International Journal of Teaching and Learning (INJOTEL) e-ISSN: 3025-8308
Vol. 2 No. 1 2024, pages: 1605~1618

THE ROLE OF DIGITALIZATION IN PROJECT BASED CURRICULUM

Andi Irma Sarjani
Universitas Darma Persada, Jakarta, Indonesia
Email: andiirma2210@gmail.com

Abstract

Digitalization in the education curriculum is an effort to support the online learning process without reducing the essence of delivering the material. Online learning is flexible to use, anywhere you can learn without having to meet the teacher. With this, schools can provide a platform that can be used to access student learning every day. School digitalization aims to increase the effectiveness, efficiency and overall quality of education following increasingly advanced technological developments. By implementing digital technology in schools, the learning process can become more interactive, interesting and easily accessible to all students equally. In the educational curriculum there is a project-based learning method which is one of the independent learning programs where learning is carried out collaboratively so that one class is divided into several groups. In project-based learning, students carry out investigations through daily experiences in solving problems from a question asked. It is hoped that from this process students will understand the benefits of learning which will be useful for their future life. The research methodology employed in this article is literature study, which is the process of conducting research using books, relevant journal collections, reports of research findings from earlier research, or other types of literature (library). The definition of digitalization in the context of education curricula, project-based learning, and its significance in the age of digitalization are all covered in this study.

Keywords: Digitalization, Curriculum, Project-Based Learning

INTRODUCTION

Boss, S., & Krauss, J. (2022) stated that Project Based Learning is a learning approach that makes students the center of learning. This method also focuses on the process of having a final result in the form of a product or service (depending on what problem is given). So students are given the freedom to determine their own learning activities to create results in the form of a product. A lot of this strategy depends on what the students do in class. As a result, students will work together to design, develop, and produce solutions to the problems that are presented.

The current development of digital technology has changed the role of humans in all dimensions of life, including in the fields of education and learning. Technology for learning has become more and more integral to the process of teaching and learning. For the education sector to grow and be able to stay up with advancements in other domains, innovation is essential. Technology use offers both advantages and disadvantages (Alam, A. 2022).

If there is good cooperation from different parties, the impact can be concentrated on positive things and minimize negative things so that the use of technology fulfills its objectives. The use of technology as a medium in learning has opened new doors to enrich students' learning experiences and facilitate the development of their cognitive skills. One of the cognitive skills that is very important in the educational context is critical thinking and problem solving skills. A different approach to education in the digital age is through digital pedagogy, which strives to create young people with the social intelligence, adaptability, and critical thinking needed to meet the demands of the industrial age. 4.0 (Safaruddin et al. al., 2020).

Critical thinking and problem solving skills are cognitive abilities that involve information processing, analysis, evaluation, and logical and rational decision making. These skills are necessary to face complex challenges in everyday life, both in academic and professional contexts. However, improving students' critical thinking and problem solving skills is still a challenge for the education system. Technological developments make the learning process easier and searching for various learning resources, because today's learning is no longer limited by space and time (Mohanty et al., 2021).

Everyone can access it by using technology. For this reason, using technology as a learning medium can be an effective tool in improving students' critical thinking and problem solving skills. Learning technology provides a variety of interactive resources, simulations, games, and evaluation tools specifically designed to engage students in authentic critical thinking and problem-solving activities. The use of learning technology provides a learning environment that supports the development of these skills in ways such as: access to extensive information, where learning technology allows students to access diverse and up-to-date information resources. This helps them develop analytical skills to collect and evaluate information from various sources. Optimizing the use of learning media is carried out by understanding the characteristics of the media and learning needs, so that educators need to innovate when faced with limited facilities or other technical obstacles (Kalimullina, et al., 2021). Teachers can make the most of all the tools at their

disposal to impart knowledge, including the environment, in order to convey genuine material in a way that is relevant to the students.

In the era of the 21st century which is marked by advances in information and communication technology, the role of technology as a learning medium has become very significant. In the context of education, technology has changed the way we access information, interact and learn. The use of technology in learning has provided new opportunities for students and teachers to improve the quality of learning and achieve better results. Technology as a learning medium in the 21st Century era plays an important role in several important aspects, such as accessibility, interactivity, personalization, collaboration and digital skills development (Bygstad et al., 2022).

Technology allows easy access to online learning resources, such as e-books, interactive learning materials, videos, and other digital resources. Students can access learning materials from anywhere and at any time, overcoming geographical and time constraints. Technology provides opportunities for students to interact directly with learning materials through various interactive tools, such as simulations, educational games, interactive videos, and online learning platforms. This allows students to actively engage in learning and understand concepts in depth. Technology enables personalization of learning by providing an adaptive learning platform that can adjust materials, assignments, and feedback based on individual student needs and level of understanding. This helps students to learn at their own pace and according to their learning style (Haleem et al., 2022).

Students are encouraged to become independent workers, critical thinkers, and lifelong learners by utilizing a project-based approach that integrates technology and real-world challenges into the learning process. Project-based curriculum teaches students how to collaborate as well as how to study. In addition to speaking with parents or guardians of pupils, teachers can converse and share ideas with one another. This can also break down various invisible barriers such as fear of starting something new, to invisible boundaries in the classroom.

RESEARCH METHOD

The research methodology employed in this article is literature study, which is the process of conducting research using books, relevant journal collections, reports of research findings from earlier research, or other types of literature (library).

A methodical and iterative strategy was used to acquire a full understanding of the role of digitalization in project-based curriculum during the literature search for this extensive review. Clearly defining the scope of the literature study, identifying key themes including the theoretical framework, optimization techniques, social and cultural variables, and practical implementation recommendations are among the first steps (Paré & Kitsiou, 2015).

RESULT AND DISCUSSION

Definition of Digitalization in the Education Curriculum

Schmidt, J. T., & Tang, M. (2020) stated that digitalization in the education curriculum is an effort to support the online learning process without reducing the essence of delivering the material. Online learning is flexible to use, anywhere you can learn without having to meet the teacher. With this, schools can provide a platform that can be used to access student learning every day.

The concept of school digitalization is the process of using digital technology to improve the quality of education, starting from the learning process, school administration, interactions between students, teachers, parents and school staff, to school management. This concept involves a complete transformation from conventional teaching methods to a more interactive, responsive and technology-oriented model (Kovalchuk et al., 2023).

The Ministry of Education, Culture, Research, and Technology also approved the digitization of schools as a program to get them ready for the coming era of Industrial Revolution 4.0. the Ministry of Education and Culture, Research and Technology's program for digitizing schools, will not eliminate the face-to-face learning process because face-to-face learning is still important and irreplaceable. The implementation of school digitalization will focus more on enriching learning with sophisticated digital content that will attract students' interest (Kalimullina et al., 2021).

The government's school digitalization program is also supported by increasing teacher competency, especially in the field of ICT mastery. This is important to implement because teachers are the spearhead that determines the success of school digitalization programs (Khoza, S. B., & Mpungose, 2022).

School digitalization aims to increase the effectiveness, efficiency and overall quality of education following increasingly advanced technological developments. By implementing digital technology in schools, the learning process can become more interactive, interesting and easily accessible to all

students equally. Apart from that, school administration and management activities have also become more integrated (Frolova et al., 2020).

Implementing the concept of school digitalization can bring significant benefits to education in Indonesia. According to Mertala, P. (2020), the benefits of school digitalization include:

1. Increase Accessibility
   The digitalization of schools allows for easier accessibility to educational resources. Students and teachers can access various resources from anywhere and at any time via digital devices equipped with an internet connection.
2. Increase Student Engagement
   With interactive learning methods, such as the use of educational applications and Learning Management System platforms such as Jelajah Ilmu, students can be more actively involved in the learning process compared to traditional learning methods, where students only passively listen to explanations from the teacher (
3. Administrative processes become more efficient
   As discussed at the beginning, the school digitalization process is not only applied to learning, but also to school administration. With digitalization, school administration management such as student data management, assessment and reporting can be done automatically using an integrated system so that it is more efficient.
4. Enables More Effective Teacher Collaboration
   The existence of a digital platform can facilitate collaboration between teachers, so that they can share ideas, educational resources, and learning plans or methods more effectively.
5. Increase Involvement of Parents and Students
   One important aspect of education is the involvement of students' parents. Parents of students have an obligation to monitor their child's educational progress during the learning period. With digitalization, parents can be more actively involved and access information regarding their children's academic development and behavior in real-time (Kornelakis, A., & Petrakaki, 2020).

According to Erstad et al., (2021) the implementation of school digitalization can be done in various ways, for example as follows:

1. Use of Learning Applications
   Schools use mobile or web-based learning applications to provide materials, assignments and exams to students.

2. Use of Technology Devices in the Classroom
   Use of computers, smartphones, tablets, or other technological devices as a means to support more interactive learning in the classroom.

3. Administrative Management with an Integrated System
   Implementation of an integrated school management system that includes management of student data, schedules, attendance, assessments, and reporting student learning results to parents.
4. Distance Learning
   The use of online learning platforms to enable distance learning via video conference, especially when there is an emergency situation or to increase accessibility for all students (Volungeviciene et al., 2020).

Project Based Learning

In the educational curriculum there is a project-based learning method which is one of the independent learning programs where learning is carried out collaboratively so that one class is divided into several groups. In project-based learning, students carry out investigations through daily experiences in solving problems from a question asked. It is hoped that from this process students will understand the benefits of learning which will be useful for their future life. Project-based learning methods conflict with traditional learning which relies on lectures and memorization. In this method, teachers are really needed who think and act creatively to make the learning atmosphere enjoyable so that students are more enthusiastic when learning (Kokotsaki et al., 2016).

Menurut Krajcik, J. S., & Blumenfeld, P. C. (2006) pembelajaran berbasis The project has several principles, namely:

1. The core of the curriculum is project work, as the centralized principle highlights. Project work teaches students the fundamentals of knowledge. So project work is not artificial or additional and practical application but is central to learning activities in the classroom.
2. The principle of guiding questions means that project work begins by focusing on "questions or problems" that encourage students to try to obtain certain concepts or principles.
3. The principle of constructive investigation is a process that leads to achieving goals, which contains inquiry activities, concept building, problem solving, and decisions.

4. The autonomy concept suggests that students are accountable, autonomous, free to make their own decisions, and able to complete the learning process with little direction. 5) The realistic principle states that the endeavor is not fictional and has a real-world connection.
5. Students create a real project and focus on authentic problems, and not simulations.

Project-based learning seems to be almost oriented towards the CTL Contextual Teaching Learning learning model discovered by John Dewey (1916) where the learning process involves full student involvement in discovering the material being studied and connecting it with real life so that students not only get information from the teacher but also search for it. information on lesson material alone or with a group. There are several benefits and advantages of the CTL learning model, namely that students are more sensitive to the environment because they gain experience while studying, gaining skills that can be used for the future. Apart from that, CTL places more emphasis on mastering the material rather than pursuing high grades. CTL has 7 components as the foundation for implementing the learning process (Condliffe, 2017).

Constructivism, namely: a learning process that emphasizes building understanding actively, creatively based on previous understanding from learning experiences. Inquiry is a search and discovery process with the steps of formulating a problem, asking questions, making allegations, collecting data, and concluding.

From this learning community, students will realize that humans remain social creatures, in essence a problem cannot be solved alone but requires the help of other people. By communicating with other people, students can form understanding and knowledge. Learning is obtained from the results of collaboration with other people.

Modeling the learning process is demonstrating, imitating something from an expert or from something seen during observation in the CTL model, not only the teacher. This way of learning will be easier to understand than listening to stories. Reflection is the process of recalling experiences, lessons that have been learned by sequencing events in learning material that has been passed previously (Larmer et al., 2015).

Real assessment, namely collecting data that can see student progress, assessment is not only carried out by teachers but can be carried out by friends or group members. Assessments are carried out to find out whether students are really learning or not, learning experiences have a positive influence on

intelligence, mentality and good attitudes. And can the skills learned really be used for future preparation?

Project-based learning offers great potential in increasing educational effectiveness. By providing students with more in-depth and relevant learning experiences, we can help them develop the skills and knowledge necessary to succeed in the real world. However, to achieve the full potential of this approach, collaborative efforts from various parties, including teachers, schools, and communities, are essential. Only by working together can we create a more dynamic, inclusive and effective education for all students.

Project-based learning has a number of important benefits. The following are the benefits of project-based learning according to Kwietniewski, K. (2017), namely:

1. Formation of Practical Experience
   Through Project Based Learning, students gain hands-on experience in applying their knowledge and skills in real-world situations. This helps them understand the relationship between theory and practice, and provides a more concrete context for their learning.
2. Active Learning
   In Project Based Learning, students can be involved in planning, implementing, and evaluating their own projects. This helps students' in-depth understanding of the subject matter.
3. Development of Critical Thinking Skills
   Students are encouraged to use critical thinking skills when tackling challenging projects through project-based learning. They have to make judgments, solve issues, and assess the outcomes of their work, which helps them develop their critical thinking abilities. Students get the ability to apply their knowledge in practical settings, which aids in the development of critical thinking abilities needed for success in the real world.
4. Formation of Collaboration and Social Skills
   Projects in PBP often involve teamwork or collaboration between students. This helps them develop communication, teamwork, negotiation and leadership skills that are important in the world of work and everyday life.
5. Life Skills Development
   In addition to academic knowledge, PBP also helps students develop important life skills such as time management, problem solving, research skills, problem solving, creative thinking, and interpersonal skills. This helps them be better prepared to face challenges in the real world after they graduate.

Even though project-based learning has many benefits, according to Kolmos, A. (2009) there are challenges that need to be faced in implementing it. The following are the challenges and efforts that can be made to overcome them:

1. Lack of Training for Teachers
   Teachers need to have sufficient skills in designing, managing and evaluating projects in the curriculum. A possible solution is that schools can provide training for teachers to help them develop the skills and knowledge needed to implement Project Based Learning. They can also facilitate collaboration between teachers to share ideas, resources, and best practices in project-based learning.
2. Time and Resource Management
   Implementing Project Based Learning requires efficient time and resource management. The solution that can be taken is that teachers must carry out project planning carefully before starting to implement it, teachers must make a realistic schedule and ensure that each stage of the project is completed according to the deadline that has been set, and teachers must prioritize the most important resources for projects. the.
3. Appropriate Evaluation of Learning Effectiveness
   Teachers must ensure that the project-based learning carried out can achieve the learning objectives and expected results. A possible solution is to use formative evaluation during the learning process to provide continuous feedback to students and summative evaluation to assess the final results of the project.

The Importance of Project Based Learning in the Era of Digitalization

The project-based learning approach has become a major concern in the world of education. In this digital era that continues to develop rapidly, project-based learning is becoming increasingly relevant and important. This article will explain why project-based learning is very important in the digital era and how this approach can provide significant benefits for students (Rini, T. A., & Cholifah, 2020)

A learning strategy known as "project-based learning" places students in actual projects or real-world scenarios. Under project-based learning, students research, examine, and create products or solutions pertaining to a particular subject in groups. These projects are designed to encourage deep understanding, collaborative skills, creativity, problem solving, and application of knowledge in real-world contexts (Damayanti et al., 2023).

The benefits of Project Based Learning in the Digital Era according to Žerovnik, A., & Nančovska Šerbec, I. (2021) are as follows:

1. Increases student engagement: Project-based learning offers active and relevant learning experiences for students. In a digital context, students can use a variety of exciting tools and technologies to investigate, design and present their projects. This increases student engagement, learning motivation, and deeper understanding.
2. Develop 21st century skills: In a digital era dominated by technology, students need to develop relevant 21st century skills. Project-based learning provides opportunities for students to hone critical, creative, collaborative, communicative and problem-solving skills. Students learn to think critically, overcome challenges, work together in teams, communicate effectively, and use technology wisely.
3. Building deep understanding: Through project-based learning, students gain a deeper understanding of the topic being studied. They engage in active exploration, research, data analysis, and application of knowledge in real contexts. This helps students build a richer and more sustainable understanding of the subject matter.
4. Improve teamwork skills: Project-based learning involves collaborative teamwork. Students learn to work together in groups, share ideas, communicate, appreciate the contributions of each team member, and achieve goals together. The teamwork skills developed through project-based learning are invaluable in the professional world of the future.

Although project-based learning has significant benefits, there are also challenges that need to be overcome according to Васильева, О. И., Алексеева, Ю. А., & Редько, С. Г. (2022), namely:

1. Technology management: Using technology in project-based learning requires adequate technological skills and knowledge from educators. This challenge involves selecting, integrating, and managing appropriate technology tools and applications.
2. Comprehensive evaluation: Evaluation in project-based learning must include aspects of student knowledge, skills and attitudes. Developing effective and comprehensive evaluation instruments is a challenge that needs to be overcome.
3. Time management: Projects in project-based learning can take longer than traditional learning. Effective approaches to managing time and ensuring projects are completed on time need to be considered.

4. Collaboration and group dynamics: Teamwork in project-based learning requires effective collaboration and healthy group dynamics. Building collaborative skills and resolving conflict within groups is a challenge that must be overcome.

To implement effective project-based learning in the digital era, here are several steps that can be taken according to Ulyawati, U., & Sugito, S. (2022), namely:

1. Careful planning: Planning the project clearly and in detail is an important step. Learning objectives, assigned tasks, required resources, and time required must be carefully considered.
2. Use of relevant technology: Selecting technology tools and applications that suit the learning and project objectives is the key to success. Educators need to explore a variety of relevant digital resources and tools to support project-based learning.
3. Training and support for educators: Providing adequate training and support to educators is essential. They need to be given a good understanding of project-based learning concepts, relevant technology skills, and effective classroom management strategies.
4. Student-centered learning: Project-based learning should be student-centered. They should be given the autonomy to manage their own projects, choose topics of interest, and have the freedom to put forward ideas and solutions.
5. Reflection and feedback: Providing opportunities for students to reflect on their projects and receive constructive feedback is important. The reflection process helps students identify strengths and weaknesses and develop better understanding.

In an ever-evolving digital era, Students have a priceless opportunity to acquire 21st century skills and get ready for a digital future through project-based learning. By overcoming existing challenges and implementing the right approach, project-based learning can provide meaningful and relevant learning experiences for students.

CONCLUSION

Digitalization in the education curriculum is an effort to support the online learning process without reducing the essence of delivering the material. Online learning is flexible to use, anywhere you can learn without having to meet the teacher. With this, schools can provide a platform that can be used to access student learning every day. School digitalization aims to increase the

effectiveness, efficiency and overall quality of education following increasingly advanced technological developments. By implementing digital technology in schools, the learning process can become more interactive, interesting and easily accessible to all students equally. Apart from that, school administration and management activities have also become more integrated.

In the educational curriculum there is a project-based learning method which is one of the independent learning programs where learning is carried out collaboratively so that one class is divided into several groups. In project-based learning, students carry out investigations through daily experiences in solving problems from a question asked. It is hoped that from this process students will understand the benefits of learning which will be useful for their future life. Project-based learning methods conflict with traditional learning which relies on lectures and memorization. In this method, teachers are really needed who think and act creatively to make the learning atmosphere enjoyable so that students are more enthusiastic when learning.

The benefits of Project Based Learning in the Digital Era are as follows:

1. Increase student engagement
2. Develop 21st century skills
3. Build a deep understanding
4. Improve teamwork skills

REFERENCES

Alam, A. (2022, April). A digital game based learning approach for effective curriculum transaction for teaching-learning of artificial intelligence and machine learning. In *2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS)* (pp. 69-74). IEEE.

Васильева, О. И., Алексеева, Ю. А., & Редько, С. Г. (2022). The Project-Based Approach in Organizing Cooperation Between Business Institutions and Technical Universities in Digitalization Conditions. *Социология науки и технологий*, *13*(2), 135-149.

Boss, S., & Krauss, J. (2022). *Reinventing project-based learning: Your field guide to real-world projects in the digital age*. International Society for Technology in Education.

Bygstad, B., Øvrelid, E., Ludvigsen, S., & Dæhlen, M. (2022). From dual digitalization to digital learning space: Exploring the digital transformation of higher education. *Computers & Education*, *182*, 104463.

Condliffe, B. (2017). Project-Based Learning: A Literature Review. Working Paper. *MDRC*.

Damayanti, S., Nanggala, A., & Suryadi, K. (2023, December). Building Smart And Good Young Citizens Through Project-Based Learning In Civic Education As A Means Of Preventing Cyberbullying In The Digitalization Era. In *International Seminar* (Vol. 5, pp. 113-124).

Erstad, O., Kjällander, S., & Järvelä, S. (2021). Facing the challenges of 'digital competence' a Nordic agenda for curriculum development for the 21st century. *Nordic Journal of Digital Literacy*, *16*(2), 77-87.

Frolova, E. V., Rogach, O. V., & Ryabova, T. M. (2020). Digitalization of education in modern scientific discourse: new trends and risks analysis. *European journal of contemporary education*, *9*(2), 313-336.

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, *3*, 275-285.

Kalimullina, O., Tarman, B., & Stepanova, I. (2021). Education in the context of digitalization and culture. *Journal of Ethnic and Cultural Studies*, *8*(1), 226-238.

Khoza, S. B., & Mpungose, C. B. (2022). Digitalised curriculum to the rescue of a higher education institution. *African Identities*, *20*(4), 310-330.

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving schools*, *19*(3), 267-277.

Kolmos, A. (2009). Problem-based and project-based learning. *University science and mathematics education in transition*, 261-280.

Kornelakis, A., & Petrakaki, D. (2020). Embedding employability skills in UK higher education: Between digitalization and marketization. *Industry and Higher Education*, *34*(5), 290-297.

Kovalchuk, V. I., Maslich, S. V., & Movchan, L. H. (2023). Digitalization of vocational education under crisis conditions. *Educational Technology Quarterly*, *2023*(1), 1-17.

Krajcik, J. S., & Blumenfeld, P. C. (2006). *Project-based learning* (pp. 317-34). na.

Kwietniewski, K. (2017). Literature review of project based learning.

Larmer, J., Mergendoller, J., & Boss, S. (2015). *Setting the standard for project based learning*. Ascd.

Mertala, P. (2020). Paradoxes of participation in the digitalization of education: A narrative account. *Learning, Media and Technology*, *45*(2), 179-192.

Mohanty, A., Alam, A., Sarkar, R., & Chaudhury, S. (2021). Design and development of digital game-based learning software for incorporation

into school syllabus and curriculum transaction. *Design Engineering*, *8*, 4864-4900.

Pare, G., Trudel, M. -C., Jaana,M. dan Kitsiou, S., 2015. Synthesizing Information Systems Knowledge: A Typology of Literature Reviews. *Information & Management*, 52, 183-199

Rini, T. A., & Cholifah, P. S. (2020). Electronic module with project based learning: Innovation of digital learning product on 4.0 era. *Teknologi Pendidikan*, *5*(2), 155-161.

Safaruddin, S., Ibrahim, N., Juhaeni, J., Harmilawati, H., & Qadrianti, L. (2020). The effect of project-based learning assisted by electronic media on learning motivation and science process skills. *Journal of Innovation in Educational and Cultural Research*, *1*(1), 22-29.

Schmidt, J. T., & Tang, M. (2020). Digitalization in education: challenges, trends and transformative potential. *Führen und Managen in der digitalen Transformation: Trends, Best Practices und Herausforderungen*, 287-312.

Ulyawati, U., & Sugito, S. (2022). Digitization of Elementary School Science Learning In The Industrial Era 4.0. *AL-ISHLAH: Jurnal Pendidikan*, *14*(2), 2049-2064.

Volungeviciene, A., Tereseviciene, M., & Ehlers, U. D. (2020). When Is Open and Online Learning Relevant for Curriculum Change in Higher Education? Digital and Network Society Perspective. *Electronic journal of e-Learning*, *18*(1), 88-101.

Žerovnik, A., & Nančovska Šerbec, I. (2021). Project-based learning in higher education. *Technology supported active Learning: Student-centered approaches*, 31-57.