The Evolution of Neuroinclusion: Historical and Semantic Perspectives in European Education

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Abstract: *The article explores the concept of inclusion within European pedagogy, with particular attention to its integration into the neuropsychological context. It examines the historical evolution of inclusive education, key conceptual shifts, and the current challenges that educators face. Emphasis is placed on the notion of neuroinclusion – a new approach aimed at integrating neurodivergent students into mainstream educational settings. This article addresses the timely and underexplored phenomenon of neuroinclusion in European pedagogy. It offers a detailed analysis of the concept's evolution, its theoretical underpinnings, and its practical application in the educational process. Neuroinclusion, which merges insights from neuroscience with the principles of inclusive education, is gaining increasing relevance in today's education. By understanding the neurobiological foundations of learning and development, educators can create more individualized and effective learning environments. The article traces the historical development of the neuroinclusion concept. It outlines its core ideas and foundational approaches. It also examines the current state of neuroinclusive practices in various European countries. Additionally, it discusses the main challenges and prospects related to implementing neuroinclusion in education.*

Keywords: n*euroinclusion, inclusive education, European pedagogy, neuropsychology, adaptation, cognitive features.*

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Introduction

Inclusion is one of the most important areas in the development of pedagogy. The European approach to inclusive education has deep roots, dating back to the early 20th century. Today, however, research in neuropsychology adds a new layer to this concept, namely, neuroinclusion. This emerging perspective emphasizes the integration of students with diverse cognitive, sensory, and emotional characteristics into the general educational process.

Neuroinclusion is gaining prominence in current educational discourse, particularly in light of the ongoing transformations within European education. It represents not only an educational strategy but also a broader philosophy. Its goal is to create an environment where all individuals, regardless of their neurophysiological differences, can learn, work, and thrive without barriers.

The historical development of this concept is closely connected to broader changes in attitudes toward people with developmental disorders. European pedagogy has come a long way – from early practices of segregation and marginalization of individuals with mental and physical challenges to today's concepts of integration and inclusion. The emergence of neuroinclusion is a logical continuation of these changes. It brings together humanistic ideals and innovative scientific advances in neuropsychology, cognitive science, and special education.

One of the key points of debate is whether a universal approach can be applied to neurodivergent students, or whether each case requires a more individualized strategy. On the one hand, many researchers argue that a universal model of inclusion has strong potential. It promotes equal rights for all learners, regardless of their cognitive characteristics. Furthermore, it follows the principle of equal access to education within a shared learning environment.

On the other hand, some scholars believe that general methods may be ineffective when it comes to meeting the needs of neurodiverse students. They emphasize the importance of individualized education plans and tailored adaptations that address each student's specific needs. Their criticism is aimed at the limitations of the universal approach. The latter may not provide adequate support for students with significant cognitive or psychological challenges due to a lack of specialized resources.

Roldán et al. (2021) examine various approaches to inclusion within the educational context. They focus on how neuropsychological differences influence the learning process. Besides, the researchers evaluate the evolution

of inclusive practices in Europe and their impact on educational strategies. Slee (2011) offers a critical analysis of how the concept of inclusion has developed in education, especially within European countries. The researcher also explores the historical progression of approaches to children with special needs, including the emerging concept of neuroinclusion. Lindsay (2007) analyzes the effectiveness of inclusive education in the UK. He also examines how the system has been adapted to address the needs of neurodivergent students.

At the same time, this theoretical article aims to investigate the historical and semantic development of neuroinclusion. It also seeks to analyze its influence on educational practices across Europe. Additionally, the article identifies the key stages in the formation of neuroinclusion as a pedagogical concept, outlines its core principles and approaches, and assesses its prospects within European education.

Research methods used include a) a detailed analysis of scientific literature (publications in neuroscience, pedagogy, and inclusive education); b) historical analysis (how the concepts of "inclusion" and "neurodevelopment" have evolved within the European educational context); c) comparative analysis (comparing approaches to neuroinclusion in different European countries); and d) policy and legislative analysis (the regulatory frameworks governing inclusive education in Europe).

Historical development of the "inclusion" concept in european pedagogy

Inclusive education emerged in the early 20th century as an alternative to segregated education for children with special educational needs. European countries have gradually recognized the right of these students to access general education. The foundations of inclusion were laid by figures such as Maria Montessori (2003) and other progressive educators, who believed that education should address the individual needs of each child. Inclusion, as both a social and educational phenomenon, has deep historical roots. It traces back to the humanist era and the first efforts to create educational opportunities for children with different needs.

According to Munyi (2012), in the early stages of societal development, segregation was the prevailing view, and people with physical or mental health conditions were often marginalized. However, as society gradually began to appreciate the value of human life and diversity, attitudes toward these individuals began to shift.

The first efforts to integrate people with special educational needs can be traced back to the Renaissance. Humanists such as Desiderius Erasmus

(2023) and Martin Luther (2024) advocated for education as a universal right. Their ideas paved the way for educational systems that recognized the unique abilities of each child.

In the 18th century, Enlightenment ideals contributed to the establishment of institutions for children with sensory impairments, such as the National Institute for the Deaf and Dumb in France. The works of Jean-Jacques Rousseau (1893) and Johann Heinrich Pestalozzi (1898) emphasized individualized learning. In turn, this formed the basis for developing teaching methods for children with special needs.

In the 19th century, advances in science, particularly in medicine and psychology, led to further specialization in the education of children with special needs (Winzer, 2009). The first schools were established to support children with visual, hearing, and intellectual impairments, promoting access to education for all. However, these efforts were primarily carried out within segregated educational models that emphasized the differences between neurotypical students and those requiring special conditions.

The early history of inclusive education laid the groundwork for the later evolution of the concept. The late 20th century witnessed a shift from isolation to the integration and full inclusion of students with special educational needs in mainstream schools. During this time, the core principles of inclusion began to take shape, including accessibility, equal opportunities, acceptance of diversity, and respect for human dignity.

As noted by Losberg & Zwozdiak-Myers (2021), inclusion as a pedagogical and social concept has undergone significant development in recent decades. This development in European pedagogy reflects society's changing attitudes toward people with special educational needs, particularly the shift from a medical to a social model of inclusion.

The second half of the 20th century saw a paradigm shift from the medical model (focused on "treating" disorders) to the social model. This transition led to the realization of the importance of creating an accessible environment for all students, regardless of their health conditions.

The medical model, which dominated European pedagogy until the mid-20th century, viewed developmental differences as problems to be "cured" or "corrected (Ivanova, 2019). This perspective contributed to the segregation of people with special needs, making it difficult for them to integrate into society.

In the early 20th century, socio-economic and cultural changes across Europe brought humanistic ideals focused on human rights to the forefront of public discourse. This shift gave rise to a new paradigm, namely, the social model. It redefined disability not as an individual deficit but as a societal

challenge. Rather than placing responsibility solely on the individual, the social model shifts the focus to society. It calls for the removal of systemic barriers that hinder people with special needs from accessing education, employment, and full participation in social life.

In education, the social model promotes individualizing the learning process to meet the needs of each child. It also encourages community involvement in supporting inclusive initiatives, thus strengthening social cohesion.

The shift to the social model in European pedagogy was a fundamental step in rethinking inclusion. From focusing on medical intervention to embracing social inclusion, this movement laid the foundation for today's inclusive practices. These practices aim to provide equal opportunities for all learners in environments that value human diversity.

With the adoption of key documents such as the Salamanca Declaration (UNESCO, 1994) and the Lisbon Strategy (European Parliament, 2000), inclusion became a cornerstone of EU education policy. These initiatives emphasized the importance of equal access to education and the integration of students with special needs.

Inclusion has now become one of the key concepts in today's European pedagogy. It aims to create an equal learning environment where every student can reach their full potential. This concept has evolved from segregated approaches to integration. Now, it reflects an understanding of inclusive education that recognizes the needs of all participants in the educational process.

The development of inclusion as an educational concept began in the mid-20th century. During this period, the first educational reforms were introduced to integrate children with physical and mental health conditions into mainstream schools.

EU policies have played a significant role in spreading inclusion across European education. Notable documents include the European Strategy on the Rights of People with Disabilities (European Platform for Rehabilitation, 2015), which enshrines the principles of equality and access to quality education for all. Another key initiative is the Education and Learning 2020 programme (European Forum of Technical and Vocational Education and Training (EfVET), 2009), which promotes the exchange of the most effective practices and the implementation of inclusive approaches among EU member states. Additionally, the European Accessibility Act (European Commission, 2019) requires countries to ensure equal access to all aspects of public life, including education.

Inclusion has become an integral part of EU policies aimed at fostering social cohesion, reducing inequalities, and combating discrimination. The EU continues to invest in research to develop innovative inclusive education approaches and supports related projects through programmes such as Erasmus+ and Horizon Europe.

The development of inclusion in European education is a multi-faceted process, reflecting the aspirations for equity, equality, and accessibility. Influenced by international initiatives and EU policies, inclusion has become a guiding principle for today's education strategies. However, the process is ongoing, as European countries continue working to improve inclusive practices and ensure maximum participation in public and school life.

Key concepts and approaches to neuroinclusion

Neuroinclusion is an educational approach that considers the neuropsychological characteristics of students. Its main goal is to adapt the learning process in ways that support each student's cognitive and social development.

As Lindsay (2007) explains, neuroinclusion is an innovative approach that acknowledges neurodiversity, i.e., the natural variations in how people's brains function. The concept seeks to provide equal access to education for all learners, including individuals with autism, attention deficit hyperactivity disorder (ADHD), dyslexia, dyspraxia, and other neurocognitive conditions.

The principle of neurodiversity is central to neuroinclusion. It views differences in brain functioning as natural aspects of human diversity, rather than as deficits that need to be corrected. In this regard, neuroinclusion promotes the development of educational environments that accommodate a wide range of neurocognitive profiles.

This approach emphasizes the importance of tailoring education to the needs of each learner. It involves creating individualized learning plans, assigning differentiated tasks, and using flexible methods for assessing knowledge. Rooted in humanistic values, neuroinclusion highlights the importance of respecting every learner, recognizing their unique qualities, and building on their strengths. Education, in this context, becomes a space not only for gaining knowledge but also for developing social skills, emotional resilience, and self-confidence.

The problem of neuroinclusion in European pedagogy examines the integration of neurodivergent individuals into mainstream education. It also raises various debates and critical observations about the existing theories that explain this process. One of the most controversial theories is the concept of neurodiversity, which emphasizes the biological aspects of brain function

differences and learning abilities. While neurodiversity has many supporters, it also faces significant criticism. A major concern is the potential for reinforcing biological determinism, which can influence pedagogical approaches and educational strategies.

Neurodiversity promotes the idea that differences in neuropsychological development are natural and should be seen as part of human diversity. This concept has gained widespread acceptance in educational circles. At the same time, differences in brain activity and development should be viewed as natural, without the need for "treatment" or "correction. McLaughlin et al. (2013) advocate for educational environments that support the unique ways neurodivergent students perceive and process information.

A key issue with neurodiversity theory is that it may strengthen biological determinism while downplaying the role of social and cultural factors. If neuropsychological differences are seen as the primary cause of learning difficulties, it may overshadow other significant factors. These can include social stereotypes, economic status, access to resources, and cultural influences, all of which impact educational success or failure.

Another concern is that focusing too much on neuropsychological traits may lead to ethical problems. When neurodiversity emphasizes biological differences, it can harm students' self-esteem. They may feel defined solely by their neuropsychological characteristics and perceive themselves as "incomplete" or incapable of academic success due to their nature.

Additionally, there is a risk that pedagogical strategies based primarily on biological differences may fail to address social challenges. Neurodivergent students often face prejudice and discrimination in educational settings. This raises questions about whether the theory of neurodiversity can offer a comprehensive approach to inclusive education. As it primarily focuses on one aspect of the issue, it may not fully account for the broader social context.

The concept of neuroinclusion focuses on creating a learning environment accessible to all learners without requiring customization. Key principles of Universal Design for Learning (UDL) (CAST, 2024) include varying the way information is delivered, offering multiple opportunities to demonstrate knowledge, and encouraging active participation in the learning process.

To implement neuroinclusion, a multimodal approach is used. This approach incorporates different modes of information delivery, such as visual, auditory, and tactile methods, ensuring accessibility for students with special educational needs.

Gergen et al. (2001) emphasize that emotion-centered learning focuses on developing emotional intelligence and creating a comfortable environment. This approach promotes the success of students with neurocognitive disabilities. Additionally, digital tools, such as word processing software, planning applications, and specialized learning platforms, can help overcome learning barriers for children with special needs.

Successful neuroinclusion requires an interdisciplinary approach, involving collaboration between teachers, psychologists, social workers, and families. This team provides comprehensive support to students.

Neuroinclusion is grounded in research on brain neuroplasticity. It shows that individualized learning approaches can improve the cognitive abilities of students with special needs. Furthermore, multimodal teaching methods that engage different parts of the brain are crucial in this process.

Today, neuroinclusion offers solutions to the challenges of providing equal access to education in a neurodiverse society. Its core concepts, such as neurodiversity, individualization, universal design, and humanistic pedagogy, combined with practical approaches, create new possibilities for inclusive learning environments. Implementing these principles will not only help learners reach their full potential but also contribute to the development of a more cohesive, tolerant, and innovative society.

The current state of neuroinclusive practices in european countries

Neuroinclusion is an educational approach aimed at integrating people with different neurocognitive features, such as autism, ADHD, and dyslexia. This approach is actively being implemented in many European countries. Recognizing neurodiversity and creating equal opportunities for all students have become important goals in educational policy across Europe.

As stated by Yermakova (2019), the implementation of neuroinclusion faces various challenges. These challenges vary depending on national traditions, socio-economic conditions, and the level of development of inclusive education in each country.

Many European countries, including Sweden, Norway, the UK, and Germany, have adopted national policies that support neuroinclusion and promote inclusive practices in school curricula. However, significant differences exist in the development of inclusive education across countries due to varying economic and social factors.

According to Slee (2011), Scandinavian countries, particularly Sweden and Norway, are pioneers in implementing neuroinclusive practices. In these countries, inclusion is considered both an educational and a social value.

Sweden has a well-developed system of support for students with special educational needs. This system includes the use of advanced technology, adaptive learning processes, and individualized approaches to each student. There is also a strong emphasis on supporting teachers through inclusive education curricula.

Norway has adopted the Universal Design for Learning (UDL) approach to create a universal learning environment for all students (CAST, 2024). The country invests in training professionals working with neurocognitive disorders and provides access to technology that facilitates learning for these students.

In the UK, neuroinclusion has made significant progress as part of mainstream education. The focus is on individualized learning plans for students with special needs, including special assistance, assistive technology, and personalized learning strategies. Digital technologies are used to support students with dyslexia, autism, and ADHD. Writing remediation programmes, along with audio and video resources, are actively integrated into the educational process. However, despite a well-developed legal and regulatory framework, challenges remain in terms of resources and the ongoing professional development of teachers.

In Germany and France, the implementation of neuroinclusion is slower, even though some initiatives have been made. Germany emphasizes the inclusion of children with special needs in mainstream schools. Still, there are significant differences in policy implementation at the state level. Many districts lack adequate support for students with neurodiversity. France is working on reforms in special education and aims to create uniform standards for neuroinclusion across educational institutions.

While neuroinclusion is actively being developed in European countries, its implementation faces challenges such as underfunding, insufficient teacher training, and social stigmatization. Scandinavian countries, the UK, and some other nations show a high level of development in neuroinclusive practices. However, Germany and France need to make further efforts to bridge the gaps in policy implementation. Neuroinclusion must serve as the foundation for creating a more accessible and equitable educational environment for students with neurodisabilities across Europe.

Challenges and prospects for implementing neuroinclusion

Neuroinclusion is an educational approach that focuses on neurodiversity. It ensures equal access to education for all learners and is a crucial step toward social justice and inclusion. However, the implementation of neuroinclusive practices in educational systems faces several challenges.

These challenges are related to organizational and social factors, as well as the insufficient preparation of teachers to work with neurodivergent students. This article discusses the main challenges encountered by teachers, parents, and educational authorities when implementing neuroinclusion.

Cognitive psychology is a key discipline that has significantly influenced the understanding of neuroinclusion. Scholars such as Jean Piaget (1952) and Lev Vygotsky (1978) have significantly contributed to the development of theories on cognitive function in children. Piaget (1952) focused on the stages of cognitive development. In contrast, Vygotsky et al. (1978) emphasized the importance of social context for cognitive growth. However, the most relevant theories for neuroinclusion are those that emphasize adapting educational practices to the individual cognitive abilities of students.

The sociology of education offers valuable insights into how social structures and practices impact the implementation of neuroinclusion. Inclusion is often linked to social justice and equality. Research by sociologists such as Pierre Bourdieu (1990) and Antonio Gramsci (1971) reveals how social inequality and cultural stereotypes can influence the integration process in educational systems. Bourdieu (1990), in particular, examined social capital and access to education as key factors in the development of inclusive systems.

In this context, neuroinclusion is not only an educational process but also a social one. It involves issues of social integration, equal access to education, and the fight against discrimination. Sociological research can help assess how factors such as socioeconomic status, ethnic background, or cultural differences affect the inclusion of students with neuropsychological differences.

Developmental psychology, particularly the theories of emotional and cognitive development, is also vital for neuroinclusion. Understanding how neurodivergent children and adolescents adapt to learning is crucial in inclusive pedagogy. The work of psychologists such as Erik Erikson (1950) and Lawrence Kohlberg (1981) highlights the development of social and cognitive skills. These skills can evolve as students with special educational needs are integrated into the educational system.

Philosophy and ethics play an important role in shaping the concept of neuroinclusion. This concept addresses not only cognitive and social aspects but also ethical considerations related to human rights and equality. Philosophers such as John Rawls (1971) and Martin Luther King (1963) emphasized the importance of justice. They advocated for equal opportunities for all members of society, regardless of their biological or cognitive differences.

One of the biggest challenges is the inadequate preparation of future educators. Many teachers lack the appropriate training to work with neurodivergent students. This includes basic knowledge of various neurological conditions, such as autism, ADHD, and dyslexia, as well as practical skills to adapt the learning process to the needs of these students.

According to Hehir (2005), teachers often do not know how to individualize instruction or have insufficient knowledge about Universal Design for Learning (UDL) (CAST, 2024). This makes it difficult to implement inclusive approaches effectively.

Additionally, implementing neuroinclusion requires a significant investment in resources. This includes funding to adapt learning materials and purchase specialized technology, such as assistive tools for students with dyslexia or cognitive impairments. Many educational institutions, especially in rural areas or countries with low education funding, lack the resources to provide the necessary support for neuroinclusion.

To gain a deeper understanding of the neuroinclusion process and its effectiveness in different European countries, it is essential to collect primary data. This will provide insights into the current state of inclusion within educational institutions. It will also help identify the real needs, problems, and barriers faced by participants in the process, including students, teachers, and parents.

One effective method for collecting data is through interviews with teachers, psychologists, and school administrators working with neurodiverse students. Interviews allow for in-depth, qualitative data on how teachers adapt educational programmes, which tools they use to monitor student progress, and which support methods are most effective. Interviews also help identify challenges teachers face when working with neurodivergent students and the resources or training that would enhance the effectiveness of the educational process.

Surveys of students and their parents are another useful tool. They provide data on how neurodivergent students feel in an inclusive environment. The surveys can reveal how comfortable students are in the learning process and whether they feel supported by teachers and classmates. Additionally, surveys can highlight important aspects of social adaptation and emotional well-being for students.

A significant development in neuroinclusion has been the widespread implementation of individualized education plans (IEPs). They cater to the unique needs of each student and support both the academic and emotional development of neurodivergent students. However, despite these advances, challenges remain. These include the need for resource support, appropriate

learning materials, and qualified teachers who can effectively work with neurodivergent students.

A detailed analysis of neuroinclusion in pedagogy often relies on literature that supports specific theoretical concepts, which can lead to bias. For example, much of the focus may be on the experiences of Western European countries, while the experiences of Eastern European and post-Soviet countries may not be adequately represented. Additionally, many studies on this topic were written before current psycho- and neuropedagogical diagnostic methods were developed, which limits the application of current approaches.

To strengthen the empirical foundation of research on neuroinclusion in European pedagogy, it would be valuable to include primary data collection methods such as interviews or surveys with teachers, psychologists, and neuroeducators working directly with neurodivergent students. This would provide practical feedback, highlight key challenges faced in practice, and identify areas that need further improvement.

The collection and selection of literature may also present methodological limitations. For example, when analyzing neuroinclusion in European pedagogy, much of the available literature focuses on the experiences of large Western European countries. These include the UK, Germany, and France, where inclusive education has been a priority for many years. This focus can create a skewed perception of the overall situation in Europe and neglect the specific challenges faced by regions where neuroinclusion is still developing or facing different cultural, social, and economic obstacles. Therefore, it is important to broaden the scope of research and include Eastern European and post-Soviet contexts as well, to provide a more balanced and objective view of neuroinclusion's development in pedagogy.

Despite growing awareness of the importance of neuroinclusion, neurodivergent individuals still face significant stigmatization in society. This often appears as stereotyping, biased attitudes toward students with special needs, or even direct discrimination. In some cases, parents of neurotypical students may be reluctant to have their children educated alongside neurodivergent peers. Such resistance can create additional challenges for implementing inclusive practices in the classroom.

Conclusion

Therefore, a detailed analysis of the neuroinclusion's evolution, its foundational concepts and approaches, and its current implementation in European countries reveals several key insights.

Neuroinclusion has progressed from early efforts to integrate neurodivergent individuals into mainstream education to current practices that recognize neurodiversity as a natural and valuable aspect of human variation. From the outset, it has been viewed as a critical element of inclusive pedagogy. Central principles include the recognition of neuropsychological diversity, individualized learning, Universal Design for Learning (UDL) (CAST, 2024), and a humanistic approach to each student.

The definition and implementation of neuroinclusion in European educational systems reflect a convergence of scientific advancement, political action, and social transformation. Countries across Europe are actively working to embed neuroinclusive practices through the use of advanced technology, adapted teaching methods, and legal frameworks that guarantee equal access to education for all students.

Nevertheless, significant challenges remain. These include inadequate teacher training, the absence of a standardized implementation model across nations, and limited public involvement in the reform process. The success of neuroinclusion depends not only on policy initiatives but also on the willingness of educational institutions to adjust to special learning needs.

Despite these obstacles, neuroinclusion offers strong potential for improving educational systems. It promotes equal opportunities and supports the social integration of neurodivergent individuals. Its effective implementation requires collaborative efforts among governments, educational institutions, educators, and society. Neuroinclusion stands as a crucial step toward building a more equitable, inclusive, and diverse society.

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