ENHANCING REFLECTIVE AND METACOGNITIVE COMPETENCES IN TEACHER EDUCATION FOR THE INCLUSION OF STUDENTS WITH AUTISM SPECTRUM DISORDER

POTENZIARE LE COMPETENZE RIFLESSIVE E METACOGNITIVE NELLA FORMAZIONE DEGLI INSEGNANTI PER L'INCLUSIONE DEGLI STUDENTI CON DISTURBO DELLO SPETTRO AUTISTICO

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ABSTRACT
This study proposes a training activity to enhance reflective and metacognitive competences in special education teachers, with a focus on the inclusion of students with Autism Spectrum Disorder (ASD). Through an exercise involving the objective description of a silent short film, participants practiced inhibiting automatic mental attributions. Grounded in the theory of *simplexity* and educational neuroscience, the activity aimed to promote flexible, conscious, and inclusive teaching practices. Preliminary results from 177 participants show increased awareness of interpretive automatisms and support the effectiveness of this approach in fostering inclusive education.

Questo studio propone un'attività formativa volta a potenziare le competenze riflessive e metacognitive degli insegnanti di sostegno, con particolare attenzione all'inclusione degli studenti con Disturbo dello Spettro Autistico (ASD). Attraverso un esercizio basato sulla descrizione oggettiva di un cortometraggio privo di dialoghi, i partecipanti hanno praticato l'inibizione delle attribuzioni mentali automatiche. Basata sulla teoria della *semplessità* e sulle neuroscienze educative, l'attività mira a promuovere pratiche didattiche flessibili, consapevoli e inclusive. I risultati preliminari, raccolti su un campione di 177 partecipanti, evidenziano una maggiore consapevolezza degli automatismi interpretativi e confermano l'efficacia dell'approccio nel favorire l'inclusione scolastica.

KEYWORDS
Reflective Practice; Simplexity; Teacher Training; Autism Spectrum Disorder; Inclusive Education.
Pratiche Riflessive; Semplessità; Formazione Docenti; Disturbi dello Spettro Autistico; Inclusione Scolastica

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Introduction

This contribution proposes a training exercise aimed at promoting the reflective and metacognitive competencies of support teachers, with particular attention to teaching situations involving students with Autism Spectrum Disorder (ASD). This objective is framed within a broad and complex conception of inclusive education, understood not only as a set of strategies to respond to the needs of students with disabilities but as a transformative process involving the entire school system. As emphasized by Ainscow and Miles (2008), inclusion is a continuous journey that aims to remove barriers to learning and participation, promoting educational justice and valuing diversity as a resource, rather than as a factor of separation. From this perspective, inclusion is not limited to the adoption of compensatory measures or individualized interventions but is configured as a cultural and pedagogical shift that affects curricula, teaching practices, assessment criteria, and school organization (Florian & Black-Hawkins, 2011). It is therefore not merely about ensuring formal access to the school environment but about creating conditions that allow full, meaningful, and transformative participation for all students, regardless of their characteristics, abilities, backgrounds, or educational needs. Booth and Ainscow (2016), through the *Index for Inclusion*, propose a relational and ethical vision of "schooling," emphasizing the importance of creating learning environments capable of welcoming and valuing differences. In this sense, the inclusive school is not just a place for the transmission of knowledge, but a dynamic space for the co-construction of meaning, where diversity represents added value for collective growth. Inclusive teaching thus requires a profound rethinking of daily practices and educational relationships, recognizing that every student learns in different ways and brings a universe of experiences and potential that enrich the school community (UNESCO, 2017). The promotion of genuinely inclusive educational contexts implies overcoming the deficit paradigm and adopting a rights-based and equity-oriented approach (Armstrong, Armstrong & Spandagou, 2010). Inclusion is built through the pedagogical intentionality and ethical commitment of teachers in promoting the participation of all, especially those at risk of exclusion. This requires the development of reflective and metacognitive competencies so that teachers can critically analyze their practices and adopt flexible and adaptive perspectives, as will be further explored in the following sections.

1. Towards a Transformative Pedagogy: Practice and Reflection

The concept of inclusive education entails a profound and systemic revision of the entire educational framework, involving teaching practices, curricula, assessment criteria, and school organization in order to provide appropriate responses to the needs of every student (Florian, 2014). School inclusion cannot be understood as a mere marginal adjustment or a set of compensatory strategies, but rather requires a substantial transformation in how teaching is designed, implemented, and evaluated. In this sense, the school is called to adopt a pedagogical stance centered on equity, meaningful access, and the active participation of all students, regardless of their personal, social, or cultural characteristics. Within this framework, the role of the inclusive teacher becomes crucial. As emphasized by Sapon-Shevin (2010), the inclusive teacher does not merely provide individualized support but builds collaborative, welcoming, and flexible learning environments in which all students can learn together, even while following differentiated pathways. This teaching flexibility is not merely a methodological issue; it is closely linked to a professional attitude that values diversity as a resource and fosters educational relationships based on mutual respect and attentive listening. A key element of this inclusive professionalism is the teacher's reflective capacity, understood as the disposition to question one's interpretative frameworks, habitual practices, and pedagogical beliefs. According to Schön (1983), reflection on practice is an essential process for dealing with the complexity and uncertainty that characterize educational work. This reflection occurs both as "reflection-in-action"—which enables teachers to reorient their decisions while teaching—and as "reflection-on-action," through which past choices are critically analyzed and long-term professional learning is developed. This reflective capacity, when directed toward a deep rethinking of one's educational paradigms, becomes the engine of transformative learning, as theorized by Mezirow (1991). Transformative learning is not limited to the accumulation of new knowledge but entails a substantial change in the meaning perspectives through which individuals interpret experience. In the context of teacher training, such an approach fosters critical awareness of one's biases, implicit expectations, and representations of students, enabling the development of more ethical, equitable, and diversity-sensitive practices. These processes become particularly relevant in educational situations involving students with Autism Spectrum Disorder (ASD), whose communicative, relational, and cognitive needs require constant adaptation of teaching practices. In such contexts, teachers

must activate reflective thinking that allows them to question not only what works but also why and for whom a certain strategy may be effective. Only in this way can genuine inclusion be promoted—not based on standardized protocols, but on the continuous construction of shared meanings and meaningful educational relationships.

2. Autism and the Challenge of Theory of Mind

Students with Autism Spectrum Disorder (ASD) display a variety of cognitive, communicative, and socio-relational profiles, yet they share certain distinctive characteristics—one of the most prominent being difficulties related to Theory of Mind (ToM). Theory of Mind refers to the ability to attribute mental states—such as desires, beliefs, intentions, and emotions—to oneself and others, understanding that these states may differ from one's own (Premack & Woodruff, 1978). According to the pioneering studies by Baron-Cohen (1997), this ability is often impaired in individuals with ASD, resulting in difficulty predicting or interpreting the behavior of others in mentalistic terms, and thus complicating social interactions and integration within educational settings. This impairment affects not only the understanding of emotions and intentions but also the use of non-verbal communication, participation in cooperative activities, and the regulation of one's own emotions in response to the dynamics of the classroom group (Frith & Happé, 1994). In facing these challenges, the role of the teacher becomes central—not only as a facilitator of academic learning but also as a cultural and emotional mediator capable of fostering learning environments that are accessible, empathetic, and respectful of individual specificities. Over the past two decades, international approaches to teacher training for the inclusion of students with ASD have significantly evolved. There has been a shift from a predominantly theoretical-informative approach to evidence-based training models that focus on reflective practices, personalized teaching interventions, and the development of socio-relational skills (Jordan, 2005; Humphrey & Symes, 2013). These approaches are grounded in empirical evidence from educational and clinical research, promoting the use of adaptable strategies tailored to the individual profile of each student. In particular, Jordan (2005) emphasizes the importance of teachers understanding the "cognitive diversity" of students with ASD, avoiding reductive or pathologizing interpretations and instead adopting a neurodivergent perspective. Humphrey and

Symes (2013), in a series of studies conducted in UK schools, show that training programs incorporating practical-reflective components—such as guided observation, mentoring, and simulation—are more effective in changing teachers' beliefs and improving their inclusive practices. A key element of such programs is the promotion of reflectiveness, understood not only as technical self-analysis but also as the ability to adopt multiple perspectives and to question the ethical, relational, and cultural implications of one's teaching choices (Lindsay et al., 2013). By strengthening metacognitive skills, teachers are better able to create learning environments that are more responsive to the needs of students with ASD, supporting inclusion through authentic, intentional, and respectful educational relationships.

3. Reflectivity and Metacognition in Teacher Professionalism

The most effective teacher training programs for inclusive education emphasize the importance of metacognition and reflectivity as key tools in developing a conscious and inclusive professional identity (Lindsay, Pather, & Strand, 2013). In this perspective, reflectivity is not an ancillary activity but lies at the very heart of teaching professionalism, as it allows educators to continuously question their actions, instructional decisions, and outcomes within various learning contexts. Metacognition and reflectivity are interdependent concepts: the former refers to the awareness and regulation of one's own cognitive processes (Flavell, 1979), while the latter involves the ability to critically distance oneself from educational action in order to analyze its premises, the emotions involved, and its consequences. Reflecting on educational action therefore does not simply mean assessing outcomes but entails a deep examination of the interpretative frameworks employed, implicit expectations, and operative strategies used, with the aim of reformulating them in more effective and inclusive ways (Brookfield, 1995). Korthagen and Vasalos (2005) propose a model of professional reflection based on concentric levels, extending from the external environment to the deeper dimensions of teacher identity and personal mission. This approach underscores that authentic reflectivity goes beyond technical-functional analysis of practices and involves the whole professional self, including values, beliefs, and motivations. According to the authors, professional reflectivity is inherently metacognitive, as it requires teachers to observe their own actions from an external perspective, activating a process of decentering that enables the emergence of new meanings

and transformative actions. Furthermore, reflectivity enables the development of "situated awareness" (Schön, 1983)—the ability to adapt and reinvent teaching practices in response to the specific needs of educational contexts, especially those involving students with special educational needs. This type of reflective learning, according to Mezirow (1991), is at the core of *transformative learning*, a process through which educators challenge their own frames of reference and adopt new interpretive paradigms to approach educational challenges in a more ethical, critical, and inclusive manner. Finally, professional reflectivity is also a key component in promoting an ethic of care and responsibility—essential elements for anyone working within the field of inclusive education. The ability to question oneself, to listen to otherness, and to act with educational intentionality forms the foundation of truly transformative practice grounded in respect for differences.

4. Simplexity as a Pedagogical Model

In the context of teacher training for inclusion, the paradigm of simplexity, as outlined by Berthoz (2009), represents a key theoretical resource to support educators in navigating the complexity of educational situations. Simplexity, understood as a dynamic balance between complexity and comprehensibility, enables teachers to face daily challenges without reducing them to overly simplistic, linear solutions that risk overlooking the diversity of students' experiences and needs. The goal of simplexity is not to eliminate complexity, but rather to develop strategies to manage it effectively—making educational dynamics more understandable without falling into misleading simplification (Berthoz, 2009; Aiello, 2016). The concept of simplexity is closely tied to the inhibition of automatic cognitive processes, which often lead to stereotypical and predetermined responses. As suggested by Zollo et al. (2021), the inhibition of automatic responses is a fundamental competence for teachers, as it allows for more conscious and deliberate choices in complex educational contexts. In practice, simplexity encourages educators to intentionally select relevant information, avoiding distractions from irrelevant details and fostering a deeper and more integrated understanding of the situation. Simplexity also involves the anticipation of the effects of one's actions. This aspect is crucial in managing relational dynamics with students who have special educational needs, such as those with Autism Spectrum Disorder (ASD). The ability to predict how a given action or strategy might impact learning processes and student behavior enables

teachers to continuously adapt and enhance the effectiveness of their educational interventions (Sibilio, 2014). Another core aspect of simplexity is the adoption of flexible and adaptive strategies. The ability to modify and tailor instructional approaches in real time, based on students' responses, is a skill that supports inclusive and personalized teaching (Zollo et al., 2016). This approach allows teachers to address the challenges of inclusion in a nonlinear way, recognizing that each student follows a unique path and that educational situations involve multiple variables requiring differentiated responses. In this sense, the simplexity paradigm aligns perfectly with the goals of inclusive education, helping teachers avoid rigid or stereotypical interpretations of students' behaviors and instead encouraging openness to diverse perspectives and nonlinear understandings (Aiello, 2015). Training grounded in simplexity therefore promotes a type of reflection that not only enhances technical competence, but also fosters greater emotional and relational awareness—essential elements when working with students with conditions such as ASD, where communicative and interactive dynamics can be particularly complex.

5. Neuroscience, Cognitive Inhibition, and Reflective Thinking

Educational neuroscience has significantly contributed to our understanding of learning processes, demonstrating that learning does not follow a linear or cumulative path, but is instead marked by interruptions, regressions, and readjustments (Houdé, 2004; 2009). This dynamic model of learning recognizes that the educational process is influenced by multiple factors, including the brain's ability to adapt, reorganize, and face cognitive challenges that arise through interaction with the environment. One of the most relevant cognitive functions in this context is cognitive inhibition, which refers to the ability to suppress automatic responses and inadequate cognitive strategies, thereby supporting more refined executive control and flexible thinking. In fact, cognitive inhibition is a crucial component of executive function, which includes a set of mental processes that allow for the regulation of attention, inhibition of impulsive responses, and planning of goal-directed actions (Diamond, 2013). This function becomes especially important in teaching and learning contexts, where teachers are required to manage complex situations and make real-time decisions while adapting to students' needs. Cognitive inhibition enables both teachers and students to resist cognitive automatisms that may limit critical reflection and the ability to adapt to

new or unexpected situations (Houdé, 2004). The concept of "pedagogy of inhibition", theorized by Diamond et al. (2007), suggests that teaching should be intentionally designed to foster cognitive inhibition, enabling students to exert more conscious control over their cognitive and emotional responses. Specifically, this pedagogical approach encourages self-regulation and metacognitive reflection, helping students make more aware decisions and develop flexible thinking capable of adapting to changes and challenges within educational environments. Rueda et al. (2005) confirmed that cognitive inhibition plays a central role in the regulation of attention and emotion control—skills fundamental for effective learning. In school contexts, the ability to inhibit automatic responses helps teachers avoid snap judgments and stereotypical interpretations of student behavior, especially for those with special educational needs such as students with Autism Spectrum Disorder (ASD). Cognitive inhibition also supports educators in engaging in deeper, more metacognitive reflection on their own educational practices, allowing them to adapt strategies and respond more flexibly and thoughtfully to classroom dynamics. The approach based on cognitive inhibition is closely connected to the concept of metacognition, which refers to the awareness and regulation of one's own cognitive processes. Developing metacognition means that both students and teachers become more aware of their thoughts, emotions, and reactions, and are able to regulate their responses more effectively (Flavell, 1979). This type of reflection promotes deeper and more meaningful learning, in which the teacher does not simply react to students' behavior, but critically reflects on their own actions and the outcomes achieved. In summary, cognitive inhibition plays a fundamental role not only in enhancing executive control and flexible thinking but also in developing the metacognitive and reflective competences essential for inclusive and effective teaching. The pedagogy of inhibition fosters an educational environment in which decisions are made consciously and both students and teachers can adapt and reflect on their actions in a critical and constructive way.

6. Study Methodology and Training Context

The study was conducted as part of an intensive training module lasting a total of five hours, integrated into the university programs for Active Teaching Internship for Support (TFA Sostegno) at the University of Salerno. This training intervention was inspired by the principles of inclusive education (Booth & Ainscow, 2016; Florian, 2014), aiming at the development of reflective, metacognitive, and ethical-

relational skills among future special education teachers, particularly in the management of complex teaching situations involving students with Autism Spectrum Disorder (ASD). The structure of the experience was based on a reflective and transformative approach to adult learning (Mezirow, 1991; Schön, 1983), and on the idea that teaching professionalism is built through critical awareness of one's own practices (Korthagen & Vasalos, 2005). The operational context involved an active teaching methodology, centered on the development of laboratory activities and reflective exercises, in line with the guidelines of evidence-based training for inclusion (Jordan, 2005; Humphrey & Symes, 2013), and with training models focused on the interaction between theory, practice, and emotion (Korthagen, 2010). The focus was oriented towards promoting reflective and metacognitive abilities and competencies, capable of addressing the educational needs of students with ASD, while valuing the perspective of simplexity (Berthoz, 2009; Aiello, 2015; Sibilio, 2014). The sample considered in the study consisted of 177 participants, recruited through a non-probabilistic, convenience sampling method, as is often done in educational and training contexts (Creswell & Plano Clark, 2011). The participants, coming from different geographical areas of Italy, were distributed by gender as follows: 44 men, 129 women, and 4 individuals who did not indicate their gender. The geographical variability and the heterogeneity of the participants' previous experiences were significant elements contributing to the richness of interactions and reflections developed during the module. For data collection, a custom-made survey tool was used, administered via the digital platform Google Forms, in accordance with contemporary data collection practices in educational contexts (Cohen, Manion & Morrison, 2018). The questionnaire included both closed questions with a 10-point Likert scale (1 = strongly disagree; 10 = strongly agree) and open-ended questions aimed at capturing the subjective perception of the intervention’s effectiveness, the emotions elicited, and the metacognitive processes induced. The chosen methodological approach is a mixed-methods design (Johnson, Onwuegbuzie & Turner, 2007), aimed at integrating quantitative and qualitative data for a multi-level interpretation of the training experience. This approach not only allows for triangulating the information collected (Denzin, 1978), but also values individual narratives as sources of pedagogical knowledge, in line with narrative research (Clandinin & Connelly, 2000) and transformative formative assessment (Brookfield, 1995). The analysis of open-ended responses was guided by thematic analysis (Braun & Clarke, 2006), focusing on identifying significant recurring themes in the participants' representations, with

particular attention to the emergence of metacognitive awareness, suspension of judgment, and reformulation of habitual interpretative schemas. The overall methodological choices reflect the intention to promote a culture of teacher training that values conscious reflection as a lever for professional change, supporting a model of critical and responsive teaching (Darling-Hammond & Bransford, 2005).

7. Training Tools and Activities

One of the central training activities of the module consisted of an exercise based on the principle of suspending mentalistic attributions, a concept that emphasizes the need to temporarily suspend the interpretation of others' behaviors based on inferences related to internal mental states, intentions, or emotions, particularly relevant when working with students with Autism Spectrum Disorder (ASD). This exercise is rooted in pedagogical and neurocognitive reflection that highlights the role of cognitive inhibition in learning and social understanding (Houdé, 2004; Diamond et al., 2007). During the activity, participants were shown a short film devoid of verbal dialogues, selected for its ability to represent ambiguous or complex social interactions. The instruction given was to describe only the actions observed, avoiding any reference to mentalistic content such as desires, emotions, intentions, or psychological inferences. This type of task encourages a "bottom-up" descriptive approach, which helps deactivate, as much as possible, the automatic tendencies to assign meaning to behaviors based on pre-existing interpretive schemas (Zahavi, 2005; Berthoz, 2009). From a formative perspective, this operational strategy is closely related to the simplexity paradigm (Berthoz, 2009; Frauenfelder et. al., 2013; Sibilio, 2014), which encourages deconstructing automatic cognitive simplifications in favor of intentional and deliberate observation. Through this exercise, participants were prompted to inhibit immediate responses, encouraging them to practice a phenomenological observation, which is closer to direct experiential description (Merleau-Ponty, 1945) and useful for understanding relational dynamics without prejudice or interpretative distortions. In the educational field, this type of reflection constitutes a deep metacognitive practice (Korthagen & Vasalos, 2005; Costa & Kallick, 2008), essential for working with students whose social expressiveness deviates from neurotypical conventions, such as in the case of ASD (Baron-Cohen, 1995; Frith, 2003). The exercise also contributed to making visible the cognitive automatism

activated in the everyday interpretive process and increasing awareness among the teacher trainees about how such automatism could influence educational expectations and teaching practices. This type of epistemic suspension fostered a more critical and reflective attitude, in line with the principles of transformative learning (Mezirow, 1991) and education for complexity (Morin, 2000), enhancing participants' ability to observe without judgment and to construct more grounded and less stereotyped educational meanings. Finally, the exercise reinforced the idea that inclusive teaching professionalism cannot disregard the continuous renegotiation of one's interpretive schemas, especially in contexts of communicative or relational disabilities, where the risk of misunderstandings is high. The suspension of attributions, in this sense, is not just a teaching technique but an ethical practice that recognizes the value of difference and promotes genuinely equitable and responsive education (Nussbaum, 2006; Florian & Black-Hawkins, 2011).

8. Results and Data Analysis

In the context of our data analysis, we conducted a multiple regression to examine the influence of three independent variables on the difficulty perceived by participants: field of study, experience in special education support, and experience with students with Autism Spectrum Disorder (ASD). The goal was to explore how these factors might predict the perceived difficulty during the execution of teaching tasks. The regression model produced a multiple R value of 0.1739, indicating a moderate correlation between the independent variables and the dependent variable. However, the R^2 value of 0.0303 suggests that only about 3% of the variability in perceived difficulty is explained by the model, with a standard error of 2.42, indicating some imprecision in the predictions. This suggests that, despite the inclusion of multiple factors, the model is not particularly effective in predicting perceived difficulty. The analysis of variance (ANOVA) revealed an F value of 1.79 with a p-value of 0.1511, indicating that the overall model is not statistically significant at the 5% significance level. Therefore, we can conclude that the independent variables do not significantly contribute to explaining the variability in perceived difficulty, at least in this specific context. Analyzing the coefficients of the individual variables, we found that the intercept was highly significant ($p < 0.05$), with a value of 7.3952, suggesting that in the absence of the independent variables, the perceived difficulty would be around 7.4. However, the variable "field of study"

did not show a significant impact ($p = 0.4086$), with a coefficient of -0.3046, indicating that the difference between the humanities and technical-scientific areas does not significantly affect the perceived difficulty. This result aligns with previous studies that have suggested that differences between fields of study, while relevant for other dimensions of teaching, do not seem to be decisive in the perception of difficulty (Adams, 2009). On the contrary, experience in special education support revealed a significant effect ($p = 0.0390$), with a coefficient of -0.4137. This suggests that, as experience in special education support increases, the perceived difficulty decreases, which could reflect greater competence and confidence in handling complex tasks. This is consistent with the literature, which has shown that professional experience is a factor that contributes to improving the management of difficulties and reducing the perception of stress and difficulty in teaching (Friedman, 2013). Finally, experiences with students with ASD did not have a significant impact on the perceived difficulty ($p = 0.5763$), with a coefficient of -0.2119. This might suggest that, although experience with students with ASD is important for other aspects of teaching, it does not have a direct impact on the perception of difficulty in the tasks described in our study. Other studies have highlighted that experiences with students with special educational needs can positively affect teachers' perceptions of their effectiveness but not necessarily the perception of difficulty (Simpson, 2004). In summary, the results suggest that, although experience in special education support is a significant predictor of perceived difficulty, the other variables considered (field of study and experience with students with ASD) do not seem to have a significant influence. This highlights the need to include other variables or factors, such as specific educational support or ongoing professional development, to improve the predictive capacity of the model.

OUTPUT RIEPILOGO								
Statistica della regressione								
R multiplo	0,173945467							
R al quadrato	0,030257025							
R al quadrato corretto	0,013342904							
Errore standard	2,417341664							
Osservazioni	176							
ANALISI VARIANZA								
	gdl	*SQ*	*MQ*	*F*	*Significatività F*			
Regressione	3	31,35985961	10,45328654	1,788861759	0,151112057			
Residuo	172	1005,089004	5,843540721					
Totale	175	1036,448864						
	Coefficienti	*Errore standard*	*Stat t*	*alore di significativit*	*Inferiore 95%*	*Superiore 95%*	*Inferiore 95,0%*	*Superiore 95,0%*
Intercetta	7,395247138	0,594188188	12,44596793	9,08902E-26	6,222407494	8,568086783	6,222407494	8,568086783
area disciplinare formazio	-0,304621725	0,367695701	-0,828461482	0,408557313	-1,030398683	0,421155232	-1,030398683	0,421155232
esperienza sostegno	-0,41369848	0,198933204	-2,079584864	0,039046884	-0,806363216	-0,021033744	-0,806363216	-0,021033744
esperienze con studenti at	-0,211861684	0,378374837	-0,559925405	0,576258808	-0,958717678	0,53499431	-0,958717678	0,53499431

Figure 1. Results of the multiple regression analysis on perceived difficulty, based on disciplinary area of training, experience in support teaching, and experiences with students with Autism Spectrum Disorder (ASD).

The multiple regression analysis was conducted to explore the extent to which three independent variables — field of study (humanities = 1; technical-scientific = 2), years of experience in special education support, and prior experience with students with Autism Spectrum Disorder (ASD) — could predict the perceived usefulness of a cognitive inhibition exercise, proposed to future teachers as a training tool. Inhibition, defined as the ability to suppress automatic responses in favor of intentional and adaptive behaviors (Diamond, 2013), is a fundamental component of executive functions and plays a crucial role in effective classroom management and emotional regulation during teaching (Traverso et al., 2015). The results show that the overall regression model is not statistically significant ($F(3, 172) = 1.12$, $p = 0.343$), and the variance explained by the model is quite limited ($R^2 = 0.019$; adjusted $R^2 = 0.002$). This indicates that only a small portion of the variability in the perceived usefulness of the inhibition exercise can be attributed to the three independent variables analyzed. At the level of individual predictors, none of the variables reached statistical significance. The field of study shows a negative coefficient ($B = -0.216$; $p = 0.351$), suggesting a non-significant tendency for future teachers with a technical-scientific background to perceive the exercise as slightly less useful compared to colleagues from the humanities field. In contrast, experience in special education support shows a positive coefficient ($B = 0.168$; $p = 0.180$), suggesting that perceived usefulness might increase with experience, although this relationship does not reach the threshold of significance. Similarly, prior experiences with students with ASD do not significantly impact the perceived

usefulness (B = -0.165; p = 0.489). These results partially contrast with previous studies highlighting how training and experience positively influence the perception of competence and the usefulness of educational tools (Sharma et al., 2008; MacFarlane & Woolfson, 2013). It is possible that other factors not included in the current model may have a greater influence on the perception of usefulness, such as professional self-efficacy (Bandura, 1997), intrinsic motivation toward the teaching profession (Deci & Ryan, 2000), or an orientation toward inclusion (Jordan, 2005). Additionally, the limited variance explained may reflect the subjective complexity involved in evaluating the effectiveness of a metacognitive task like inhibition, which requires awareness of one's cognitive functioning and meta-reflective thinking. In summary, the results suggest that the perceived usefulness of the inhibition exercise is not significantly dependent on the field of study, professional experience, or prior exposure to students with special educational needs. However, these findings provide useful insights for reconsidering which educational dimensions actually influence the assessment and adoption of metacognitive strategies by future teachers.

OUTPUT RIEPILOGO

Statistica della regressione	
R multiplo	0,138290457
R al quadrato	0,019124251
R al quadrato corretto	0,002015953
Errore standard	1,518879737
Osservazioni	176

ANALISI VARIANZA

	gdl	*SQ*	*MQ*	*F*	*Significatività F*
Regressione	3	7,736520001	2,57884	1,117834788	0,34337231
Residuo	172	396,8032527	2,306995655		
Totale	175	404,5397727			

	Coefficienti	*Errore standard*	*Stat t*	*Valore di significatività*	*Inferiore 95%*	*Superiore 95%*	*Inferiore 95,0%*	*Superiore 95,0%*
Intercetta	8,379502795	0,373344163	22,44444573	5,49735E-53	7,64257661	9,11642898	7,64257661	9,11642898
area disciplinare form	-0,21610066	0,231032939	-0,935367313	0,350910412	-0,672125528	0,239924209	-0,672125528	0,239924209
esperienza sostegno	0,168412034	0,124994996	1,347350203	0,179639709	-0,078309611	0,415133678	-0,078309611	0,415133678
esperienze con studer	-0,164737229	0,237742923	-0,692921695	0,48929324	-0,634006614	0,304532155	-0,634006614	0,304532155

Figure 2 Results of the multiple regression analysis on perceived usefulness, based on disciplinary area of training, experience in support teaching, and experiences with students with Autism Spectrum Disorder (ASD).

The qualitative analysis of open-ended responses to the question “why,” in relation to the perceived difficulty of the task, led to the development of five coding categories. These reflect cognitive, emotional-relational, and metacognitive dimensions, aligning with established theoretical models in teacher education and pedagogical self-reflection. The first code, *task not completed*, includes segments in which participants explicitly stated that they were unable to complete the

proposed activity. These responses highlight operational or technical difficulties and suggest a possible lack of cognitive or self-regulatory strategies. This is consistent with metacognitive models by Flavell (1979) and Brown (1987), which emphasize that the absence of awareness about one's own cognitive strategies can hinder task management. Alongside these responses, the category *perceived difficulties and resistance* emerged, encompassing statements related to subjective discomfort, emotional resistance, or frustration. These underscore the significant influence of affective components on task engagement (Pekrun, 2006; Schutz & Zembylas, 2009). The code *empathy and perspective-taking* gathers responses indicating a process of role-taking—the ability to put oneself in another's shoes—often referring to students with disabilities and recognizing their difficulties. This reflective and relational stance recalls the concepts of *perspective-taking* and *empathic concern* theorized by Eisenberg et al. (2006), which are considered fundamental for the development of social-relational competencies in educational settings (Rodriguez & Solís, 2013). The codes *metacognitive awareness* and *metacognitive regulation* represent a deeper level of task processing. The former refers to participants' awareness of their own mental state and the challenges encountered, while the latter involves the ability to strategically intervene in one's performance by adjusting behavior or activating compensatory strategies.

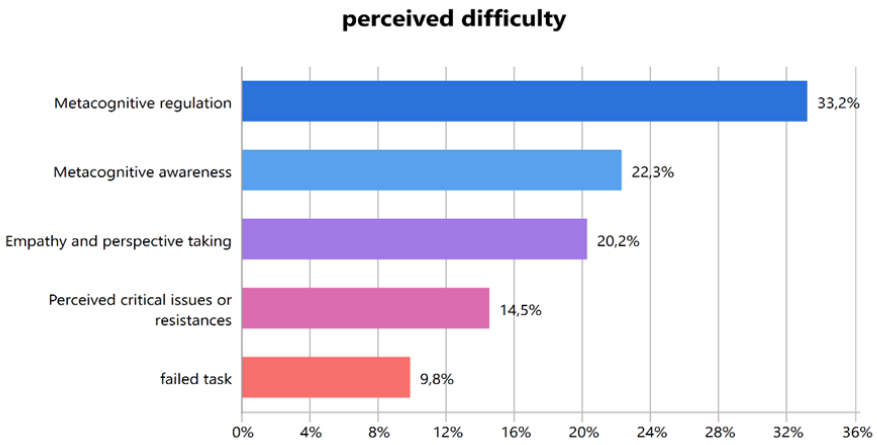

Figure 3. Perceived Difficulty Subcode Statistics

These processes align with the theoretical framework of *self-regulated learning* (Zimmerman, 2002; Pintrich, 2000), which posits that self-regulation requires both monitoring and control of cognitive and emotional processes in complex situations.

Overall, the distribution of codes suggests that perceived task difficulty extends beyond the executive domain, encompassing deeper dimensions tied to professional identity, interpersonal relationships, and critical reflection on the educational role. These findings highlight the value of incorporating highly reflective activities into initial teacher training, in line with the literature on *reflection-in-action* (Schön, 1983) and reflective teaching professionalism (Korthagen, 2010; Meijer et al., 2009).

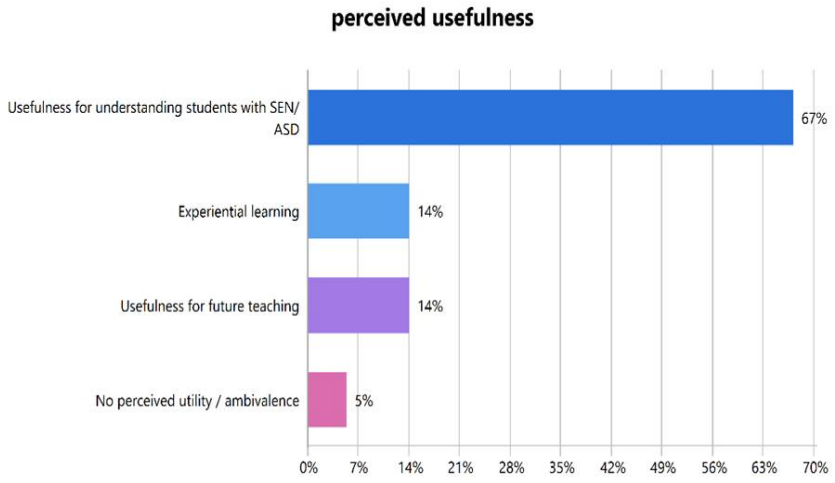

Figure 4. Perceived Usefulness Subcode Statistics

The thematic analysis of participants' perceptions concerning the utility of the training program identified four key subcodes: (1) *experiential learning*, (2) *usefulness for future teaching*, (3) *usefulness for understanding students with SEN/ASD*, and (4) *no perceived utility or ambivalence*. These categories reflect how participants interpreted the value of the training in relation to their professional development, pedagogical practices, and inclusive attitudes. *Experiential learning* was consistently recognized as a highly valuable component, with participants emphasizing the impact of active participation, simulations, and reflective exercises. This finding resonates with Kolb's (1984) theory of experiential learning, which highlights the transformative potential of learning through direct experience. Experiential formats are particularly effective in teacher education, where reflection-on-action and situated learning (Schön, 1983; Lave & Wenger, 1991) enable future educators to make sense of complex classroom realities. Additionally, Moon (2004) argues that structured reflection within experiential learning is

essential for meaningful knowledge construction and transfer to professional contexts. *Usefulness for future teaching* was another dominant theme, suggesting that participants valued the training's applicability to real-world classroom scenarios. This aligns with Guskey's (2002) research on professional development, which indicates that perceived practical relevance is a key predictor of implementation success. Similarly, Desimone (2009) emphasizes coherence and active learning as central features of effective teacher training, particularly when aligned with participants' curricular and instructional goals. The belief that training is immediately transferable reinforces motivation and deepens engagement. *Usefulness for understanding students with SEN/ASD* emerged as a critical category, reflecting the training's contribution to fostering inclusive values and practical strategies. This supports the inclusive pedagogy framework proposed by Florian and Black-Hawkins (2011), which advocates teaching practices that support the participation of all learners, regardless of ability or background. The Universal Design for Learning (UDL) framework (CAST, 2018) further reinforces this approach by encouraging multiple means of representation, engagement, and expression to meet diverse learning needs. Additionally, literature on autism education (e.g., Humphrey & Lewis, 2008; Lindsay et al., 2013) highlights the importance of educator awareness and adaptive practices, which participants in this study recognized as integral outcomes of the training. Finally, the subcode *no perceived utility or ambivalence* points to the diverse reactions among participants and underscores the complexity of training effectiveness. According to Kirkpatrick and Kirkpatrick (2006), participants' initial reactions (Level 1) are essential for assessing training reception and predicting future behavior change. A lack of perceived utility may signal a mismatch between the training content and participants' expectations, prior experience, or teaching context (Kennedy, 2016). This highlights the need for differentiated, context-sensitive approaches in teacher development programs. In summary, the four subcodes collectively reflect how the training influenced participants across cognitive, practical, and affective domains. The strong alignment with experiential, pragmatic, and inclusive pedagogical frameworks affirms the program's strengths, while the presence of ambivalence invites reflection on areas for further adaptation and refinement.

Conclusions

The analysis of the results suggests that the variables considered in our study, including the academic discipline area, experience in support, and experiences with students with autism spectrum disorder (ASD), do not significantly explain the perceived difficulty of the participants, although experience in support emerges as a significant predictor. This finding aligns with the literature, which emphasizes how professional experience helps improve the management of teaching challenges and reduce stress (Friedman, 2013). However, the academic discipline area and experience with students with ASD do not seem to directly influence the perception of difficulty, suggesting the need to incorporate other factors into the modeling of such experiences, such as self-efficacy (Bandura, 1997) and intrinsic motivation (Deci & Ryan, 2000). The qualitative results, highlighting the effectiveness of the exercise on suspending mentalistic attributions, are particularly significant, as they reflect a change in how future teachers interpret classroom dynamics, reducing psychological inferences and promoting a more objective and phenomenological approach (Baron-Cohen, 1995; Frith, 2003). This supports the theoretical framework based on metacognition and transformative learning (Flavell, 1979; Mezirow, 1991), suggesting that the training approach stimulated critical reflection on teaching practices and individual perceptions. Furthermore, the adoption of the simplexity paradigm (Berthoz, 2009; Sibilio, 2012; 2014; 2023) and the pedagogy of cognitive inhibition (Houdé, 2015; 2019; 2025) emerges as a strength of the study, as it facilitated the development of a more reflective and inclusive teaching professionalism. The participants' appreciation of the methodological approach confirms the importance of promoting skills that foster greater awareness of neurodiversity and a more flexible management of educational dynamics (Zollo et al., 2021; Aiello, 2016). Future perspectives could include the integration of additional variables into the predictive model, such as continuous training and specific educational support, which could strengthen the model's predictive capacity. Furthermore, expanding the sample and including different educational contexts could help obtain more generalizable results and refine the training strategies for teachers. A limitation of the study concerns the limited variance explained by the regression model, which suggests that other factors, not included in this study, might have a greater influence on the perception of difficulty and the usefulness of educational tools. For example, the perception of effectiveness may be more closely related to individual factors such as personality or participants'

metacognitive awareness. Additionally, the low statistical significance of the model in the second analysis, related to perceived usefulness, indicates that the selected variables might not adequately represent the variables influencing the evaluation of metacognitive tools like cognitive inhibition. In summary, this study provides important insights for the training of future teachers, suggesting that while experience in support plays a crucial role, other formative dimensions and metacognitive awareness should be further explored to improve teaching practices and inclusion strategies.

Author contributions

Carmine Sessa (Introduction; 1.2.3.4.5.6.7.8.); Paola Aiello (Conclusions).

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