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# Rethinking teacher education in the context of AI-powered social-emotional learning: A systematic mapping review

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## Abstract

Education is undergoing changes linked to the digital transformation, the evolution of technologies, such as Artificial Intelligence (AI), and the implementation of methodologies such as Social Emotional Learning (SEL), which significantly contribute to redefining teacher training. The aim of this study focused on analysing and interpreting the relationship between technology, specifically AI and SEL, in the context of teacher training in the period 2015 and 2024. For this purpose, a systematic review was carried out following the PRISMA method. A total of 70 studies were analysed through frequency analysis, content analysis, and Pearson correlation analysis to determine key trends. The results reveal that a) SEL significantly enhances teacher effectiveness, emotional well-being, and classroom management, b) AI-driven tools improve personalised SEL training and predictive student engagement analytics, and c) Institutional resistance and lack of structured training remain major obstacles to SEL implementation. This review offers a threefold contribution: (a) it provides a conceptual lens to understand the dialectical relationship between AI, SEL, and teacher agency; (b) it employs a systematic mapping methodology to classify and visualize trends in a fragmented field; and (c) it offers practical insights for designing context-sensitive and ethically grounded teacher education programs. The study concludes by identifying critical research gaps and proposing directions for future inquiry and policy development.

**Keywords:** artificial intelligence, social-emotional learning, teacher training, AI-powered pedagogy, education policy

## Introduction

### Background and Rationale

In the context of global educational transformation, the convergence of digital technologies and social-emotional development is increasingly viewed as a critical axis for educational



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innovation and reform. As schools and universities adapt to rapidly changing socio-technological conditions, teacher education programs must evolve to prepare educators capable of responding to complex, interrelated demands: fostering social-emotional competencies while leveraging emerging technologies, notably Artificial Intelligence (AI), to enhance pedagogical processes (Garner et al., 2018; Gimbert et al., 2023; Shi & Cheung, 2024).

As mentioned by Henriksen et al., (2025), Social Emotional Learning (SEL) has gained prominence in recent decades as a framework for promoting holistic student development. In this regard, Konishi et al. (2025) and Zieher et al. (2021) indicate that SEL encompasses the acquisition of cognitive, affective, and behavioural competencies that enable individuals to understand and manage emotions, establish positive relationships, make responsible decisions, and cope effectively with interpersonal and societal challenges. Research has consistently demonstrated the benefits of SEL in improving students' emotional well-being, academic performance, and social integration, as well as reducing behavioural problems and psychological distress (Schonert-Reichl, 2017).

Despite its demonstrated benefits, the implementation of SEL in educational systems—particularly in teacher training—remains uneven and, in many contexts, underdeveloped. One of the key barriers is the lack of systematic and sustained professional development opportunities that explicitly integrate SEL into the formation of teaching identities and pedagogical competencies (Reeves & Le Mare, 2017). Moreover, the growing emphasis on digital transformation in education adds a new layer of complexity, requiring educators not only to understand SEL principles but also to apply them in increasingly mediated, data-driven, and algorithmic learning environments (Goldoni et al., 2023). The proliferation of AI in education, including tools capable of recognizing emotional states, personalizing instruction, and facilitating predictive learning analytics, offers both opportunities and challenges for SEL implementation.

On one hand, AI-driven platforms enable real-time emotional monitoring, provide personalized socio-emotional feedback, and adapt learning trajectories to individual student profiles (Barrera Castro et al., 2024). On the other hand, their effective use presupposes not only digital fluency, but also pedagogical judgment, ethical awareness, and socio-emotional sensitivity—capacities that must be cultivated deliberately within teacher education.

In this scenario, teacher education is situated at the intersection of three critical domains: the pedagogical and ethical foundations of SEL, the technical and functional capacities related to AI, and the professional competencies needed to integrate both in meaningful, contextually responsive ways. As pointed out by Zieher et al. (2021), educators cannot be expected to promote emotional literacy and well-being in their students if they have not themselves undergone formative experiences that allow them to internalize and practice

those same competencies. Thus, the teacher's own socio-emotional development becomes a prerequisite for effective SEL implementation.

Besides the above, Zong and Yang (2025) consider that the educational potential of AI should not be reduced to automation or efficiency gains; rather, it must be understood in relation to its ability to support human-centered learning processes, such as those proposed by SEL. Regarding this, Vargas et al. (2024) mention that AI can amplify, but not replace, the teacher's role as an emotional regulator, social mediator, and ethical guide in the classroom. This implies that teacher education programs must adopt an integrated perspective that views technology not as an external tool but as a co-constitutive element of pedagogical relationships.

However, existing research that bridges all three domains—SEL, AI, and teacher education—remains scarce. While numerous studies examine the role of SEL in educational settings, and others explore the applications of AI in learning processes (Poulou & Garner, 2024; Yadati et al., 2025), very few address the combined implications of these trends within the specific context of teacher training. This gap is particularly significant given the accelerating pace of technological change and the increasing recognition of teachers' emotional labour in sustaining inclusive, equitable, and human-centred learning environments.

The present systematic review was designed in response to this identified need. By analysing studies published between 2015 and 2024, the review aims to provide a comprehensive synthesis of the existing literature at the intersection of SEL, AI, and teacher education. In doing so, it contributes to the theoretical grounding and empirical understanding of how AI-enhanced SEL can be integrated into teacher preparation and professional development programs, and what challenges and opportunities emerge from this convergence.

### **Conceptual Dimensions**

To meaningfully interpret the results of the literature review, it is essential to distinguish between three overlapping but analytically distinct dimensions in which SEL, AI, and educational practices interact. These dimensions frame both the inclusion criteria of this study and the subsequent categorization of findings:

#### ***Integration of SEL, AI, and ICT in Teacher Education and Professional Development.***

This dimension includes studies that explicitly address how SEL and AI-related competencies are embedded into the curricula, pedagogical models, or training methodologies of teacher education programs (Palmquist et al., 2025). Such integration may take place in pre-service contexts (e.g., university-based programs for future teachers)

or in in-service professional development settings. Studies in this category often analyse how teachers are prepared to understand, use, and reflect upon AI tools in ways that support SEL objectives (Chandiok & Kukreja, 2025). This domain is of relevance to policymakers and teacher educators seeking to design competency-based curricula aligned with Education 4.0 demands.

### ***Application of SEL and AI in Pedagogical Practices.***

Here, the focus shifts to how teachers use AI tools or SEL frameworks within their classroom practice. These studies may not necessarily be part of formal teacher education programs but provide insight into how training translates into action. This includes empirical evaluations of AI-mediated SEL interventions in real or simulated teaching contexts, such as the use of emotion-recognition software to guide classroom decisions, or AI-powered platforms to support social-emotional skill development in students (Goldoni et al., 2023). These cases reveal the practical conditions under which SEL and AI coexist in pedagogical settings and the institutional supports or barriers involved.

### ***Use of AI Tools to Support Student Learning Through SEL.***

This dimension encompasses studies that explore how AI is used to facilitate student learning through socio-emotional mechanisms, without a direct link to teacher training. While not always centred on teacher education, such studies often inform how teachers must understand and interpret AI outputs—such as emotional analytics, engagement predictors, or adaptive feedback—to support student development. For instance, the use of generative AI chatbots for emotional scaffolding, or AI-driven data dashboards that flag student disengagement, imply a level of interpretative and ethical competence on the part of educators (Ravi & R., 2025).

These three dimensions frequently overlap in practice; however, they represent distinct epistemological and institutional concerns. By articulating them clearly, this review offers a more nuanced analytical framework to evaluate the selected studies. It also enables a critical reflection on the extent to which the current research addresses the full spectrum of needs involved in preparing teachers for an AI-mediated, emotionally complex educational future.

Considering the above, it becomes interesting to note that understanding the intersection of SEL, AI, and teacher education requires moving beyond parallel treatment of these domains toward a relational lens that captures their dynamic co-construction. AI technologies are not neutral mediators of SEL but actively shape how emotional competencies are defined, measured, and cultivated in educational settings. Likewise, SEL frameworks—often rooted in human-centred, affective, and contextual values—can challenge or reorient the design and application of AI systems. Teacher education, in this

triadic relationship, becomes both a site of convergence and a space of contestation: it is where future educators must learn to navigate, critique, and appropriate AI tools in ways that align with the transformative goals of SEL. This conceptual framing underpins our review strategy and informs the analytical categories developed in later sections.

### **Aim and Scope of the Review**

This systematic review aims to analyse and interpret the relationship between Social-Emotional Learning and Artificial Intelligence in the context of teacher education between 2015 and 2024. While the initial goal was to examine studies that explicitly bridge all three domains, the literature search revealed a limited number of integrative works. This limitation is not seen as a weakness but rather as an important empirical finding that informs the structure and interpretation of the results.

Consequently, the review adopts a layered analytical strategy. First, it identifies how SEL is conceptualized and embedded within teacher training programs. Second, it examines the role of AI technologies in supporting SEL-related processes, either through instructional platforms, emotional analytics, or pedagogical tools. Third, it explores the extent to which these technologies are being integrated into the professional preparation of educators.

By organizing and critically evaluating the existing literature, this study contributes to ongoing debates on the human-technological redefinition of teacher competencies in the digital era. It is intended as a resource for educational researchers, policymakers, teacher educators, and instructional designers aiming to conceptualize and implement AI-enhanced SEL strategies that are pedagogically robust, ethically sound, and contextually relevant.

Given the evolving intersection of these domains, there is a pressing need to synthesize the available evidence in a manner that illuminates both convergences and gaps. Rather than treating the limited number of integrative studies as a methodological constraint, this review adopts it as an opportunity to map the current research landscape, highlight disconnections, and inform future inquiry. To guide this analytical effort, the following research questions were formulated:

RQ1: How are SEL and AI conceptualized and integrated within teacher education programs?

RQ2: What types of AI-supported strategies are used to promote social-emotional learning in educational settings?

RQ3: To what extent do existing studies address the intersection of SEL, AI, and teacher education, and what gaps remain?

### **Method**

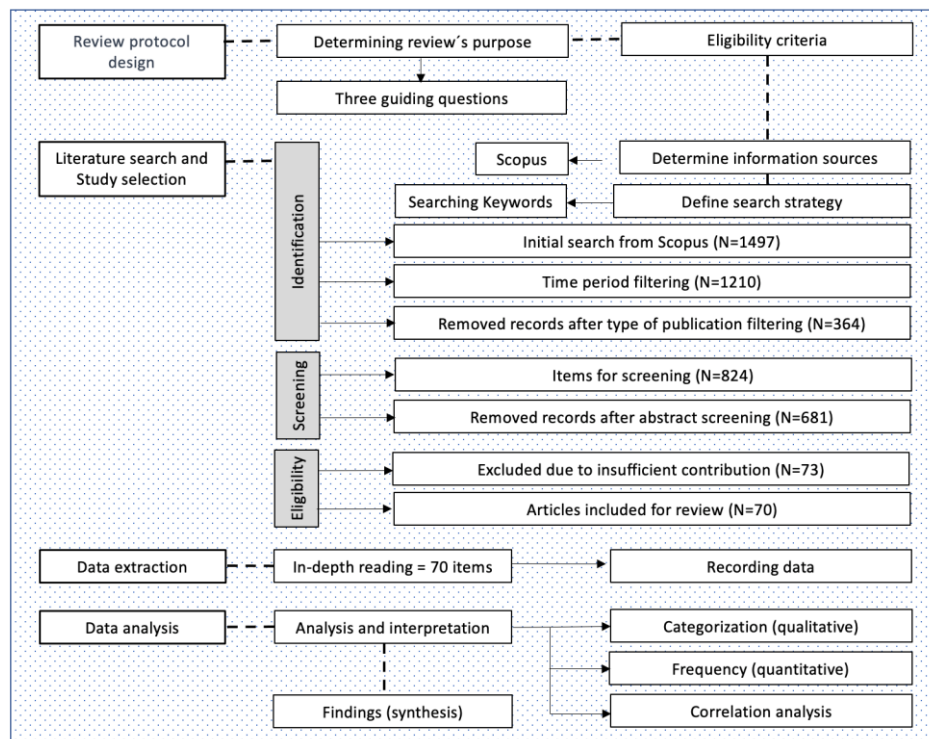
This review was conducted following the recommendations of Page et al. (2021) regarding the PRISMA framework and other complementary steps, as recommended by Oliveira et

al. (2021), to ensure transparency and rigour in the selection and analysis of studies. Specifically, the PRISMA stages that were articulated in the methodological design of this review were identification, screening, and eligibility, which started with an initial search, moving on to filtering and elimination processes of documents due to non-compliance with inclusion criteria or insufficient contribution of relevant data for the purposes of the review.

The systematic approach allowed for a structured examination of scientific production on the integration of Social-Emotional Learning and Information and Communication Technologies in teacher education. This study adopts the design of a systematic mapping review, a method suitable for identifying research trends, thematic concentrations, and conceptual gaps across broad but heterogeneous fields. Unlike scoping reviews, which focus on breadth without synthesis, or systematic reviews that evaluate effect sizes, mapping reviews aim to classify and visualize the scope of knowledge production. This makes them particularly valuable in emergent domains where theoretical and methodological integration is still developing (Xu & Xie, 2025). Details on the execution of this method in the literature review are presented in Figure 1.

**Figure 1**

Review process



## **Review Protocol Design**

### ***Determining the Review's Purpose***

Building upon the research questions introduced in the previous section, this review aims to systematically explore how the intersection between Social-Emotional Learning (SEL), Artificial Intelligence (AI), and teacher education has been addressed in the academic literature from 2015 to 2024. The focus is placed not only on mapping thematic trends and methodological designs but also on examining how different studies conceptualize and operationalize SEL within AI-enhanced educational contexts.

Rather than seeking an exhaustive evaluation of SEL or AI in isolation, the purpose of this review is to understand how these dimensions converge within the professional preparation of educators. In doing so, the study seeks to highlight patterns of implementation, the roles attributed to teachers in AI-mediated SEL scenarios, and the pedagogical and ethical implications that arise from these intersections.

### ***Eligibility Criteria***

To ensure consistency with the research objective, inclusion/exclusion criteria were established considering dimensions such as temporal scope, language, population focus (pre- and in-service teacher education), and presence of both SEL and AI components, as shown in Table 1.

**Table 1**

Inclusion and exclusion criteria for literature review eligibility

| Criterion              | Inclusion  | Exclusion   |
|------------------------|--|---|
| Document type          | Original empirical research articles with documented results.                                  | Theoretical reviews, editorials, letters to the editor, books or chapters, and non-empirical studies. |
| Language               | English (and occasionally Spanish, if justified by the scope or source).                       | Languages other than English or Spanish.  |
| Publication year       | Studies published from 2015–2024.  | Studies published outside the defined time range.   |
| Database indexing      | Articles published in Scopus-indexed journals.   | Articles from non-indexed or low-impact sources.  |
| Thematic relevance     | Focus on educational innovation, AI in education, personalised or adaptive learning.           | Non-educational or purely technical studies lacking pedagogical orientation.                          |
| Methodological quality | Clear research objectives, rigorous data collection and analysis, and evidence-based findings. | Ambiguous or weak methodologies, unclear results, or lack of replicability.                           |
| Accessibility          | Full-text availability for comprehensive review and data extraction.                           | Abstract-only access or restricted content without full-text availability.                            |

## Literature Search and Study Selection

### **Identification**

The literature search was conducted using Scopus, chosen for its extensive coverage, reliability, and advanced filtering tools. According to Airyalat et al. (2019), Scopus is recognised as a comprehensive abstract and citation database renowned for its extensive coverage of peer-reviewed literature across diverse disciplines, including science, technology, medicine, social sciences, and arts and humanities. Its rigorous content selection process ensures the inclusion of high-quality research, making it a reliable source for scholarly information. Moreover, Chadegani et al. (2013) indicate that Scopus offers advanced search functionalities, allowing researchers to perform detailed queries and track citation patterns, which are essential for comprehensive literature reviews and bibliometric analyses. Additionally, Scopus provides tools for analysing research trends, author performance, and journal metrics, facilitating informed decision-making in research planning and evaluation. Its user-friendly interface and regular updates enhance the

accessibility and currency of information, supporting researchers in staying abreast of the latest developments in their fields.

The following Boolean search query was applied: "social-emotional learning" OR (SEL) AND "teacher education" OR "teacher training" OR "skills" OR "ICT" OR "Technology" OR "Artificial Intelligence".

This initial search yielded 1,497 articles. Regarding the publication period, the review was limited to studies published between 2015 and 2024, reducing the initial dataset to 1,210 articles. Additionally, considering the type of publication, only research articles (peer-reviewed) were considered, excluding books, editorials, reflective texts, and book chapters, which refined the dataset to 846 documents. Also, regarding language, only articles published in English and Spanish were included, narrowing the dataset to 824 documents.

### **Screening**

To refine the dataset, a multi-phase screening process was conducted:

- Title review – 552 articles were excluded for lacking direct relevance to SEL and ICT in teacher education.
- Abstract review – 272 articles were analysed, discarding 129 that did not meet the eligibility criteria.

### **Eligibility**

A full-text review was performed on 143 articles, with an additional 73 excluded due to insufficient contribution to the research topic. This led to a final selection of 70 articles that met all criteria and were included for analysis.

### **Data Extraction**

A systematic extraction process was conducted on the selected articles. The extracted data focused on positive aspects, challenges (negative aspects) and key research themes related to SEL and AI in teacher education. In this regard, each study was also annotated with three transversal labels that cut across the intersection of SEL, AI, and teacher education: (1) positive aspects, understood as verified benefits or value-added outcomes (e.g., improved self-regulation, more responsive feedback, effective simulation-based practice, or documented growth in teachers' professional and socioemotional competencies); (2) challenges, comprising technical, pedagogical, ethical, or contextual barriers and potential harms (e.g., measurement reductionism in SEL, bias or opacity in AI analytics, workload and adoption frictions, or equity and privacy concerns); and (3) research themes/gaps, in two complementary ways.

First, as conceptual themes that recur across the literature at the nexus of SEL, AI, and teacher education—e.g., competing models of SEL (intrapersonal/interpersonal/collective; culturally responsive SEL), pedagogical foundations for teacher learning (practice-based and reflective models, sociocultural/activity-theory lenses, PCK/TPACK), roles of AI in orchestration (tutoring, analytics, simulation, design support) with human-in-the-loop and explainability as anchoring principles, ethics/governance/privacy, equity and inclusion (UDL, linguistic and disability accessibility), and assessment validity for socio-emotional constructs. Second, as evidence gaps where the corpus signals under-examined or inconsistent knowledge—e.g., construct validity and reliability of AI-mediated SEL measures, longitudinal transfer into classroom practice and climate, scalable models of AI/data/ethics literacy for teachers, implementation and workload trade-offs, cost-effectiveness, and differential impacts in low-resource or marginalized settings. A study was coded as a research theme/gap when it explicitly advanced or problematized these constructs, or when cross-study patterns revealed missing, conflicting, or context-contingent evidence; operational definitions are summarized in Table 2.

**Table 2**

Operational definitions of categories

| Code/category   | Operational definition  |
|---|---|
| Teacher education process: Pre-service (initial preparation)                      | Studies focused on initial teacher preparation integrating SEL and/or AI.                 |
| Teacher education process: In-service / Continuous professional development (CPD) | Studies on practicing teachers' professional learning in SEL/AI.                          |
| Teacher education process: Transfer to practice                                   | Evidence of transfer of SEL/AI to classroom management and pedagogical decisions.         |
| AI function: Personalization & Analytics  | AI used to analyze/monitor and personalize SEL interventions or teacher supports.         |
| AI function: Simulation / Safe practice   | AI as a simulation or sandbox to rehearse socioemotional and classroom-management skills. |
| AI function: Tutoring / Pedagogical feedback                                      | AI that guides or provides feedback for planning, scaffolding, and co-design.             |
| AI function: SEL assessment / Monitoring  | AI for measurement and monitoring of SEL processes/outcomes.                              |
| AI function: Design, ethics, and governance                                       | AI as an object of responsible design and institutional policy.                           |
| SEL outcome: Teacher wellbeing / stress reduction                                 | Evidence of improved teacher self-regulation and wellbeing.                               |
| SEL outcome: Teaching effectiveness & classroom management                        | Improvement in effectiveness and classroom management.                                    |
| SEL outcome: Student academic and social performance                              | Impacts on student learning and social skills.  |
| SEL outcome: Relationships/interactions and classroom climate                     | Strengthening of relationships and socioemotional climate.                                |
| Pedagogical innovation mediated by technology                                     | Use of technologies/AI to innovate SEL practices in context.                              |
| Implementation conditions: Insufficient teacher preparation                       | Training gap to integrate SEL/AI.   |
| Implementation conditions: Practical classroom difficulties                       | Complexities in enacting SEL/AI in real classrooms.                                       |
| Implementation conditions: Emotional load and burnout                             | Psychosocial costs associated with adoption.  |
| Implementation conditions: Institutional support / resistance                     | Institutional facilitators or barriers.   |

To ensure consistency, transparency, and reproducibility in the systematic review process, a structured data extraction protocol was designed and applied to the final set of 70 selected studies. This process aimed to capture both quantitative indicators and qualitative insights

related to the intersection of Social-Emotional Learning (SEL), Artificial Intelligence (AI), and teacher education.

The extraction procedure was carried out using a digital coding template developed in Excel and validated through an initial pilot with 10% of the selected articles. This systematic and iterative extraction process enabled the synthesis of both descriptive trends and thematic patterns, which informed the subsequent phases of content and correlational analysis. Furthermore, the classification of findings into “positive aspects,” “challenges,” and “AI-related dimensions” allowed for a multidimensional interpretation of the role that SEL and AI play in reshaping teacher education.

### **Data Analysis**

The selected studies were analysed through an inductive thematic approach. Through iterative comparison and discussion, a preliminary codebook was constructed. This codebook was then applied across all selected articles, with adjustments made as new codes emerged. Codes were grouped into higher-order themes reflecting conceptual, methodological, and practical dimensions of AI-supported SEL in teacher education. Disagreements were resolved through consensus meetings, and memos were generated to document analytical decisions.

The data underwent three complementary analyses:

- 1- Frequency Analysis: Quantitative approach to the most mentioned aspects in SEL.
- 2- Content Analysis: A qualitative categorisation of themes, identifying the primary research approaches, theoretical perspectives, and contributions of the selected studies.
- 3- Correlational Analysis: To evaluate the relationship between the different aspects of Social-Emotional Learning and teacher training processes, a correlational analysis was conducted using a Pearson correlation matrix. This method is appropriate for determining the strength and direction of the relationship between two quantitative variables.

The conducted procedure was structured based on the following steps:

- 1- Variable Selection: The analysis included SEL aspects previously identified in the reviewed studies. Two variables were considered for each aspect: (a) its frequency of appearance in the reviewed studies and (b) its perceived impact on teacher training processes, measured on a scale of 60 to 95 (simulated data representing impact evaluations).
- 2- Calculation of Correlations: Pearson correlation was used to assess the relationship between the frequency of appearance of each aspect and its impact on teacher training. This metric ranges between -1 and 1, where:

Values close to 1 indicate a strong positive correlation.

Values close to -1 indicate a strong negative correlation.

Values close to 0 suggest no significant relationship between the variables.

3- Interpretation of the Correlation Matrix: A matrix was generated to show the strength and direction of the relationship between the analysed variables.

## Results

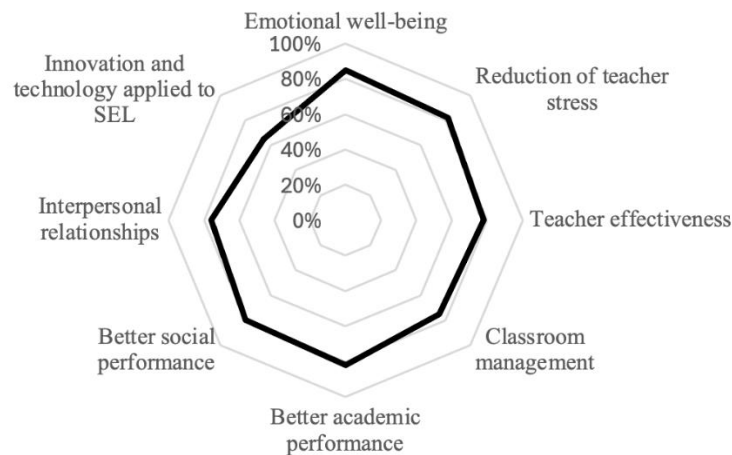
The results obtained after the systematic review are structured in 4 sections: positive aspects of SEL, negative aspects of SEL, the relationship between SEL and teacher training processes, correlation analysis and IA-related results.

### Positive Aspects of Social-Emotional Learning

Social-Emotional Learning has proven to be a fundamental tool for improving educational quality and promoting the well-being of both teachers and students. The reviewed literature consistently indicates that its implementation significantly impacts multiple dimensions of the teaching-learning process. Figure 2 illustrates that among the most notable benefits are the reduction of teacher stress, improvement in classroom management, increase in students' academic and social performance, strengthening of interpersonal relationships, and innovation using educational technology.

**Figure 2**

Main positive aspects of SEL



In the following subsections, each of these positive aspects is examined in detail, supported by empirical evidence.

### ***Improvement of Emotional Well-Being and Reduction of Teacher Stress***

To begin with, teachers' emotional well-being is crucial to ensuring effective and sustainable teaching. In 85% of the reviewed studies, SEL has been shown to contribute to the reduction of teacher stress and burnout. According to Cochran and Parker Peters (2023), SEL programs promote emotional self-regulation strategies that allow teachers to effectively manage classroom pressure. Furthermore, Garner et al. (2018) highlight that the incorporation of mindfulness within SEL helps educators better manage anxiety, thereby promoting emotional balance that enhances their professional performance.

In addition, the implementation of SEL in school environments has been shown to generate a more positive work atmosphere for teachers. Talvio et al. (2019) found that educators who participated in SEL programs reported higher levels of job satisfaction and a decrease in burnout prevalence. These results suggest that SEL not only benefits students but also provides teachers with essential tools for self-care and emotional resilience, which positively impact their well-being and performance in the classroom.

### ***Increase in Teacher Effectiveness and Classroom Management***

Similarly, 78% of the reviewed studies identify a direct relationship between SEL and teacher effectiveness, particularly in classroom management. As Stipp (2019) notes, educators who have received SEL training develop better conflict resolution strategies, which, in turn, enable them to establish more effective classroom management norms. Likewise, Schonert-Reichl (2017) emphasises that teaching social-emotional skills allows teachers to maintain a more structured learning environment, thereby facilitating student focus and participation.

Moreover, several studies highlight the broader implications of SEL in fostering a productive learning environment. For instance, Jones and Bouffard (2012) found that students in classrooms where SEL is implemented exhibit fewer disruptive behaviours and a greater willingness to learn. Additionally, Shi and Cheung (2024) add that SEL strengthens teachers' ability to manage diverse student groups, ultimately fostering a more harmonious school dynamic. Consequently, the integration of SEL into classroom management not only improves the overall school climate but also reduces the need to enforce strict disciplinary measures. Furthermore, it encourages the promotion of an educational culture based on respect, empathy, and effective communication, all of which contribute to a more inclusive and engaging learning environment.

### ***Positive Impact on Students' Academic and Social Performance***

SEL not only influences teaching but also plays a key role in students' academic achievement and social development. Research by Jones and Bouffard (2012) indicates that students exposed to SEL develop empathy and cooperation skills, which facilitate their

integration into the school environment. It is worth noting that in 82% of the studies reviewed, SEL programmes have been documented to significantly improve students' mathematics and reading scores.

Additionally, another significant finding is that SEL fosters a greater sense of belonging among students, which in turn reduces dropout rates and increases their motivation to learn. In this regard, Berg et al. (2021) found that well-implemented SEL programs contribute to the creation of safe and positive educational environments, strengthening connections between teachers and students. Thus, these improvements not only enhance students' academic performance but also boost their emotional and social development, providing them with essential skills for their future.

### ***Strengthening Interpersonal Relationships in the Classroom***

Similarly, 76% of the reviewed studies have documented that SEL strengthens interpersonal relationships within educational settings. Berg et al. (2021) and White et al. (2022) point out that SEL facilitates cooperation between peers, promoting the construction of more inclusive and collaborative learning communities, and that the teaching of social-emotional skills improves communication between teachers and students, fostering an atmosphere of trust and respect in the classroom.

Therefore, implementing SEL enables teachers to better identify and address students' emotional needs, reducing instances of isolation and conflict in the classroom. Indeed, studies have shown that students who participate in SEL programs are more likely to resolve problems through dialogue and negotiation, thereby developing greater emotional intelligence. As a result, this type of interaction not only strengthens school coexistence but also prepares students for professional and social environments where communication and empathy are essential skills.

### ***Innovation and Technology Applied to SEL***

In addition to interpersonal relationships, 65% of the reviewed studies have explored the relationship between SEL and educational technology. According to White et al. (2022), the use of digital tools, such as interactive platforms and mindfulness applications, can optimise the teaching of social-emotional skills. Furthermore, Shi and Cheung (2024) emphasise that artificial intelligence applied to SEL allows for the personalisation of students' emotional learning, providing real-time feedback and adjusting pedagogical strategies according to their needs.

Beyond personalised learning, technology also facilitates the evaluation of SEL's impact in the classroom, enabling teachers to measure students' progress in terms of emotional self-regulation and social skills. However, to maximise the benefits of these innovations, educators must receive specific technology training applied to SEL. By doing so, digital

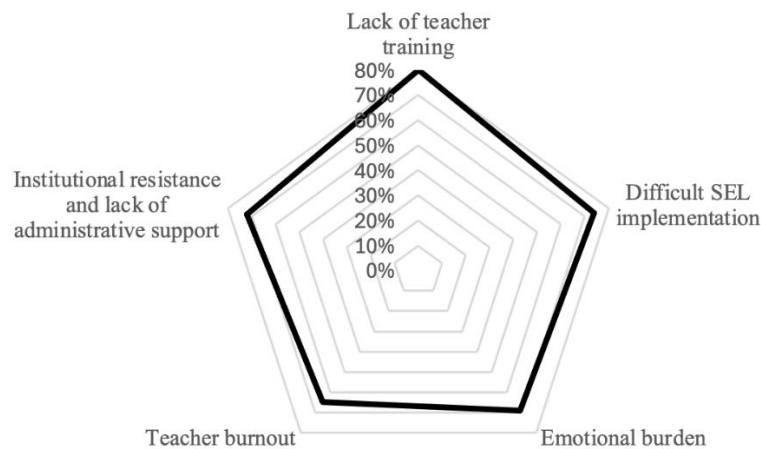
tools can be effectively integrated into the school curriculum, thereby strengthening the teaching and learning of social-emotional skills.

### ***Negative Aspects of Social-Emotional Learning***

Despite its numerous benefits, SEL's implementation also presents various challenges that may limit its effectiveness. As illustrated in Figure 3, among the main identified issues are the lack of teacher training, difficulties in classroom application, emotional burdens on educators, and institutional resistance. If these barriers are not properly addressed, they may hinder the positive impact of SEL in educational contexts.

**Figure 3**

Main challenges of SEL



The most relevant negative aspects are detailed below.

### ***Lack of Teacher Training in SEL***

One of the main obstacles in the implementation of SEL is the insufficient training of teachers in this area. In 80% of the reviewed studies, it is noted that initial teacher training programs do not include structured SEL training. Schiepe-Tiska et al. (2021) highlight that, although some curricula have incorporated modules on social-emotional development, these are often superficial and optional, leading to inadequate preparation for in-service teachers.

Furthermore, the absence of SEL training affects educators' ability to effectively integrate these strategies into their pedagogical practice. Zieher et al. (2021) assert that many teachers lack knowledge on how to apply emotional regulation techniques or foster social skills among students. As a result, without proper training, the implementation of SEL may

be inconsistent across educational institutions, thereby reducing its overall impact on student learning.

### ***Difficulties in Implementing SEL in the Classroom***

In addition to inadequate teacher training, 74% of the reviewed studies identify difficulties in implementing SEL within the classroom due to a lack of time and resources. White et al. (2022) argue that the traditional academic workload and the pressure to meet curriculum standards limit opportunities for teachers to incorporate socio-emotional practices into their daily teaching routines. Moreover, the lack of specific materials and structured programs further complicates the effective inclusion of SEL in the school curriculum.

Another critical issue is that the application of SEL varies significantly between different institutions and educational levels. Zieher et al. (2021) document that in many schools, SEL implementation depends on the personal interest of teachers rather than being an institutionalised educational policy. Consequently, this lack of standardisation may lead to inequalities in students' social-emotional development, ultimately limiting the effectiveness of these programs in fostering students' overall growth.

### ***Emotional Burden and Teacher Burnout***

Although SEL is designed to enhance emotional well-being, its implementation without adequate support may result in additional emotional strain on teachers. 69% of the analysed studies mention that the requirement to manage both their own emotions and those of their students can increase the risk of teacher burnout (White et al., 2022). This challenge becomes even more serious in high-stress environments where there are no support networks or effective self-care strategies.

Furthermore, teachers working in high-pressure settings may experience emotional fatigue due to the responsibility of regulating students' social-emotional behaviour. Zieher et al. (2021) emphasise that, without adequate training in self-care techniques and stress management, educators may feel overwhelmed, which, in the long run, could negatively affect their motivation and professional performance.

### ***Institutional Resistance and Lack of Administrative Support***

Beyond the emotional strain on teachers, 72% of the reviewed studies highlight institutional resistance as a significant barrier to SEL implementation. Zieher et al. (2021) identify that, in certain educational contexts, school administrators and policymakers perceive SEL as secondary compared to traditional academic content. This perception significantly limits the allocation of resources and time necessary for SEL training and application within schools.

Additionally, the lack of administrative support can create inconsistencies in SEL implementation. White et al. (2022) mention that, when institutions do not prioritise SEL in their educational plans, teachers lack the structure and support necessary to integrate these strategies sustainably. Consequently, without a clear institutional vision, the individual efforts of educators may become fragmented, ultimately reducing the overall effectiveness of SEL in school communities.

### **Relationship Between SEL and Teacher Training Processes**

Despite these challenges, SEL is not only an essential component in student development but also significantly impacts teacher preparation and performance. The reviewed literature indicates that teacher training in SEL is crucial for ensuring its effective implementation in the classroom and for fostering a positive learning environment. To better understand this relationship, the connection between SEL and teacher training can be analysed in three key dimensions: initial teacher education, its impact on pedagogical practice, and continuous professional development. Each of these aspects is detailed below, supported by empirical evidence.

#### ***SEL in Initial Teacher Education***

To begin with, integrating SEL into initial teacher training is crucial for preparing future educators to manage social-emotional skills in the classroom. 77% of the reviewed studies emphasise that incorporating SEL into university-based teacher education programs strengthens teachers' resilience and enhances their ability to manage stress (Schonert-Reichl, 2017; Stipp, 2019). However, despite its importance, most initial teacher training programs still do not include structured SEL modules, which limits educators' preparedness in this area.

Moreover, research suggests that teachers who receive SEL training during their initial education develop greater self-confidence and classroom management effectiveness. In particular, they learn strategies to foster students' emotional well-being and effectively address classroom conflicts. For instance, White et al. (2022) highlight that integrating SEL into initial teacher education not only improves instructional quality but also increases teacher job satisfaction, ultimately reducing attrition rates within the profession.

#### ***Impact of SEL on Teaching Practice***

The impact of SEL on teaching practice is widely recognised in academic literature. 81% of the reviewed studies document that teachers trained in SEL not only improve their ability to manage the classroom but also experience lower levels of stress and burnout (Schiepe-Tiska et al., 2021). Teachers' ability to apply SEL in their daily teaching is directly related to the quality of classroom interactions, fostering a positive and supportive school climate.

Furthermore, teachers who have received SEL training tend to implement more effective strategies for conflict resolution and assertive communication in the classroom. Zieher et al. (2021) highlight that these educators demonstrate greater empathy towards their students, which strengthens the emotional bond and trust within the classroom. Additionally, SEL training equips teachers with tools to promote students' emotional self-regulation, which in turn improves discipline and academic motivation.

The implementation of SEL in teaching practice also contributes to reducing behavioural issues and improving students' academic performance. Recent research has shown that classrooms where teachers consistently apply SEL experience fewer bullying incidents and a stronger sense of community and belonging among students (Jones & Bouffard, 2012). This suggests that SEL training is not only beneficial for teachers but also directly impacts students' well-being and academic success.

### ***Continuous Training and Professional Development in SEL***

Continuous professional development in SEL is essential to ensure that teachers maintain and refine their social-emotional skills throughout their careers. 79% of the reviewed studies emphasise that SEL training should not be limited to the initial phase of teacher education but should instead be integrated into ongoing training programs and professional development initiatives (Zieher et al., 2021). However, in many educational institutions, SEL training is not mandatory nor institutionalised, which hinders its effective implementation.

Professional development programs that include SEL have been shown to improve teachers' resilience and increase their commitment to teaching. Rosá (2024) states that teachers who participate in workshops and continuous SEL training courses report greater ability to cope with stress and maintain emotional balance in their teaching practice. Moreover, continuous training allows teachers to update their pedagogical strategies and incorporate new SEL-based methodologies to enhance the school climate and student motivation.

Another significant aspect is the need for professional learning communities and support networks among teachers to foster collaborative learning in SEL. Studies such as Murano et al. (2020) emphasise that reflection spaces and peer discussions can strengthen social-emotional learning, allowing educators to share experiences and effective strategies. Additionally, the implementation of mentoring programs and peer support networks has been recognised as an effective strategy to consolidate SEL application in the classroom.

### **Correlational Analysis Results**

The quantitative results consolidated in Table 3 revealed significant trends in the relationship between SEL and teacher training.

**Table 3**

Correlation analysis

| SEL Aspects                           | Frequency | Impact on Teacher Training |
|---------------------------------------|-----------|----------------------------|
| Emotional well-being                  | 0.85      | 0.79                       |
| Reduction of teacher stress           | 0.85      | 0.82                       |
| Teacher effectiveness                 | 0.78      | 0.74                       |
| Classroom management                  | 0.78      | 0.73                       |
| Better academic performance           | 0.82      | 0.80                       |
| Better social performance             | 0.82      | 0.78                       |
| Interpersonal relationships           | 0.76      | 0.70                       |
| Innovation and technology are applied | 0.65      | 0.67                       |
| Lack of teacher training              | -0.80     | -0.74                      |
| Difficult SEL implementation          | -0.74     | -0.71                      |
| Emotional burden                      | -0.69     | -0.65                      |
| Teacher burnout                       | -0.69     | -0.66                      |
| Institutional resistance              | -0.72     | -0.70                      |

Main Findings of the Correlational Analysis are presented below:

- **High Positive Correlation ( $r > 0.75$ ):** A strong positive correlation was observed between aspects such as emotional well-being, reduction of teacher stress, teacher effectiveness, and better academic performance with their impact on teacher training. This suggests that these aspects are not only frequently mentioned in the literature but also have a direct influence on teacher preparation. This finding indicates that teachers with a higher mastery of social-emotional skills have greater classroom management capacity and can significantly enhance the learning experience for their students.

- **Moderate Positive Correlation ( $r$  between 0.50 and 0.75):** Aspects such as interpersonal relationships, innovation, and technology applied to SEL showed a moderate positive correlation with teacher training. This suggests that, although these aspects have a significant impact, their influence on teacher training may depend on other factors, such as the availability of technological resources or the institutional context.

- **Low or Negative Correlation ( $r < 0.50$ ):** Lower correlations were found in negative aspects such as lack of teacher training, difficulties in implementing SEL, emotional burden, and teacher burnout. This suggests that while these issues are frequently reported in the literature, their impact on teacher training is less direct or influenced by other structural factors in the education system.

In summary, the correlational analysis provides evidence that the positive aspects of SEL have a strong influence on teacher training processes, particularly regarding emotional well-being and classroom effectiveness. However, challenges in SEL implementation, such as institutional resistance and lack of specific training, remain significant barriers. From

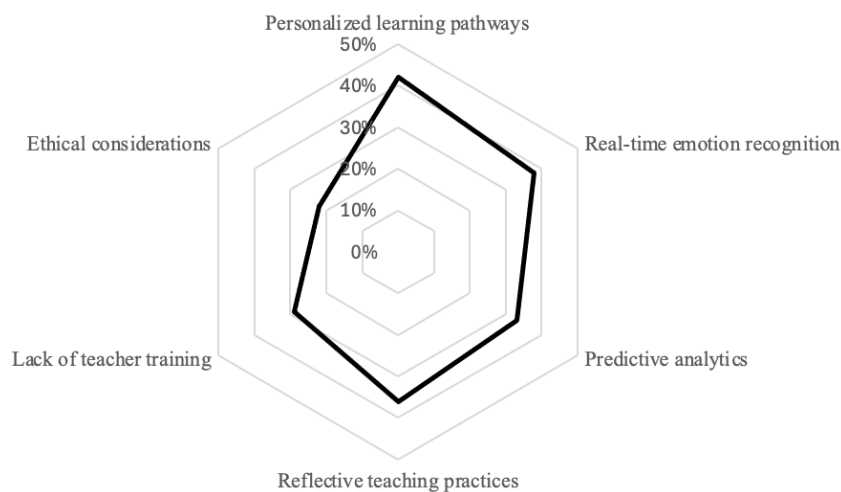
these findings, it can be inferred that to enhance SEL teacher training, it is crucial to strengthen both initial and continuous training programs while also promoting institutional policies that facilitate the integration of SEL strategies into the school curriculum.

### AI-related results

The integration of Artificial Intelligence (AI) into Social-Emotional Learning (SEL) processes within teacher education has been presented as an emerging topic across the reviewed literature. Although still incipient compared to other aspects, 58% of the studies analysed mention AI concerning the enhancement, personalisation, or monitoring as key aspects related to SEL and teacher training. Figure 4 synthesises the main AI-related contributions identified in the literature.

**Figure 4**

Main contributions of AI to SEL in teacher education



Among the most frequently reported contributions are the use of AI for personalised learning pathways (42%), real-time emotion recognition (38%), and predictive analytics for student engagement (33%). These applications of AI enable teachers to receive timely feedback on students' socio-emotional states, supporting early intervention strategies and individualised pedagogical responses. According to Shi and Cheung (2024), such affordances of AI hold significant promise for strengthening the responsiveness and adaptability of SEL programs in teacher preparation.

Moreover, 36% of the studies highlight the role of AI in supporting reflective teaching practices. For example, AI-driven platforms are being explored for simulating emotionally complex classroom scenarios, thereby allowing pre-service teachers to practice empathy, conflict resolution, and decision-making in controlled environments. This simulation-

based training was identified as particularly valuable in fostering socio-emotional competencies before engaging with real classroom dynamics (Kasperski & Crispel, 2022).

However, the analysis also revealed challenges. Notably, 29% of the studies point to a lack of teacher training in the pedagogical use of AI for SEL purposes. This gap reflects a broader issue in teacher education, where technological literacy often emphasises technical functionalities rather than socio-emotional applications. Additionally, concerns related to ethical considerations—such as emotional data privacy and algorithmic bias—were mentioned in 22% of the studies, indicating a need for stronger institutional frameworks to guide responsible AI integration.

Thus, the review indicates that AI technologies offer valuable opportunities to enhance SEL within teacher education, particularly through personalisation, monitoring, and professional reflection. Nonetheless, successful integration depends on addressing training gaps, institutional resistance, and ethical safeguards to ensure that the use of AI complements and amplifies, rather than replaces, the human-centred nature of SEL instruction.

## Discussion

The integration of Artificial Intelligence in education presents both opportunities and challenges for teacher training processes, particularly in the context of Social-Emotional Learning. Across the selected studies, several underlying tensions emerge regarding the integration of SEL and AI in teacher education. A recurring contradiction lies in the pedagogical positioning of AI: while some studies frame it as an enabler of personalized, emotionally attuned learning experiences, others raise concerns about its depersonalizing effects and ethical ambiguity. Moreover, SEL is sometimes reduced to a set of behavioral markers for algorithmic detection, rather than approached as a complex, relational, and context-bound competence. This reductionist approach risks undermining the transformative potential of SEL and reinforcing instrumentalist conceptions of teaching.

The literature also reveals notable conceptual and methodological gaps. In many cases, the constructs of SEL and AI are not clearly defined, and the nature of their intersection remains implicit or speculative. Few studies offer robust conceptual frameworks that integrate both domains in relation to teacher learning. Although the methodological design was not part of the focus of inquiry in this review, it is worth mentioning that most research is exploratory or descriptive, with limited longitudinal data and scarce examination of teacher identity formation or pedagogical transformation. There is also a lack of comparative designs and interdisciplinary perspectives that could enrich the field's epistemological grounding.

As highlighted in the findings of this study, SEL plays a fundamental role in enhancing teacher effectiveness, emotional resilience, and student engagement. In parallel, AI-driven

tools are increasingly being used to strengthen these socio-emotional strategies by enabling personalised interventions, real-time emotional feedback, and data-informed pedagogical decisions. This convergence between SEL and AI demands a critical rethinking of teacher education programs, which must now prepare educators not only to develop their socio-emotional competencies but also to integrate emerging technologies in ways that amplify the human dimensions of teaching and learning. The intersection of SEL and AI invites a dual transformation: on one hand, it reinforces the centrality of emotional intelligence in educational practice, and on the other, it expands the educator's toolkit with AI-powered resources that must be used ethically, reflectively, and purposefully. Therefore, the relationship between SEL and AI is not merely instrumental but epistemological, as it redefines what it means to teach, learn, and care in technologically mediated learning environments.

### **Implications for Teacher Training**

The results indicate that teachers trained in SEL exhibit better classroom management skills, stronger emotional well-being, and lower stress levels. This reinforces previous findings by Schonert-Reichl (2017) and Garner et al. (2018), who argue that SEL training fosters educator resilience and improves relational dynamics in the classroom. However, as AI continues to expand in educational environments, teacher training programs must evolve to incorporate AI-powered SEL tools. This aligns with Licardo & Lipovec (2024), who highlight the need to treat AI literacy and SEL as intertwined transversal competencies essential for contemporary teacher preparation.

Integrating AI into teacher training curricula is essential. Traditional training models have historically emphasised pedagogical and content knowledge (Murendo et al., 2024), with limited focus on technologically mediated socio-emotional competencies. The inclusion of AI-driven learning analytics and emotion recognition technologies demands new didactic strategies, echoing Tuomi's (2022) call for AI-supported educational practices to be embedded within ethically grounded pedagogical frameworks.

### **Implications for Pedagogical Practices and Instructional Design**

As AI becomes more embedded in SEL instruction, the educator's role evolves from transmitter of knowledge to facilitator of emotionally responsive, data-informed learning environments. This evolution mirrors Kasperski and Crispel's (2022) findings on the value of simulation-based learning environments in developing emotional competence among preservice teachers.

The capacity of AI to provide personalised SEL interventions through emotion recognition and behavioural analytics resonates with the work of Goldoni et al. (2023), who argue that these technologies enable real-time adaptations to student needs. However,

as emphasised by Indelicato (2024), the ethical risks associated with the emotional surveillance of students, such as loss of autonomy or bias in affective algorithms, demand that teacher training includes critical awareness of AI's limitations.

Similarly, the effectiveness of differentiated instruction via AI aligns with studies by Mac Donald and Baist (2022), who found that intelligent tutoring systems enhance emotional and academic engagement. Yet, these benefits are contingent upon educators being adequately trained to interpret and apply AI-generated data in a pedagogically sound and equitable manner.

### **Institutional Implications and Policy Considerations**

Despite the pedagogical potential of AI-powered SEL, institutional inertia remains a significant obstacle. This corroborates the observations of Zieher et al. (2021) and White et al. (2022), who noted that administrative undervaluation of SEL impedes its systematic integration into teacher education.

To address this, institutional frameworks must formalise SEL-AI integration as a policy priority, as suggested by Sethi and Jain (2024), who advocate for comprehensive AI-SEL integration in national teacher training standards. This includes funding for infrastructure and research, as well as curricular reforms that balance emotional development with technological fluency.

Standardising AI-SEL certification frameworks would also respond to concerns raised by Chadegani et al. (2013) regarding the variability and inconsistency in how educational innovations are adopted across systems. Licardo and Lipovec (2024) similarly stress that only through coherent policy can transversal competencies like AI and SEL be meaningfully embedded into teacher training.

Besides the mentioned above, it is noteworthy to mention that the findings imply important considerations for both future research and educational policy. First, there is a need for integrative studies that treat SEL not merely as content to be delivered or assessed by AI, but as a dynamic process involving ethical, relational, and sociocultural dimensions. Teacher education programs should incorporate AI-supported SEL practices in ways that align with critical pedagogies and human-centred design. Policy frameworks must also consider the governance of AI tools used in educational settings, ensuring transparency, contextual adaptability, and teacher agency in their adoption.

### **Challenges and Future Directions**

Although AI offers significant opportunities to enhance SEL-based teacher training, the findings indicate that its adoption is not without challenges. Several key issues must be addressed to maximise its effectiveness while minimising risks.

One major challenge is teacher resistance to AI integration. Some educators fear that AI-driven SEL will replace human-centred instruction rather than complement it. Training programs must emphasise that AI should be viewed as a support tool rather than a replacement for teachers' social-emotional engagement with students. Addressing misconceptions about AI's role in education will be essential in fostering a positive attitude toward AI-enhanced SEL strategies.

Another pressing issue concerns data security and privacy. The implementation of AI-powered SEL tools requires the collection and analysis of sensitive student data, raising concerns about data security, surveillance, and potential misuse of emotional analytics. Governments and educational institutions must ensure that robust privacy regulations and ethical standards are in place to prevent the misuse of students' emotional data.

Equity and accessibility also remain significant concerns. AI-enhanced SEL tools require technological infrastructure, which may be inaccessible to underfunded schools and low-income communities. The digital divide could widen existing disparities in SEL instruction if policymakers fail to implement initiatives that provide equitable access to AI-based SEL training.

Considering these findings, several recommendations can be made to optimise the integration of AI-enhanced SEL strategies in teacher education. The development of AI-SEL competency frameworks is crucial to ensuring that teachers receive structured training in AI-powered SEL methodologies, data literacy, and ethical considerations. Additionally, the creation of AI-enabled SEL simulation labs would provide teachers with opportunities to engage in realistic social-emotional teaching scenarios, improving their ability to respond to complex classroom dynamics. It would also promote educational inclusion, as it would mean progress and improvement for pupils with certain specific educational support needs, due to their difficulties in expressing their emotions, relating to others, making decisions, among others.

Furthermore, encouraging interdisciplinary research collaborations between universities, ed-tech companies, and policymakers could enhance the development of innovative AI-SEL tools while ensuring their alignment with educational needs. Ensuring equitable AI access in SEL training must also be a priority, with governments implementing policies to make AI-powered SEL tools available to teachers in diverse socio-economic contexts. Lastly, introducing mandatory ethical AI training for educators would help prevent biases in AI-driven SEL assessments while ensuring that teachers use AI responsibly.

As a final insight, it is noteworthy to mention that the integration of AI-powered SEL tools in teacher training has the potential to revolutionise social-emotional education, providing teachers with real-time insights, personalised interventions, and adaptive learning environments. However, successful implementation requires significant policy, pedagogical, and institutional transformations. Addressing the challenges through policy

reforms, teacher training updates, and ethical AI integration strategies will be crucial to ensuring that AI enhances rather than replaces human-centred teaching approaches. Moving forward, collaborative efforts between educators, policymakers, and AI developers will play a decisive role in shaping the future of emotionally intelligent, AI-powered teacher education.

#### Abbreviations

AI: Artificial Intelligence; SEL: Social Emotional Learning

#### Acknowledgements

We thank the Universidad de La Sabana, Campus Universitario Puente del Común, KM 7 Autopista Norte de Bogotá, Chía, Cundinamarca, Colombia, for the support received in the preparation of this article.

#### Author's contributions

All authors contributed to the preparation of this article. All authors read and approved the final manuscript.

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#### Funding

Universidad de La Sabana (Project “Enseñar y aprender con Inteligencia Artificial” - EDUPHD-20-2022).

#### Availability of data and materials

Data will be available on request from authors.

#### Declarations

#### Competing interests

The authors declare that they have no competing interests.

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Received: 8 May 2025 Accepted: 26 November 2025

Published online: 1 January 2027 (Online First: 27 May 2026)

#### References

- Airyalat, S. A. S., Malkawi, L. W., & Momani, S. M. (2019). Comparing bibliometric analysis using PubMed, Scopus, and Web of Science databases. *Journal of Visualized Experiments*, 152, e58494.
- Barrera Castro, G. P., Chiappe, A., Becerra Rodriguez, D. F., & Sepulveda, F. G. (2024). Harnessing AI for education 4.0: Drivers of personalized learning. *Electronic Journal of E-Learning*, 22(5), 01–14. <https://doi.org/10.34190/ejel.22.5.3467>
- Berg, M., Talvio, M., Hietajärvi, L., Benítez, I., Cavioni, V., Conte, E., Cuadrado, F., Ferreira, M., Košir, M., Martinsone, B., Ornaghi, V., Raudiene, I., Šukyte, D., Talić, S., & Lonka, K. (2021). The development of teachers' and their students' social and emotional learning during the “Learning to be project”-training course in five European countries. *Frontiers in Psychology*, 12, 705336. <https://doi.org/10.3389/fpsyg.2021.705336>
- Chadegani, A. A., Salehi, H., Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ebrahim, N. A. (2013). A comparison between two main academic literature collections: Web of science and Scopus databases. *Asian Social Science*, 9(5), p18. <https://doi.org/10.5539/ass.v9n5p18>
- Chandiok, S., & Kukreja, J. (2025). Reinventing learning: Educational innovations for tomorrow's skills. In *Innovative educational frameworks for future skills and competencies* (pp. 343–382). IGI Global Scientific Publishing. <https://www.igi-global.com/chapter/reinventing-learning/367107>

- Cochran, L. M., & Parker Peters, M. (2023). Mindful preparation: An exploration of the effects of mindfulness and SEL training on pre-service teacher efficacy and empathy. *Teaching and Teacher Education*, 123, 103986. <https://doi.org/10.1016/j.tate.2022.103986>
- Garner, P. W., Bender, S. L., & Fedor, M. (2018). Mindfulness-based SEL programming to increase preservice teachers' mindfulness and emotional competence. *Psychology in the Schools*, 55(4), 377–390. <https://doi.org/10.1002/pits.22114>
- Gimbert, B. G., Miller, D., Herman, E., Breedlove, M., & Molina, C. E. (2023). Social emotional learning in schools: The importance of educator competence. *Journal of Research on Leadership Education*, 18(1), 3–39. <https://doi.org/10.1177/19427751211014920>
- Goldoni, D., Reis, H. M., Carrascoso, M. M., & Jaques, P. A. (2023). Computational tools to teach and develop socio-emotional skills: A systematic mapping. *International Journal of Learning Technology*, 18(2), 207–236. <https://doi.org/10.1504/IJLT.2023.132758>
- Henriksen, D., Creely, E., Gruber, N., & Leahy, S. (2025). Social-emotional learning and generative AI: A critical literature review and framework for teacher education. *Journal of Teacher Education*, 76(3), 312–328. <https://doi.org/10.1177/00224871251325058>
- Indelicato, R. (2024). Artificial intelligence and social-emotional learning: What relationship? *Journal of Modern Science*, 60(6), 460–470. <https://doi.org/10.13166/jms/196765>
- Jones, S. M., & Bouffard, S. M. (2012). Social and emotional learning in schools: From programs to strategies and commentaries. *Social Policy Report*, 26(4), 1–33.
- Kasperski, R., & Crispel, O. (2022). Preservice teachers' perspectives on the contribution of simulation-based learning to the development of communication skills. *Journal of Education for Teaching*, 48(5), 521–534. <https://doi.org/10.1080/02607476.2021.2002121>
- Konishi, C., Vargas-Madriz, L. F., & Tesolin, J. (2025). Fostering equity, diversity, and inclusion through social-emotional learning: The role of digital technologies. *Journal of Research on Technology in Education*, 1–13. <https://doi.org/10.1080/15391523.2025.2455054>
- Licardo, M., & Lipovec, A. (2024). *Artificial intelligence literacy and social-emotional skills as transversal competencies in education*. Kovac, Dr. Verlag. [https://www.verlagdrkovac.de/open-access/13814/Licardo,%20Lipovec.\\_Artificial\\_Intelligence\\_Literacy\\_and\\_Social-Emotional\\_Skills\\_as\\_Transversal\\_Competerencies\\_in\\_Education.pdf](https://www.verlagdrkovac.de/open-access/13814/Licardo,%20Lipovec._Artificial_Intelligence_Literacy_and_Social-Emotional_Skills_as_Transversal_Competerencies_in_Education.pdf)
- Mac Donald, J., & Baist, H. (2022). Using virtual collaboration and education to increase teachers' ability to promote self-regulation. *Journal of Occupational Therapy, Schools, & Early Intervention*, 15(4), 403–417. <https://doi.org/10.1080/19411243.2021.1983497>
- Murano, D., Sawyer, J. E., & Lipnevich, A. A. (2020). A meta-analytic review of preschool social and emotional learning interventions. *Review of Educational Research*, 90(2), 227–263. <https://doi.org/10.3102/0034654320914743>
- Murendo, C., Azemi, Z., Zaw Oo, T., Arlini, S. M., Chanbona, M., Fermin, R., Shrestha, N., Sadat, S. M., Kimani, E., & Bosco, K. (2024). Teachers' well-being, home learning environment and children learning outcomes in emergencies: A case of Afghanistan. *Cogent Education*, 11(1), 2335839. <https://doi.org/10.1080/2331186X.2024.2335839>
- Oliveira, E., Galvao De Barba, P., & Corrin, L. (2021). Enabling adaptive, personalised and context-aware interaction in a smart learning environment: Piloting the iCollab system. *Australasian Journal of Educational Technology*, 37(2), 1–23. <https://doi.org/10.14742/ajet.6792>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Palmquist, A., Sigurdardottir, H. D. I., & Myhre, H. (2025). Exploring interfaces and implications for integrating social-emotional competencies into AI literacy for education: A narrative review. *Journal of Computers in Education*, 13, 127–163. <https://doi.org/10.1007/s40692-025-00354-1>
- Poulou, M. S., & Garner, P. W. (2024). Teacher-student relationships: The roles of teachers' emotional competence, social emotional learning beliefs, and burnout. *Teachers and Teaching*, 1–22. <https://doi.org/10.1080/13540602.2024.2435080>
- Ravi, H., & R., V. (2025). Chatbots as scaffolding tools: An active learning model to empower diverse learners. *On the Horizon: The International Journal of Learning Futures*, 33(2), 283–297. <https://doi.org/10.1108/oth-07-2024-0035>
- Reeves, J., & Le Mare, L. (2017). Supporting teachers in relational pedagogy and social emotional education: A qualitative exploration. *International Journal of Emotional Education*, 9(1), 85–98.
- Rósa, B. (2024). In pursuit of social emotional learning in a Swedish pre-service teacher education programme: A qualitative study of intended curriculum. *Teaching and Teacher Education*, 142, 1–12. <https://doi.org/10.1016/j.tate.2024.104527>
- Schiepe-Tiska, A., Dzhaparkulova, A., & Ziernwald, L. (2021). A mixed-methods approach to investigating social and emotional learning at schools: Teachers' familiarity, beliefs, training, and perceived school culture. *Frontiers in Psychology*, 12, 518634. <https://doi.org/10.3389/fpsyg.2021.518634>
- Schonert-Reichl, K. A. (2017). Social and emotional learning and teachers. *The Future of Children*, 27(1), 137–155. <https://doi.org/10.1353/foc.2017.0007>
- Sethi, S. S., & Jain, K. (2024). AI technologies for social emotional learning: Recent research and future directions. *Journal of Research in Innovative Teaching & Learning*, 17(2), 213–225. <https://doi.org/10.1108/JRIT-03-2024-0073>
- Shi, J., & Cheung, A. C. K. (2024). Effective components of social emotional learning programs: A meta-analysis. *Journal of Youth and Adolescence*, 53(4), 755–771. <https://doi.org/10.1007/s10964-024-01942-7>

- Stipp, B. (2019). A big part of education also: A mixed-methods evaluation of a social and emotional learning (SEL) course for pre-service teachers. *Emotional and Behavioural Difficulties*, 24(2), 204–218. <https://doi.org/10.1080/13632752.2019.1597569>
- Talvio, M., Hietajärvi, L., & Matischek-Jauk, M. (2019). Do lions quest (LQ) workshops have systematic impact on teachers' social and emotional learning (SEL)? Samples from nine different countries. *Electronic Journal of Research in Education Psychology*, 17(2), 465–494.
- Tuomi, I. (2022). Artificial intelligence, 21st century competences, and socio-emotional learning in education: More than high-risk? *European Journal of Education*, 57(4), 601–619. <https://doi.org/10.1111/ejed.12531>
- Vargas, E. G., Chiappe, A., & Durand, J. (2024). Reshaping education in the era of artificial intelligence: Insights from situated learning related literature. *Journal of Social Studies Education Research*, 15(2), 1–28. Scopus.
- White, A. M., Akiva, T., Colvin, S., & Li, J. (2022). Integrating social and emotional learning: Creating space for afterschool educator expertise. *AERA Open*, 8, 1–18. <https://doi.org/10.1177/23328584221101546>
- Xu, J., & Xie, Y. (2025). Investigating social media-driven technology-enhanced learning for teachers' continuing professional development: A systematic mapping review. *Professional Development in Education*, 1–33. <https://doi.org/10.1080/19415257.2025.2513539>
- Yadati, N., Thomas, B., & Rajan, S. K. (2025). Promoting equity through teacher practices: A scoping review on transformative social-emotional learning. *Issues in Educational Research*, 35(1), 422–441.
- Zieher, A. K., Cipriano, C., Meyer, J. L., & Strambler, M. J. (2021). Educators' implementation and use of social and emotional learning early in the COVID-19 pandemic. *School Psychology*, 36(5), 388–397. <https://doi.org/10.1037/spq0000461>
- Zong, Y., & Yang, L. (2025). How AI-enhanced social-emotional learning framework transforms EFL students' engagement and emotional well-being. *European Journal of Education*, 60(1). <https://doi.org/10.1111/ejed.12925>

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The Asia-Pacific Society for Computers in Education (APSCE) remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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