

The Transformation of University Students' Social Intelligence Skills in Hybrid Learning Ecosystems: A Literature Review

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Abstract

This study aims to map how university students' social intelligence skills are reshaped and transformed within hybrid learning ecosystems in higher education. The article applies a systematic literature review guided by PRISMA 2020 by examining 28 peer-reviewed journal articles selected from approximately 500 initial records published between 2022 and 2026. The literature was identified through Google Scholar, ScienceDirect (Elsevier), MDPI, and ERIC using keywords related to hybrid learning, blended learning, HyFlex, social presence, belonging, social skills, and socio-emotional competence in higher education. The selected studies were analysed through thematic synthesis to identify changing patterns of social competence, enabling factors, barriers, and pedagogical implications. The review shows that social intelligence skills in hybrid learning can no longer be understood merely as face-to-face interpersonal ability. They increasingly refer to the capacity to read multimodal social cues, build social presence, sustain a sense of belonging, regulate synchronous and asynchronous collaboration, and adapt social behaviour across physical and digital spaces simultaneously. The article concludes that strengthening students' social intelligence skills in hybrid ecosystems requires intentionally designed pedagogies that place meaningful social interaction, relational support, and socio-emotional reflection at the centre of higher education learning experiences.

Keywords: Social Intelligence Skills; University Students; Hybrid Learning; Social Presence; Belonging

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INTRODUCTION

The development of hybrid learning in higher education has changed the ways university students construct learning experiences, interact with lecturers, and build relationships with peers. Hybrid learning is no longer understood merely as a combination of offline and online meetings, but as a learning ecosystem that connects physical presence, digital connectivity, synchronous activities, asynchronous activities, and various forms of academic participation within an interconnected learning landscape. In such an ecosystem, student success is determined not only by cognitive ability and digital literacy, but also by the ability to understand others, read social contexts, respond to communication cues, negotiate roles, and maintain the quality of relationships when interaction moves from the physical classroom to the

digital space and back again. Several studies show that hybrid learning provides opportunities to expand flexibility, engagement, and learning outcomes, while at the same time presenting serious challenges related to social connection, equitable participation, communication, and a sense of belonging in the campus environment (Gamage et al., 2022; Raes, 2022; Gudoniene et al., 2025; Han, 2025). Therefore, social intelligence skills have become increasingly relevant key competencies because they determine how students establish connections, build trust, and sustain social-academic engagement in a multimodal learning ecosystem.

The main problem in hybrid learning lies not only in technical aspects, but also in the gap in social experience that emerges between students who are present in the classroom and students who connect from online spaces. Various studies report that remote students are more likely to feel marginalised, less visible, or less affectively engaged when learning design does not intentionally build social presence and meaningful two-way interaction (van der Stap et al., 2024; Wagner et al., 2024; Schermeier et al., 2025). In other contexts, research on blended learning and HyFlex also shows that the quality of students' social experience is strongly influenced by activity structure, lecturer facilitation, feedback quality, and opportunities for student collaboration across modes (Cao, 2023; Istenič, 2024; Mahmud et al., 2026). In many countries, the solutions offered have moved toward learning centred on interaction, social support, and a sense of belonging, rather than merely on the digitalisation of content. This indicates that the problem of hybrid learning is fundamentally a problem of the social ecology of learning. Students need more adaptive social intelligence so that they can manage multimodal communication, read rapidly changing interaction norms, and maintain social connections even when they do not always share the same physical space.

Although research on hybrid learning, social presence, engagement, and belonging has grown rapidly, a conceptual gap remains in explaining how university students' social intelligence skills are actually transformed within hybrid learning ecosystems. Some studies focus on the effectiveness of blended learning on learning outcomes or satisfaction, while others examine social presence, socio-emotional competence, or sense of belonging separately (Ratan et al., 2022; Kreijns et al., 2024; Dias-Broens et al., 2024; van Kessel et al., 2025). In students' lived experience, however, the abilities to understand others' emotions, interpret social cues, collaborate, build social attachment, and adjust behaviour in physical and digital spaces are intertwined as one cluster of competencies. The novelty of this article lies in its effort to synthesise these findings through the lens of the transformation of social intelligence skills. This article does not review social skills merely as personal attributes, but understands them as relational competencies reshaped by learning design, interaction media, and participation structures in hybrid ecosystems. Thus, this review offers a conceptual bridge among hybrid learning, social presence, belonging, and the development of students' social competence.

Based on this background, this article aims to describe the forms of transformation of university students' social intelligence skills in hybrid learning ecosystems, identify the factors that encourage or hinder this transformation, and formulate pedagogical implications for higher education institutions. The scope of the review is limited to the context of students in higher education and studies that discuss hybrid learning,

blended learning, or HyFlex with clear dimensions of social interaction. In this article, social intelligence skills are understood through four main indicators: social awareness, empathic response, multimodal interpersonal communication, and adaptive collaboration. Social awareness refers to the ability to read situations, norms, and the social positions of others; empathic response refers to the ability to understand and appropriately respond to others' feelings; multimodal interpersonal communication includes the ability to interact offline, synchronously online, and asynchronously; and adaptive collaboration refers to the ability to build effective cooperation amid differences in access, presence, and forms of participation. With this focus, the article is expected to make a conceptual contribution to enriching the discourse on hybrid learning that is more humane, relational, and oriented toward students' holistic development.

Table 1. Synthesis of the main themes in the transformation of university students' social intelligence skills in hybrid learning ecosystems

Theme	Synthesis of Findings	Key Studies	Implications
Redefinition of social competence	Social intelligence shifts from face-to-face interaction toward the ability to read multimodal social cues, demonstrate digital empathy, and communicate interpersonally across channels.	Ratan et al. (2022); Kreijns et al. (2024); Chang et al. (2026)	Activities need to be designed to train synchronous and asynchronous communication.
Social presence and belonging	The quality of connectedness, the sense of being visible, and the sense of being part of a community determine students' social engagement in hybrid classrooms.	Raes (2022); van der Stap et al. (2024); van Kessel et al. (2025); Wheeler et al. (2026)	Lecturers need to build social presence and belonging from the beginning of the course.
Enabling factors and barriers	Lecturer support, learning climate, technology quality, and equitable participation are key determinants of students' social competence development.	Gudoniene et al. (2025); Yalan & Marcial (2025); Fang et al. (2025); Xiong & Zhou (2025)	Institutions need to organise a supportive and inclusive learning ecology.
Pedagogical implications	Strengthening social intelligence needs to be designed through cross-modal collaboration, peer support, socio-emotional reflection, and relational assessment.	Cao (2023); Han (2025); Mahmud et al. (2026); Yan et al. (2025)	Social intelligence needs to be positioned as a core outcome of hybrid learning.

Conceptual Model of Social Intelligence Skills Transformation

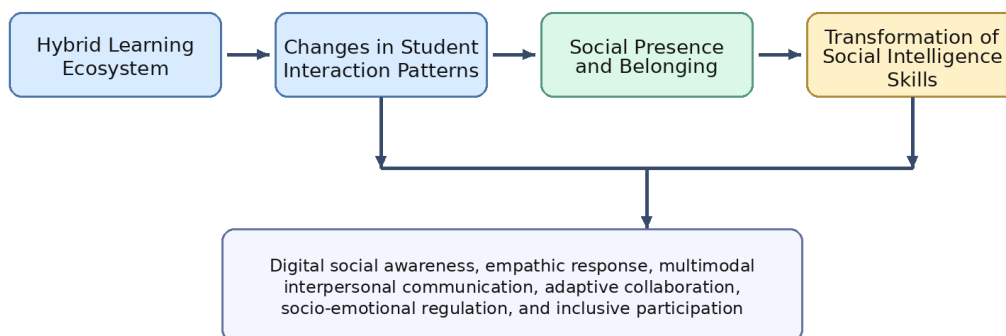


Figure 1. Conceptual model of the transformation of university students' social intelligence skills in hybrid learning ecosystems

METHODS

This article uses a systematic literature review reported in accordance with the PRISMA 2020 guidelines (Page et al., 2021). This approach was chosen so that the processes of identification, screening, eligibility assessment, and inclusion of studies could be conducted transparently and replicated. The review focuses on the transformation of university students' social intelligence skills in hybrid learning ecosystems in higher education, particularly in the contexts of hybrid learning, blended learning, and HyFlex that include dimensions of social interaction, social presence, belonging, collaboration, or socio-emotional competence. The search was conducted in April 2026 and was limited to journal articles published between 2022 and 2026 to ensure that the synthesis remained current. Using the PRISMA framework, this article not only summarises findings but also organises the study selection flow systematically so that every inclusion and exclusion decision can be explained methodologically.

The literature search sources consisted of four main databases or portals: Google Scholar, ScienceDirect representing Elsevier, MDPI, and ERIC. The keyword combinations used included "social intelligence skills" OR "social skills" OR "socio-emotional competence" OR "social presence" OR "sense of belonging" AND "hybrid learning" OR "blended learning" OR "HyFlex" AND "higher education" OR "university students". The initial identification yielded approximately 500 manuscripts, consisting of Google Scholar (n = 220), ScienceDirect or Elsevier (n = 140), MDPI (n = 85), and ERIC (n = 55). After the removal of 118 duplicate manuscripts, 382 records remained for the title and abstract screening stage. The complete study selection flow is presented in Figure 2.

The inclusion criteria consisted of peer-reviewed journal articles that discussed higher education students, used the context of hybrid, blended, or HyFlex learning, and explicitly included aspects of social interaction, social intelligence, social presence, belonging, interpersonal communication, collaboration, or socio-emotional competence. Articles were excluded if they focused on primary or secondary education, only discussed technical platform aspects without a social learning

dimension, were opinion pieces or editorials, or did not provide full text for analysis. At the title and abstract screening stage, 290 records were excluded because they were not relevant to the focus of the review. A total of 92 full-text articles were then examined at the eligibility stage. Of these, 64 articles were excluded for the following main reasons: not in the context of higher education students (18), not discussing hybrid, blended, or HyFlex learning (16), not containing relevant social or emotional dimensions (20), and being opinion, editorial, or non-research articles (10). Thus, 28 articles met the criteria and were included in the final synthesis.

Data were extracted using a review matrix containing article identity, year, source, objective, research design, subjects, learning context, social indicators examined, and main findings. The analysis was then conducted through thematic synthesis. In the first stage, the authors performed open coding of recurring concepts, such as social presence, belonging, empathy, multimodal communication, teacher support, participation equity, and collaboration. In the second stage, these codes were grouped into broader themes to explain patterns in the transformation of university students' social intelligence skills in hybrid learning ecosystems. This process produced four main themes: the redefinition of social competence in hybrid contexts, the role of social presence and sense of belonging, enabling and inhibiting factors in the transformation, and pedagogical implications for higher education institutions. This approach allowed the review to produce a synthesis that is not only descriptive, but also analytical and conceptual.

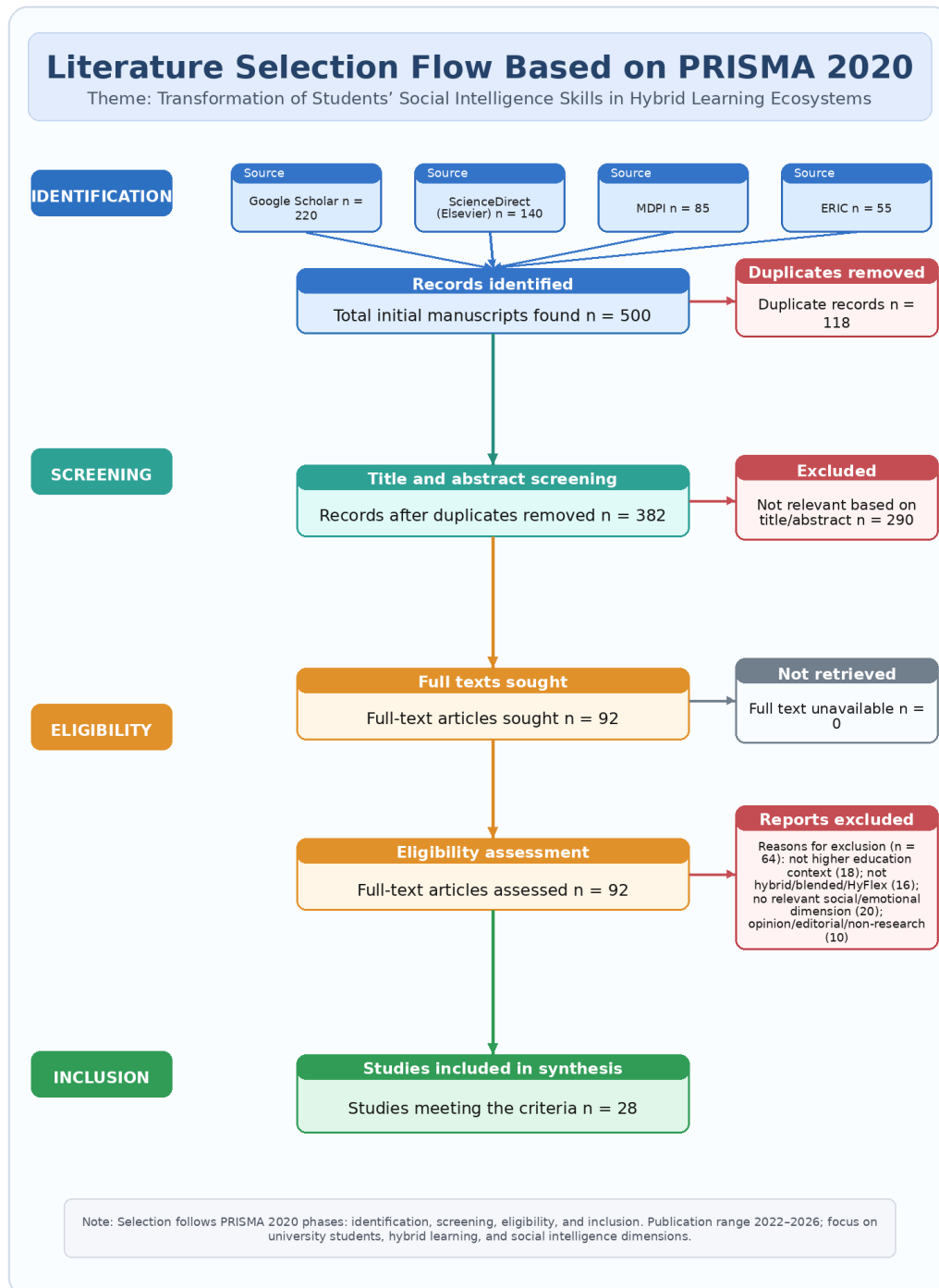


Figure 2. Study selection flow based on PRISMA 2020

RESULTS AND DISCUSSION

First, the redefinition of social intelligence skills in the context of hybrid learning.

The first finding shows that hybrid learning encourages a redefinition of social intelligence skills from face-to-face interpersonal ability toward multimodal social competence. In hybrid classroom ecosystems, students are not only required to speak, listen, and cooperate directly. They must also understand the rhythm of synchronous online interaction, interpret more limited social cues, choose appropriate communication channels, maintain digital communication ethics, and adjust social responses when learning peers occupy different spaces. Several studies emphasise that social presence, learning presence, and socio-emotional competence have become important parts of the hybrid learning experience because they determine the quality of relationships and student engagement (Ratan et al., 2022; Kreijns et al., 2024; Chang et al., 2026). In other words, social intelligence skills have expanded in meaning from merely the ability to socialise to the ability to understand, connect, and regulate relationships in distributed social spaces. This transformation is clearly visible in the growing need for digital social awareness, distance empathy, and interpersonal communication that remains warm even when mediated by technology.

This finding is consistent with studies showing that students' intrapersonal and interpersonal competencies shape each other in the context of modern university learning. Merlin and Soubramanian (2024) emphasise that self-awareness contributes to interpersonal competence, while Vázquez et al. (2025) show that social skills are positively correlated with learning competences through the mediating roles of academic motivation and emotional intelligence. At a broader level, Wang et al. (2025) also affirm that the learning environment and lecturer support for basic needs are related to the development of students' socio-emotional skills. If, in traditional learning, social intelligence was relatively developed through repeated direct interaction, then in hybrid learning this competence is reshaped through interactions that are more distributed, faster, and more layered. Therefore, students' social intelligence skills need to be understood as the capability to maintain the quality of relationships under conditions of interaction that are not always simultaneous, not always equal, and not always rich in nonverbal social cues.

Second, social presence and sense of belonging as the core of social competence transformation.

The second finding places social presence and sense of belonging at the core of the transformation of social intelligence skills in hybrid learning. The literature consistently shows that students are more likely to become socially engaged when they feel visible, recognised, and provided with space to participate meaningfully. In hybrid classrooms, this challenge becomes more complex because the experience of social presence does not automatically emerge simply because a digital platform is available. van der Stap et al. (2024) demonstrate that online interaction in blended learning needs to be supported by strategies that build social presence and convergence. Wheeler et al. (2026) also show that students' social connection in hybrid environments is shaped by experiences of socialising, social support, and belonging. These findings indicate that students' social ability in hybrid ecosystems is closely related to the capacity to build relational presence, not merely technical presence. Students who are able to initiate conversations, maintain responsiveness, and

cultivate a sense of social safety are more likely to sustain engagement and cooperation across modes.

Research on belonging strengthens this argument. Dias-Broens et al. (2024) show that sense of belonging in higher education is still defined and measured in diverse ways, but generally relates to being accepted, connected, and recognised within an academic community. van Kessel et al. (2025), through a systematic review and meta-analysis, found that university belonging is positively associated with students' academic achievement and well-being. This relationship explains why social intelligence skills in hybrid learning cannot be separated from the ability to build social bridges between online and physical spaces. Raes (2022) found that students' conceptual understanding in hybrid learning does not always differ significantly between offline and online participants, but affective engagement is strongly influenced by the quality of interaction and the sense of presence. Thus, the transformation of students' social intelligence is reflected in the increasing need to build closeness, trust, and a sense of being part of a community even though learning experiences occur in different configurations of presence.

Third, factors enabling and inhibiting the transformation of students' social intelligence skills.

The third finding concerns the factors that enable or inhibit the transformation of social intelligence skills. The literature shows that learning design, lecturer support, learning climate, and technology quality are the main determinants. Gudoniene et al. (2025) identify that hybrid learning in higher education often faces problems of communication, time management, assessment, and technology integration. Yalan and Marcial (2025) also show that stakeholders perceive the quality of hybrid learning as uneven, especially in the aspects of interaction, feedback, and students' learning experience. From the perspective of socio-emotional development, Fang et al. (2025) emphasise that school climate contributes to socio-emotional competence through psychological resilience and emotion regulation. These findings demonstrate that social intelligence skills do not grow automatically as a consequence of technology use. Such competence develops when students are situated in a safe and supportive learning climate that provides equal opportunities for participation among students who attend face-to-face and those who participate online.

Another recurring driving factor is relational support and social capital. Xiong and Zhou (2025) show that online social interaction can contribute to students' socio-emotional competence through bonding social capital. Feng and Li (2025) also affirm that social participation is related to university students' mental health from the perspective of social integration. Conversely, when hybrid classrooms fail to facilitate a fair distribution of attention, students who connect remotely may experience social alienation. Schermeier et al. (2025) found that small-group collaboration in hybrid settings can generate socio-affective experiences that differ from fully face-to-face and fully remote collaboration, particularly in relation to feelings of connectedness. Wagner et al. (2024) show that types of learning activities and social presence play important roles in synchronous hybrid classrooms. Therefore, the transformation of social intelligence skills depends greatly on interaction design that can reduce psychological distance, structure opportunities to speak, and connect all students into a more inclusive network of academic relationships.

Fourth, pedagogical implications for higher education and directions for further development.

The fourth finding confirms that strengthening social intelligence skills in hybrid learning requires intentional and structured pedagogical interventions. Cao's (2023) meta-analysis shows that blended learning can provide advantages for performance, attitude, achievement, and engagement, but these outcomes depend on how learning is designed. Han (2025) also confirms the associations among blended learning effectiveness, engagement, learning outcomes, and academic motivation. Accordingly, the development of students' social intelligence should not be positioned as a side effect, but as a target of learning design. Higher education institutions can design activities that promote reflective dialogue, peer mentoring, cross-modal collaboration, social feedback, and rotation of group roles. Such activities provide students with opportunities to practise empathy, active listening, negotiation, and collaborative leadership in the context of multimodal interaction. In addition, lecturers need to establish communication rules, participation norms, and facilitation mechanisms that prevent online students from being excluded from classroom dynamics.

A further implication is the need for a richer evaluation framework to assess the quality of hybrid learning and students' social development. Mahmud et al. (2026) show that engagement issues in HyFlex learning remain an important challenge, while Peña-Acuña et al. (2025) and Yan et al. (2025) emphasise that cultural openness, ethnocultural empathy, and social-emotional competence are related to the development of self-concept and students' readiness to interact in diverse environments. Against this background, higher education institutions need to develop assessments that capture not only student attendance or test results, but also the quality of collaboration, the ability to read social situations, contributions to the learning community, and socio-emotional regulation skills. Conceptually, this review shows that the transformation of social intelligence skills in hybrid learning ecosystems moves from an individual logic toward a relational logic. Students who succeed in hybrid environments are those who are able to maintain connections, build social presence, and create collaborative coordination amid diverse forms of participation.

CONCLUSION

This literature review shows that the transformation of university students' social intelligence skills in hybrid learning ecosystems is both a conceptual and pedagogical shift. Social intelligence skills can no longer be understood sufficiently as the ability to socialise in face-to-face interaction; rather, they have expanded into the ability to build social presence, maintain a sense of belonging, read multimodal social cues, manage synchronous and asynchronous communication, and collaborate adaptively in physical and digital spaces. This transformation is influenced by learning activity design, lecturer support, the quality of the learning climate, technology quality, and equitable participation among students. Thus, higher education institutions need to regard social intelligence as one of the core outcomes of hybrid learning, not merely as an additional effect of technology use. These findings confirm that the quality of relationships, interaction, and social support remains the main foundation of effective learning in higher education.

RECOMMENDATIONS

Future research is recommended to develop intervention models, assessment instruments, and longitudinal studies to measure the development of university students' social intelligence skills across various hybrid learning formats. Higher education institutions also need to test learning designs that explicitly target social presence, belonging, peer support, and multimodal collaboration so that the transformation of students' social competence can be facilitated more systematically.

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