

Application of the Problem-Based Learning Model In The Course Of Automation Of Public Relations Management And Protocols in the OTKP Department at State Vocational High School 7 Makassar

Nurul Faisah Andriani¹, Muh. Darwis^{2*}, Jamaluddin³

^{1,2,3}Universitas Negeri Makassar, Indonesia

Corresponding author's email: muh.darwis@unm.ac.id

ABSTRACT

This study aims to determine how the application of the problem-based learning model in the subject of automation of public relations and protocol management of the OTKP department at SMK Negeri 7 Makassar. The type of research used in this study is a qualitative descriptive type of research and the data collection techniques used are observation, interview, and documentation techniques with 5 informants, namely three teachers of the subject of automation of public relations and protocol management of the OTKP department, and two students of class XII OTKP at SMK Negeri 7 Makassar. The results of the study, observations and interviews can be concluded that the Problem Based Learning learning model in the public relations and protocol subjects of the OTKP department at SMK Negeri 7 Makassar was implemented effectively. It can be seen at the stage of student orientation to the problem in the Problem Based Learning learning model applied by the teacher in the classroom by providing an explanation of the learning material and the teacher introducing an interesting problem to students in the public relations and protocol activities material, then the teacher provides examples of problems through learning videos on the internet such as YouTube. From the stage of organizing students to learn in class, the teacher applies the problem based learning model by dividing students into small groups, each consisting of 6-7 people per group to make it easier for students to identify the problems given by the teacher. At the stage of guiding individual/group experiences of students, at SMK Negeri 7 Makassar the teacher provides motivation by guiding students who have difficulty in group discussions, in this case the teacher ensures that students understand the special learning material for public relations and protocol activities as in the learning implementation plan. At the stage of Developing and presenting the results of the work, the teacher helps students in planning and preparing work or assignments that are in accordance with the material of public relations and protocol activities by developing assignments in the form of group discussions, presenting work in the form of group presentations. And at the stage of analyzing and evaluating the problem-solving process, after students have made their presentations they will analyze questions from other groups to find answers and then will be given an evaluation by the teacher in oral form such as question and answer questions.

Keywords: implementation, learning model, problem-based learning

INTRODUCTION

Education is provided formally from an early age to college, in essence, education is provided throughout life, from birth to adulthood. Education is a guidance and teaching activity that takes place both inside and outside of school (Facer, 2011; Suprianto, 2024; Zou, 2022). This is known as the Three Centers of Education. Schools, as formal educational institutions, must have clear rules and objectives. One of these objectives is to implement the curriculum established by the government.

Learning occurs as individuals acquire knowledge, skills, and understanding. Internationally, learning is viewed as an interactive process involving students, teachers, and learning resources, occurring within an educational environment. Teachers must design

learning activities to help students achieve the desired goals or competencies. (Departement of Foreign and Trade, 2021; Malakul, 2023; Vaganova, Gilyazova, Gileva, & ..., 2020).

Problem Based Learning represents an instructional model that is highly relevant to the implementation of the 2013 Curriculum, particularly in fostering the holistic development of student competencies encompassing knowledge, skills, and attitudes. The 2013 Curriculum emphasizes student-centered learning that promotes active engagement, critical thinking, collaboration, and meaningful knowledge construction. Through the presentation of authentic, real-life problems at the beginning of the lesson, students are encouraged to analyze situations, formulate solutions, and participate actively in the learning process before receiving formal explanations from the teacher. This approach shifts the role of students from passive recipients of information to active problem solvers who construct understanding through inquiry and discussion. Effective implementation of this model requires systematic instructional planning, as teachers must design structured learning scenarios, select appropriate problem contexts aligned with the subject matter, and prepare assessment strategies that reflect competency standards. Consequently, Problem Based Learning not only aligns with the pedagogical principles of the 2013 Curriculum but also supports the development of higher order thinking skills and essential competencies needed to address complex challenges in both academic and real-world settings.

This learning model is very effective in efforts to improve the quality of learning activities, because students must play an active role in learning and are also expected to use high-level thinking skills, to hone cohesiveness and cooperation in a group (Jabarullah & Iqbal Hussain, 2019; Jacobs, Salas, Cameron, Naguwa, & Kasuya, 2005; Phungsuk, Viriyavejakul, & Ratanaolarn, 2017). So teachers and students must concentrate on the lesson material, teachers can easily provide material to students and then students can understand it well. The application of the problem-based learning model is student-centered learning that uses unstructured and open-ended real-world problems as a context for students to develop problem-solving skills (Bodagh, Bloomfield, Birch, & Ricketts, 2017; Houghton, 2023; Lim, 2012). There are several principles in implementing the Problem Based Learning model, namely: 1) involving students in working on problems in small groups of about five people, 2) teachers provide guidance to students in solving the problem, 3) problems are prepared as a context for new learning, and 4) analysis and resolution of the problem produce knowledge and skills in problem solving. In this learning model, students learn through solving real problems that are directly related to the subject matter being studied. (Ali, 2019; Dita, Utomo, & Sekar, 2021; Wang & Lin, 2021).

At SMK Negeri 7 Makassar, several challenges emerge in applying the problem based learning approach. Only a small number of students truly grasp the issues presented by the teacher for discussion. Classroom participation is also uneven, with just a few learners actively involved in analyzing problems and preparing reports. In many groups, the tasks tend to be completed by only one or two members. These conditions make it important to conduct a deeper examination of how problem based learning is implemented in the Public Relations and Protocol Management Automation subject within the OTKP Department at SMK Negeri 7 Makassar.

METHODS

This research uses a qualitative descriptive approach, with the aim of drawing conclusions based on descriptive data that depicts situations through verbal descriptions, rather than

numerical data. A qualitative approach is a type of research that aims to collect descriptive data, both written and unwritten, from participants and through behavioral observations. This method applies a scientific approach to explain specific social situations in detail, based on data obtained directly from real-world conditions.

The study focuses on describing how the Problem Based Learning model is applied to students majoring in Public Relations and Protocol Management Automation (OTKP) in the corresponding subject. It examines not only whether the model is implemented, but also how each stage is carried out, how students respond to the learning activities, and how teachers facilitate the process. The analysis is guided by five indicators: student orientation to the problem, organizing students for learning, guiding individual or group investigation, developing and presenting work, and analyzing and evaluating the problem solving process.

The research involves five informants, consisting of three subject teachers and two OTKP students. This selection provides insights from both instructional and learner perspectives. Data are collected using interview, observation, and documentation guidelines that are developed based on the framework of learning model implementation in the subject. These instruments help ensure that the data gathered are relevant and aligned with the research focus.

Data analysis is conducted inductively, with conclusions drawn from patterns that emerge from the field findings. The process includes four stages: data collection, data condensation, data presentation, and drawing conclusions or verification. Through these systematic steps, the study produces a comprehensive and well grounded description of the implementation of Problem Based Learning in the selected subject area.

RESULT AND DISCUSSION

The data presentation in this study is tailored to the research objectives, where data obtained through data collection techniques such as interviews, observation, and documentation will be presented in descriptive form. To determine how the problem-based learning model is applied in the subject of public relations management automation and protocol in the OTKP department at SMK Negeri 7 Makassar, this study used four primary informants and one supporting informant who could provide valid and accurate information regarding the implementation of the learning model and the results achieved in the research context. This study used five indicators described by Kaufman and Holmes, (1996); Mahyuddin, (2022); Mubuuke et al., (2017) namely, student orientation to problems, organizing students to learn, guiding individual/group experiences, developing and presenting work results, analyzing and evaluating the problem-solving process. The following are the results of the data analysis obtained.

Student Orientation to Problems

In the initial stages of implementing the Problem-Based Learning (PBL) model, specifically targeting the student-oriented problem indicator, teachers presented real-life problems to students in the Public Relations and Protocol Management Automation course in the OTKP department at SMK Negeri 7 Makassar. The problems presented were related to the core competencies in the lesson plan (RPP), namely, implementing Public Relations and Protocol Activities.

The implementation of the problem-based learning approach in the Public Relations and Protocol Management Automation course within the OTKP program at SMK Negeri 7 Makassar proved to be effective, as it fulfilled the criteria of student-centered problem

orientation. In this method, the teacher brought up a specific problem that the students had to think about and come up with good answers for. This method not only strengthened students' comprehension of the subject matter but also encouraged active engagement, teamwork, and creative thinking. The use of online learning videos as a medium for presenting problems further supported students in exploring ideas and responding thoughtfully to the given scenarios.

Based on observations conducted while directly observing the classroom learning process, in the initial stages of the lesson, the teacher introduced the material by presenting a problem or scenario relevant to the public relations and protocol management automation subject, specifically the protocol activities. The teacher delivered the problem-based learning material through learning videos sourced from the internet, such as YouTube. Students were asked to watch short films and then identify the problem.

Based on data analysis, the implementation of the problem-based learning model in the public relations and protocol management automation subject, with attention to the student orientation indicator for the OTKP major at SMK Negeri 7 Makassar, was considered effective in helping students understand the material. The implementation of the problem-based learning model, with the teacher introducing an interesting problem to students in the public relations and protocol activities material, was proven to increase student understanding and participation in the lesson, as students were very enthusiastic when presented with examples of problems in the form of short films in the learning videos.

Student orientation toward problems in the Problem-Based Learning (PBL) model includes explanations of learning objectives, logistical needs, and encouragement to motivate students to actively engage in problem-solving activities. Furthermore, field evidence demonstrates that the implementation of the Problem-Based Learning model has been effectively implemented by teachers and well-received by students. (Bodagh et al., 2017; Lim, 2012; Tadjer, Lafifi, Seridi-Bouchelaghem, & Gülseçen, 2022).

The application of the Problem-Based Learning model in classroom instruction has demonstrated its ability to enhance students' comprehension of the subject matter while fostering critical thinking skills, particularly in public relations and protocol management automation courses. Through this approach, learning becomes more focused on meaningful problem exploration rather than passive content absorption. Guiding students toward specific problems at the beginning of the lesson serves to familiarize them with the issues under discussion. This orientation encourages curiosity about the topic and strengthens their motivation to investigate, analyze, and develop appropriate solutions independently and collaboratively.

Organizing Students for Learning

Organizing students for learning is a procedure to assist students in determining learning topics and arranging appropriate learning tasks related to the material being taught. The problem-based learning model in the Public Relations and Protocol Management Automation subject in the OTKP department at SMK Negeri 7 Makassar is considered effective because it aligns with the indicators of organizing students for learning. The teacher provides students with problem-based learning videos from the internet to help them identify their problems. Then, the teacher forms groups of 6-7 students to facilitate student completion.

Based on observations in the 12th grade OTKP students in the Public Relations and Protocol Management Automation subject, after explaining the material on public relations and protocol activities, the teacher divides the students into heterogeneous groups. The purpose of this group arrangement is to create a more dynamic and interactive learning environment and ensure that each group has diverse abilities. By dividing the groups

heterogeneously, students with higher abilities can assist their peers who may need additional support, thus creating a more active and collaborative learning process. Based on data analysis, in general, the application of the problem-based learning model in the subject of public relations and protocol management automation by paying attention to indicators of organizing students to learn in the OTKP major at SMK Negeri 7 Makassar is classified as effective, especially in the learning process, the teacher implements a learning model that is easy for students to understand by adjusting the lesson material in the lesson implementation plan (RPP). The teacher organizes students' learning by first dividing them into several small groups, with each group consisting of 6 to 7 students. One of the successes of the step of organizing students to learn is the relevance of the material to the real world.

In the implementation of the Problem Based Learning model, teachers facilitate students in identifying, organizing, and managing learning tasks that are explicitly linked to the problems under investigation. This facilitation aims to sustain students' engagement in purposeful inquiry while promoting their autonomy and accountability in the learning process.

Empirical classroom practice indicates that teachers structure learning activities by clearly articulating instructional objectives related to public relations content and protocol management activities, in alignment with the lesson plan (RPP). Students are organized into heterogeneous groups consisting of six to seven members, a composition designed to encourage diversity of perspectives and equitable participation. This systematic organization reflects a strategic effort to cultivate active, collaborative, and meaningful learning environments. A carefully structured group arrangement provides opportunities for students to engage in discussion, conduct critical analysis, and formulate solutions to complex and contextually relevant problems, while simultaneously enhancing their communication competence and collective responsibility.

Guiding Individual/Group Experiences

Guiding individual/group experiences refers to a learning model used in accordance with the subject matter of public relations and protocol governance automation as outlined in the lesson plan (RPP). The teacher assists students in achieving a deeper understanding and developing skills necessary to achieve learning objectives, such as monitoring individual and group discussions.

Teachers successfully meet the indicators for guiding individual and group experiences, making the problem-based learning model for the public relations and protocol governance automation course in the OTKP department at SMK Negeri 7 Makassar effective. They provide effective guidance throughout the learning process, particularly during group discussions. Teachers play an active role by providing direction, explaining concepts students find difficult, and offering solutions when students encounter difficulties.

Based on classroom observations, the problem-based learning model for the public relations and protocol governance automation course in the OTKP department was implemented effectively, as the teacher actively guided students during group discussions by providing direction and answering questions. This mentoring helped students overcome difficulties and ensured all group members were actively involved in the learning process. Based on data analysis, in general, the application of the problem-based learning model in the subject of public relations and protocol management automation by paying attention to indicators of guiding individual/group experiences for students majoring in OTKP at SMK Negeri 7 Makassar is considered effective because the teacher provides effective guidance during the learning process, especially in group discussions. The teacher plays an active role by providing direction and visiting each group of students who need assistance. This increases

student involvement and active participation in the group (Acar-Şeşen & Tarhan, 2011; B Stensaker & Matear, 2025; Bjørn Stensaker & Matear, 2024)

According to Alayont, (2014); Houghton, (2023); Lim, (2012) guiding individual or group experiences in the Problem-Based Learning (PBL) model involves teachers encouraging students to gather relevant information and conduct experiments to obtain explanations or solutions to problems encountered and solve them. However, actual experiences show that teachers provide effective guidance throughout the learning process, particularly during group discussions. Teachers play an active role by providing direction to each group and assisting students experiencing difficulties.

This approach can help students overcome learning barriers and ensure the involvement of each group member to encourage active participation in completing assigned tasks. With appropriate guidance, individual and group experiences in PBL become more focused and meaningful, helping students achieve their desired learning objectives.

Developing and Presenting Work Results

Developing and presenting work is a process of exploring creativity. In presenting work, teachers prepare presentations, provide presentation skills training, and provide opportunities for students to ask questions and discuss. The problem-based learning model for the Public Relations and Protocol Management Automation (PRM) course in the OTKP department at SMK Negeri 7 Makassar is considered effective, as students are enthusiastic and motivated to develop and present work related to public relations and protocol activities. However, a challenge is that some students still feel nervous when presenting, which can take a significant amount of time.

Based on observations in grade XII, students in the Public Relations and Protocol Management Automation (PRM) course in the OTKP department, in developing and presenting work, students are trained to develop work or assignments in groups, which are then presented through presentations. Teachers provide guidance on how to process ideas, present creative work, and utilize relevant media such as videos or images. Furthermore, feedback from teachers and other group members helps students improve the quality of their work. This process strengthens understanding of the material and develops students' communication skills. However, challenges include imbalances in group participation, with some students tending to dominate while others remain passive, and limited time to complete presentations.

Based on data analysis, the implementation of the problem-based learning model in the public relations and protocol management automation course, focusing on the development and presentation indicators for students majoring in OTKP at SMK Negeri 7 Makassar, was deemed ineffective. This was because some students required more time and guidance to understand how to develop relevant and high-quality assignments. Obstacles observed during this learning process included differences of opinion in group discussions and nervousness during class presentations, resulting in lengthy presentations.

Developing and presenting assignments in the Problem-Based Learning (PBL) model involves teachers assisting students in planning and preparing appropriate assignments, such as reports, and facilitating them in sharing assignments collaboratively with their peers. (Chou et al., 2025; English et al., 2022; Mubuuke et al., 2017). However, the reality in the field shows that teachers develop and present their assignments in the learning process through group discussions of 6-7 students.

After group discussions, students were asked to present their findings. However, some students needed more time and guidance to understand how to develop relevant and high-

quality assignments. Obstacles encountered during this learning process included students still feeling nervous during group presentations due to a lack of understanding of the material.

Analyzing and Evaluating the Problem Solving Process

In this context, analyzing, when implementing the problem-based learning model, aims to assess students' understanding of the steps taken to solve a problem. This process helps students develop critical thinking skills. Evaluation, in this context, provides students with insight through question-and-answer sessions to train them in how they think, work, and learn, as well as assessing the results of the problem identification work carried out by each group.

The problem-based learning model in the public relations management automation and protocol course of the OTKP department at SMK Negeri 7 Makassar was implemented effectively, according to the indicators of analyzing and evaluating the problem-solving process. The teacher presented relevant problems to encourage critical thinking, guided students in identifying problems, and evaluated the various solutions found. Furthermore, the teacher utilized media, such as instructional videos, to help students understand the context of the problem. However, some students needed more support to build confidence in presenting the results of their group discussions. Based on observations in the 12th grade OTKP (Public Relations and Protocol Management Automation) subject, students demonstrated enthusiasm in group discussions, although some still faced challenges such as nervousness when responding to the teacher's verbal evaluation. The teacher conducted the evaluation through verbal questions and answers to reflect on the results of their group discussions.

Based on data analysis, the implementation of the problem-based learning model in the Public Relations and Protocol Management Automation subject, which focused on analyzing and evaluating the problem-solving process of students majoring in OTKP at SMK Negeri 7 Makassar, was generally considered ineffective. This was because some students needed more support to build confidence in presenting the results of their group discussions. Furthermore, during the verbal evaluation, such as questions and answers, some students were unable to answer the teacher's questions due to a lack of understanding of the group discussion results.

Analyzing and evaluating the problem-solving process in the Problem-Based Learning model involves helping students reflect on and assess the investigations they have conducted and the methods used. However, in reality, some students require more support to build confidence in presenting the results of their group discussions. Then, when the teacher conducted an oral learning evaluation, such as a Q&A session, several students were unable to answer the teacher's questions due to a lack of understanding of the learning material during the group discussion (Daryanes *et al.*, 2023; O'Shea & Leavy, 2013; Xianjun, Yang, Junchao, Shuguang, & Ling, 2016).

Analyzing and evaluating the problem-solving process in Problem-Based Learning is a crucial step to ensure students not only solve problems but also understand how they achieved them. This stage focuses on in-depth reflection on the learning process, strategies, and outcomes, so students can improve their problem-solving and learning skills in the future.

CONCLUSION

Based on the findings regarding the implementation of the Problem-Based Learning model in the Public Relations and Protocol Management Automation subject within the OTKP program at SMK Negeri 7 Makassar, the approach can generally be classified as

effective. This conclusion is supported by several performance indicators observed during the learning process. In terms of student orientation toward problems, the teacher was able to introduce engaging and contextually relevant issues, particularly those related to protocol activities in public relations. The organization of student learning also demonstrated positive results. Students were divided into small heterogeneous groups consisting of six to seven members, which contributed to increased collaboration and interaction during the learning activities.

Regarding the facilitation of individual and group learning experiences, the teacher provided consistent guidance to students who encountered difficulties during discussions. This support helped students address learning challenges, ensured the participation of all group members, and promoted active engagement in completing assigned tasks. Nevertheless, the development and presentation of students' work outcomes indicated a relatively lower level of effectiveness. Some students required additional time and more structured guidance to produce assignments that met expected standards of relevance and quality. A similar pattern was observed in the analysis and evaluation stage of the problem-solving process. Students still needed reinforcement to build confidence when presenting discussion results and articulating their conclusions.

When oral evaluations were conducted through question-and-answer sessions, several students experienced difficulty responding to questions, suggesting that their understanding of group discussion outcomes had not yet been fully consolidated. Overall, while the Problem-Based Learning model has yielded positive results in several dimensions, further refinement is necessary. We should particularly focus on strengthening students' ability to develop high-quality outputs and enhancing their competence in analyzing and evaluating the problem-solving process.

REFERENCES

- Acar-Şeşen, B. A., & Tarhan, L. (2011). *Active-learning versus teacher-centered instruction for learning acids and bases*. 29(2), 205–226. <https://doi.org/10.1080/02635143.2011.581630>
- Alayont, F. (2014). *Using Problem-Based Pre-Class Activities to Prepare Students for In-Class Learning*. 24(2), 138–148. <https://doi.org/10.1080/10511970.2013.844510>
- Ali, S. S. (2019). Problem based learning: A student-centered approach. *English Language Teaching*, 12(5), 73–78.
- Bodagh, N., Bloomfield, J., Birch, P., & Ricketts, W. (2017). Problem-based learning: a review. *British Journal of Hospital Medicine*, 78(11), C167–C170.
- Chou, X., Messina, E., & W. Wallace, S. (2025). *Solving Two-Stage Stochastic Programming Problems via Machine Learning* (G. Nicosia, V. Ojha, S. Giesselbach, M. P. Pardalos, & R. Umeton, Eds.). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-031-82481-4_1
- Daryanes, F., Darmadi, D., Fikri, K., Sayuti, I., Rusandi, M. A., & Situmorang, D. D. B. (2023). The development of articulate storyline interactive learning media based on case methods to train student's problem-solving ability. *Heliyon*, 9(4). <https://doi.org/10.1016/j.heliyon.2023.e15082>
- Departement of Foreign and Trade. (2021). *Education Learning and Development Module*.

- Dita, P. P. S., Utomo, S., & Sekar, D. A. (2021). Implementation of problem based learning (PBL) on interactive learning media. *Journal of Technology and Humanities*, 2(2), 24–30.
- English, J. L., Keinonen, T., Havu-Nuutinen, S., & Sormunen, K. (2022). *A Study of Finnish Teaching Practices: How to Optimise Student Learning and How to Teach Problem Solving*. 12(11). <https://doi.org/10.3390/educsci12110821>
- Facer, K. (2011). *Learning futures: Education, technology and social change*. Routledge.
- Houghton, J. (2023). Learning modules: problem-based learning, blended learning and flipping the classroom. *Law Teacher*, 57(3). <https://doi.org/10.1080/03069400.2023.2208017>
- Jabarullah, N. H., & Iqbal Hussain, H. (2019). The effectiveness of problem-based learning in technical and vocational education in Malaysia. *Education+ Training*, 61(5), 552–567.
- Jacobs, J., Salas, A., Cameron, T., Naguwa, G., & Kasuya, R. (2005). *Implementing an online curriculum management database in a problem-based learning curriculum*. 80(9), 840–846. <https://doi.org/10.1097/00001888-200509000-00011>
- Kaufman, D. M., & Holmes, D. B. (1996). *Tutoring in problem-based learning: Perceptions of teachers and students*. 30(5), 371–377. <https://doi.org/10.1111/j.1365-2923.1996.tb00850.x>
- Lim, W. K. (2012). *Dysfunctional problem-based learning curricula: Resolving the problem*. 12(1). <https://doi.org/10.1186/1472-6920-12-89>
- Mahyuddin, A. (2022). The Application of Problem Based Learning Models to Improve Motivation and Learning Outcomes Materials Analyzing the Size of Single Data Concentration and Student Group Data. *Pinisi Journal of Education and Management*, 1(1), 79–88.
- Malakul, S. (2023). The effects of using an auto-subtitle system in educational videos to facilitate learning for secondary school students: learning comprehension, cognitive load, and satisfaction. *Smart Learning Environments*, 10(1). <https://doi.org/10.1186/s40561-023-00224-2>
- Mubuuke, A. G., Louw, A. J. N., & Van Schalkwyk, S. (2017). Cognitive and social factors influencing students' response and utilization of facilitator feedback in a problem based learning context. *Health Professions Education*, 3(2), 85–98.
- O'Shea, J., & Leavy, A. M. (2013). *Teaching mathematical problem-solving from an emergent constructivist perspective: The experiences of Irish primary teachers*. 16(4), 293–318. <https://doi.org/10.1007/s10857-013-9235-6>
- Phungsuk, R., Viriyavejakul, C., & Ratanaolarn, T. (2017). Development of a problem-based learning model via a virtual learning environment. *Kasetsart Journal of Social Sciences*, 38(3), 297–306.
- Stensaker, B, & Matear, S. (2025). *Student involvement in quality assurance: perspectives and practices towards persistent partnerships*. 31(1), 8–22. <https://doi.org/10.1080/13538322.2024.2346358>
- Stensaker, Bjørn, & Matear, S. (2024). Student involvement in quality assurance: Perspectives and practices towards persistent partnerships. *Quality in Higher Education*, 1–15.
- Suprianto, S. (2024). Education, Regulation, and Public Administration. *International Journal of Administration and Education (IJAE)*, 1(3), 141–148. <https://doi.org/10.70188/vayc8r80>

- Tadger, H., Lafifi, Y., Seridi-Bouchelaghem, H., & Gülseçen, S. (2022). Improving soft skills based on students' traces in problem-based learning environments. *Interactive Learning Environments*, 30(10). <https://doi.org/10.1080/10494820.2020.1753215>
- Vaganova, O. I., Gilyazova, O. S., Gileva, A. V, & ... (2020). Quality management of educational activities in higher education. *Amazonia*
- Wang, W.-T., & Lin, Y.-L. (2021). Evaluating factors influencing knowledge-sharing behavior of students in online problem-based learning. *Frontiers in Psychology*, 12, 691755.
- Xianjun, L., Yang, Y., Junchao, Z., Shuguang, W., & Ling, D. (2016). *On the Effects, Problems, and Countermeasures of Undergraduate Teaching Evaluation in Higher Education*. 49(1-2), 20-38. <https://doi.org/10.1080/10611932.2016.1192383>
- Zou, Y. (2022). *Quality of higher education: Organizational and educational perspectives*. taylorfrancis.com. <https://doi.org/10.1201/9781003339168>