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Mediation activities in problem-based learning in English language teacher education

This article presents the findings of a qualitative study investigating the use of mediation activities and strategies within an English teacher education course that implemented problem-based learning (PBL). Working collaboratively in teams, pre-service teachers engaged in solving realistic problems situated in the context of teaching English as a foreign language (EFL). Data were collected through individual semi-structured interviews and analyzed using the mediation descriptors defined in the *CEFR Companion Volume* (Council of Europe, 2020). The results indicate that core components of the PBL methodology, namely, individual engagement with background literature and collaborative team discussions, fostered the use of mediation activities and strategies across both cognitive and social dimensions. Among these, activities classified under the “mediating concepts” category, which involves facilitating others’ access to knowledge and conceptual understanding, emerged as the most frequently employed. Participants also reported several perceived benefits of the PBL approach, many of which were closely associated with the mediation practices they enacted. By underscoring the strong connections between PBL and mediation in English teacher education, the study advocates for the incorporation of mediation-oriented practices in pre-service teacher training and emphasizes the importance of developing mediation skills in EFL instruction.



Keywords: mediation activities, problem-based learning, PBL, L2 teacher education, CEFR

Słowa kluczowe: działania mediacyjne, podejście problemowe, PBL, kształcenie nauczycieli języka obcego, ESOKJ

1. Introduction

Contemporary foreign language (L2) teacher education faces a multitude of demands, particularly the imperative to equip pre-service teachers with the competencies required to navigate an increasingly dynamic educational landscape. More crucially, it must empower them to prepare their future learners for the complex challenges of today's world. In an era that values adaptability, the "participate-and-learn" approach, grounded in socio-cultural theory, has emerged as a vital pedagogical model (Díaz Maggioli, 2023). This sociocultural orientation offers future teachers rich opportunities to engage in meaningful social interactions with both teacher educators and peers. Through such interactions, cognition is stimulated and knowledge is internalized via mediation processes that foster self-regulation (Díaz Maggioli, 2023; Jiménez Raya, 2024; Johnson *et al.*, 2025).

Mediation has gained prominence in contemporary L2 education, reflecting a growing awareness of the nuanced nature of language use in multicultural contexts. Alongside reception, production, and interaction, mediation is now recognized as a fundamental dimension of language use (Janowska, Plak, 2021). Recent publications have provided comprehensive frameworks for describing mediation competence, including detailed scales for tracking its development in language learning (Coste, Cavalli, 2015; North, Piccardo, 2016). These contributions have significantly enhanced teachers' understanding of the role of mediation in education (Kucharczyk, 2020).

While earlier conceptualizations of mediation, such as those in the first edition of the *Common European Framework of Reference for Languages* (CEFR) (Council of Europe, 2001), focused primarily on cross-linguistic and cross-cultural activities, the updated *Common European Framework of Reference for Languages. Companion Volume* (CEFR CV) (Council of Europe, 2020) presents a more expansive view. It encompasses inter- and intralingual mediation, social interaction, and engagement with instructional materials, and categorizes mediation as text-based, concept-based, and communication-based.

Building on these evolving perspectives, the present study investigates how pre-service teachers of English draw on mediating activities and

strategies within a teacher education course. By considering how mediation intersects with problem-based learning (PBL), the study seeks to shed light on how mediating activities function in problem-solving contexts, and what this reveals about the pedagogical potential of PBL for developing mediation competence. It thus aims to extend current understandings of the mediation-PBL interface, offering insights that go beyond confirming existing descriptions of mediation in the CEFR CV.

2. Literature review

2.1. The notion of mediation in language learning and teaching

While the term “mediation” carries various meanings and connotations depending on the context, it generally refers to the role of a third-party facilitator in resolving conflicts or addressing problematic situations (Janowska, Plak, 2021). According to the Merriam-Webster Dictionary (2025), mediation is defined as “intervention between conflicting parties to promote reconciliation, settlement, or compromise; indirect conveyance or communication through an intermediary; transmission by an intermediate mechanism or agency”.

In the field of education, the concept of mediation is rooted in Vygotsky’s sociocultural theory, which posits that human cognitive development occurs through mediated interaction using psychological tools. These tools support the internalization of knowledge and the advancement of higher mental processes. Educational mediation typically involves the teacher, as the more knowledgeable individual, guiding learners in understanding and acquiring new knowledge, as well as supporting their overall development. However, mediation is not limited to teacher-student interactions; it can also occur among peers, often facilitated by instructional materials, or through interaction between learners and texts (Janowska, Plak, 2021; Kucharczyk, 2020). Mediation can thus be external, taking place through social interaction among individuals engaged in a shared activity, or internal, occurring through self-regulation and reflection (Johnson, Golombek, 2016; Johnson *et al.*, 2025). This dual nature of mediation highlights the interdependence between individual and collective processes, as well as between cognitive and social dimensions (Piccardo, 2023).

In the original edition of *Common European Framework of Reference for Languages: Learning, Teaching, Assessment* (Council of Europe, 2001), mediation was primarily associated with translation, although the two concepts only partially overlap (Janowska, 2024; Janowska, Plak, 2021). More recent

interpretations have expanded the notion of mediation to encompass the construction of meaning and facilitation of communication. This broader perspective emphasizes mediation as a tool for supporting plurilingual and pluricultural interaction (Candelier *et al.*, 2012; Piccardo, 2023) and for fostering learners' personal development within their communities (Coste, Cavalli, 2015). It highlights the social and cultural dimensions of language use and the learner's active role in communication. North and Piccardo (2016) further enriched the concept by identifying its linguistic, cultural, social, and pedagogical dimensions. Their work laid the foundation for the development of descriptors for mediation activities, which are categorized into relational mediation, focused on creating cooperative social environments, and cognitive mediation, centered on facilitating access to knowledge and understanding.

The revised *Common European Framework of Reference for Languages. Companion Volume* (Council of Europe, 2020) builds on these earlier frameworks, offering the most comprehensive and systematic account of mediation to date. It emphasizes the active role of language users in shaping and conveying meaning across modalities and languages. Mediation is presented as a dynamic process involving the facilitation of communication and learning, the co-construction of meaning, and the effective transmission of ideas. The CEFR CV outlines three categories of mediation activities: mediating a text, mediating concepts (subdivided into collaborating in a group and leading group work), and mediating communication. It also identifies two sets of strategies that support these activities: strategies to explain a new concept and strategies to simplify a text (Council of Europe, 2020).

Mediation skills can be cultivated through diverse instructional practices, including translation tasks, text summary, cross-linguistic comparisons, collaborative decision-making, role-play, simulations, and group projects (Janowska, Plak, 2021; Kucharczyk, 2020). One particularly effective pedagogical approach for fostering mediation is problem-based learning, which encourages learners to engage in meaningful dialogue, negotiate understanding, and collaboratively solve complex issues.

2.2. Mediation in problem-based learning

Problem-based learning (PBL) is a student-centered, inquiry-driven instructional approach in which learners actively engage with complex, real-world problems. Rather than seeking a single correct solution, students explore diverse perspectives and develop multiple possible responses. This process fosters the integration of disciplinary knowledge, learning strategies, and self-regulation skills, enabling learners to gain deeper insights into the dy-

dynamic relationship between theory and practice (Barrett, Moore, 2011; Han, 2025; Hmelo-Silver, 2004).

The implementation of PBL typically follows a structured sequence of steps, each requiring the use of mediation activities to support learning and collaboration. These steps include:

- 1) Problem scenario: The process begins with the presentation of an “ill-structured” problem, which is open-ended and lacking a single solution. From the very beginning, students are organized into groups and introduced to the scenario collectively.
- 2) Identifying facts: Collaborative inquiry begins as students examine the problem and identify its key elements.
- 3) Generating hypotheses: Based on the identified facts and shared prior knowledge, students propose initial hypotheses.
- 4) Identifying knowledge gaps: Learners articulate and write down the learning issues they need to investigate further. This typically concludes the first group session (tutorial).
- 5) Self-directed learning: Students independently seek out relevant background reading sources to address the identified learning issues.
- 6) Applying new knowledge: In subsequent tutorials, students synthesize their findings and collaboratively work toward solving the problem.
- 7) Evaluation: The group assesses the gathered information and makes informed decisions.
- 8) Reflection: Students revisit the learning issues and reflect on their learning process and outcomes (Lu *et al.*, 2014; Han, 2025; Hmelo-Silver, 2004).

Throughout this process, the facilitator (or tutor) plays a crucial mediating role. Rather than offering direct solutions, the facilitator guides learners through the complexities of the problem, encouraging collaborative problem-solving, critical thinking, and increasing autonomy. By prompting discussion and scaffolding the learning experience, the facilitator helps shape students’ reasoning and create a supportive environment for shared knowledge construction (Hmelo-Silver, Burrows, 2008; Hmelo-Silver *et al.*, 2019). Significant social and cognitive mediation also occurs during peer collaboration in PBL tutorials. Tan and Tee (2021) identified six phases of interaction that contribute to social knowledge building: a) sharing and comparing information, b) exploration of the hypothesis or opinions, c) discovery and exploration of dissonance or inconsistency among ideas, concepts or statements, d) negotiation of meaning/co-construction of knowledge, e) testing and modification of a proposed synthesis or co-construction, f) agreement statement(s)/applications of

newly constructed meaning. These phases illustrate the mediation of concepts and ideas in defining a problem and seeking ways of solving it.

2.3. Mediation and PBL in L2 teacher education

Mediation is a foundational concept in learning to teach, and its significance is well established in L2 teacher education literature. Drawing on Vygotskian sociocultural theory, scholars have emphasized the connection between mediation processes and teacher cognition (Díaz Maggioli, 2023; Johnson, Golombek, 2016; Martínez Agudo, 2024). This mediation-oriented perspective informs the pedagogical design of L2 teacher education, shaping both the interactions between teacher educators and trainees, and the nature of instructional activities. Through intentional, carefully structured guidance, teacher educators provide trainees with psychological tools that help them overcome misconceptions, and effectively conceptualize academic knowledge (Johnson, Golombek, 2016).

A particularly salient form of mediation in teacher education is “responsive mediation”, which involves expert intervention, typically by a teacher educator or mentor, to elicit cognitive engagement and abstract reasoning from trainees. This is achieved through activities that incorporate mediational artifacts such as language use, physical objects, video recordings, academic concepts, and social interactions (Johnson, Golombek, 2016; Johnson *et al.*, 2025). Techniques like microteaching, especially when paired with critical reflection, and structured problem-solving tasks foster cognitive mediation, by supporting the internalization of pedagogical and theoretical concepts. Johnson and Golombek (2016) illustrate this approach through a teacher training project in which small teams of student teachers collaboratively designed and taught a lesson in a real English classroom. The process, which encompassed lesson planning, revision, microteaching, and reflective dialogue, created “varied and multiple structured mediational spaces” (p. 92). Dialogic interactions with peers and the teacher educator enabled student teachers to articulate and refine their ideas, deepen their understanding of lesson content and pedagogy, and enhance their professional competence. Peer-to-peer mediation also plays a vital role in teacher development. As Díaz Maggioli (2023) notes, collaborative engagement among student teachers who are at similar levels of conceptual development provides opportunities for shared inquiry and mutual growth.

It can thus be seen that the PBL approach in teacher education aligns closely with the principles of sociocultural theory. Both are grounded in constructivist paradigms and emphasize the role of social and cognitive mediation in fostering professional expertise and autonomy (Martínez Agudo,

2024; Mishan, 2011). As such, PBL is particularly well-suited to professional training programs in higher education, including teacher education, due to its emphasis on authentic, real-world challenges. In PBL-based teacher education, pre-service teachers work collaboratively in teams under the guidance of a teacher educator, who acts as a tutor. They are presented with realistic, ill-structured problems centered on teaching-related issues. This instructional model promotes inquiry, reflection, and self-regulation, while also providing opportunities to develop practical teaching skills and exercise professional judgment (Filipenko *et al.*, 2016).

Research highlights a wide range of benefits associated with PBL in teacher training, many of which are closely linked to mediation processes. These include the development of interpersonal communication, teamwork and management skills, inquiry and conflict-resolution strategies, textual analysis and synthesis, and presentation abilities. Additionally, student teachers gain deeper knowledge of teaching practices, refine their instructional techniques, and engage in critical reflection. The use of metacognitive strategies further supports self-regulation and autonomy (Amerstorfer, 2020; Mishan, 2011; Muñoz Campos, 2017). Empirical studies confirm that PBL-based teacher education enhances conceptual understanding, interpersonal and pedagogical skills, and learner engagement (Erdogan, Senemoglu, 2017; Hmelo-Silver *et al.*, 2009; Wang, 2021). These findings underscore the value of mediation as a central mechanism in preparing reflective, competent, and autonomous educators.

In aligning the CEFR CV conceptualization of mediation with sociocultural theory, the present study positions mediation as both a socially distributed activity and a pedagogically structured competence. By analyzing preservice teachers' mediating actions in a PBL environment, the study seeks to illuminate how these frameworks can mutually inform one another and how the findings may contribute to refining theoretical models of mediation in L2 teacher education.

3. The study

3.1. Rationale for the study and research questions

This study explores how pre-service teachers of English employed mediating activities and strategies within the context of a teacher education course. It also examines the relationship between mediation and problem-based learning (PBL). Although existing literature highlights the benefits of PBL for developing teacher competencies (Muñoz Campos, 2017; Erdogan,

Senemoglu, 2017; Wang, 2021), the intersection between PBL and mediation, particularly in the context of L2 teacher education, remains underexplored. Addressing this gap, the present study elucidates how mediating activities function as a mechanism through which learning and professional development are co-constructed within PBL environments. In doing so, it offers new insights into the dynamic interplay between mediation and PBL, highlighting how mediation not only supports problem-solving processes, but also shapes the development of L2 teacher competencies in context. Specifically, the following research questions were posed:

RQ1: What mediation activities and strategies did the participants employ during the PBL cycle?

RQ2: What mediation-related benefits of the PBL approach did they perceive as significant in their training?

3.2. Participants and context

A total of 23 second- and third-year pre-service English teachers from the Faculty of English at Adam Mickiewicz University, all demonstrating B2+/C1 proficiency in the language, participated in the study. The research was set in the context of the academic course “Teaching English as a foreign language”, in which the PBL approach was implemented. Participants were recruited through convenience sampling, as the researcher was also the course instructor. Participation in the study was voluntary. In line with PBL principles (outlined in section 2.2), the students worked in teams of 4–6, following the typical steps: after the presentation of the problem situation, the teams brainstormed initial ideas and delineated specific learning issues to be further explored through individual study and collaborative activities during team sessions in and outside class. Finally, the outcomes of the teamwork were presented in class, followed by self-, peer-, and teacher assessment (Barrett, Moore, 2011). A PBL sequence in the courses typically took from three to five weeks. As an illustration, one problem situation (for the third year) is included in Appendix 1. At the time of the study, each of the participants had completed two PBL sequences within a single semester. The participants were thus well familiarized with the concept and practice of PBL.

3.3. Data collection and analysis

Before the study, ethical approval was obtained from the Ethics Committee for Research Involving Human Participants at Adam Mickiewicz Univer-

sity (Resolution No. 9/2022/2023, 31 March 2023), and the participants signed informed consent. The data were collected through individual semi-structured interviews, guided by eight core questions (Appendix 2) that were flexibly adapted and supplemented in response to participants' answers (Wilczyńska, Michońska-Stadnik, 2010). The interviews, conducted online via Microsoft Teams, lasted between 53 and 68 minutes. The interview recordings underwent automatic transcription, followed by manual verification and correction, and were saved as separate files. Polish was used as the language of communication throughout, with the illustrative quotations included in the following sections of this report translated into English.

Qualitative content analysis was applied to the transcribed data (Saldaña, 2016), with the use of Atlas.ti ver. 25. The categories and codes that were sought in relation to Research question 1 were based on the mediation activities and strategies as defined in the CEFR CV (Council of Europe, 2020). The analysis addressing Research question 2 uncovered the following codes: "collaboration skills", "reflection", "practical knowledge", "academic skills" and "self-regulation".

4. Results

4.1. Mediation activities and strategies used

The qualitative analysis revealed that in the process of completing the PBL sequences the participants acknowledged using 9 out of the 16 types of mediation activities from the CEFR CV typology. The activities discussed and the frequency of mentioning them in the interviews (the numbers of quotations) are presented in Figure 1.

As can be seen in Figure 1, the most frequently used activities belonged to the "mediating concepts" category (344 quotes in total). *Collaborating to construct meaning*, the most frequent activity, covered co-developing ideas in in-class and out-of-class tutorials in the process of arriving at a solution to the problem. The students described various stages of collaborating, e.g., "We first met to define the core of the problem" (Participant 13), "Our team generated so many specific ideas that it was impossible to use them all, and the selection was a challenge" (Participant 5). Referring to background reading was often mentioned, as in this quote, "Marek found two articles with practical exercises which were a source of inspiration for our work" (Participant 19). The code *facilitating collaborative interaction with peers* comprised quotes related to organizing work in teams, setting up meetings, and balancing contributions to make collaboration

successful. The following quotes illustrate it: “Reading others’ summaries [of the materials] helped us save a lot time, which we could use on productive discussions” (Participant 5), and “There was a temptation to just divide tasks and do them individually, but the format of PBL made us do everything together” (Participant 20).

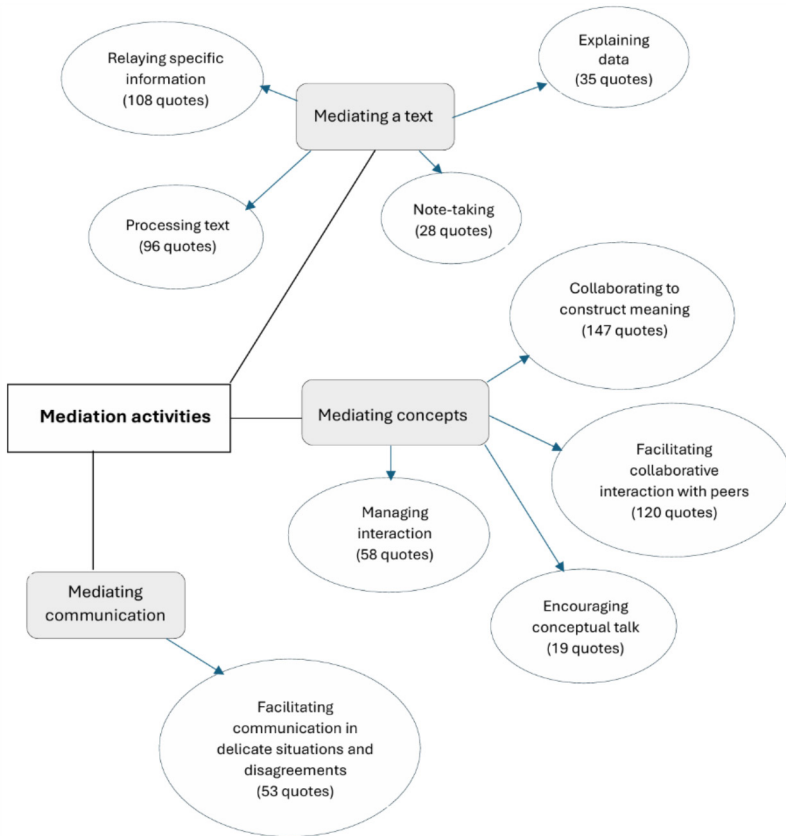


Figure 1. The mediation activities acknowledged to be used by the participants.

Source: own work.

Managing interaction means orchestrating communication during meetings, and was closely connected to the roles that participants were assigned for a PBL sequence, e.g. a chairperson, a time-keeper, a speaker, a scribe. The quotations showed how the division of tasks facilitated smooth interactions: “While everybody wanted to share their comments, the speaker summed up the most important points” (Participant 1); “Being a scribe, I documented what everybody had said, which gave us

an orientation for future discussions” (Participant 11), but also indicated that in some situations the roles were fluid: “Sometimes the functions were spontaneously taken up in specific tasks” (Participant 1); “We gave the ‘speaker’ role to two people to make it easier” (Participant 8). *Encouraging conceptual talk*, which denoted asking additional questions to stimulate a more precise response, was less frequently used. The following quote illustrates how the students tried to get the discussions on the right track: “At one point, we were completely lost, and we had to formulate new questions which were very specific” (Participant 21). In other situations, the activity was undertaken when discussions were too general and lacked conceptual value, e.g., “We already had some ideas about how to teach, but what we read about gave us richer knowledge that was closely linked to the topic” (Participant 3).

A total of 267 quotations belonged to the category of “mediating a text”, which comprised activities performed mainly during the individual research stage in the PBL sequence, when students acquaint themselves with background reading materials for subsequent group discussions. Searching for relevant materials, scrolling through sources and identifying adequate content to share with others were the primary activities within the *relaying specific information* code, as illustrated by these quotes: “I first read through all articles and then focused on the learning issues for the problem” (Participant 12); “I used key expressions to look through articles found on Jstor and Researchgate” (Participant 18); “Deciding how much the sources would be useful for our work was the next step” (Participant 3). *Processing text* embraced reading the sources, making sense of them, and summarizing them in a table that was next uploaded by each student to a shared folder. The table contained an obligatory section for justifying the relevance of the text for the problem. One student said, “The brief synopsis had to be properly structured and understandable to others” (Participant 20), and another added, “If the articles were properly selected, then writing how it is linked to our work was easy” (Participant 14). Another code, *explaining data*, involved inferring information from research data found in scientific texts, often in the form of tables and diagrams, and rephrasing it in the table or during oral interactions, as aptly illustrated in this quote, “I analyzed the numbers and drew conclusions to share with the group” (Participant 23). The final code in this category, *note-taking*, involved noting down key information to further develop into the summaries. Usually, digital text annotating functions, or bullet points in digital or pen-an-paper formats were used: “I noted down the key information on a piece of paper so that I wouldn’t miss anything for later work” (Participant 18); “I color-coded different types of information and added notes to remember what I meant” (Participant 4).

Finally, in the category of “mediating communication” (53 quotations), there were references to only one type of activity, *facilitating communication in delicate situations or disagreements*. Such situations concerned problems with meeting deadlines, lower engagement or poor performance in the assigned role, and required direct communication. Most students pointed to the challenges they faced: “We had to discipline the person who didn’t do their tasks properly - I would call it a confrontation” (Participant 7); “I wish we had talked to him earlier, because a lot of time was wasted” (Participant 8), but also to the positive outcomes of the interventions: “Teamwork creates conflicts, but you have to openly address the problems” (Participant 5).

Following the CEFR CV scales, the analysis also targeted the specific strategies used while performing the mediation activities, revealing two of them (Figure 2).

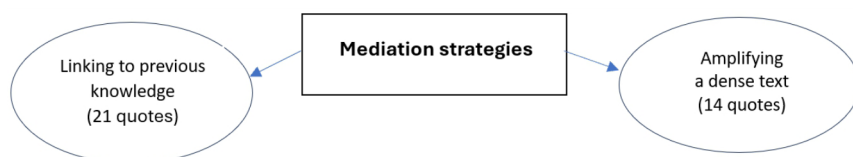


Figure 2. The mediation strategies used by the participants.

Source: own work.

Linking to previous knowledge (e.g., from pedagogy and psychology courses and from life experience) was a useful strategy in selecting the literature for background reading, in justifying ideas in group discussions, and in designing the outcomes of group work. For example, the students said, “My previous knowledge was mainly theoretical, and here I linked it to practical solutions” (Participant 12); “I integrated the knowledge I had gained when participating in Camp America” (Participant 10). The strategy of *amplifying a dense text* was used when processing difficult, scholarly texts. The students recalled paraphrasing specialist terminology and explaining concepts in plain language, both in making summaries and in interactions. However, one student also admitted to rejecting a text because of its density and thus its hermeticism.

4.2. The perceived benefits of PBL for teacher training

The analysis revealed five codes related to benefits of PBL the participants perceived (Figure 3).

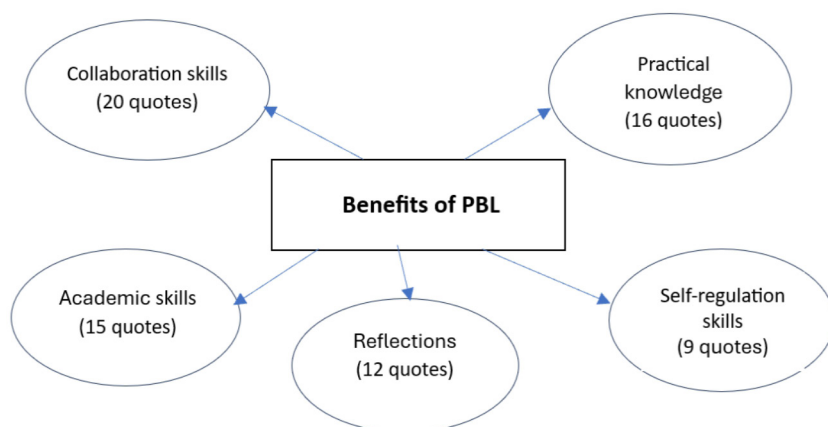


Figure 3. The perceived benefits of participating in PBL in L2 teacher education.

Source: own work.

Most quotations highlighted the developed *collaboration skills*, which included effective communication in groups, solving problems, and doing tasks together, as seen in the following examples: “I learned how to convey information clearly and listen to others” (Participant 10); “We had to reconcile different ideas and work out a common solution” (Participant 22); “My greatest gain was actually working together with others. I have always avoided group work, and here I had no choice” (Participant 11). Some students also pointed out that collaboration is necessary in various areas of professional activity. The second most frequently mentioned benefit was gaining *practical knowledge* connected with teaching English. The students gave numerous examples of how the “theoretical” knowledge from reading and class discussions was enriched by knowledge about its possible applications. Some respondents even said they had already used their group ideas in the teaching practicum at school (e.g., “I actually had a chance to teach a grammar lesson with the materials we created as a group” (Participant 7)). Another benefit was the stimulation of *reflections*, particularly about L2 learning and teaching, and one’s own practice. Background reading, group discussions, facilitation from the tutor and feedback sessions were listed as evoking reflection. One student explained how the PBL experience changed her thinking about learner autonomy: “A few weeks ago I would have said that the teacher has a leading role in the classroom, but now it is clear to me that learners have to manage their own learning” (Participant 13). A further benefit discussed by the students concerned the development of a range of *academic skills*, such as working with specialist literature, note-taking, using educational software, and preparing and delivering presentations, as

illustrated by this quote: “Using the databases, summarizing the articles and putting it all together was demanding, but I know that it will be useful in my further studies” (Participant 5). The final benefit was the development of *self-regulation skills*, such as time management, organization skills, and the use of learning strategies. One student said, “Organizing my own learning was the main competence I developed. I mean creating folders with materials, updating a calendar and so on. I think all of us have transferred these skills to other classes as well” (Participant 21).

5. Discussion

With reference to the first research question, the participants reported using a high number and a great variety of the mediation activities and strategies described in the CEFR CV (Council of Europe, 2020) in the PBL-based teacher education course. As revealed by the analysis, participation in the course mainly stimulated the use of activities within the “mediating concepts” category, which is congruent with the main tenets of PBL as an inquiry-based constructivist learning approach (Hmelo-Silver, Barrows, 2008; Tan, Tee, 2021). Numerous quotations documented how the students collaborated in teams to construct meaning in the process of making sense of the core of the problem and, once the learning issues were defined, in working out solutions to the problems. The participants’ high proficiency in English likely facilitated their ability to engage in concept-based mediation, as they could focus on meaning rather than linguistic form. The students described in detail how ideas were compared and generated through collaborative effort, how they convinced one another and selected the best solutions. Importantly, the meaning-construction in the team interactions was scaffolded by the background literature and feedback from the tutor. This is in line with the suggestions about the role of peer-to-peer mediation by Johnson, Golombek (2016) and Díaz Maggioli (2023), and it was evident in the data that the process of shared inquiry was very intensive. It is also worth noting that examples of stimulating “conceptual talk” through asking additional questions and prompting in constructing new concepts were reported.

The remaining activities in the “mediating concepts” category encompassed other aspects of interactive activity, crucial for the completion of the tasks. Since PBL is strongly collaboration-oriented and most activity is conducted through student interactions in small teams (Barrett, Moore, 2011; Lu *et al.*, 2014), activities to facilitate and manage interaction are crucial in successful completion of a PBL sequence, and appeared to be frequently used by the participants. Their prior exposure to PBL may explain the ease

with which they adopted collaborative mediation strategies, suggesting that mediation competence may be partly shaped by earlier pedagogical experiences. The division of functions among the different roles performed by team members, crucial in PBL, supports facilitation and management of interaction: the chairperson oversees smooth collaboration, the scribe takes minutes and thus documents what has been achieved and what to do next, and the speaker reports on the group's progress. This supported peer mediation activity, enabling the process of communication, negotiation, finding solutions to problems, and promoting student responsibility.

The participants also discussed their use of a range of mediation activities in the "mediating text" category. Working with domain-specific literature is a vital step in the PBL sequence as part of preparation for team tutorials in which students work out the solution to the problem (Amerstorfer, 2020; Barrett, Moore, 2011; Hmelo-Silver *et al.*, 2019). Within the present study, the students' task was to select a minimum of four academic sources, summarize them in the table provided, justify their relevance to the problem, and share the summaries with the group for subsequent discussions. The data showed that this task was taken very seriously, and they engaged in a high number of specific activities concerning relaying specific information, text processing, note-taking, and explaining data. In light of sociocultural theory, working with academic sources is a vital way of making sense of "expert" knowledge, and teacher education should enable pre-service teachers "to enact theoretically and pedagogically sound instructional practices and thus develop greater levels of teacher/ teaching expertise" (Johnson *et al.*, 2025, p. 6). The participants of the present study gave numerous examples of how they avoided the temptation of relying on their experiential knowledge, enriching their cognitions about teaching through searching for relevant sources and processing their content. In this way, the mediation through working with texts provided a scaffolding in constructing their knowledge representations, and understanding of the relevant issues underlying the problems they solved.

Within the CEFR CV model of mediation, the intensive group collaboration also necessitated the use of activities for facilitating communication in delicate situations and disagreements. There were multiple examples of problematic issues related to performing tasks, in which the students had to act as mediators to resolve problems and get the tasks completed. This is a slightly different, but equally important dimension of language mediation, which the PBL design naturally embraces.

Finally, the execution of the mediation activities was accompanied by the use of certain mediation strategies - two out of the four strategies from the CEFR CV. The students described how they referred to and made use

of the previous knowledge they possessed, by activating what they already knew, making comparisons, and justifying their selection of ideas. Making use of previous knowledge is an essential part of learning and of mediation processes (Janowska, Plak, 2021; North, Piccardo, 2016). Using the other strategy, amplifying a dense text, the students clarified texts that were difficult to understand by paraphrasing them so that the texts became more accessible to others. In this way, they acted as mediators between the texts and their teammates.

Regarding research question 2, the students provided a number of benefits of participating in PBL, all of which appeared to be related to the mediation activities that PBL stimulated. Practising collaboration skills, which are a foundation of social mediation, was the most frequently listed, followed by gaining practical knowledge, which is at the core of PBL methodology. PBL bridges theoretical and practical knowledge through mediation, enabling pre-service teachers to connect academic concepts with the practical dimension of teaching. The remaining benefits perceived, namely the development of a range of academic skills, reflectivity, and self-regulation, are also naturally connected to their mediation practice within the PBL sequence. These benefits confirm those found in previous research (Caswell, 2017; Erdogan, Senemoglu, 2017; Hmelo-Silver et al., 2009; Muñoz Campos, 2017; Wang, 2021). Previous research, however, did not consider the advantages of PBL in teacher education in terms of the mediation activities that the students are engaged in. The present analysis demonstrates strong intersections between mediation in the context of PBL and the benefits that it provides to pre-service teachers in the process of the development of their professional skills and knowledge.

The findings of the study underscore two key practical implications for L2 teacher education. First, they highlight the importance of deliberately integrating mediation-oriented tasks into teacher education courses to support pre-service teachers in developing their own mediation skills that are essential for facilitating learning, fostering collaboration, and navigating complex classroom interactions. By engaging in structured activities, such as collaborative problem-solving, microteaching with reflection, and dialogic exchanges, trainees not only internalize academic concepts, but also learn to mediate meaning effectively. Second, as pre-service teachers become more aware of the role and value of mediation in their own learning, they are better equipped to cultivate these skills in their future students. This awareness enables them to design learning experiences that promote cognitive and social mediation, thereby fostering deeper understanding, autonomy, and communicative competence in the L2 classroom.

Finally, it must be acknowledged that the small number of participants constitutes a clear limitation of the study. At this stage, however, its value lies in generating data within an action research framework, whose primary aim is to diagnose a problem and apply the findings directly to one's own practice in preparing future L2 teachers. In this sense, the study also serves as an important component of professional self development. Given the limited sample size, the project should be regarded as a pilot study that can inform and support future replications with larger groups of participants.

6. Conclusions

The findings of this study corroborate existing research on the benefits of problem-based learning (PBL), particularly in fostering collaboration and self-regulation skills, reflectivity and practical knowledge among pre-service L2 teachers. However, the distinctive contribution of this research lies in its detailed documentation of the specific activities undertaken by participants and its integration of two key pedagogical constructs: PBL and language mediation. The analysis demonstrates a clear interrelation between these concepts, with participant-generated examples illustrating how engagement in PBL tasks stimulated both social and cognitive forms of mediation. These outcomes support a sociocultural orientation in L2 teacher education, emphasizing the value of active participation in the co-construction of knowledge and the development of conceptual understanding. Although the sample was small and context-specific, the patterns observed here may offer insights for similar teacher education settings where PBL is used to foster mediation competence. The study thus advocates for the intentional inclusion of mediation-oriented tasks within L2 teacher education programs, not only to enhance pre-service teachers' own mediation competencies, but also to prepare them to foster these skills in their future learners.

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Appendix 1: An example of a problem used in the course

MAKING THEM SPEAK: MISSION IMPOSSIBLE?

Your friend Olga, who is a novice teacher, has told you about her experience with conducting speaking activities with a group of high school students.

I would like my students to speak fluently about various things, but speaking activities don't work with this class. For example, I recently asked: "Should sensitive content on the Internet be censored?", expecting a lively discussion, but they didn't really say much. They are 17, and their proficiency is at B2 level, so I find it strange, but there are always problems with this group. What do I do wrong?



Having promised to help Olga, you have thought about her concerns, consulted a few sources, and decided to prepare a mini-guide on how to successfully implement speaking activities in teenage classrooms. To make it more interesting, illustrate it with examples.

Source: own work.

Appendix 2: The semi-structured interview guide

- 1) Jaka jest różnica pomiędzy PBL a tradycyjnymi kursami uniwersyteckimi w zakresie zaangażowania studentów?
- 2) W jaki sposób podejście PBL wpływa na rolę studenta w zdobywaniu wiedzy?
- 3) Jak Pani/Pan ocenia zasadność czytania literatury fachowej w przygotowywaniu się do zadań w cyklu PBL?
- 4) Proszę opisać konkretne czynności w trakcie opracowywania źródeł dla dalszej pracy.
- 5) Jak ocenia Pani/Pan wpływ pracy grupowej na proces uczenia się?
- 6) W jaki sposób wykorzystywaliście Państwo opracowane indywidualnie źródła w trakcie sesji grupowych?
- 7) Proszę podać konkretne przykłady rozwiązań wypracowanych na podstawie omawiania przeczytanych tekstów.
- 8) Jakie umiejętności i kompetencje Pani rozwinęła/Pan rozwinął w procesie project-based learning?

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