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Professional development for promoting a sense of community in blended learning

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ABSTRACT

While blended learning holds considerable potential in higher education, suboptimal social interactions among students may lead to feelings of loneliness, isolation, and demotivation. To address this issue, a professional development programme was designed and assessed for its viability in helping university teachers promote a sense of community within the blended learning environment. This programme introduces a new visually-based theoretical model, equipping teachers with practical tools for implementing activities that foster a strong sense of community in the blended learning. Drawing upon the teachers' perceived experiences, the study identifies key recommendations to enhance the viability of this professional development programme. In particular, it is necessary to establish a strong theoretical foundation to dispel misconceptions among teachers about blended learning. Additionally, it provides several concrete strategies to support teachers' hands-on practice and suggests integrating a team-based approach to collectively enhance the quality of blended learning. Furthermore, the study underscores the importance of the institution's commitment, recognising its important role in the long-term success and sustainability of both blended learning and associated professional development initiatives for teachers.

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Introduction

Blended learning (BL) has shown a growing presence in higher education (Dziuban *et al.* 2018). While the benefits of BL, including flexibility and accessibility, are widely acknowledged, there is a need to shift the research focus to understanding how BL impacts students (Lomas *et al.* 2021). Recent studies have illuminated the critical role of a sense of community (SoC) in BL, as inadequate social interactions can lead to students feeling lonely, isolated, and demotivated (Arslan 2021, Hehir *et al.* 2021). Conversely, a strong SoC is associated with deep learning, as well as students' well-being (Garrison and Vaughan 2011, Stubb *et al.* 2011). Hence, it is essential to create an open, safe, and supportive BL environment that fosters social connectedness and enhances student engagement (Garrison and Vaughan 2011, Cleveland-Innes 2019). Despite the recognised importance of SoC in the literature, empirical studies on professional development (PD) for university teachers in this regard remain scarce (Pei *et al.* 2023). To fill this gap, we have developed a PD programme to enhance teacher competence in promoting a SoC in BL. This study's aim is to further evaluate the

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viability of the designed PD programme in terms of its added value, clarity, compatibility, and tolerance (Mckenney and Reeves 2018).

Theoretical framework

Blended learning and sense of community

While BL has gained popularity in recent years, its definition remains ambiguous (Hrastinski 2019). This concept involves integrating technology, pedagogical approaches, and instructional methods in different ways, leading to a wide range of variations in how BL is defined (Driscoll 2002). However, the overarching goal of BL should be to enhance students' learning. This study focuses on Garrison and Kanuka (2004), p. 96's definition: 'the thoughtful integration of classroom face-to-face learning experiences with online learning experiences'. This definition emphasises a deliberate process of integrating online and face-to-face (F2F) elements to achieve a deep learning experience for students, which can be further enhanced by incorporating social, cognitive, and teaching presence: Social presence fosters a trusting and open social climate among students, cognitive presence involves structured and intellectual activities for higher-order learning outcomes, and teaching presence facilitates and guides students' social and cognitive presence, accomplished through teachers' efforts in the design, implementation, and delivery of a blended course (Garrison and Vaughan 2011).

Prior research has underscored the significance of a SoC in BL (Shackelford and Maxwell 2012, Tayebinik and Puteh 2015), as it creates 'a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together' (McMillan and Chavis 1986, p. 9). In higher education, a strong SoC is characterised by two critical variables: connectedness and learning (Rovai 2002). Connectedness encompasses students' feelings of belonging, acceptance and relationship bonding, tied with the students' involvement in social presence, while learning refers to students achieving academic success supported by cognitive presence that stimulates critical thinking and meaningful discourse (Rovai 2002). Teaching presence is the link between connectedness and learning, shaped by teachers' roles and practices that impact how students perceive a SoC (Pei *et al.* 2023). For practical implementation, correlations between the three types of presence and their associated interactions in BL have been identified: teaching presence is linked with teacher – student interactions, social presence involves student – student interactions, and cognitive presence relates to student – content interaction (Swan 2006, Saadatmand *et al.* 2017).

According to social constructivist theories, learning unfolds through iterative processes of individual reflection and external interactions with others, engaging in discourse to construct meaning and validate acquired knowledge (Dewey, Garrison and Vaughan 2011). In BL, individual learning, facilitated through student – content interactions, equips students with the ability to comprehend theoretical concepts and construct meaning at their own pace (Pei *et al.* 2023). Moreover, interactions with peers and teachers, facilitated through various group learning activities, motivate students to collaborate for academic success and reinforce social bonds, involving both student-student and student-teacher interactions (Garrison and Vaughan 2011, Fiock 2020, Pei *et al.* 2023). Whether these interactions take place in an online or offline setting, either individually or within groups, they can be thoughtfully designed to collectively contribute to the creation of a supportive and effective learning environment, thereby fostering a strong SoC among students.

Teacher professional development for blended learning

Professional development contributes to the continual improvement of teachers' knowledge, skills and attitudes, and can ultimately contribute to students' learning (Lawless and Pellegrino 2007). In

a meta-aggregative review, Philipsen *et al.* (2019) presented a framework that includes six synthesised findings for effective PD in the context of online and blended learning. These recommendations are consistent with findings from other studies on PD in general (Van Veen *et al.* 2010, Darling-Hammond *et al.* 2017, Philipsen *et al.* 2022):

- (1) Design and develop a supportive PD environment: Provide regular and just-in-time support and feedback for teachers, implement a well-defined process and align the PD programme's duration with teachers' wishes.
- (2) Acknowledge the existing context: Take institutional characteristics into consideration, including ICT capabilities, teaching support infrastructure, and institutional incentives.
- (3) Address the changes teachers undergo during the transition to BL, which involve rethinking their roles and considering their professional identity and pedagogical beliefs.
- (4) Determine the overall goals and relevance of the PD: Outline the PD's objectives and address teachers' specific needs, ensuring they recognise the merit of participating in the programme.
- (5) Acknowledge the PD strategies associated with the transition to BL: Immerse teachers in real and active experiences, with hands-on practice.
- (6) Evaluate the PD not only provides opportunities for improvement, but also increases its relevance and value. This, in turn, encourages further dissemination of the PD.

Viability of teacher professional development for blended learning

According to Philipsen *et al.* (2022), evaluating a PD can reveal its impact on teachers' experiences and provide insights for reforming PD strategies. This provides deep understanding of a PD, such as 'the appropriateness of its intentions, what it looks like when implemented, and the effects it yields' (Mckenney and Reeves 2018, p. 162). For small-scale PD programmes, evaluating their viability is particularly crucial to identify potential barriers or challenges early on and increase the chances of success when scaling them up (Mckenney and Reeves 2018). Four attributes should be considered for the PD's viability: added value, clarity, compatibility, and tolerance (Mckenney and Reeves 2018):

- *Added value*: Value-added PD programmes are characterised by their ability to produce observable benefits that outweigh the effort and resources expended (Rogers 2010). Measures of PD's added value can be based on the perceived effectiveness and efficiency of teacher learning, as well as teachers' perceived sense of enjoyability of accomplishment (Kirschner 2019, Van Der Linden 2022). The effectiveness of a PD programme involves the extent to which it enhances teachers' knowledge, skills, and attitudes. The efficiency can be assessed by comparing teachers' perceived experience of the PD programme with alternative options. The enjoyability factor can be evaluated by investigating teachers' satisfaction with the PD.
- *Clarity*: PD programmes that are clear and easy to understand can help participants envision their involvement in the programme. Involvement refers to participants' understanding of the purpose of a PD programme, as well as how the programme is structured and delivered to enable them to complete the activities presented. Thus, a clear PD programme is characterised by a high level of explicitness in its components, such as its objectives, materials, structures, procedures, and other related aspects.
- *Compatibility*: Compatible PD programmes are those that align with the existing values, cultures, practices, and beliefs of the participants. The degree of perceived compatibility of the PD programme is essential to its success, as it directly affects its ability to respond to the needs and context of the participants. If participants perceive that a PD programme is not aligned with their own needs and is difficult to apply in their own teaching context, they may view the PD programme as irrelevant and become resistant to it.

- *Tolerance*: The concept of PD's tolerance refers to its ability to withstand and accommodate changes and variations while remaining aligned with its intended goals. Unlike rigid PD programmes that demand strict adherence to their original design (i.e. fidelity), tolerant PD programmes can be flexibly adapted to suit different circumstances. As PD programmes are invariably subject to variations in their implementation over time, a tolerant PD programme can still be effective in different situations, even when faced with challenging conditions or limited resources (Clarke and Dede 2009). Consequently, PD programmes that are characterised by a higher degree of tolerance have more potential to be scaled up and spread.

Professional development programme: active and connected blended learning

Drawing upon the theoretical framework, a PD programme (Active and Connected Blended Learning) was developed. The content of the programme revolves around social, cognitive and teaching presence for promoting a SoC. To ensure practicality for teachers, we developed an IGOF (Individual-Group-Online-F2F) model. This model categorises BL into four blocks, with the vertical axis representing the online and F2F dimensions, and the horizontal axis denoting the individual and group learning modalities (Figure 1). For each block, we pinpointed the key interaction types and provided associated examples and best practices demonstrating how to map individual and group learning activities in both online and F2F settings based on literature (Garrison and Vaughan 2011, Fiock 2020, Pei *et al.* 2023). Teachers could select and engage in discussions about these teaching and learning activities, subsequently implementing them into their respective BL courses.

- Online-individual learning (block 1): This block enhances student-content interaction through activities like watching mini-lectures and practicing online quizzes. Often, this type of self-paced individual learning serves as valuable preparation for students to engage in F2F classroom activities.
- Group F2F learning (block 2): This block focuses on teaching and learning activities occur in classroom. Examples include ice-breaking activities to facilitate quick social bonding, think-

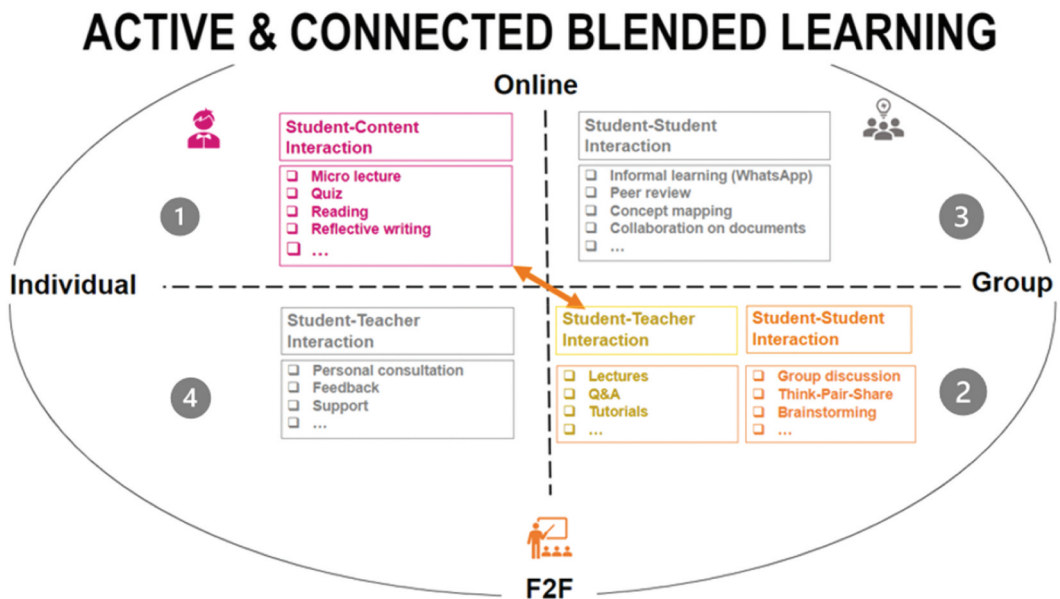


Figure 1. IGOF model.

Table 1. PD implementation.

Recommendations by Philipsen <i>et al.</i> (2019)	As implemented in the Active and Connected Blended Learning programme
1	Provide ongoing support and feedback from BL experts throughout the PD. Structure sessions to follow cycles of theory, examples, discussion, feedback, implementation and self-reflection; adjust the PD session's duration and quantity based on teacher wishes. Note: BL experts include educational specialists with proficiency in pedagogical theory and eLearning specialists with expertise in the technical implementation of BL.
2	Utilize the institution's resources. Have a team of educational specialists, eLearning specialists and technical staff such as video experts available throughout the PD.
3	Involve teachers in discussions and promote self-reflection on how their roles and teaching attitudes are evolving in the context of BL for building a SoC.
4	Communicate the general objectives of the PD and ask teachers to establish their personal goals for the PD; request teachers to bring forward their specific needs and potential challenges related to their respective courses during the PD.
5	Integrate theory and practical application in extended, team-based multi-session workshops with interactive discussions and feedback from BL experts and peers; supply supplementary materials such as teaching activity lists, best practices, and strategies; encourage teachers to adapt their learning to their specific teaching context; promote self-reflection by using reflection forms to track learning progress.
6	Collect ongoing feedback from teachers to adjust the PD, conduct evaluations informed by scientific research (PD viability evaluation).

pair-share exercises, and other group learning activities led by teachers. In this phase, teachers have the opportunity to provide feedback, guidance, and explanations on challenging topics. Research suggests that students prefer F2F interactions with teachers and peers for complex and in-depth discussions that online tools cannot replicate effectively (Pei *et al.* 2023). Thus, this block should prioritise student-student and student-teacher interactions to foster both higher-order learning and the cultivation of strong social connections.

- Online-group learning (block 3): This block involves activities conducted online within a group setting. Examples include virtual group discussions and peer-reviewed activities. Informal learning opportunities arise in this block. Teachers can encourage students to stay socially connected through non-academic activities on social media platforms like WhatsApp (Pei *et al.* 2023). Participation should be voluntary, informal, and independent of teacher involvement. Students must be advised to protect their privacy and respect ethical considerations.
- Individual- F2F learning (block 4): This block emphasises one-on-one student-teacher interactions such as personal consultations, providing students with a vital channel to seek help for personal or academic issues. Teachers should emphasise these communication channels and encourage students to seek help when needed.

Incorporating the insights from Philipsen *et al.* (2019)'s recommendations, the PD's procedure unfolded in two phases. First, interactive plenary sessions covered BL and SoC theories, coupled with the IGOF model and practical explanations for their implementation. During these sessions, teachers engaged in collaborative discussions, sharing and exchanging ideas with both peers and BL experts while designing their BL courses. In the second phase, teachers individually implemented specific teaching and learning activities that they selected and received personalised support through individual consultations and technical assistance provided by BL experts (See Table 1 for the PD's key features).

Research aim and questions

We applied Philipsen *et al.* (2019)'s framework to create a professional development programme for teachers to promote a sense of community in blended learning. The aim of this study was to

evaluate the viability of the PD programme, based on Mckenney and Reeves (2018)'s four criteria. The research question was:

How do teachers perceive the viability of the designed professional development programme, in terms of added value (RQ1), clarity (RQ2), compatibility (RQ3), and tolerance (RQ4)?

Method

We used a qualitative methodology to explore participants' perspectives on the PD programme (Castleberry and Nolen 2018). Specifically, the interpretive framework of social constructivism was used to explore teachers' viewpoints on the viability of the PD (Cohen *et al.* 2017).

Procedure and participants

Conducted in 2023 at a Dutch university, this study utilised purposive criterion sampling (Patton 2014), to ensure diversity among participating teachers across disciplines such as finance, chemistry, electrical, physics, mechanical engineering, and biomedical technology. The sampling also accounted for varying levels of prior experience in BL (see Table 2). All selected teachers were affiliated with the same university to maintain organisational consistency. Six teachers participated voluntarily, providing signed consent forms and ethical permission was granted by the Institutional Review Board.

Due to the PD's focus on addressing teachers' unique needs, a tailored approach was adopted for the PD sessions, rather than following a uniform length and structure. Four teachers teaching in the same module formed one group, each responsible for teaching different sections of the same course, while another two teachers formed a separate group. Both groups participated in plenary sessions during the first phase of the PD programme, ranging from 8 to 12 hours respectively. Subsequently, individual implementation of acquired knowledge in their respective courses varied between 4 to 16 hours.

Data collection and instruments

Data collection spanned before, during, and after the PD, using reflection forms, field notes and interviews (see Table 3).

Table 2. Participant profile.

Teacher Pseudonyms	BL Experience	Teaching in one course
Lydia	1–2 years	No
Andrew	1–2 years	No
Dax	More than 5 years	Yes
Tom	3–4 years	Yes
Carlo	0	Yes
Rudy	0	Yes

Table 3. Data collection and instruments.

Instrument	RQ1 (Added value)	RQ2 (Clarity)	RQ3 (Compatibility)	RQ4 (Tolerance)
Reflection form	Primary data	Supplementary data	Supplementary data	Supplementary data
Field notes	Supplementary data	Primary data	Supplementary data	Supplementary data
Interview	Primary data	Primary data	Primary data	Primary data

- *Reflection form:* The reflection forms (Appendix A) were used to elicit teachers' reflections on their learning, with a primary focus on the added value of the PD programme (RQ1). The form tracked changes in teachers' knowledge and skills at various stages throughout the PD. Additionally, the inclusion of open-ended questions allowed for specific feedback on how the PD programme addressed their needs and their overall experiences with it, which served as supplementary data for RQ2 (clarity), RQ3 (compatibility) and RQ4 (tolerance).
- *Field notes:* Field notes were used to evaluate the clarity of the PD programme (RQ2). The field notes were taken by the researcher to record teachers' immediate thoughts and reactions during the PD, aiming to uncover any questions or difficulties that could indicate potential weaknesses in the PD's clarity. The field notes were enriched with input from the independent educational specialist's observations. The field notes also provided supplementary data for RQ1, RQ3, and RQ4.
- *Interview:* At the end of the PD, individual interviews of approximately 1 hour were conducted with all teachers. The interviews used a semi-structured protocol (Appendix B), with questions aligned with the four attributes of viability; open-ended questions allowed the teachers to freely express their viewpoints (Creswell and Creswell 2017). First, the interviews were intended to validate and expand upon the initial findings derived from the reflection forms and field notes. The teachers shared their perceived experiences of the PD programme's added value (RQ1). The presentation, handouts, structure, and procedures of the PD programme were also discussed with them to determine the level of clarity (RQ2). Moreover, the interview data captured the teachers' perceived experience regarding compatibility (RQ3), addressing how well the PD met their individual needs and the extent to which teachers were able to apply what they learned to their specific teaching context. Finally, the interviews explored the tolerance of the PD (RQ4), assessing its alignment with its original objectives, the ability to overcome challenging situations, and its adaptability to support other teachers (Mckenney and Reeves 2018).

Data analysis and quality

To establish data validity, we worked on the sampling choices outlined in the procedure section. To further enhance data reliability and minimise bias from the first author's role in PD development, several measures were implemented: an independent educational specialist observed the PD and provided feedback through field notes; participating teachers completed reflection forms, and member-checking was conducted during interviews. An independent researcher, not affiliated with the university, coded 10% of the data, achieving a 94% inter-coder agreement. By triangulating multiple data sources, we aimed to generate coherent and converging results (Creswell and Creswell 2017).

All data were transcribed and imported into Atlas.ti for analysis. The data were processed using content analysis to 'identify core consistencies and meanings' (Patton 1990, p. 453). Themes were initially identified using a deductive analysis approach, with the four attributes of viability from the theoretical framework as first-level codes. Second-level codes were then assigned to sub-categories within these four attributes, such as 'added value' at the first level and 'effectiveness' at the second level (Appendix C: codebook). Subsequently, we performed an iterative inductive analysis on the entire dataset, but did not discover any new codes.

Results

Added value

Effectiveness

Effectiveness of the PD programme was investigated in terms of changes in teachers' competences related to promoting a SoC in BL. The reflection forms showed that before the PD,

teachers viewed BL as a diverse teaching approach with various tools and methods. Following the PD, their definitions remained mostly consistent but grew more comprehensive. Four teachers explicitly stressed that BL requires a ‘thoughtful’ design process to integrate online and F2F learning and highlighted the importance of incorporating social, cognitive, and teaching presence in BL. The field notes showed that they actively participated in discussions and dispelled misconceptions about BL being limited to ‘using some online tools.’ The interviews further confirmed that teachers appreciated the PD’s initial emphasis on theoretical underpinnings, which gave them ‘confidence’ and a source of ‘affirmation’, validating their teaching practices.

While the teachers did not explicitly reference SoC in their definitions of BL in the reflection form, the interview revealed that they all acknowledged that the PD had significantly enriched their understanding of SoC in BL. For example, the PD presented cases from the same university where students expressed a need for enhanced social connections and highlighted challenges related to social isolation. Further, the PD gave a rationale for the importance of SoC in BL, elucidating its role in enhancing active learning and strengthening social connections. Moreover, examples were provided to illustrate the interplay between individual and group learning in both online and offline settings for creating a SoC. Lydia stated:

I didn’t know that sense of community is that important. But after this workshop, I realize . . . it is very critical in blended learning . . . If you want to make blended learning a success, you need to create a sense of community among the students.

Teachers in the interviews highlighted the importance of adapting their role in BL to promote a SoC by ‘build[ing] bond[s] with students’. Four of them described specific techniques they learned and implemented, including providing a more open introduction of themselves in the initial lectures, increasing F2F interactions and communication with students, actively seeking feedback from students, and making necessary adjustments during teaching. While some of these changes were described as ‘subtle’, Rudy reported observing a positive atmosphere in their courses:

If I apply some techniques in this community building . . . , students will feel very motivated. They belong to this group. They want to learn.

Efficiency

The PD’s efficiency was discussed during the interviews. The approach of integrating theory and practice within a single PD programme was appreciated by all teachers. The IGOF model helped them to understand ‘how each of the concepts are connected with each other, why they are related, and what is important’. They perceived that this model’s division into four categories simplified and structured the various perspectives in BL. Further, they stressed the value of combining this model with the provided list of teaching and learning activity examples and best practices, which were viewed as ‘practical tools’ for implementing BL. They highlighted specific examples that they learned, such as think-pair-share for active F2F-group learning, using digital polls to connect online and F2F learning, and incorporating icebreakers to build trust and foster an open atmosphere. Lydia stated:

The PD exceeds my anticipation . . . I also got a list of very useful tools and how these tools help you to achieve the purpose based on the theory.

According to the teachers, this PD programme adopted a more hands-on approach compared to others, allowing them to directly apply theoretical principles to implementation. This process was enhanced by the presence of both educational and eLearning specialists. Teachers valued the educational specialists’ guidance in their course design discussions. Notably, Rudy stated that while they could certainly have discussions solely with fellow teachers, the expertise and experience from the educational specialists provided an external perspective. This ‘independent’ advice was needed to ensure the quality of the course. The majority of the teachers also expressed their

appreciation for the support from the eLearning specialists, particularly for using technology in the implementation of BL.

Four teachers collaborated in the PD programme as a team, each responsible for teaching different sections of the same course. They found this team-based approach highly productive, as it integrated the PD into their course development process. They valued the emphasis on peer discussions, which enabled them to receive immediate feedback and engage in constructive dialogues with peers teaching within the same course. Combining their newly acquired theoretical knowledge with practical insights, they could collectively assess and determine the suitability of specific changes for the shared course. Given the time constraints they faced, this approach was especially beneficial, as it allowed the PD to channel their collective efforts towards course enhancement.

I think the sessions were perhaps most fruitful . . . for being a team [of] a whole module so that you can also connect what you know from each other [with] what you are doing. It is really helpful for teacher professionalization, for the quality of the education. -Tom

Dax, a senior teacher believed that this approach was extra beneficial for junior teachers: ‘I have junior teachers to train and this (PD) really helped me to support the new teachers in my module.’ The junior teacher, Carlo, reinforced this observation: ‘I was not so ready for my own things to be implemented directly . . . The PD opens up a lot of opportunities on what I could do for my course’.

Enjoyability

First, the field notes did not record any major issues related to the PD. Second, the reflection forms captured teachers’ positive experiences, with some noting the stimulating discussions held in an open atmosphere, others highlighting improvements in their BL courses, a few expressing appreciation for the team-based approach, and some mentioning that the PD had clarified their previous misconceptions about BL. Additional comments praised the clarity of content, programme structure, and manageable workload. Teachers also suggested improvements, including involving more teachers teaching the same topics in the PD programme and using an example course that runs throughout the entire PD programme. Additionally, there was a recommendation to further divide sessions into more frequent segments.

Finally, insights from the field notes and reflection forms were corroborated in the interviews. All teachers expressed general satisfaction with the PD sessions, which was again validated through member checking.

I’m an engineer, so all these [educational] things can be, for me personally, a bit fuzzy . . . I really like [this PD], because it gave concrete examples and the tension between online and face to face and individual and groups for sense of community. -Rudy

Clarity

The data obtained from the reflection forms indicated that teachers did not encounter any issues regarding the clarity of the PD. Subsequently, the field notes were examined to capture additional insights. There were two key areas requiring further clarification.

First, although the eLearning specialists were introduced at the beginning of the PD, questions persisted about the specific support that they provided. Four teachers had not contacted them prior to the PD, even though these positions had been established in their faculties for several years.

Second, teachers commented that the relevance of the techniques and methods taught in the PD, originally designed for BL, could be applied to ‘regular’ courses. They emphasised the importance of fostering a SoC in all university education settings. This sparked a deeper discussion about potentially expanding the PD programme to accommodate larger groups.

During the interviews, the clarity of the PD content, including presentations, handouts, and the purpose of each session, as well as the procedures, planning, activities, and related aspects, were

discussed with the teachers. Andrew still had some questions regarding the role of the eLearning specialist. A brief explanation provided the necessary clarification. Furthermore, some teachers expressed their wish to extend the PD to the programme level or to involve a wider group of teachers. Tom made the notable point that while individual improvements were attainable, truly achieving a high-quality course would necessitate ‘fundamental’ changes that could only be realised through the collective commitment and collaboration of all the teachers involved in delivering the programme.

Compatibility

Compatibility was discussed with the teachers during the interviews. Rudy expressed gratitude for the additional consultation to accommodate their difficulty in attending one session. Four teachers requested additional sessions for deeper course design and implementation, which was accommodated.

The participants valued the contextualisation aspect of the PD. While the PD started with general principles for SoC, teachers were asked to select the specific elements that best suited their course context. Subsequently, collaborative discussions unfolded among the teachers, guided by educational and eLearning specialists, to determine how, when, and what to incorporate their ideas into their teaching context. For example, how to adapt group activities for larger student groups and how to enhance the integration of existing video materials with classroom group discussions were addressed.

If the concepts are new, it really helps also to get the implementation part where you actually have to use it . . . It helps me also to think of how I would implement it in my own teaching on the spot. Whereas if you wouldn't do that, you might just forget about it. -Lydia

While teachers appreciated the adaptability of the PD, Rudy and Tom raised questions about the large amount of freedom they had. Tom suggested increased ‘supervision’ from the educational specialists, with frequent checks on teaching, direct observation and suggestions for improvement. Rudy felt that this PD leaned more towards a ‘bottom-up’ approach. He believed that students could benefit from a cohesive and interconnected structure, rather than one perceived as ‘completely arbitrary.’

I think it's nice to have still this freedom . . . but at the same time to also have a bit of a top down . . . We have these teachers teaching these courses and how can everyone make adaptations and improvements? – Rudy

Tolerance

PD's alignment with its original objective

Five teachers during the interviews acknowledged that the programme was aligned with its original objective, which was to promote a SoC by providing students with a connected and active learning environment in BL. Dax stated that while the PD supported teachers, it might not inherently lead to immediate community building among students, per its strict definition:

This [PD] approach is a great way to initiate the learning of teaching teams . . . to have them make the first steps and evaluate these. It's not by definition that the content of this course results in community . . . at the student side . . . it is also a great to find out how to increase the student community thing, but not by definition. But I think it is a very good goal to put it on and have teams work on it.

PD's effectiveness when faced with challenging conditions

During the interviews, teachers commonly cited time constraints as a major challenge in implementing the acquired knowledge due to their numerous university tasks and responsibilities. Three of them had objectives and intentions that they were not able to fully accomplish. Tom acknowledged that, while he had learned a lot, ‘it's not perfect’. For example, managing group discussions

remained challenging for him, and he expressed that he would benefit from additional time to practice. This reflection showed the teacher's commitment to continual improvement and indicated that the PD requires ongoing practice and refinement.

Dax openly shared having anticipated this time-related challenge before the PD, but decided nonetheless to encourage the team to attend. He explained that they considered it necessary for the whole team, especially the junior teachers, to first have a fundamental understanding of teaching in BL. Dax perceived that throughout the PD programme, the teachers engaged in extensive discussions, exchanged ideas, and also reached a consensus on their future plans.

I think it was very valuable to get some initial input. So even though it's not fully implemented right at the beginning, to have at least awareness and a bit of methods to do it maybe in the future. – Dax

The other three teachers of the same team agreed and emphasised the significance of taking incremental steps. They explained that implementing small steps not only addressed the challenge of limited time, but also included evaluation and continual improvement as essential components.

Participating the PD initiated a change or a development ... in my case ... small steps and small improvements ... [it is] also important because if the steps are too big ... you cannot correlate clearly action to the evaluation. –Rudy

Adaptability for supporting other teachers

The teachers had varying perspectives on the extent to which the PD programme could support other teachers. While some were confident that the PD programme would indeed be beneficial for other educators, three teachers believed that to fully maximise the potential of this PD programme, it would be more advantageous for teachers to engage as a team. According to them, it is better for these teachers to either teach the same course or share a similar background.

Lydia and Andrew highlighted that for this PD programme to effectively support others, the teachers themselves also need motivation and the right attitude. Lydia pointed out that if teachers recognise the challenges faced by students, they should actively seek solutions and, consequently, be willing to participate in PD. Andrew stressed that promoting a SoC in BL requires teachers to be 'open'. Not all colleagues might be willing: 'If they are not open, it will not work.'

Discussion

The present study sought to assess the viability of a professional development (PD) programme to support university teachers in promoting a sense of community (SoC) in blended learning (BL). By synthesising findings on its added value, clarity, compatibility, and tolerance, we provide recommendations for future teacher support in these areas.

Theoretical foundations underpinning practice

The findings show that establishing a solid foundation based on BL and SoC theories is necessary to dispel teachers' misconceptions, particularly regarding the limited scope of BL as merely 'online tool usage.' During the PD programme, we highlighted the distinct characteristics of both online and face-to-face learning. Teachers reported that the theoretical explanation guided them to recognise the necessity of a thoughtful design process integrating these two modes, enriching learning experiences, and reinforcing social connectedness among students (Garrison and Vaughan 2011). While affirming the vital role of hands-on strategies in BL PD (Philipsen *et al.* 2019), this study also reveals a specific expectation from university academics: they seek a strong rationale behind teaching practices, for confidence and validation. Consequently, BL PD initiatives tailored for university teachers should be firmly rooted in BL theories.

At the study's outset, teachers reported their previous unfamiliarity with the concept of SoC in BL, given the absence of prior training or support in this domain (Pei *et al.*, 2023). However, their

participation in the PD significantly raised awareness about fostering social connectedness in BL contexts. Our study introduces the IGOF model, expanding on Garrison and Vaughan (2011)'s social, cognitive, and teaching presence principles. The IGOF model offers a new perspective for conceptualising instructional strategies to promote SoC in BL. Specifically, it entails mapping individual and group learning activities across both online and F2F dimensions. Teachers have reported the practical viability of this model insofar as it distils complex theories into a tangible and visualised structure.

We emphasise that for PD topics such as SoC in BL, where pedagogy and technology are deeply intertwined (Torrise-Steele and Drew 2013), it is crucial to ensure that teachers have ample opportunities to apply new knowledge (Nihuka and Voogt 2012). As suggested by Philipsen *et al.* (2019), PD should incorporate tailored strategies that support teachers in transitioning to BL. The findings from our study provide further insights: first, we recommend integrating the implementation phase as an integral component of the PD programme, incorporating an extended format with multiple sessions over time, allowing teachers to actively engage in learning through design, implementation, discussion and reflection cycles, immersing them in hands-on experience. Second, given the varying levels of digital literacy among teachers (Adekola *et al.* 2017), it is essential to include individual consultations during the implementation phase, particularly for addressing technical difficulties. Third, to create a supportive environment that motivates and encourages teachers to step outside their comfort zones (Philipsen *et al.* 2022), a well-rounded support structure in the form of a multidisciplinary team comprising both educational and technical expertise is desired.

Amplifying sense of community through team-based professional development

This study reveals that when teachers involved in teaching the same course engage in the PD related to course design as a team, they report high effectiveness, echoing earlier findings on the multi-faceted benefits of a team-based approach (Gast *et al.* 2017). Particularly noteworthy is the advantage junior teachers derive from the direct learning experiences shared by their more seasoned colleagues. Encouraging active engagement in group discussions, reflective practices, and collective evaluations of teaching methods, the team-based PD leverages the collective knowledge and skills of the group regarding the promotion of a SoC in BL (Kerin and Murphy 2015). The coherence and relevance of this team-based PD became particularly evident due to the shared goals, backgrounds, and mutual involvement in similar teaching tasks among participating teachers. Thus, the team-based PD provides an excellent opportunity to contextualise the general principles of SoC within teachers' specific domains, which aligns with the recommendations highlighted by Mcleavy *et al.* (2018), emphasising the need for PD tailored to suit specific teaching situations.

Moreover, while teachers highly valued the PD's adaptability to their individual needs and the autonomy it offers, they also expressed a desire to collectively improve BL course development for a more cohesive and interconnected learning experience for students. Therefore, teachers advocated collaborative endeavours, such as participating in PD as a team among all teachers involved in the same courses or programmes, as individual efforts alone may not yield significant impacts on students' learning. They considered that participating in PD as a team not only enhanced their professional learning, but also served as a platform to directly influence improvements in shared courses. This indicates the need for universities to implement a more structured strategy to streamline the BL development across programmes, ensuring consistency and alignment among teachers.

Organisational commitment is imperative

The present study stresses the necessity for organisational commitment for effective professional development (Adekola *et al.* 2017). Our findings outline critical actions for institutions to take:

- **Addressing time constraints:** Teachers' time constraints represent a substantial hurdle in the path of effective professional learning. The most significant concern revolves around the time required for teachers not only to participate in the PD, but also to effectively implement its principles in practice. Teachers wish to achieve higher objectives, yet often find themselves limited by the available time due to their multitude of complex roles and responsibilities at the university (Macphail *et al.* 2019). Institutions should establish a well-structured and balanced work schedule that prioritises allocating ample time for teachers' PD (Macphail *et al.* 2019). The commitment to time allocation for PD should be regarded as an investment in the continuing growth and enhancement of teaching practices, which ultimately benefits both teachers and learners, enhancing overall educational quality (Macphail *et al.* 2019).
- **Raising awareness of in-house expertise:** Our study highlights that there is a lack of awareness among teachers regarding in-house expertise, particularly in terms of technical support for BL. Consistent with Adekola *et al.* (2017), we assert that for long-term support in promoting a SoC in BL, educational institutions must raise awareness among teachers regarding the availability of support resources and encourage their effective use.
- **Adopting a holistic approach to SoC support implementation** In line with (Pei *et al.* 2023), this study advocates a holistic approach to establishing a multifaceted infrastructure for successful SoC support implementation in BL. Such an approach involves individual teacher initiatives, broader programmatic efforts to engage larger teacher groups, and a revamped professional development support structure centred on teachers' daily practice (Keevers *et al.* 2014).

Limitations and recommendations for further research

The small sample size was intentional in order to assess the initial viability of the designed PD programme in depth before contemplating its scalability. However, we recognise that the small sample may limit the generalisability and wider applicability of the study's outcomes. Future work should involve a large cohort of teachers, incorporating longitudinal studies across diverse educational contexts. We also acknowledge the potential for bias due to the author's involvement in developing this PD initiative. To address this, further studies need to engage independent evaluators with no prior involvement in the research to objectively assess both the design and delivery of the PD. Additionally, feedback from a broader and more diverse group of participants from other universities can be collected to ensure a more objective and reliable evaluation. Finally, we recognise the need for further validation of the PD's impact on students. While our current focus has been on the teachers, the next step involves gathering student data to obtain their perspective on the sense of community in blended learning.

Conclusion

Drawing from Philipsen *et al.* (2019)'s framework, this study developed a professional development programme aimed at enhancing university teachers' competences for promoting a sense of community in blended learning. The PD's viability appears to depend on several crucial factors, including establishing a strong theoretical foundation that underpins teaching practice, integrating implementation as part of the professional development programme, fostering a supportive environment with access to educational and technical expertise, extending the duration of the PD, and providing tailored support for individuals' teaching contexts. Additionally, teachers appreciated the team-based approach, particularly when the professional development is embedded in a course development process. This approach is likely to yield a more direct impact on enhancing shared courses, as teachers can collaborate on decision-making and engage in concerted efforts. Given the time constraints faced by university educators, this approach holds the potential to be more widely accepted among teachers.

This study makes several contributions to the professional development field. First, it provides empirical insights by applying Philipsen *et al.* (2019)'s framework within the higher education context and extends it with the IGOF model, offering a theoretical foundation to ensure quality BL. Second, while Philipsen *et al.* (2019) emphasised the need for hands-on PD strategies, our research advances this by offering concrete, actionable recommendations for practical implementation. Third, as universities increasingly adopt digital learning, the strategies identified in this study offer valuable insights for broader PD initiatives aimed at improving educational quality. Lastly, our findings stress that effective PD programmes require a holistic approach, integrating multiple features, multidisciplinary support, and strong organisational commitment. Given these findings, a small-scale evaluation is a crucial step to assess the validity of PD in depth, ensuring a thorough understanding of its impact before broader implementation.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to restrictions e.g. their containing information that could compromise the privacy of research participants.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendices

Appendix A. Questions for the reflection form

Questions marked with (*) will be revisited

- (I) **Prior to the session**
- (II) How would you define blended learning? *
- (III) What is your goal in (re-)designing this course as blended? What do you wish to achieve? *
- (IV) What potential challenges do you anticipate? *
- (V) Are there any additional considerations you would like to express? *
- (VI) **During the session**

Teachers discuss with peers and trainer first, then complete this question

I. What is your goal in (re-)designing this course as blended? What do you wish to achieve? *

After trainers demonstrate activities, strategies, and tools to develop sense of community in BL, teachers discuss with peers and trainers and document their intended items.

- (I) Name a few examples of activities/strategies/tools that you would like to implement in your BL courses to support individual online learning (student-content interaction).
- (II) Name a few examples of activities/strategies/tools that you would like to implement in your BL courses to support group face-to-face learning (teacher – student interaction).
- (III) Name a few examples of activities/strategies/tools that you would like to implement in your BL courses to support group face-to-face learning (student – student interaction).
- (IV) Which other activities/strategies or tools do you want to incorporate into your BL courses?
- (V) **End of the session**
- (VI) How would you define blended learning? (*connect to question I.I*)
- (VII) Does the programme help you achieve your goal of developing blended learning? If not, can you explain why? (*connect to question I.II and II.I*)
- (VIII) Does the programme address the potential challenges you have identified?? If not, can you explain why? (*connect to question I.III and I.IV*)
- (IX) What went well?
- (X) What could be improved?
- (XI) Any other comments?

Appendix B. Interview protocol

Teachers first need to sign the consent form

[Read to interviewee] This interview is part of the research *Professional Development for Sense of Community in Blended Learning*. The interview will last approximately 60 minutes. We will start the interview and recording if you do not object.

- Q1. What aspects of the PD programme did you like the most? Which parts of the programme were the least helpful?
- Q2. After participating in this programme, how would you define BL now? (Added value)
- Q3. Briefly explain Sense of Community. How did this programme help you to promote a sense of community in BL? (Added value)
- Q4. Can you share some examples of the specific strategies, activities, tools or other things you learned to foster a sense of community in BL? (Added value)
- Q5. Were you able to adapt what you learned to fit your own teaching context? How did you make changes? (Compatibility)
- Q6. Did you experience any challenging situations during design and implementation? Did you find the programme helpful in overcoming these challenges? (or didn't help) Why? (Tolerance)
- Q7. How did the programme help you adapt your teaching role to promote a sense of community in your teaching? (Compatibility)
- Q8. We had design sessions coupled with implementation. What do you think of this approach? (Added value)
- Q9. How do you feel about having the support of educational consultant, e-learning specialist in this programme? (Added value)

- Q10. How clear were the roles of the team supporting you during the programme? (Clarity)
- Q11. How well did the programme communicate the purpose of each session to you? (Clarity)
- Q12. What other aspects of the programme were particularly clear or unclear to you? presentations, handouts, activities, planning, tasks, procedure or anything else. (Clarity)
- Q13. To what extent do you feel that this programme addressed your needs?(e.g. some examples mentioned by teachers in the reflection form) (Compatibility)
- Q14. To what extent do you feel that the programme aligned with its original objectives (promoting sense of community in BL)? Can you elaborate on any specific aspects that exceeded, met, or fell short of what you had anticipated? (Tolerance)
- Q15. In your opinion, how easily can the intervention be adjusted to support other teachers in promoting SoC in BL? (Tolerance)
- Q16. What are your overall impressions of this programme? Are you satisfied? Can you share your ideas? (Added value)
- Q17. What do you think of this teacher training programme compared to others that focus on blended learning? Why? (Added value)

Before moving on to the final questions, take a moment to double-check that everything has been covered

Q18. Is there anything else we have not mentioned about the programme that you would like to add?

Q19. Can I still contact you if I have any further questions?

Thank you for your time and we will send you a summary of the interview for your approval.

Appendix C. Codebook

First level code	Second level code	Examples
Added value	Effectiveness	<i>I like the theoretical foundation of the workshop. So there we learn several models and we also got a few practical tools. And those tools are all based on theoretical model. So that gave me confidence in using those tools.</i>
	Efficiency	<i>It (the PD) is super helpful. Super productive.</i>
	Enjoyability	<i>I like it (the PD) because I can use the things I learned in it in designing my next course. The PD exceeds my anticipation.</i>
Clarity	Content and procedure	<i>So definitely the handout and the PowerPoint were clear. The structure was absolutely fine.</i>
	Trainer's role	<i>What was Tom (pseudonym name of eLearning specialist) doing then?</i>
Compatibility	Individual needs	<i>So I could come with my needs and my requests and I got an individual respond to it.</i>
	Application in own context	<i>If the concepts are new, it really helps also to get the implementation part where you actually have to use it ... It helps me also to think of how I would implement it in my own teaching on the spot. Whereas if you wouldn't do that, you might just forget about it.</i>
Tolerance	Alignment with objectives	<i>This (PD) approach is a great way to initiate the learning of teaching teams ... to have them make the first steps and evaluate these. It's not by definition that the content of this course results in community ... at the student side ... it is also a great to find out how to increase the student community thing, but not by definition. But I think it is a very good goal to put it on and have teams work on it.</i>
	Overcoming challenges	<i>I think it was very valuable to get some initial input. So even though it's not fully implemented right at the beginning, to have at least awareness and a bit of methods to do it maybe in the future.</i>
	Adaptability for other teachers	<i>It was very nice that we are (teaching) in the same module and we anyways had to make sure that everything aligns. But that's harder if the teachers are from different courses, different programs.</i>
Challenges		<i>Time is always challenging</i>
Teamwork		<i>I think the sessions were perhaps most fruitful ... for being a team (of) a whole module so that you can also connect what you know from each other (with) what you are doing. It is really helpful for teacher professionalization, for the quality of the education.</i>
Wishes		<i>I mentioned that in my feedback ... that next time maybe you can make use of an example course throughout the whole workshop.</i>

(Continued)

First level code	Second level code	Examples
Teacher's role		<i>I'm more adaptable for others. Might be difficult for other colleagues (to be open), I've been discussing more or less the same topic with someone else from another faculty, and this person has had ten years of experience with teaching . . . it was difficult for him to make a change . . .</i>
