communicate and cooperate with other teachers and school staff in the best interest of students with SEN.

Appendix A.1.3. Improvement Needs and Suggestions

Q13. Overall, how would you rate your need for additional training on SEN and differentiated instruction?

- 1 = No need ... 5 = Very high need

Q14. How effective do you think the following measures would be for improving initial teacher education programs regarding SEN?

“Dedicated practicum placements focused on working with students with SEN.”

- 1 = Not effective at all ... 5 = Very effective

Q15. Please mention one concrete suggestion for improving initial teacher education programs in relation to SEN and differentiated instruction.
(Open-ended.)

The full version of the questionnaire (28 items) is available from the authors upon request.

Appendix B. ANCOVA Results for Specific Pedagogical Competencies (Differentiated Instruction)

Source	Type III Sum of Squares (SS)	df	Mean Square (MS)	F	p-Value	Partial Eta Squared (η^2_p)
Corrected model	12.45	2	6.22	4.15	0.016	0.025
Intercept	845.20	1	845.20	563.10	<0.001	0.635
Age (covariate)	1.85	1	1.85	1.23	0.268	0.004
Training level	6.15	1	6.15	4.10	0.043	0.013
Error	486.30	324	1.50			
Total	1345.80	327				

Note: $R^2 = 0.025$ (adjusted $R^2 = 0.019$). The effect of the formal training level is statistically significant ($p < 0.05$), but the effect size is small ($\eta^2_p = 0.013$), indicating a limited practical impact on technical skills. SS = Sum of Squares; MS = Mean Square; η^2_p = partial eta squared. $R^2 = 0.025$. $p < 0.05$.

Appendix C. ANCOVA Results for General Adaptive Attributes (Openness to Diversity)

Source	Type III Sum of Squares (SS)	df	Mean Square (MS)	F	p-Value	Partial Eta Squared (η^2_p)
Corrected model	28.60	2	14.30	11.20	<0.001	0.065
Intercept	912.40	1	912.40	715.60	<0.001	0.688
Age (covariate)	24.15	1	24.15	18.94	<0.001	0.055
Training level	1.95	1	1.95	1.52	0.218	0.005
Error	413.20	324	1.27			
Total	1356.15	327				

Note: $R^2 = 0.065$ (adjusted $R^2 = 0.059$). Age (representing life experience) is the dominant predictor for general inclusive attitudes ($p < 0.001$), while the formal Training Level does not show a significant unique contribution when controlling for age. SS = Sum of Squares; MS = Mean Square; η^2_p = partial eta squared. $R^2 = 0.059$. $p < 0.05$.

Appendix D. Simple Regression Model for the Question: Do You Believe That You Will Have Pupils with SEN in Your Classroom

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Year of study	0.019077	0.007973	2.392646	0.0173
C	0.978104	0.017719	55.20077	0.0000
R-squared	0.017310			
Adjusted R-squared	0.014286			
S.E. of regression	0.190095			
Sum squared resid	11.74420			
Log likelihood	79.90630			
F-statistic	5.724756			
Prob(F-statistic)	0.017295			
Mean dependent var	1.012232			
S.D. dependent var	0.191467			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Akaike info criterion	−0.476491			
Schwarz criterion	−0.453311			
Hannan–Quinn criterion	−0.467242			
Durbin–Watson stat	1.855848			

Appendix E. Statistical Model with Dependent Variable Skills in Using Digital Tools in Specific Teaching Activities and Independent Variable Age Range

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Year of study	−0.066078	0.037922	−1.742458	0.0824
C	2.889219	0.095804	30.15756	0.0000
R-squared	0.009256			
Adjusted R-squared	0.006207			
S.E. of regression	0.838110			
Sum squared resid	228.2893			
Log likelihood	−405.2398			
F-statistic	3.036162			
Prob(F-statistic)	0.082374			
Mean dependent var	2.743119			
S.D. dependent var	0.840724			
Akaike info criterion	2.490763			
Schwarz criterion	2.513943			
Hannan–Quinn criterion	2.500012			
Durbin–Watson stat	2.131417			

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