

Katja Kranjec

Faculty of Public Administration

University of Ljubljana

Slovenia

katja.kranjec@fu.uni-lj.si

UDK 811.111:378.147

DOI: 10.4312/vestnik.17.277-300

Izvirni znanstveni članek



Damijana Keržič

Faculty of Public Administration, University of Ljubljana

Slovenia

damijana.kerzic@fu.uni-lj.si

STUDENTS' PERCEPTIONS OF PROBLEM-BASED LEARNING IN ESP TEACHING IN HIGHER EDUCATION

ABSTRACT

To address the ever-increasing need for more learner-centred teaching approaches in higher education, a study was conducted to explore students' perceptions of problem-based learning (PBL) in an English for Specific Purposes (ESP) course at the Faculty of Public Administration, University of Ljubljana. This was the first time students experienced this approach in their classes at the faculty. 73 responses to an open-ended question about PBL were analysed, applying text mining techniques conducted in the Orange software tool. First, the most frequent words and phrases expressed in students' responses were determined and visualized using a word cloud. Next, sentiment analysis was carried out to identify the emotional tone behind the responses, further enhanced by an analysis based on Ekman's model to discern dominant emotions. Finally, key themes were aligned with theoretical concepts of PBL and divided into positive and negative categories. More than 95% of students' responses were overwhelmingly positive, expressing feelings of joy and high satisfaction with the new method. Even though students' perceptions may be influenced by various factors, such as the quality of teaching, the rapport between the teacher and the students as well as the students' background, the findings of this study suggest that PBL may be very effective in ESP teaching, particularly in the field of public administration. Learning evolves through solving real-life problems, providing ample opportunities to develop language skills relevant to students' needs and future endeavours.

Keywords: English for Specific Purposes (ESP), problem-based learning (PBL), teamwork, learner-centred teaching, problem-solving skills

IZVLEČEK

MNENJA ŠTUDENTOV O PROBLEMSKEM UČENJU PRI POUČEVANJU ANGLEŠČINE ZA POSEBNE NAMENE V VISOKEM ŠOLSTVU

Zaradi vse večje potrebe v visokem šolstvu po bolj prilagojenih pristopih k poučevanju je bila na Fakulteti za upravo Univerze v Ljubljani pri predmetu angleščina za posebne namene izvedena študija, katere namen je bil raziskati, kako študenti dojemajo problemsko učenje. Ta pristop je bil namreč na fakulteti v prvem letniku prvič uporabljen.

Z uporabo tehnik rudarjenja besedil s programskim orodjem Orange je bilo analiziranih 73 odgovorov na odprto vprašanje o problemskem učenju. Poiskane so bile najpogostejše besede in besedne zveze, ki so vizualizirane z oblakom besed. Z analizo sentimenta je bil določen čustveni ton v odgovorih, ki ji je sledila še analiza prevladujočih čustev, povzetih po Ekmanovem modelu. Glavne teme so bile ob koncu usklajene s teoretskimi zasnovami problemskega učenja in razdeljene v pozitivno in negativno skupino. Več kot 95 % vseh odgovorov je bilo izrazito pozitivnih. Študentje so izrazili občutke veselja in bili z novo metodo poučevanja zelo zadovoljni. Čeprav na mnenja študentov lahko vplivajo različni dejavniki, kot so kakovost poučevanja, odnos med učiteljem in študenti ter predznanje študenta, ugotovitve pričujoče študije nakazujejo, da je problemsko učenje lahko zelo učinkovito pri poučevanju angleščine za posebne namene, še posebej na področju javne uprave. Učenje se odvija skozi reševanje življenjskih problemov in tako ponuja številne priložnosti, da študentje razvijejo jezikovne veščine, ki ustrezajo njihovim potrebam in ciljem v prihodnosti.

Ključne besede: angleščina za posebne namene, problemsko učenje, skupinsko delo, na učenca osredotočeno poučevanje, veščine reševanja problemov

1 INTRODUCTION

Collaborative and problem-solving skills have become increasingly important to the success of every individual, not only in their personal lives but also in their professional ones. One of the teaching approaches that considers these skills and places the student at the centre of the teaching process is problem-based learning (PBL), first developed in the field of medicine by H.S. Barrows in 1971. Its main principles are based on constructivism, where knowledge is created through active participation and engagement with the environment (Hmelo-Silver, 2004; Savery & Duffy, 1995). Students learn by attempting to solve authentic problems, following a clearly defined process. First, a complex, multi-disciplinary problem is presented to students. This is then followed by a discussion in small groups of five to nine, who use background knowledge to explain the problem and

find possible solutions. Next, students decide how to learn and where to find appropriate resources. When the group reconvenes, the findings are discussed and applied to the problem to test their hypotheses. It is recommended that students return to the problem with new knowledge and repeat the process (Barrows, 1996, 1986). Finally, students assess their learning experience and discuss the abstract knowledge acquired in the process (Hmelo-Silver, 2004).

One of the greatest benefits of PBL lies in its focus on the development of problem-solving, teamwork, and self-directed learning skills, which are critical for a successful career – yet they are generally overlooked by learning centres and institutions that prioritize standardized tests and are averse to change (Barrows, 1996; Savery, 2006). The first step to acquire collaborative and autonomous, self-directed learning skills is metacognitive awareness, which is the ability to identify your own strengths and weaknesses in dealing with problems, and the actions taken to achieve learning goals (Hmelo-Silver, 2004). Tutors or facilitators who guide students by asking open-ended questions and helping them develop higher-order thinking skills are indispensable to this process (Barrows, 1996; Hmelo-Silver, 2004; Schmidt et al., 2011).

The PBL approach is highly suitable for the teaching of English for Specific Purposes (ESP), which is student-centred and prioritizes learners' needs. Learning in PBL evolves through solving authentic problems, which expose learners to field-specific genres. This helps them explore and acquire literacy skills relevant to their study area, which is crucial in ESP (Hyland, 2002). It is specificity, Hyland argues, that helps students develop the skills they need. PBL thus offers an excellent opportunity to engage ESP students in real communicative situations pertinent to their work environments. The PBL focus on authenticity is also in line with one of the main principles of The Common European Framework of Reference for Languages (CEFR) (Council of Europe, 2020), emphasizing the adoption of an action-oriented approach, which places the learner in real situations that encourage meaningful communication and language use.

Project-based learning, which is similar to problem-based learning as it fosters students' autonomy and creativity, also includes the creation of projects, such as presentations, videos or performances. Adding these elements to an ESP course may help students develop not only their language skills, but also their digital and literacy skills, which are essential for success at work (Bell, 2010).

Since the 1990s there have been numerous reviews and meta-analyses conducted on the effectiveness of PBL in higher education, including studies by Albanese and Mitchell (1993) and Vernon and Blake (1993). Strobel and van Barneveld (2009) carried out the first meta-synthesis in the field of PBL, and found that this teaching method has a positive impact on long-term retention, the development of skills as well as teachers' and students' satisfaction. However, most studies focused on the field of medicine. Walker and Leary (2009) conducted the first meta-analysis, which explored the effectiveness of PBL across disciplines. Still, only about one-third of the outcomes analysed were from

non-medical domains. Surprisingly, the results from the field of teacher education and the social sciences were much better in comparison with those in medicine.

One area that seems to be particularly underrepresented in PBL studies in higher education is the field of ESP. While research into PBL in ESP settings has been undertaken in Slovenia, most studies were conducted more than a decade ago. The research started in 2000 with a project led by the Slovene Association of Teachers of Languages for Specific Purposes with the aim of implementing PBL in ESP courses at the tertiary level in Slovenia (Jarc & Zorko, 2013). Students and teachers from all Slovene universities participated in the project, and the results were highly positive. Besides publishing a *Guide to Problem-Based Learning* to help ESP teachers with the new teaching approach (Jurković, 2005), research has been conducted into the differences between more traditional, teacher-led methods and the PBL approach, as well as the roles and competences of teachers in the PBL process (Celinšek & Markič, 2011).

Most recent research, however, has been carried out in Asian countries, including Malaysia, Indonesia, Taiwan, and China. Nevertheless, these studies were excluded from the literature review due to cultural and educational differences, which may influence how PBL is perceived among students. Despite numerous initiatives in Asian countries to promote student-centred approaches, both educators and learners in these cultures tend to favour teacher-centred approaches, with less emphasis on collaboration and teamwork (Fung Ching et al., 2019; Yang & Tan, 2019; del Valle, 2021; Wang & Gopez, 2024). The present study aims to fill the research gap in the field of PBL in ESP in American and European contexts and explore students' perceptions of PBL in an ESP course for students of Public Administration, University of Ljubljana. The following research question was thus posed:

What are students' perceptions of the PBL experience in an ESP course for public administration?

Due to the lack of studies in the field of PBL in ESP in higher education, exploring the perceptions of students and their satisfaction with the method, the literature review is extended to disciplines typically associated with public administration, including the social sciences, law, and administrative courses taken in more technical programmes. Even though language teaching differs greatly from teaching other subjects in public administration, the information on the perceptions of PBL in related disciplines is invaluable as PBL helps to develop students' soft skills and self-directed learning skills, which are transferrable across disciplines. Furthermore, ESP is interdisciplinary in nature and incorporates scenarios and content relevant to the target group, which may help with the design of ESP syllabi for students of public administration.

This paper examines students' perceptions of PBL in an ESP course for administrative sciences. The first section reviews studies exploring students' perceptions of PBL

in ESP settings, as well as disciplines closely related to public administration. The next section presents the methodology and data obtained from the research. After that, the findings of the research are discussed. The paper concludes with implications for teaching and further work required to fill the identified research gaps.

2 LITERATURE REVIEW

Much research into PBL has been conducted in English Language Teaching (ELT), which is not relevant to our present study as it is primarily focused on secondary school students and lacks the interdisciplinary component, which is a key feature of ESP. This literature review focuses on research of perceptions of PBL in disciplines closely related to public administration, including business, law, and political science.

A recent study of PBL carried out in an ESP course at a Lithuanian university (Šliogėrienė et al., 2025) presents the analysis of an online survey with open- and closed-ended questions assessing how PBL was viewed among 212 undergraduate students of technical and creative programmes. It revealed that PBL helped students of both programmes develop their language proficiency, problem-solving and teamwork skills. Technical students, however, were more sceptical and less enthusiastic about PBL, which might be due to the nature of how problems are solved in their disciplines. While this study offers valuable insights into the perceptions of PBL in the field of ESP, little information is provided about the type of ESP course students were enrolled in.

Finding solutions to problems that demand complex analytical and interpersonal skills is integral to business settings and is directly applicable to the field of public administration. Surprisingly, the results of a study on the perceptions of PBL conducted among 303 undergraduate business students in the United States show no significant differences between a traditional, lecture-based teaching and PBL (Garnjost & Brown, 2018). Knowledge gain, the development of autonomous learning as well as critical thinking, teamwork, and problem-solving skills were assessed. The reason for the absence of differences between the two approaches may be the fact that PBL was not part of a curriculum and was carried out in one course only. The authors further suggest that PBL may be more suitable for postgraduate students who already possess basic knowledge in their field of study. Moreover, courses at the postgraduate level are generally more interdisciplinary, which helps learners resolve problems more effectively. The study reveals important information about the perceptions of students who experienced two types of pedagogy. Still, there is no information about the level of experience of the teachers with PBL, which may significantly influence students' perceptions of learning outcomes.

Similar to public administration, the field of law is content rich and information dense, demanding advanced literacy and higher-order thinking skills to tackle the complex, multi-layered problems students may face in their professional work. One part of

a major PBL study conducted at the Erasmus School of Law in Rotterdam (Wijnen et al., 2017), representing one of the few universities outside the medical profession that changed the entire undergraduate study programme to PBL in 2012, focused on the perceptions of the new learning method by the first generation of students enrolled in the programme. Even though PBL was implemented across the entire curriculum and was carefully planned, the analysis of 344 responses to a questionnaire showed moderate results, with almost half of the students reporting studying more regularly and acquiring more knowledge. Additional comments at the end of the survey mentioned similar benefits listed in the previous literature on PBL, including higher motivation and engagement with the course materials. Surprisingly, despite tackling realistic problems the students believed that PBL had not prepared them sufficiently for professional work. This could be ascribed to the fact that the findings in the reporting phase had not been successfully connected to the initial problem. Even though the programme was in its early phase, the results are promising. The dropout rates of students enrolled in the first year decreased by 5%, while the percentage of students enrolled in the second study year increased by more than 20%.

Another field of study that is central to public administration is political science. A study of a partial implementation of PBL in an introductory American politics class at Lycoming College in the United States shows positive results, including more motivated students and the development of higher-order thinking skills, collaboration, and literacy skills (Williamson & Gregory, 2010). The course combined three traditional lecture-based periods, each followed by a PBL assignment lasting two weeks. The activities did not replicate the content of the lecture but complemented it. Students generally enjoyed working in teams and engaging with the problem. Similar to the findings in other studies, some students were disheartened by the lack of time and explanation. Even though the study was relatively small, including just 42 students, it shows a viable path of how to partially implement PBL in the social sciences, where basic knowledge of the field is required to tackle problems more effectively.

The findings of a study exploring students' perceptions of PBL in an electrical engineering programme at a university in Brazil are congruent with the main PBL literature, highlighting students' satisfaction with the method (Camargo Ribeiro, 2008). Despite the fact that this is a technical field, the course under investigation was an administration theory module, which is closely related to the content and objectives students of public administration may need to explore. The course was taken by 38 mostly fifth-year students, lasting one semester. The whole PBL cycle spanned over two weeks and was conducted successively throughout the semester, with the teacher synthesizing the main theories related to the problem at the end of each study process. Even though the study featured a tutorless implementation of PBL, which is similar to the present study, the students believed they had acquired collaborative, self-directed, and problem-solving skills. This is in line with a study conducted by Celinšek and Kostić Bobanović (2022), indicating that

continuous guidance from a tutor may not necessarily contribute to the greater development of problem-solving and collaborative skills.

Nevertheless, some students complained about uncooperative group members, the time-consuming nature of PBL and the lack of in-depth knowledge gained during the research period. Despite a small number of participants, the research presents a type of PBL that may well be suited to students of public administration, as it was carried out in succession throughout the semester, enabling the students to get acquainted with the process and develop interpersonal and self-directed learning skills more effectively.

3 DATA AND METHODOLOGY

3.1 Participants

The study was conducted among 96 first-year students of the first-cycle professional study programme at the Faculty of Public Administration, University of Ljubljana. The learning objectives for this course are in line with the main principles of PBL, including the achievement of goals through teamwork, the ability to use public administration vocabulary in spoken and written discourse, the production of a research report as well as the delivery of formal oral presentations. The average pre-existing language proficiency level of students was B2 according to the CEFR. A single PBL cycle was implemented as part of a blended ESP course spanning two semesters. In addition to face-to-face classes, students completed assignments in the Moodle e-classroom, designed according to the faculty e-classroom implementation guidelines. Students first acquired relevant ESP skills, including delivering presentations, summary writing, and formal email correspondence, helping them prepare for PBL in the spring semester. As they were unfamiliar with PBL, detailed information was provided about the new method as well as guidance at each stage of the process, both during the face-to-face sessions and in the e-classroom. In parallel with PBL, students studied other English course content specified in the syllabus.

3.2 Implementation of PBL

To prepare students for PBL, they were first introduced to the dynamics of teamwork and the roles of group members as well as strategies for conflict resolution. They formed groups of three to six members (average 4.7, median five), divided the roles and signed a contract confirming that they were familiar with their roles and responsibilities in the group. Students chose a real-life problem, such as the shortage of student dormitories or lack of residential parking spaces, and formulated a research question. In order to find solutions to the problem, students searched for literature in relevant online databases and carried out empirical research. To collaborate outside of class, the groups used MS

Teams, where they opened a shared folder that enabled them to co-create documents. The teacher reviewed the assignments weekly and provided guidance on how to improve them and continue with the learning process. Besides submitting a formal report and recording a video presentation of the research in English, students had to conduct and record one of their meetings in the MS Teams environment, demonstrating proficiency in the linguistic features typical of meetings in English. The PBL cycle concluded with the presentation of the proposed solution and a formal assessment of the PBL research process, the report, and video presentation.

To enhance their digital skills the students recorded a video and learned to use various tools and databases, including MS Teams, Zoom, Moodle, Mentimeter, Google Scholar, the Digital Library of the University of Ljubljana (DiKUL), and the National Library Information System (Cobiss).

The PBL weekly steps are illustrated in Table 1. The left-hand column presents the session numbers, the middle column shows the PBL syllabus while the right-hand column shows the tasks the students had to submit within weekly deadlines.

Table 1: PBL weekly steps

Session	PBL syllabus	Products to be submitted by Tuesday evening
1	<ul style="list-style-type: none"> – introducing PBL – getting familiar with forms of assessment – forming groups 	
2	<ul style="list-style-type: none"> – developing teamwork skills – forming groups 	
3	<ul style="list-style-type: none"> – forming groups 	
4	<ul style="list-style-type: none"> – forming groups – dividing roles – signing group contract 	<ol style="list-style-type: none"> 1. groups formed in Moodle 2. roles divided, contracts signed
5	<ul style="list-style-type: none"> – brainstorming PBL problems – writing the PBL problem definition – formulating a research question or hypothesis – writing working questions – distributing tasks 	<ol style="list-style-type: none"> 3. problem defined by the students 4. research question (or hypothesis), working questions completed, tasks distributed
6	<ul style="list-style-type: none"> – searching electronic databases and journal literature to find sources for answers to questions – reading literature 	<ol style="list-style-type: none"> 5. sources listed 6. literature review written
7	<ul style="list-style-type: none"> – developing methodology – carrying out research 	<ol style="list-style-type: none"> 7. methodology section written 8. results section written

Session	PBL syllabus	Products to be submitted by Tuesday evening
8	<ul style="list-style-type: none"> – writing the discussion – writing the abstract, introduction, and conclusion 	9. discussion section completed 10. abstract, introduction, and conclusion completed
9	<ul style="list-style-type: none"> – finishing the report 	submitted PBL report
10	<ul style="list-style-type: none"> – preparing an oral and video presentation 	
11–13	<ul style="list-style-type: none"> – presentations and discussion 	
14	<ul style="list-style-type: none"> – project survey 	
15	<ul style="list-style-type: none"> – end of project evaluation 	respond to open-ended question

3.3 Open-ended question

To capture the students' perceptions without any restriction, an open-ended question, adapted from Shoufan's (2023, p. 38807), was asked to allow students to formulate their feedback in their own words:

What do you think of problem-based learning? Think deeply and write down whatever comes to mind.

The question was made available in the e-classroom at the end of the PBL cycle. Participation was voluntary, with all students consenting to the use of their reflections for research purposes. To ensure the study's validity and trustworthiness, a combination of qualitative and quantitative analytical strategies was employed. First, we conducted text mining to identify dominant words and topics, examining word frequency and co-occurrence. These results provided an empirical overview of the data and informed subsequent interpretation. Next, two researchers independently examined the most frequent words and the words that were most relevant to the context. Afterwards, the underlying meanings were interpreted and grouped into broader conceptual themes. The analytical process was iterative and transparent. We enhanced credibility through independent researcher consensus and by integrating text-mining results with interpretive thematic analysis. Dependability and confirmability were supported by documenting all analytical steps.

3.4 Data analysis

Open-ended questions generate unstructured qualitative data that cannot be analysed efficiently using traditional quantitative or manual methods. Therefore, we employed text mining, which provides researchers with reliable and effective methods for systematically analysing large amounts of text data (Agrawal & Batra, 2013), and opinion mining, which captures broader patterns and tendencies within the data (Baek et al., 2011; Reich et al., 2014). These methods are used in different fields of research to complement qualitative interpretation with quantitative evidence, thereby enhancing analytical rigour and

validity (e.g. Hemmatian & Sohrab, 2019; Koufakou et al., 2016; Gottipati et al., 2018; Ordenes et al., 2014, Filipe et al., 2010, Barbierato et al., 2022). We opted for Orange, an open-source machine learning and data visualization platform (Demšar et al., 2013), which provides users – even those with no programming experience – with a comprehensive toolbox containing various widgets that enable data analysis via visual workflows. In the study, widgets from the Text Mining and Data Toolbox were used to interpret the students' responses.

Finally, the most frequent themes determined through text mining analysis were aligned with theoretical concepts of PBL and divided into positive and negative categories.

Data preparation and preprocessing of text

Apart from a few minor typos, which were corrected to ensure consistency in spelling, no attempt was made to alter the students' sentences and phrases. Only one response was written in Slovenian and translated into English. Before conducting the analysis, the PBL group and the student's gender were added to their responses.

A standard preprocessing procedure was applied to analyse the students' responses. Preprocessing transforms text into individual words or tokens (Nandwani & Verma, 2021) and is a critical stage in data cleaning as the quality of the data has a significant impact on subsequent analytical approaches. In this study, several preprocessing stages were conducted to remove irrelevant information from the students' responses: (1) transformation – converting all text to lowercase; (2) tokenization – dividing sentences into chunks of core units of analysis called tokens, which are often words, but could also be characters or n-grams (Pretnar Žagar, 2024), with the punctuation symbols remaining intact using regex `"\w+"`; (3) normalization – employing lemmatization with the Lemmagen Lemmatizer (an option in Orange) to remove inflectional endings from tokens in order to transform them into base forms (lemmas); and (4) the removal of stop words with a built-in filter and our own list of words: "us", "also", "would", "well", "got", "others", "pbl", "think", "year", "every", and "student", which were assumed not to carry any important meaning. It is important to note, however, that some information necessary for sentiment and emotion analysis may be lost when using the Orange Preprocess Text widget during data preprocessing, such as emoticons.

Frequency analysis of words and main themes

To identify key themes and common phrases in the students' responses, bigrams and collocations of word pairs were identified. A word cloud, which is a visual representation of how frequently words appear in the analysed text, was created displaying the most frequent bigrams (Heimerl et al., 2014). Next, an analysis was carried out to determine the most significant collocations. Collocations are pairs of words (bigrams) that are not

necessarily adjacent and occur together more often than would be expected by chance. Word cloud analysis, further enhanced by collocation bigram analysis, identified the most frequent themes present in the students' responses, which were further aligned with the main theoretical concepts of PBL.

Sentiment analysis and emotion detection

Sentiment analysis was employed to find out how the students felt about the PBL experience, which was further examined by emotion analysis using Twitter Profile widgets. Sentiment analysis, also referred to as opinion mining, is a natural language processing technique that detects the emotional tone of a text and predicts the sentiment of each student's response in the corpus, i.e. positive, negative, or neutral (Nandwani & Verma, 2021). VADER (Valence Aware Dictionary and Sentiment Reasoner) sentiment analysis was used, which is simple to perform and a popular choice for quick sentiment analysis tasks (Elbagir & Yang, 2019). VADER is particularly effective in analysing social media text, for instance tweets and Facebook posts, as it captures the nuances of sentiment in short, informal texts. It also provides multiclass sentiment analysis for each body of text, including a vector of sentiment scores that display the proportion of positive, negative, and neutral sentiments in a text, as well as compound polarities. Positive, negative, and neutral sentiment tones are normalized between 0 and 1, while the compound polarity, which sums up the overall sentiment of the body text, ranges between -1 (the most negative) and +1 (the most positive). The emotion analysis was based on Ekman's model with six emotion categories: anger, disgust, fear, joy, sadness, surprise (Ekman, 1999).

4 RESULTS

Out of 96 students (72 females, 24 males) who took part in PBL, 79 participated in the survey (58 females, 21 males). Six students (five females, one male) opened the questionnaire but did not submit an answer. The final sample for analysis comprised 73 students, with 53 females and 20 males. The basic statistics of the responses show that the average number of words per response was 40 (median 32), with 146 words in the longest response and five in the shortest.

4.1 Results from text mining analysis

First, the responses were analysed to identify the key words used by the students to describe their feelings about PBL. A word cloud was generated to visualize the most frequent bigrams, which were further explored using collocation analysis. Unlike bigrams, which display any sequence of two consecutive words in a text, collocation bigram

Table 2: The most frequent bigrams in the corpus by gender

Male			Female		
Frequency	Weight	Bigram	Frequency	Weight	Bigram
4	0.20	problem project	12	0.23	work group
3	0.15	team work good experience learned lot lot work good work	7	0.13	good experience learned lot
2	0.10	take lot fun experience experience learned	6	0.11	lot new work team
			5	0.09	experienced learned team work

4.1.2 Collocations

Student's T-test was used to assess the significance of collocations. It is often referred to as the T-score and assesses the strength of association between two words by looking at the mean and standard deviation of their joint frequency (Gablasova et al., 2017). Typically, a T-score of two or higher is considered statistically significant. Lower scores may indicate that the words occur together by chance. Table 3 shows the collocation bigrams occurring more than three times in the students' responses.

Table 3: Collocation bigrams

	Collocation bigrams	Score
1	learned lot	2.701
2	work group	2.626
3	good experience	2.589
4	new thing	2.281
5	lot new	2.270
6	team work	2.259
7	experience learned	1.812
8	great experience	1.792
9	group like	1.775
10	good working	1.714

The results for bigrams and collocations are not significantly different, which may be due to the fact that the sentences were not very complex (the students' average language level, according to the CEFR, was B2). The results may differ if the students had a higher level of English proficiency. Nevertheless, the bigram collocations "learned lot", "work group", "good experience", "new thing", "lot new", and "team work" were identified as statistically significant, forming a strong association between the two words.

4.1.3 Sentiment analysis

Sentiment analysis reveals that only one female opinion has a negative compound value of -0.52 (e. g., "I think that the PBL project can be a very interesting and instructive way, but a good team is absolutely necessary for this. Unfortunately, i don't have the best experience with this work due to non-team cooperation. In addition, i also learned a lot about myself, how i work in a team and i learned new theoretical things based on the topic we chose."). Four students received a neutral rating of 0.0, while the rest were all greater than 0. The average value was 0.70 and the median value was 0.77. The most positive female opinion (0.98) was:

It was very interesting and nice and fun. We socialized a little during working in groups and learned to take responsibilities. The PBL was very interesting project to do during English lessons in second semester. Firstly, we learned a lot about using English language in business. We had to use formal phrases, write formal abstracts in English and even record a video in English. Secondly, we learned how to work in a team. We had to organize work and share it between participants. Thirdly, we learned that sessions also can be fun. That it's not just boring lessons where teacher is standing in front of the class and speaking about the theoretical part of the subject, but it can also be practical and fun. So, thus year English lessons were very interesting for me and I hope the next year will also be like this.

In addition to the VADER sentiment score calculations, the Tweet Profiler widget was used to determine dominant emotions expressed in the students' responses. Figure 2 shows the distribution of emotions across the groups. The five emotions are represented by different shapes and colours depending on the intensity of the emotion. Blue stands for the least expressed emotion, while yellow represents the most expressed value. The x-axis shows the VADER compound value, while the y-axis represents the students' PBL groups.

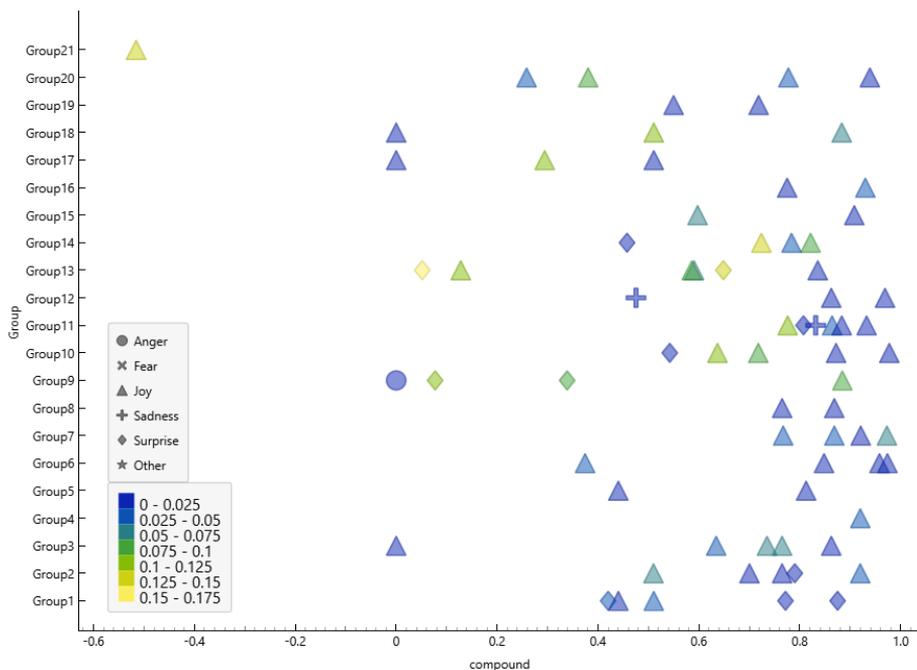


Figure 2: Scatter plot of emotion distribution

The students' emotions are primarily characterized by joy (illustrated by the triangle symbol), with sadness (the cross) prevailing in only two instances. While in Group 12 a lower VADER compound value is expressed, the overall compound score in Group 11 remains very positive, with only one student expressing disappointment, which may be due to the lack of engagement of other team members (e.g. "I think it was a valuable experience I only wish everyone was as motivated as I was." (male)). The analysis also reveals some expressions of surprise in the students' opinions.

4.2 Main themes

To ensure a more comprehensive overview, the topics identified through text mining were aligned with the main theoretical concepts of PBL and divided into positive and negative categories using manual grouping. Similar themes were grouped together (e.g. teamwork and communication skills), and additional categories were added based on the students' responses (e.g. metacognitive awareness and real-world experience).

As shown in Table 4, positive attitudes towards PBL were divided into six sub-topics: teamwork skills, academic skills, problem-solving skills, enjoyable experience, real-world experience, and metacognitive awareness. On the other hand, negative categories relate to the issues of collaboration, video recording, and time constraints.

Table 4: Positive and negative attitudes towards PBL

Topics	Students' responses
Positive	
Teamwork skills	<p>"[...] I could say that this project improved my teamwork [...]"</p> <p>"[...] Secondly, we learned how to work in a team. We had to organize work and share it between participants. [...]"</p> <p>"I have learned that at the end we have to help each other and do things which we do the best. [...]"</p> <p>"[...] We learnt how to communicate inside the groups, doing everything in time [...]"</p>
Academic skills (writing reports, vocabulary acquisition, brainstorming, searching for literature, giving a presentation, recording, and editing a video etc.)	<p>"[...] I was excited when we were brainstorming. [...]"</p> <p>"[...] Firstly, we learned a lot about using English language in business. We had to use formal phrases, write formal abstracts in English and even record a video in English. [...]"</p> <p>"PBL project gave me some new knowledge in conducting the research and writing reports. Through this, I learned how to access sources and articles that are related to our task. [...]"</p> <p>"[...] and especially you learn new skills like videoediting, presenting and the others."</p>
Problem-solving skills	<p>"[...] you learn how to resolve problems, or to suggest how to solve them which is very useful."</p> <p>"[...] I could say that this project improved my teamwork and problem solving skills."</p> <p>"I think PBL project is really good to [...] find solutions to the problem and have a successful project."</p>
Enjoyable experience	<p>"[...] It was a very fun journey that gave us all some new lessons."</p> <p>"It was very interesting and nice and fun. [...] we learned that sessions also can be fun. That it's not just boring lessons where teacher is standing in front of the class and speaking about the theoretical part of the subject, but it can also be practical and fun."</p> <p>"[...] We had a lot of fun doing all this stuff and we connected with each other even more. [...]"</p>
Real-world experience	<p>"[...] I think it is very good project, because we face all challenges that is waiting for us next years. [...]"</p> <p>"[...] it makes students think about every day problems and try to understand possible solutions. [...]"</p> <p>"I liked our PBL project on dormitory shortages because it was practical. [...]"</p> <p>"[...] We had to do a lot of work by ourselves and explore a lot about our problem outside of faculty."</p>

Topics	Students' responses
Metacognitive awareness	<p>"[...] In addition, i also learned a lot about myself, how i work in a team, and [...]"</p> <p>"It was great, we were placed in an unusual position from which we learned and gained a lot."</p> <p>"[...] Because of PBL I think for myself that I am more confident than I was before. [...]"</p> <p>"It was actually fun to work as a group. With that we have learned what our weaknesses are and also what we excel at."</p>
Negative	
Teamwork	<p>"If I had better members that would actually contribute to the good of all, I would love to do it again."</p> <p>"[...] It was fun working as a team, but our work was not equally distributed. 4 out of 5 members did an amazing job, but one member did not do a lot. [...]"</p> <p>"[...] I didn't like the big groups because you cannot arrange the work fairly between 6 members."</p> <p>"[...] If every member done what he is do the best, the project will be good."</p>
Video recording	<p>"I liked the PBL project, sometimes it was difficult to participate in the group, especially when we had to record the video."</p> <p>"We had problems recording the video, but we managed to solve it."</p> <p>"[...] but as a group we didn't really like making the video because most of us were not comfortable in front of a camera."</p> <p>"[...] I think it was a good experience, but I think its hard for students to record."</p>
Time constraints	<p>"[...] Unfortunately I believe the project was a little bit long it did take a lot of our time doing [...]"</p> <p>"[...] We also got together in a group rather late so we never really found the time to catch up with others properly. [...]"</p> <p>"It takes to much time [...]"</p>

5 DISCUSSION

This study aimed to identify students' perceptions of PBL in an ESP course for students of public administration. The results of VADER sentiment analysis indicate that more than 95% of responses (68 out of 73) were positive, four were neutral, and only one was negative. Furthermore, the emotion analysis based on Ekman's model revealed that the most dominant emotion expressed by the students was joy. There were only two groups in which sadness was present, one of which was partly negative. This may be attributed to a lack of motivation or the fact that some students decided not to continue their studies and dropped out. Some comments communicated surprise, mainly indicating the preference for the new teaching model, which, in students' words, "placed [them] in an unusual position from

which [they had] learned and gained a lot". This leads us to conclude that students were generally very satisfied with the approach. Moreover, the outcomes of the analysis indicate that students' perceptions were even more positive than in previous research carried out in the area of ESP and related disciplines (Camargo Ribeiro, 2008; Garnjost & Brown, 2018; Šliogerienė et al., 2025; Wijnen et al., 2017; Williamson & Gregory, 2010). While various factors could affect students' perceptions, including the implementation type (Celinšek & Kostić Bobanović, 2022), the level of teacher support and students' background, these findings suggest that this method may be particularly suitable for an ESP course for students of public administration. Similar to the results of the study conducted by Wijnen et al. (2017), PBL may also help increase students' motivation and engagement, and thus provide a solution to the issue of high drop-out rates among students of the professional study programme at the Faculty of Public Administration. This, of course, would need to be aligned with other necessary measures implemented by the faculty.

The word cloud analysis, further enhanced by collocation bigram analysis, showed the most frequently occurring topics, including a significant increase in knowledge, teamwork, and a new positive experience. These findings demonstrate that the majority of students recognized the importance of knowledge gain and the development of collaborative skills, which is congruent with the theoretical underpinnings of PBL (Barrows, 1996; Hmelo-Silver, 2004; Savery, 2006). Further thematic analysis, based on manual grouping, demonstrated additional topics aligned with the PBL literature, such as the acquisition of problem-solving skills, which helped students complete their projects successfully, and the inclusion of real-life problems, making learning more purposeful and motivating. Importantly, some students displayed metacognitive awareness by recognizing their own strengths and weaknesses, time-management skills as well as the ability to work in teams, and take responsibility to complete the tasks, which may lead to the enhancement of lifelong learning skills (Hmelo-Silver, 2004). Nevertheless, more cycles of PBL would be needed to fully support the development of those skills.

The analysis of the main topics further supports the inclusion of PBL in ESP courses. The deliberate practice of collaborative and problem-solving skills is generally underrepresented in these settings, which is often the result of time constraints and the lack of expertise on the part of the teacher. PBL provides an opportunity to enhance these skills without losing the focus on language development. By immersing the learner in authentic situations and allowing them to test and use new vocabulary in practical situations, they can gradually become more independent and confident language users. Additionally, students reported that they had gained relevant academic and digital skills, including in writing formal reports, brainstorming hypotheses, conducting literature searches, and recording and editing videos, which will serve them in their studies and professional careers. This may indicate that the incorporation of project-based learning elements into PBL, such as report writing, video recording, and delivering presentations, may be beneficial in an ESP course, as this helps to improve students' language skills relevant to their field of study (Hyland, 2002).

While the majority of comments were overwhelmingly positive, a small number of students were dissatisfied with the unequal distribution of tasks within the group and uncooperative team members, which made the whole experience less satisfactory. Some students found the process demanding and complained about a lack of time. Additionally, recording videos was considered challenging and stressful for some. These issues may indicate a need for more guidance on teamwork, time management, and video production prior to or during the introduction of PBL. As public administration is interdisciplinary in nature, ample opportunities are provided for cross-curricular integration, where the aforementioned skills could be enhanced. Likewise, more iterations of PBL cycles within the same course may be required to fully develop collaborative, lifelong, and problem-solving skills.

The word cloud analysis points to a minor difference in how PBL was perceived between the two gender groups. Whereas “problem project” was the most commonly used bigram among the male participants, the collocation “work group” was used most often by the female respondents. Interestingly, “fun experience” was among the most frequent bigrams for males, but not for females. These findings may indicate a slight preference of female students for the collaborative nature of the project, while their male counterparts may prefer problem-focused tasks and more relaxed learning environments. However, these differences may also stem from individual preferences and may not be the result of gender variations. A larger sample and more in-depth research would be needed to draw any firm conclusions.

Not only does long-term knowledge retention depend heavily on the quality of delivery, but also on how satisfied and motivated learners are during the process. Although the present analysis only focused on students' perceptions, it clearly shows their preference for a more learner-centred approach where they guide their own learning, while trying to solve authentic problems. Students expressed the importance of gaining teamwork and problem-solving skills, which are essential for success at work. This is particularly true in the field of public administration, which demands a high level of cooperation to ensure that government policies are successfully implemented and serve the public. Students' satisfaction with PBL may thus indicate a call for broader changes not only in ESP settings, but also in the teaching of public administration, where many subjects are generally carried out in a more traditional, lecture-based way.

6 CONCLUSION

The present study was conducted among 96 students of public administration in an ESP course at the Faculty of Public Administration, University of Ljubljana, with the aim of exploring the perceptions of PBL in an ESP course. A total of 73 responses to an open-ended question were received, which were analysed using text mining techniques.

The outcomes of the research showed that an overwhelming majority of students (more than 95%) were highly satisfied with the new method. Most groups expressed

feelings of joy and appreciated the novelty of the instructional approach. The most common themes were the acquisition of new knowledge and collaborative skills, which are aligned with the main theories on PBL. Students generally found the experience positive, helping them gain valuable knowledge and important life skills, such as working in teams and solving problems. Many appreciated the practical nature of the project by engaging in real-life problems that, in the words of one student, “affect us all”. Besides the development of soft skills, the students also indicated an improvement in academic competencies, including research, formal writing, and presentation skills, which may prove useful in their future studies.

Implications for teaching

The findings of the analysis suggest that this method could be very effective in ESP teaching, particularly in the field of public administration, as it helps with the development of transferable skills, such as collaborative, lifelong learning, and problem-solving skills. These competencies are often underrepresented in ESP settings, yet they are essential in public administration. Moreover, learning is student centred and evolves around solving authentic problems, which enhances motivation for learning and provides the opportunity to practise language pertinent to their interests and study programme.

Limitations and further research

While students’ satisfaction with the learning method is extremely important, more research is needed to determine the effectiveness of PBL in the field of ESP. An in-depth quantitative analysis of students’ responses, as well as an analysis of the obtained grades and how effective the group work was, may be particularly useful.

Acknowledgements

This work was supported by the project “University of Ljubljana for the sustainable society – ULTRA”, and specifically the pilot project “ULTRA NOO 8.06 Lifelong project e-learning”, which is co-financed by the Republic of Slovenia, the Ministry of Higher Education, Science and Innovation and the European Union – NextGenerationEU. The authors also acknowledge the financial support of the Slovenian Research and Innovation Agency (the research programme No. P5-0093 and the project No. J5-60095).

REFERENCES

- Agrawal, R., & Batra, M. (2013). A detailed study on text mining techniques. *International Journal of Soft Computing and Engineering*, 2(6), 118–121. <https://www.ijscce.org/wp-content/uploads/papers/v2i6/F1120112612.pdf>
- Albanese, M. A., & Mitchell, S. (1993). Problem-based learning: A review of literature on its outcomes and implementation issues. *Academic medicine*, 68(1), 52–81. <https://doi.org/10.1097/00001888-199301000-00012>
- Baek, Y. M., Cappella, J. N., & Bindman, A. (2011). Automating content analysis of open-ended responses: Wordscores and affective intonation. *Communication Methods and Measures*, 5(4), 275–296. <https://doi.org/10.1080/19312458.2011.624489>
- Barbierato, E., Bernetti, I., & Capecchi, I. (2022). Analyzing TripAdvisor reviews of wine tours: an approach based on text mining and sentiment analysis. *International Journal of Wine Business Research*, 34(2), 212–236. <https://doi.org/10.1108/IJWBR-04-2021-0025>
- Barrows, H. S. (1986). A taxonomy of problem-based learning methods. *Medical education*, 20(6), 481–486. <https://doi.org/10.1111/j.1365-2923.1986.tb01386.x>
- Barrows, H. S. (1996). Problem-based learning in medicine and beyond: A brief overview. *New Directions for Teaching and Learning*, 68, 3–12. <http://doi.org/10.1002/tl.37219966804>
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, 83(2), 39–43. <https://doi.org/10.1080/00098650903505415>
- Camargo Ribeiro, L. R. (2008). Electrical engineering students evaluate problem-based learning (PBL). *International Journal of Electrical Engineering Education*, 45(2), 152–161. <https://doi.org/10.7227/IJEEE.45.2.7>
- Celinšek, D., & Kostič Bobanović, M. (2022). Tutorship and student autonomy in teamwork and problem-solving in LSP teaching. *Scripta Manent*, 17(1), 29–50. <https://scriptamanent.sduisj.edus.si/ScriptaManent/article/view/388>
- Celinšek, D., & Markič, M. (2011). Nova vloga učitelja in učiteljeve kompetence pri problemsko naravnem učenju. *Didactica Slovenica / Pedagoška obzorja*, 26(4), 94–108. https://www.pedagoska-obzorja.si/Revija/Vsebine/PDF/DSPO_2011_26_03.pdf
- Council of Europe. (2020). *Common European Framework of Reference for Languages: Learning, teaching, assessment – Companion volume*. Council of Europe Publishing, Strasbourg. <https://www.coe.int/en/web/common-european-framework-reference-languages>
- del Valle, J. L. (2021). A rough sail for learner-centred education as a global reform policy in the Philippines. *Pedagogy, Culture & Society*, 31(1), 109–128. <https://doi.org/10.1080/14681366.2021.1887330>
- Demšar, J., Curk, T., Erjavec, A., Gorup, Č., Hočevar, T., Milutinovič, M., Možina, M., Polajnar, M., Toplak, M., Starič, A., Štajdohar, M., Umek, L., Žagar, L., Žbontar, J.,

- Žitnik, M., & Zupan, B. (2013). Orange: Data Mining Toolbox in Python. *Journal of Machine Learning Research*, 14, 2349–2353. <https://jmlr.org/papers/volume14/demsar13a/demsar13a.pdf>
- Ekman, P. (1999). Basic emotions. In T. Dalgleish & M. J. Power (eds.), *Handbook of cognition and emotion* (pp. 45–60). John Wiley & Sons Ltd. <https://doi.org/10.1002/0470013494.ch3>
- Elbagir, S., & Yang, J. (2019). Twitter Sentiment Analysis Using Natural Language Toolkit and VADER Sentiment. In S. I. Ao, O. Castillo, C. Douglas, D. Dagan Feng, & A. M. Korsunsky (eds.), *Proceedings of the International MultiConference of Engineers and Computer Scientists, IMECS 2019, March 13–15, 2019, Hong Kong* (pp. 12–16). https://www.iaeng.org/publication/IMECS2019/IMECS2019_pp12-16.pdf
- Fung Ching, L., Lawrence, R., & Abdullah, H. (2019). Student-Centred Learning in Selected Private Higher Education Institution. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, 9(2S3), 505–510. <https://doi.org/10.35940/ijitee.B1121.1292S319>
- Gablasova, D., Brezina, V., & McEnery, T. (2017). Collocations in Corpus-Based Language Learning Research: Identifying, Comparing, and Interpreting the Evidence. *Language Learning*, 67, 155–179. <https://doi.org/10.1111/lang.12225>
- Garnjost, P., & Brown, S. M. (2018). Undergraduate business students' perceptions of learning outcomes in problem based and faculty centered courses. *The International Journal of Management Education*, 16(1), 121–130. <https://doi.org/10.1016/j.ijme.2017.12.004>
- Gottipati, S., Shankaraman, V., & Lin, J. R. (2018). Text analytics approach to extract course improvement suggestions from students' feedback. *Research and Practice in Technology Enhanced Learning*, 13, 6. <https://doi.org/10.1186/s41039-018-0073-0>
- Heimerl, F., Lohmann, S., Lange, S., & Ertl, T. (2014). Word Cloud Explorer: Text Analytics Based on Word Clouds. In *2014 47th Hawaii International Conference on System Sciences (HICSS)* (pp. 1833–1842). <https://doi.org/10.1109/HICSS.2014.231>
- Hemmatian, F., & Sohrabi, M. K. (2019). A survey on classification techniques for opinion mining and sentiment analysis. *Artificial Intelligence Review*, 52, 1495–1545. <https://doi.org/10.1007/s10462-017-9599-6>
- Hmelo-Silver, C. E. (2004) Problem-Based Learning: What and How Do Students Learn? *Educational Psychology Review*, 16(3), 235–266. <https://doi.org/10.1023/B:ED-PR.0000034022.16470.f3>
- Hyland, K. (2002). Specificity revisited: How far should we go now? *English for specific purposes*, 21(4), 385–395. [https://doi.org/10.1016/S0889-4906\(01\)00028-X](https://doi.org/10.1016/S0889-4906(01)00028-X)
- Jarc, M., & Zorko, V. (2013). Razvoj potrebe po učenju tujih strokovnih jezikov in vloga učitelja pri oblikovanju tujejezikovno kompetentnega diplomanta. *Teorija in praksa*, 50(2), 412–442, 459. <http://www.dlib.si/?URN=URN:NBN:SI:DOC-KZ4BRIKO>

- Jurković, V. (ed.). (2005). *Guide to problem-based learning*. Slovene Association of LSP Teachers. http://www.sdutsj.edus.si/SDUTSJ_Guide_%20to_%20PBL.pdf
- Koufakou, A., Gosselin, J., & Guo, D. (2016). Using data mining to extract knowledge from student evaluation comments in undergraduate courses. In *2016 International Joint Conference on Neural Networks (IJCNN)* (pp. 3138–3142). <https://doi.org/10.1109/IJCNN.2016.7727599>
- Lucini, F. R., Tonetto, L. M., Fogliatto, F. S., & Anzanello, M. J. (2010). Text mining approach to explore dimensions of airline customer satisfaction using online customer reviews. *Journal of Air Transport Management*, *83*, 101760. <https://doi.org/10.1016/j.jairtraman.2019.101760>
- Nandwani, P., & Verma, R. (2021). A review on sentiment analysis and emotion detection from text. *Social Network Analysis and Mining*, *11*(81), 2–19. <https://doi.org/10.1007/s13278-021-00776-6>
- Ordenes, F. V., Theodoulidis, B., Burton, J., Gruber, T., & Zaki, M. (2014). Analyzing Customer Experience Feedback Using Text Mining: A Linguistics-Based Approach. *Journal of Service Research*, *17*(3), 278–295. <https://doi.org/10.1177/1094670514524625>
- Pretnar Žagar, A. (2024). *Text Preprocessing: Tips & Tricks*. Orange data mining. <https://orangedatamining.com/blog/text-preprocessing-tricks/>
- Reich, J., Tingley, D. H., Leder-Luis, J., Roberts, M., & Stewart, B. (2014). Computer-assisted reading and discovery for student generated text in massive open online courses. *HarvardX Working Paper*, *6*. <https://doi.org/10.2139/ssrn.2499725>
- Savery, J. R., & Duffy, T. M. (1995). Problem Based Learning: An Instructional Model and Its Constructivist Framework. *Educational Technology*, *35*(5), 31–38. <http://www.jstor.org/stable/44428296>
- Savery, J. R. (2006). Overview of Problem-based Learning: Definitions and Distinctions. *Interdisciplinary Journal of Problem-Based Learning*, *1*(1). <https://doi.org/10.7771/1541-5015.1002>
- Schmidt, H. G., Rotgans, J. I., & Yew, E. H. (2011). The process of problem-based learning: what works and why. *Medical education*, *45*(8), 792–806. <https://doi.org/10.1111/j.1365-2923.2011.04035.x>
- Schweinberger, M. (2024, March 7). *Analyzing Collocations and N-grams in R*. Language Technology and Data Analysis Laboratory (LADAL). <https://slcladal.github.io/coll.html>
- Shoufan, A. (2023). Exploring students' perceptions of ChatGPT: Thematic analysis and follow-up survey. *IEEE access*, *11*, 38805–38818. <https://doi.org/10.1109/ACCESS.2023.3268224>
- Šliogerienė, J., Darginavičienė, I., Suchanova, J., Gulbinskienė, D., & Jakučionytė, V. (2025). Problem-based learning in developing students' communicative skills and creativity in teaching English for specific purposes. *Creativity Studies*, *18*(1), 30–42. <https://doi.org/10.3846/cs.2025.22343>

- Strobel, J., & Van Barneveld, A. (2009). When is PBL more effective? A meta-synthesis of meta-analyses comparing PBL to conventional classrooms. *Interdisciplinary journal of problem-based learning*, 3(1), 44–58. <https://doi.org/10.7771/1541-5015.1046>
- Vernon, D. T., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine: Journal of the Association of American Medical Colleges*, 68(7), 550–563. <https://doi.org/10.1097/00001888-199307000-00015>
- Walker, A., & Leary, H. (2009). A problem-based learning meta-analysis: Differences across problem types, implementation types, disciplines, and assessment levels. *Interdisciplinary journal of problem-based learning*, 3(1). <https://doi.org/10.7771/1541-5015.1061>
- Wang, S., & Gopez, J. M. W. (2024). Challenges of Student-Centered Education in China: A Review. *International Journal for Multidisciplinary Research*, 6(5). <https://doi.org/10.36948/ijfmr.2024.v06i05.28854>
- Wijnen, M., Loyens, S. M., Smeets, G., Kroeze, M. J., & Van Der Molen, H. T. (2017). Students' and Teachers' Experiences With the Implementation of Problem-Based Learning at a University Law School. *Interdisciplinary Journal of Problem-Based Learning*, 11(2). <https://doi.org/10.7771/1541-5015.1681>
- Williamson, J., & Gregory, A. S. (2010). Problem-based learning in introductory American politics classes. *Journal of Political Science Education*, 6(3), 274–296. <https://doi.org/10.1080/15512169.2010.494485>
- Yang, J., & Tan, C. (2019). Advancing student-centric education in Korea: Issues and challenges. *The Asia-Pacific Education Researcher*, 28(6), 483–493. <https://doi.org/10.1007/s40299-019-00449-1>