

EXPLORING TEACHERS' SELF-EFFICACY FOR INCLUSION THROUGH A TUTOR-AI ASSISTANT: A PRELIMINARY EXPERT VALIDATION STUDY

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Abstract

Teachers' self-efficacy for inclusion is fundamental to the implementation of inclusive educational practices, shaping their ability to manage diversity, engage in reflective practice, and maintain professional agency. Within a socio-cognitive framework, the present study describes the design and preliminary expert validation of a Tutor-AI Assistant designed to enhance teachers' self-efficacy for inclusion through guided reflection. The digital tutor is based on Bandura's theory of self-efficacy and is organized around its four sources/modules: mastery experiences, vicarious experiences, social persuasion, and emotional and physiological states. A design-oriented methodology was employed, followed by an expert validation phase with five pedagogical experts specializing in teacher education and inclusive education. After testing the tutor, experts participated in semi-structured interviews, which were subsequently analyzed using thematic analysis (Braun and Clarke, 2006, 2022). The analysis revealed three overarching themes: theoretical and methodological coherence, which underscores the tutor's strong conceptual foundation and pedagogical clarity; usability, which highlights the significance of accessible language and practical integration into teachers' routines; and the reflective dimension, identified as the primary strength of the tool in promoting metacognitive awareness and professional self-reflection. Overall, the findings indicate that the Tutor-AI Assistant is a promising reflective tool for supporting teacher professional development. These results will guide further refinement and support future empirical testing with in-service teachers to evaluate their impact on self-efficacy for inclusive practices.

Keywords: *Teachers' self-efficacy, inclusion, Tutor-AI assistant, reflective practice, teacher professional development.*

1. Introduction

Inclusive education has become a global priority, aiming to ensure that all students participate fully in learning and school life (UNESCO, 1994, 2005). Although research demonstrates significant benefits for the educational community, the effectiveness of inclusion is largely determined by teachers' beliefs, training, motivation, and particularly their self-efficacy (Ainscow & Miles, 2008; Cerna et al., 2021; Hardy & Woodcock, 2015).

Self-efficacy is rooted in Bandura's Social Cognitive Theory (SCT), which provides a comprehensive framework for understanding human behavior through reciprocal interactions among personal, behavioral, and environmental factors (Bandura, 1986). Within this framework, self-efficacy is defined as confidence in one's ability to perform actions required to achieve specific goals (Bandura, 1977; Cameron and Grant, 2017). It encompasses intentionality, foresight, self-activity, and self-reflection, which refer respectively to forming intentions and plans, anticipating outcomes and guiding behavior, motivating and regulating actions, and reflecting on abilities to make informed choices (Bandura, 1986; Bandura, 2001). These capabilities enable individuals, including teachers, to plan, act, monitor, and adjust their behavior in dynamic social contexts, which are essential skills in inclusive educational environments (Pantić and Florian, 2015; Li and Ruppert, 2021). Self-efficacy is developed through four primary sources: mastery experiences, vicarious experiences (social modeling), verbal persuasion, and physiological and emotional states (Bandura, 2012).

In the context of inclusive education, scholarly attention to self-efficacy has increased, particularly regarding teachers' self-efficacy for inclusion. This construct refers to teachers' confidence in managing classroom diversity, which is shaped by experience, observation, encouragement, and emotional regulation (Wray et al., 2022; Yada et al., 2022; Woodcock et al., 2022; Herzig Johnson, 2023). Teachers' self-efficacy for inclusion directly influences their instructional strategies and resilience when facing challenges (Flores and Day, 2006). Furthermore, greater belief in their ability to teach all students is associated with more inclusive teaching practices (Gülsün et al., 2023).

1.1. AI in inclusive education

Recent years have seen a growing international interest in the use of artificial intelligence (AI) in education, particularly for teacher training and the development of reflective and self-regulatory skills. Intelligent Tutoring Systems (ITS) and educational chatbots provide personalized, adaptive learning experiences that enhance motivation and confidence (Lampropoulos, 2025; Perna et al., 2024). Meta-analyses confirm that these systems improve both cognitive and emotional outcomes by providing immediate feedback and realistic simulations that foster teacher reflection and self-efficacy (Chernikova et al., 2020; Létourneau et al., 2025). New generative AI models enable interaction with adaptive virtual tutors, providing formative feedback and supporting deliberate, reflective practice, both of which are key to developing self-efficacy (Bandura, 1997, 2001; Mollick et al., 2024). Evidence indicates that AI is advancing in areas such as language, social interaction, problem-solving, and metacognition, making digital tutors valuable for supporting reflective and emotional growth (OECD, 2025). Studies indicate that combining human and AI tutors encourages more adaptive, conscious, and motivating learning (Holmes et al., 2023; Kaltenborn, 2021).

2. Design of the study

The present study adopts a design-oriented approach, focusing on developing a Tutor-AI Assistant grounded in Bandura's theory of self-efficacy. The design phase aimed to translate theoretical constructs into a structured reflective learning environment for teachers, prior to empirical testing with end users.

The study evaluated a prototype Tutor-AI Assistant, a reflective tutor designed to enhance teachers' self-efficacy in inclusive education. This digital tutor serves as a conversational environment that guides teachers through structured reflection on their professional experiences, drawing on four key sources of self-efficacy. It features four interactive modules: a mastery experience that helps teachers reflect on personal episodes of successful classroom management or inclusive practice; vicarious experience through the analysis of modeled cases of inclusive teaching drawn from real contexts; social persuasion that provides teachers with the opportunity to reflect on the importance of positive and constructive feedback about their daily work as teachers, and also in relation to the tasks performed by students; physiological and emotional states that reflects on the emotional dimension of inclusive teaching, recognizing stressors, sources of satisfaction, and coping strategies. By structuring the reflective process around these four sources, the tutor translates an abstract psychological theory into a concrete psycho-pedagogical experience. Each module supports teachers' metacognitive awareness and emotional insight, fostering a holistic sense of self-efficacy that encompasses cognitive, affective, and behavioral dimensions.

3. Objectives

This study examines the preliminary pedagogical validity of a Tutor-AI Assistant designed to enhance teachers' self-efficacy for inclusive education, with a focus on expert validation prior to broader implementation. The objectives are to: assess the tutor's theoretical and pedagogical coherence, especially its alignment with Bandura's self-efficacy framework and inclusive pedagogy; investigate experts' views on its potential to encourage metacognitive awareness, professional self-reflection, and a non-judgmental approach; and identify key factors for effective use, such as usability, integration into blended professional development, and sustainability in teachers' routines. The ultimate aim is to inform further refinement of the tutor and guide future research into its impact on inclusive teaching practices.

4. Methods

4.1. Participants

Five pedagogical experts were purposefully selected for the study based on the following criteria: they held academic positions in pedagogy, educational psychology, or teacher education; had research expertise in inclusive education, teacher training, or digital learning innovation; and had direct experience in designing or mentoring professional development for teachers. All experts were affiliated with Italian universities and represented diverse pedagogical perspectives and institutional contexts.

4.2. Procedure

Data were collected through semi-structured interviews. Each interview was guided by a flexible protocol structured around three thematic clusters:

- Theoretical and pedagogical coherence – experts were asked to assess whether the tutor accurately translated Bandura's self-efficacy framework and aligned with principles of inclusive education.
- Design and usability – discussion focused on the clarity, tone, and accessibility of the tutor's language, the appropriateness of the digital format, and potential barriers for teachers.
- Perceived strengths and areas for improvement – participants reflected on the tutor's potential educational impact, suggesting refinements or future directions.

The interviews were conducted individually, in person, depending on participants' preferences, immediately after each expert had tested the Tutor-AI Assistant tool modules. Participants were encouraged to elaborate freely, provide examples, and share critical reflections. This approach allowed us to gather both confirmatory and emerging insights.

4.3. Data analysis

Data were analyzed using thematic analysis, following a reflexive and theoretically driven approach as outlined by Braun and Clarke (2006, 2022). This method was selected for its flexibility and suitability for exploring patterns of meaning across expert narratives while maintaining alignment with an explicit theoretical framework.

Following this approach, the authors familiarized themselves with the data through an initial exploration of the experts' narratives, consisting of an individual reading of the transcripts accompanied by note-taking. During the second reading of the transcripts, initial codes were generated based on the study's aims. These codes were revised by the first two authors and evolved not only with increasing knowledge of the text but also through comparisons among researchers. The initial themes were then generated, and, again, MG and FS engaged in a critical discussion to eliminate inconsistencies and to outline salient meanings that might be contained in each theme. These initial themes were subsequently revised in accordance with the criteria of internal homogeneity and external heterogeneity. For each theme, the extracts coded in the previous phase were reread to ensure consistency with the concept expressed in that theme; if they belonged to more than one theme, they were coded accordingly (i.e., twice or more, as necessary, for different themes). Once the inconsistencies between codes and themes were resolved and an agreement on coding was reached, the themes were named and defined.

5. Thematic synthesis of key findings

The thematic analysis of the expert interviews identified three overarching themes that capture pedagogical experts' evaluations of the Tutor-AI Assistant: theoretical and methodological dimensions, usability, and reflective dimensions. For details, see Table 1.

Table 1. Tutor-AI Assistant validity experience with experts' themes and subthemes found in our analysis.

	Theme	Code	Sub-theme	Definition	Who talks about it	N total turns
A	Theoretical and methodological dimension	A1	Solid structure	The interviews describe a solid modular and theoretical structure	I1, I3, I5	14
		A2	Methodological consistency	The interviews describe the clarity of the Tutor-AI Assistant with regard to the educational objective	I1, I4	4
		A3	Informative meeting	The interviews describe the need to schedule a preliminary informational and training meeting on the use of the Tutor-AI Assistant	I1, I2, I5	14
		A4	Final group meeting	The interviews describe the need to schedule a final group meeting as an opportunity for teachers to share their experiences with the Tutor-AI Assistant and exchange best practices among themselves	I2, I3, I4, I5	34
		A5	Collection and analysis of quali-quantitative data	The interviews describe the need to collect and analyse qualitative and quantitative data	I1, I2, I4	31
		A6	Supportive tool	The interviews describe the supportive rather than substitutive value of the Tutor-AI Assistant for teachers' professionalism	I1, I4	6
B	Usability	B1	Plain language	The interviews describe that the Tutor-AI Assistant tool uses simple and clear language	I2, I4	9
		B2	Usage times	The interviews describe the need to assess the feasibility of the timing for using the Tutor-AI Assistant tool	I1, I5	17
		B3	Innovative potential	The interviews describe the innovative potential of the Tutor-AI Assistant tool	I1, I5	7
C	Reflective dimension	C1	Reflective tool	The interviews describe the reflective value of the Tutor-AI Assistant	I2, I3, I5	16
		C2	Reflective sheets	The interviews describe the worksheets that can be downloaded at the end of each module as useful for reflective continuity	I1, I3	10

6. Discussion

The present study aimed to explore the preliminary pedagogical validity of a Tutor-AI Assistant designed to enhance teachers' self-efficacy for inclusive education through guided reflection.

First, experts' emphasis on the tutor's theoretical and methodological consistency underscores the importance of grounding digital innovations in robust psychological and pedagogical frameworks. The perceived alignment between the tutor's modular structure and Bandura's sources of self-efficacy suggests that socio-cognitive constructs can be meaningfully translated into concrete, reflective experiences. This finding is consistent with previous research indicating that professional learning interventions are more likely to promote self-efficacy when they are theoretically explicit and experience-based (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001). Furthermore, the experts' insistence on placing the tutor within a broader training programme, which includes preparatory and collective moments, emphasises the importance of avoiding a purely technocentric approach and reinforces the view of AI as a support rather than a substitute for human professional judgement.

Secondly, the issue of usability highlights a fundamental balance between innovation and feasibility. Although experts appreciated the innovative potential of using AI for reflective rather than didactic purposes, they also emphasised that accessibility, clarity of language, and compatibility with teachers' workloads are essential conditions for its adoption. This aligns with studies indicating that the effectiveness of digital tools in teacher training depends not only on their pedagogical value but also on their perceived practicality and sustainability in everyday professional contexts (Holmes et al., 2023; OECD, 2023). From this perspective, usability also emerges as an ethical and practical issue, as overly complex or time-consuming tools can burden such digital experiences, reducing the potential benefits and innovation of the tool.

Third, and most prominently, experts consistently identified the reflective dimension as the core pedagogical strength of the Tutor-AI Assistant. The tutor was perceived as a space that encourages teachers to pause, revisit their experiences, and engage in metacognitive reflection, processes that are often marginalized in fast-paced school environments. This finding aligns with models of reflective practice that emphasize the role of guided narration and structured self-analysis in professional learning (Korthagen, 2017). Importantly, the experts' appreciation of reflective worksheets and continuity tools suggests that reflection is most effective when it extends beyond isolated digital interactions and becomes part of an ongoing reflective cycle. In this sense, the tutor may function as a catalyst for reflective agency, supporting teachers in recognizing and consolidating their sense of professional competence.

Taken together, these findings suggest that AI-based reflective tutors hold promise as mediating tools for fostering teachers' self-efficacy for inclusion, provided that they are theoretically grounded, usable, and embedded within relational and institutional contexts. The expert validation also highlights the need to conceptualize AI not as an autonomous training solution, but as part of a blended reflective ecology that integrates individual, collective, and contextual dimensions of professional development.

7. Conclusions

The preliminary results of the study recognise the potential of the designed tool, the Tutor-AI Assistant, as a reflective practice in teacher training to improve their self-efficacy towards inclusion. The perspectives presented here reflect the assessments of experts in education and school inclusion. These considerations will inform the next phase of empirical testing with in-service teachers, using mixed methods to examine both perceived and measured changes in self-efficacy over time.

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