JPKN: Jurnal Pendidikan dan Kebudayaan Nusantara
E-ISSN: 2963-0746
P-ISSN: 2963-0738
https://dinastires.org/JPKN dinasti.info@gmail.com +62 811 7404 455
DOI: https://doi.org/10.38035/jpkn.v3i4

Can Problem-Based and Project-Based Learning Improve the Education Quality Control in the Transformation to Online Learning

Ahmed Gaber Abdelhamid Ahmed[1], R.Madhakomala[2]
[1]Universitas Negeri Jakarta, Indonesia, ahmedgaberabdelhamidahmed@gmail.com
[2]Universitas Negeri Jakarta, Indonesia, madhakomala@unj.ac.id

Corresponding Author: ahmedgaberabdelhamidahmed@gmail.com[1]

Abstract: Put an apropriete solution to the disadvantages of lack qulity control in online education; as the online education are growing very fast, world wide, the advanteges push many of learners make it the best choice, like more wide diversity of education program without confine by the learner place, flixable scaduale time, practicing the learning process parallel to practicing the work and so on, but little of student start see the symptom of disadvateges of online learning, by the experience during online study, like social losses,lose indirect learning from teachers, lose respect the education process and so on, Research and developing using relevent articles accredited from aothorised platfoms to find the appropiete data, to find out clear defintions for the problem and the suggested solutions, answer the research problems, and attaine the researsh purposes, Identifying how can use different teaching methode to solve the loose quality control in the online education.

Keywords: Quality control in online learning, disadvantages of online learning, problem-based learning, project-based learning

INTRODUCTION

Online learning is taking a rigid place in the world, this makes the researcher put a sustainable solutions to the online learningg disadvantages.

Research background: Online learning: Online learning is an educational method that uses the internet to deliver courses, lectures, and other learning materials to students remotely, allowing for flexible, self-paced study from anywhere. Also known as e-learning or distance education, it utilizes online platforms, discussion forums, video conferencing, and other digital tools for instruction, communication, and assessment in a fully virtual environment**. "**The use of online learning technologies places high demands on teachers.Excellent knowledge of the subject area, professional computer knowledge, communication skills, clarity of expression, emotional connection with students other necessary skills to meet the needs of online platforms, as well as the ability to solve small problems during and after online classes, are considered as online learning skills and methods necessary for teaching online in this pandemic. The experience of working in a virtual classroom, patience, empathy, caring for students, excellent presentation skills with an appeal to a given topic, correct handling of learning tools, accessible,

with convenient functions, were additional skills necessary for managing the online learning process**"**(Danchikov, Prodanova, Kovalenko, Bondarenko, 2021**), Oline learning importnce:** Online learning is important because it offers accessibility, flexibility, and personalized learning experiences, enabling individuals to learn at their own pace and on their own schedule, often with lower costs compared to traditional education. It also helps in developing crucial future-proof digital literacy and soft skills like time management and global communication, while providing access to a wider range of global courses and educational resources.**, "**It offers a broad and promising vision of the future of education as long as we are aware of the obstacles and are able to overcome them. Through this analysis, it can be concluded that e-learning has a number of significant advantages that are highly beneficial for the improvement of the teaching and learning process of students. This educational modality not only facilitates access to education at any time and from anywhere but also promotes the development of essential digital competencies in an increasingly technological world. Along these lines, perspectives on e-learning highlight its potential to transform education, but also point to the importance of carefully addressing its implications and challenges in order to maximise its benefits and ensure equitable and quality education for all" (Rueda, Cerero, Cerero, Meneses, 2024**)**

METHOD

Research and development research method uses literature review from an accredited journal platform, to collect data related to the research problems; then analyzing the data by comparing the article in matrices, understanding it by setting the data extraction in a framework, then extracting the research result breakdown in steps

RESULTS AND DISCUSSION

Research purpose results: **a.** Enhance socialization in online learning**, b.** Create group-based learning in online learning**, c.** Build a virtual learning environment in online learning**, e.** create group tasks, guarantee experience and attitude exchange between students **d.** Create motivation by competition in online learning, **f.**Give the teacher the role of consulting and advising, besides teaching

Discussion about the research problems: **a**.Lack of face-to-face communications in online learning**. "**In the educational process, the face-to-face communication approach is undoubtedly effective; it leads to the strengthening of quality human relationships and represents a powerful form of human interaction. Digital technology cannot fully replace the face-to-face approach between teacher and students"(Stoian, Köber, 2022)," This study found that the level of online distance learning barriers experienced by the students were all "high."(Moraleja, Angele, 2022), "As online learning continues to be an area of growth in community colleges, the findings from this study provide information for institutions and college personnel to reflect on, and implement changes to their current practices. This study revealed that there was a difference in students' perceptions of their performance, challenges, satisfaction, and achievement in online and F2F modalities."(Mathera, Sarkans, 2018), **b**.Weakness to perform in group in online learning, "although special attention was paid to relationalcommunication and immediacy in online surroundings, problemswith conversations and social interactions were reported."(Eklund, Isotalus,2024), "The application of cooperative learning in learning places more emphasis on cooperation between students in groups. This is based on the idea that students find it easier to understand and remember a concept of facts if they discuss the problem with each other.

In cooperative learning, students have good behavior because they are motivated to learn and actively engage in various activities. To ensure that students will use time effectively and direct their energy toward productive activities, teacher creativity is needed in the process of learning activities. Online learning systems through cooperative models can provide many opportunities"(Silalahi, Hutauruk, 2020), **c**lose respect of the education process in online

learning:" One of which this study aimed to investigate is whether online learning meets the basic learning needs of students. Since learning is both an emotional and intellectual process which is significant to children and adolescent development, can online learning without social and physical interaction with teachers and peers in an actual school setting meet the students' basic learning needs"(wong, 2020)," Although many researchers do not consider the learning that has taken place during the COVID-19 pandemic to be regular online learning, as mentioned previously, it is expected that the learners will have faced similar barriers to those encountered by the online learners investigated in the previous literature. Researchers have classified these barriers in different ways.

For example, Assareh and Bidokht (2011) highlight four types of barrier, which they outline in detail: (1) The learners themselves, including their access to computers and the Internet, and their confidence in using them, as well as their motivation, financial problems, assessment tools, sense of isolation, and poor skills and experience in distance learning; (2) The teachers, including the adequacy of their knowledge of the e-learning environment and their difficulties with assessment; (3) The curriculum, including vagueness, and a lack of quality and resources, and (4) The school, involving structural factors and support services."(ALSHWIAH, 2021), **d**. lose the group motivation in online learning, "Online education may be very efficient and fruitful, but only if students are highly motivated. As was previously mentioned, many different theoretical frameworks make important contributions to our understanding of and ability to foster student motivation in the context of online education." (Jain, Roy, 2024), **e**.lose attitude transferred by group in online learning, "In this paper, the researchers began by developing an understanding of the classroom environment on students' experience. Significant difference between progressive and traditional environments on all four aspects of experience was not expected. Contrary to expectations, the researchers found that the kind of classroom environment can determine students' co-construction of knowledge, subjective interpretation, the relatedness of real-world, and lastly growth of the experience.

Additionally, the researchers determined that through two principles of experience, interaction, and continuity are influenced by the classroom environment. Interaction influences experience through a discussion-based environment, wherein a student can form an interpretation of his/her experiences based on talking to others"(Mathur, 2022**)**, **f.** lose guidance transferred by teacher leadership," Teacher leadership is a leadership model where power is distributed and authority is realigned within the organisation (Muijs & Harris, 2006). Additionally, teacher leadership is conceptualised as teachers who assume leadership responsibilities outside the classroom"(Kamaruzaman, Musa, Hashim,2020), **Use Research theories to solve the research problems**:**1.** What is different between project-base learning and problem-base learning: Project-based learning (PjBL) focuses on students creating a tangible product or artifact as the outcome of a complex, real-world investigation, while problem-based learning (PBL) emphasizes the process of finding a theoretical or practical solution to an open-ended problem, often resulting in a comprehensive plan or understanding rather than a physical product, "Problem-Based Learning or PBL is a well-known approach among students, educators and researchers. PBL approach, which had been introduced by HowardBarrows, is an innovative teaching strategy where the teaching manner is shifted from teacher-driven to student-driven by emphasizing the development of problem-solving, creativity, and critical thinking skills (Hasna, 2009).

PBL is defined as "the learning which results from the process of working towards the understanding of, or resolution of, a problem" (Barrows & Tamblyn, 1980). For Tan (2003), the current definition of PBL is defined as "a progressive active learning and learner-centred approach where unstructured problems are used as the starting point and anchor for the learning process". As the name implies, PBL begins with a problemand that problem becomes the main focus in PBL, from which all progress, planning, and work done by the students is directed towards solving the problem. PBL was first introduced in medical courses in 1969, and it was

implemented at McMaster University, Canada, and it is now being widely used all over the world. According to Subramaniam (2006), PBL accommodates the environments that encourage the staff's reflection on their personal approach as educators and support the student learning process. PBL is an innovative learning approach that is based on constructivist learning theory, where the learning process is driven by the Students. As PBL has shown its effectiveness, this approach has later been accepted and adopted by various disciplines such as business, mathematics, psychology, and engineering as well. There are many ways to implement PBL in the learning process (Duch, 2001). For instance, the PBL approach can be implemented by utilizing e-learning (Zaidatun et al., 2005).

The PBL approach needs to be modified in order to make sure it is appropriate for particular disciplines. The learning process depends on the educators and how they want to structure the whole model of the PBL approach. In 1992, the PBL approach in engineering education began with the implementation in undergraduate instruction in both introductory and advanced courses in a few subjects by some professors in the University of Delaware, which seemed effective and easy to implement in engineering education (Helerea et., 2008). Nowadays, many universities worldwide have adopted and implemented the PBL approach in their teaching and learning process for engineering subjects. Most of the research on PBL for engineering education in Malaysia started around 2004. From all the research, learning outcomes have been successfully achieved by implementing the PBL approach in the teaching and learning process. Researchers all over the world have proven that the PBL approach is much better than the traditional approach because it produces better and well-equipped students., According to A. Ahmad (2006), the achievement of students from the PBL method in examinations, which is mostly paper-based, is as good as that of students from the traditional methods, and yet they are better in the practical and hands-on activities.

On the other hand, Khairiyah et al. (2005) have proven that students ' generic skills can also be improved through PBL. A comparative study conducted by Hsieh and Knight (2008) on first-year engineering students at the University of the Pacific has proved that PBL is an effective method to bridge the gap between practice and theory. Furthermore, PBL provides higher motivation over the traditional approach, Project-Based Learning (PjBL) is pedagogical approach inspired by John Dewey, an American philosopher, psychologist, and educational reformer, who asserted the imperative of hands-on experience or learning by doing (Lam, 2008) and byforcing students to solve complex and open ended problems, which can significantly improve the integration of knowledge (Lowenthal, 2006). According to Prince and Felder (2006: 14), PjBL is defined as: Project-based learning begins with an assignment to carry out one or more tasks that lead to the production of a final product—a design, a model, a device, or a computer simulation. The culmination of the project is normally a written and/or oral report summarizing the procedure used to produce the product and presenting the outcome. PjBL is well-known among engineering education researchers. Much of the literature reported how they designed and implemented the model of PjBL into teaching and learning, and eventually, they evaluated and assessed the effectiveness of the model.

Many authors stated that PjBL is effective in developing non-technical and technical skills among engineering graduates. The traditional method of teaching for engineering education is not effective anymore because the skills of the 21st-century engineer cannot be developed through this method (Vanasupa et al, 2007). Gradually, this type of approach cannot be used anymore in engineering education as it has become obsolete. López (2007), Noordin, Nabil, Nasir, Farzeeha, Nordin, 2011), "The PjBL method trained the students to learn through a problem-solving process, which was facilitated and monitored by the teacher. The learning process in PjBL class proved positive in developing the students' critical thinking, rebuilding social and cooperative skills, and boosting motivation and enjoyment. (Affandi, Sukyadi, 2016), "there was an effect between problem-based learning and problem-solving skills on the ability in writing scientific articles",(Sari, Sumarmi, Utomo, Astina, 2020). Problem-based

Learning: In PBL, small student groups work on real-life problems, guided by a teacher (Barrows, 1996).

Developed in the late 1960s to reform medical education at McMaster University (Canada), PBL aimed to boost student motivation and learning (Spaulding, 1968; Wijnia & Servant-Miklos, 2019). Involving first-year students with patient-related problems was expected to make learning more meaningful and motivating (Servant-Miklos, 2019; Spaulding, 1969). PBL was further refined at Maastricht University (the Netherlands) and adopted in various curricula and courses worldwide (Servant-Miklos et al., 2019), often with the instructional aim to foster intrinsic motivation and other important outcomes such as knowledge retention and professional skills (Barrows, 1986; Hmelo-Silver, 2004; Norman & Schmidt, 1992).PBL's key features are: (a) starting the learning process with a problem to activate students' prior knowledge and interest in learning; (b) student-centered, active learning; (c) small group collaboration (5 to 12 students); (d) teacher guidance; and (e) self-directed learning with adequate self-study time (Barrows, 1996; Hmelo-Silver, 2004; Schmidt et al., 2009).The problem can be a case, story, visual prompt, or phenomenon that needs explaining (Barrows, 1996).

These problems are designed to be optimally challenging and—combined with appropriate teacher scaffolding—could enhance students' motivational beliefs and values (Belland et al., 2013). Schmidt et al. (2007) provided an example of the problem "Little Monsters" from a clinical psychology course focused on the phenomenon "phobias" (Wijnia, Noordzij, Arends, Rikers, Loyens, 2024). There exists a favorable attitude among students and teachers toward employing the PBL approach in learning. Therefore, future work should consider establishing guidelines for teachers to incorporate the PBL approach in different areas of learning and learning processes",(Almulla, 2020). "Project-based learning has been demonstrated to have a particularly salient impact on the development of students' collaborative skills within the context of high school. The implementation of project-based learning in the existing high school curriculum has been observed to facilitate effective communication and collaborative work among students",(Sappaile, Hartinah, Hendrik, Sumanik, 2025), "PBL classes in both skill domains. The strength of the PBL lies in its ability to present real-world, contextual problems that foster collaboration, creativity, and deep engagement"(.Habibaha, Ibrohima, Susilo, 2025), "One alternative learning method and a widely used method of teaching, such as the project-oriented problem-based learning (POPBL), can help achieve this (Pucher & Lehner, 2011).

Central to the POPBL approach is the idea that learning is most effective when students put theory into practice (Harmer, 2014). POPBL provides opportunities for students to apply knowledge and, at the same tim, gather information. POPBL can be characterized as a teaching and learning model with well-constructed problems that emphasizes student-centered instruction by assigning projects to small groups of students. In terms of learners' knowledge, the majority of students agreed that the project allowed them to develop a deeper understanding of the course (79.7%) and was effective in developing understanding (81.6%). The project allows for application of learning in the classrooms to the community (94.7%), and in turn, increases their awareness of community issues (92%). In addition to this, the project encouraged them to integrate concepts and skills from other disciplines besides the contents learnt from this course (82.5%)"(Alwi, Ruhaya, 2018), "One of the key strengths of PBL lies in its ability to foster interdisciplinary understanding.

By tackling multifaceted problems, students draw upon knowledge from various disciplines, connecting theoretical concepts with practical applications. This integration not only enhances their grasp of subjects but also nurtures a holistic perspective essential for navigating a world characterized by interconnectedness and rapid change. Moreover, PBL nurtures skills that are increasingly valued in today's workforce. Collaborative problem-solving, effective communication, and adaptability are all competencies that students develop through

PBL experiences. These skills are not only crucial for professional success but also for active citizenship and lifelong learning.Furthermore, PBL promotes intrinsic motivation and a sense of ownership over learning. When students are actively involved in defining problems, conducting research, and proposing solutions, they become more invested in their education. This autonomy not only enhances their confidence but also encourages a growth mindset, where mistakes are viewed as opportunities for learning and improvement.In addition to its benefits for students, PBL also transforms the role of educators. Teachers become facilitators and guides, supporting students as they navigate challenges rather than simply delivering content. This shift promotes a student-centered approach that acknowledges the diverse strengths and learning styles of individuals within the classroom"(Ni'mah, Arianti, Suyanto, Putera, Nashrudin, 2024).

There are significant differences in learning outcomes between students who are taught using inquiry learning, problem-based learning, and traditional methods. Students who were prepared using the problem-based learning method had the highest learning outcomes, followed by the inquiry learning method, and the lowest was the traditional method. There is a significant difference in learning outcomes between students with high involvement in learning and those with expected learning outcomes. Students who are highly involved in education will improve their learning outcomes if they are taught using the inquiry learning method. In contrast, students who are now engaged in learning will enhance their learning outcomes if prepared using the PBL method."(Rafiq, Triyono, Djatmiko, 2022). To enhance the students' learning experience, it is crucial to integrate practical exercises, discussions based on current events, and marketing strategies. In terms of the practical value of education, this study combines evaluation research methods, including pre-test and post-test assessments, as well as the NPS and other measurement tools, to evaluate the effectiveness of the intervention.

It validates the effectiveness of the agile teaching model of PBL in enhancing student competencies",(Chueh, Kao, 2024)," Problem-Based Learning (PBL) that was carried out for this group of students could create an interesting and realistic learning environment. The outcomes of the project created by the students undergoing a project-based, On a PBL approach, can be described as having more creative and innovative characteristics as compared to the previous projects. The competition and cooperation between students are stimulating in designing and implementing innovative projects within their groups. The result of the discussion between group members and the project's problem-solving activities during the presentation could give confidence to the students in producing a more creative and innovative project by this group. The facilitator is merely playing the role of a guide and evaluator during the implementation of this course of project. The facilitator's absence once in a while (official purpose) would not disrupt the implementation of the project because students could contact and obtain information through the forum when they are faced with problems and use the URL links provided in CIDOS to search for information, especially those relevant to their project.

PBL gives a positive effect as an encouraging agent for the students to explore knowledge that they already owned and expand its capabilities in learning to solve problems that they face using the knowledge. Students feel more confident, able to communicate, share information, and have the initiative to search for the required information. More importantly, this learning method would be able to engage the learners actively in the learning process" (Krishnan, 2012). " For many years in the UK there has been a sharp division between project-based learning and problem-based learning, with the former adopting a more technical rationalist approach than the latter, which adopts a more Socratic and dialogic approach. In the field of creative, practice-based education, this debate is of considerable importance, since project-based learning is one of the most commonly utilised, yet little theorised, paradigms for structuring the learning experience.

The term project-based learning is broad, far-reaching, and means different things in different countries and different disciplinary arenas. There are many differing approaches, models, and methodologies available (de Graaff and Kolmos 2007, 1–8). Moreover, Project Management is seen as a discipline in its own right, offering a range of tools and techniques for adoption by educators. However, few of these are ideally suited to the kind of small-scale projects undertaken in an educational context. Furthermore, the lack of critical questioning on the subject of 'what it is we do when we do this thing called a project' (Hodgson and Cicmil 2006, 32) means the idea of a project is often not well understood. For many educators, project-based learning is utilised in such a way that it offers little more than an administrative framework for delivering instrumental outcomes. The resultant assessment is then conducted by trying to align the project output with some previously specified learning outcomes",(Hanney, Baden, 2013)," The PjBL-TPS course model, comprising five key elements, including Project Preparation, Pair Cooperation, Production, Evaluation, and Conclusion, provides a comprehensive framework for enhancing the creative thinking of education students.",(Li, Tu, 2024), "Problem-based online learning, integrated projects have succeeded in improvingthe communication skills of students taking MPP courses "(Waluyanti, Santoso,2022), "Overall, this study shows that the PBL method for D&T subjects has an impact on students' collaboration skills."(Ibrahim, Rashid, 2022), "This study demonstrates that the Discovery Learning (DL), Cooperative Learning (CL) and Problem-Based Learning (PBL) models significantly influence the development of students' communication and collaboration skills. Statistical analysis identified PBL as the most effective learning model"(Ningsih, Aman, N asrulloh, 2025). " The result of this research reveals that Problem-Based Learning (PBL) brings a significant impact on students' English speaking skills.

Problems were found to trigger students' active discussion and interaction to identify and find a solution to the assigned problem. While they were interacting with each other, they indirectly practice and develop their oral communication skills"(Putu, Artini, 2020), **2.** Use the research theories to solve research problems by putting a solution for the research results:

Table 1. Comparison between project-based learning and problem-based learning

Project Based Learning vs. Problem Based Learning	
Similarities	
Both PBLs: • Focus on an open-ended question or task • Provide authentic applications of content and skills • Build 21st century success skills • Emphasize student independence and inquiry • Are longer and more multifaceted than traditional lessons or assignments	
Differences	
Project Based Learning	**Problem Based Learning**
Often multi-subject	More often single-subject, but can be multi-subject
May be lengthy (weeks or months)	Tend to be shorter, but can be lengthy
Follows general, variously-named steps	Classically follows specific, traditionally prescribed steps
Includes the creation of a product or performance	The "product" may be tangible OR a proposed solution, expressed in writing or in a presentation
May use scenarios but often involves real-world, fully authentic tasks and settings	Often uses case studies or fictitious scenarios as "ill-structured problems"

Table 2. Analyzing research problems: a.Research problem 1

	Research Problem a.Lack of face-to-face communication in online learning	Research purpose result a.Enhance isolation and disappointment in online learning
Project-based learning	appropriete	It is mandatory to complete the project to communicate deeply with the teacher or colleagues
Problem-based learning	appropriate	It is mandatory to solve the problem to communicate deeply with the teacher

Table 3. analyzing research problems: :b.Research problem 2:

	Research Problem b.Weakness in performing in a group in online learning	Research purpose result b.Enhance the communication and socialization in online learning
Project-based learning	More appropriate	Project-based learning uses student groups to make one project, which will push them to socialize outside the formal online class room
Problem-based learning		

Table 4. analyzing research problems: c.Research problem 3:

	Research Problem c. loss of respect education process in online learning:	Research purpose result c.Build a virtual learning environment for online learning
Project-based learning		
Problem-based learning	More appropriate	Problem-based learning creates the need inside the student to consult their teacher to collect the clues, which makes the student feel the formality of the education process

Table 5. analyzing research problems:d.Research problem 4:

	Research Problem d.lose the group motivation in online learning	Research purpose result d. Create a motivation by competition in online learning
Project-based learning	More appropriate	Project-based learning puts the students in groups, and the competition between the groups creates motivation
Problem-based learning		

Table 6. analyzing research problems: e.Research problem 5:

	Research Problem e.lose attitude transferred by the group in online learning	Research purpose result e.create groupe taske guarantee experience and attitude exchange between students
Project-based learning	More appropriate	Exchanging life experiences and attitudes it can occur while the student cooperates in a project group
Problem-based learning		

Table 7, analyzing research problems: f.Research problem 6:

	Research Problem f.lose guidance transferred by teacher leadership	Research purpose result f.Give the teacher the role of consulting and advising, besides teaching
Project-based learning		
Problem-based learning	More appropriate	In problem-based learning, the teacher will play the role of guidance and advisor or consultant beside the lecturer; these roles will create an area for teacher leadership ship

CONCLUSION

By literature review, the research explored that some of the research problems can be handled by project-based learning, while the remaining can be handled by problem-based learning, so the combination of the two teaching methods is important as follows**: a.** Enhance isolation and disappointment in online learning, an appropriate method is Project-based learning & Problem-based learning**, b.**.Enhance the communication and socialization in online learning**,** an appropriate method is Project-based learning, **c.** Build a virtual learning environment for online learning**,** an appropriate method is Problem-based learning, **d.** Create motivation by competition in online learning**,** an appropriate method is project-based learning, **e.** create group tasks to guarantee experience and attitude exchange between students**,** an appropriate method is Project-based learning, **f.** Give the teacher the role of consulting and advising, besides teaching, an appropriate method is Problem-based learning

REFERENCES

Affandi, Sukyad. (2016). Project-Based Learning and Problem-Based Learning for EFL Students' Writing Achievement at the Tertiary Level. https://doi.org/10.14456/rjes.2016.2

Almulla. (2020). The Effectiveness of the Project-Based Learning (PBL) Approach as a Way to Engage Students in Learning. https://doi.org/10.1177/2158244020938702

ALSHWIAH. (2021). BARRIERS TO ONLINE LEARNING: ADJUSTING TO THE 'NEW NORMAL' IN THE TIME OF COVID-19. https://files.eric.ed.gov/fulltext/EJ1316914.pdf

Alwi, , Ruhaya. (2018). Becoming Socially Responsible: The Implementation of Project-Oriented Problem-Based Learning. DOI: http://dx.doi.org/10.33200/ijcer.478973

Chen, Mokhtar. (2023). Education on quality assurance and assessment in teaching qua. https://doi.org/10.1186/s40537-023-00811-7

Chueh, Kao. (2024). Exploring the impact of integrating problem-based learning and agile in the classroom on enhancing professional competence. https://doi.org/10.1016/j.heliyon.2024.e24887

Danchikov, Prodanova, Kovalenko, Bondarenko. (n.d.). The Potential of Online Learning in Modern Conditions and its Use at Different Levels of Education. https://doi.org/10.37028/lingcure.v5nS1.1442

Eklund,Isotalus. (2024). Having it both ways: learning communication skills in face-to-face and online environments. https://doi.org/10.3389/feduc.2024.1270164

Espinosa, González. (2023). The effect of teacher leadership on students' purposeful learning. https://doi.org/10.1080/23311886.2023.2197282

Ghilay. (2024). Rapid Transition to Online Learning: Faculty Distance Training on LMS, Synchronous/Asynchronous Learning, and Computer-Assisted Assessment. doi:10.5539/jel.v13n6p61

Guo, Saab, Post, Admiraa. (2020). A review of project-based learning in higher education: Student outcomes and measures. https://doi.org/10.1016/j.ijer.2020.101586

Habibaha, Ibrohima, Susilo. (2025). The effect of AI-assisted problem-oriented project-based learning on students' critical thinking and communication skills. https://doi.org/10.22219/jpbi.v8i3.22992

Hanney, Baden. (2013). The problem of projects: understanding the theoretical underpinnings of project-led PBL. https://doi.org/10.1080/14748460.2012.761816

Hwa Koh, Hill. (2009). Student perceptions of group work in an online course: Benefits and challenges. https://www.researchgate.net/publication/285867454_Student_perceptions_of_group_work_in_an_online_course_Benefits_and_challenges

Ibrahim, Rashid. (2022). *Effect of Project-Based Learning Towards Collaboration among Students in the Design and Technology Subject*. https://doi.org/10.5430/wje.v12n3p1

Jain, Roy. (2024). Student Motivation in Online Learning. https://doi.org/10.48047/INTJECSE/V14I1.540

Kamaruzaman, Musa, Hashim. (2020). Teacher Leadership: Concept and Framework. https://doi.org/10.6007/IJARPED/v9-i2/7628

krishnan. (2012). Using PBL Approach to Conduct Project Course in Polytechnic of Port Dickson. https://doi.org/10.7763/IPEDR

Lee. (2024). Online Learning versus Face-to-Face Learning toward Students: Which can be an effective way of Learning Methodology to our current Educational System? https://doi.org/10.17632/m2prrm7c3g.1

Li, Tu. (2024). Developing a Project-Based Learning Course Model Combined with the Think–Pair–Share Strategy to Enhance Creative Thinking Skills in Education Students. https://doi.org/10.3390/educsci14030233

Mathera, Sarkans. (2018). Student Perceptions of Online and Face-to-Face Learning. https://files.eric.ed.gov/fulltext/EJ1207234.pdf

Mathur. (2022). Analysing Student Experience in Classroom Environment. https://doi.org/10.31901/24566322.2022/36.1-3.1212

Moraleja, Angele. (2022). Online Distance Learning Barriers and Their Implication in the Delivery of Instruction in the New Normal. https://doi.org/10.53378/352919

Ni'mah, Arianti, Suyanto, Putera, Nashrudin. (2024). Problem-Based Learning (PBL) Methods Within An Independent Curriculum. https://doi.org/10.61132/sintaksis.v2i4.859

Ningsih, Aman ,Nasrulloh. (2025). Enhancing communication and collaboration skills through discovery, cooperative and problem-based learning models in Social Studies education. https://doi.org/10.1080/2331186X.2025.2500110

Noordin, Nabil, Nasir, Farzeeha, Nordin. (2011). Problem-Based Learning (PBL) and Project-Based Learning (PjBL) in engineering education: a comparison.

https://www.researchgate.net/publication/229036490_Problem-Based_Learning_PBL_and_Project Based_Learning_PjBL_in_engineering_education_a_comparison

Oleo. (2023). Online Learning in University: Pros and Cons of Study. DOI: 10.46843/jiecr.v4i1.455

Putu, Artin. (2020). Does Problem-Based Learning Affect Students' Speaking Skill and Attitude toward ELL? https://doi.org/10.22225/jr.6.2.2315.131-138

Rafiq, Triyono, Djatmiko. (2022). The Integration of Inquiry and Problem-Based Learning and Its Impact on Increasing the Vocational Student Involvement. https://doi.org/10.29333/iji.2023.16137a

Rueda, Cerero, Cerero, Meneses. (2024). Perspectives on online learning: Advantages and challenges in higher education. https://doi.org/10.30935/cedtech/15011

Sappaile, Hartinah, Hendrik, Sumanik. (n.d.). The Impact of Project-Based Learning on Students' Collaboration Skills in Secondary Schools. DOI: 10.55299/ijere.v4i1.1268

Sari, Sumarmi, Utomo, Astina. (2020). The Effect of Problem-Based Learning on Problem Solving and Scientific Writing Skills. https://doi.org/10.29333/iji.2021.1422a

Sharim. (2020). Quality Standards in Online Education. https://doi.org/10.3991/ijet.v15i19.15065

Silalahi,Hutauruk. (2020). The Application of the Cooperative Learning Model during Online Learning in the Pandemic Period. https://doi.org/10.33258/birci.v3i3.xxx

Smith, Sorensen, Gump, Heindel, Caris, Martinez. (2010). Overcoming student resistance to group work: Online versus face-to-face. doi:10.1016/j.iheduc.2010.09.005

Stoian, Köber. (2022). EDUCATION THROUGH VIRTUAL AND FACE-TO-FACE COMMUNICATION. DOI: 10.15405/epes.23045.112

Syakur, Sudrajad, Winurati, Tilwani. (2023). The Motivation of Students and Their Exposure to Learning Loss After the Pandemic. https://doi.org/10.46627/silet.v4i3.348

Waluyanti, Santoso. (2022). Improving Communication Skills Through Problem Project Based and Online Learning Integrated in Mpp Courses. https://doi.org/10.2991/978-2-494069-67-1_22

Wijnia, Noordzij, Arends, Rikers, Loyens. (2024). The Effects of Problem-Based, Project-Based, and Case-Based Learning on Students' Motivation: a Meta-Analysis. https://doi.org/10.1007/s10648-024-09864-3

wong. (2020). When no one can go to school: does online learning meet students' basic learning needs? https://doi.org/10.1080/10494820.2020.1789672

Yemini, Engel, Simon. (2022). Place-based education – a systematic review of literature. https://doi.org/10.1080/00131911.2023.2177260

Zakaria, Khaled. (2019). A Systematic Review of Problem Based Learning in Education. https://www.researchgate.net/deref/https%3A%2F%2Fdoi.org%2F10.4236%2Fce.2019.1012194?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19

Zaki. (n.d.). ADVANTAGES AND DISADVANTAGES OF ONLINE LEARNING. DOI: 10.17719/jisr.2022.75162