

Project-Based Learning Through a Heutagodic Approach in Higher Education: Challenges, Technology and Implementation

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ABSTRACT

This study explores the implementation of Project-Based Learning (PBL) with a heutagodic approach in universities to enhance student autonomy and critical thinking. An explanatory sequential mixed-methods design was used, combining quantitative surveys with qualitative interviews, observations, and document analysis. The study involved 150 students from three universities in West Java. Quantitative data were analyzed using descriptive statistics in IBM SPSS 24, while qualitative data were examined through thematic analysis and triangulation techniques. Findings indicate that PBL with a heutagodic approach follows seven systematic steps: problem identification, learning objective formulation, project strategy planning, information collection, project execution, presentation of results, and reflection. This method significantly enhances students' critical thinking, creativity, and independent learning skills. However, challenges include limited technological resources, the need for more structured lecturer guidance, and student time management issues. Technological tools such as Google Classroom, Zoom, and presentation software support PBL effectiveness, though unequal access to technology remains a constraint. Addressing these challenges requires institutional investment in infrastructure, faculty training, and policy development to foster autonomous and collaborative learning environments. The findings provide insights for higher education institutions on optimizing heutagodic-based PBL to develop graduates equipped with the skills needed in the modern workforce.

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1. INTRODUCTION

Higher education faces the demands of producing graduates who not only possess academic competence but also critical thinking skills, creativity, collaboration, and independence. Higher education is faced with increasingly complex challenges in preparing graduates who are adaptive to changing times, especially in the era of the Industrial Revolution 4.0 (Limeri et al., 2019). The curriculum in higher education views the traditional model with a pedagogical approach as no longer relevant to the needs and objectives of learning (Gregory et al., 2018). One of the learning approaches currently widely used to answer this challenge is *Project-Based Learning* (PBL). PBL provides opportunities for students to actively learn through hands-on experience, complete projects that are relevant to real life, and develop 21st-century skills (Kemp et al., 2019). However, to face the complexity of the ever-changing modern world of work, learning approaches need to be updated to be more adaptive and flexible. One of the innovations that is developing is integrating *the heutagogy* approach into PBL.

In recent years, the emphasis on project-based learning (PBL) in higher education has been increasing (Lasauskiene & Rauduvaite, 2015). This is in line with the demands of curriculum development and responsibility for improving the main performance indicators of postgraduate study programs in higher education. It is worth noting that the learning approach has shifted in higher education over the past five decades from andragogy to heutagogy (Sidhu et al., 2023). The heutagogy approach can be utilized as a viable teaching and learning framework to help adult postgraduate learners develop basic competencies in their postgraduate studies (Sidhu et al., 2023). In this context, educators must continue to innovate and adapt their teaching strategies through the provision of a challenging, learner-centered environment to meet the needs of contemporary learning.

In the context of higher education, *Project-Based Learning* (PBL) and heutagogy are two complementary approaches in building student-centered learning. PBL, as a project-based learning method, emphasizes the development of problem-solving skills through real-world projects involving collaboration and the application of knowledge (Shamansurovna et al., 2023). On the other hand, heutagogy, known as autonomous learning, emphasizes on students' ability to learn independently, manage their own learning process, and explore learning objectives more flexibly (Majid et al., 2023). In the context of PBL, heutagogy offers great potential to encourage students to be more active, innovative, and able to make the most of technological resources to achieve optimal results.

The implementation of PBL through a heutagogy approach in higher education faces various challenges, ranging from the lack of understanding and skills of lecturers to the limitations of technological infrastructure. Many lecturers are still familiar with traditional learning methods, so special training is needed to understand the concept of heutagogy and how to integrate it in PBL (La Rotta et al., 2020). On the other hand, students also need to be accompanied to develop metacognitive skills in order to be able to undergo independent learning effectively. In addition, while educational technologies such as online platforms and collaborative tools offer great opportunities to support flexible, data-driven project-based learning, unequal access to technology is a barrier that needs to be overcome (Stentiford & Koutsouris, 2021). The success of this implementation also requires institutional support in the form of supportive policies, resources, and evaluation systems, including curriculum changes and more flexible teaching times (Gregory et al., 2018).

A number of studies have explored the integration of problem-based learning and heutagogy in education across various disciplines. Investigations investigating the effectiveness of PjBL with a heutagogy approach can improve student autonomy (Peredo, 2022), motivation (Lastariwati et al., 2022), in-depth understanding of subject matter (Rahmasari et al., 2020), critical thinking skills (Heilala et al., 2023), and lifelong learning environments (Blaschke, 2017). Researchers have also explored how faculty members can adapt teaching strategies to support heutagogy principles (Kim, 2022) and how this approach affects students' perception of their own learning process (Ramkissoon et al., 2020). Although some studies have examined heutagogy and PBL separately, few have focused on the combined implementation of the two in higher education, particularly regarding technology challenges and institutional support.

This research is expected to make a significant contribution in bridging the gap regarding the integration of Project-Based Learning (PBL) and heutagogic in higher education, especially in the context of technological challenges and institutional support. The implications of this study are expected to provide an overview of the development of more adaptive and innovative learning strategies, which not only improve students' autonomy, motivation, and critical thinking skills, but also strengthen institutional support for the sustainability of their implementation. Benefits include the creation of a more holistic and inclusive learning environment, where students can develop as lifelong learners who are able to face global challenges with more confidence.

2. METHODS

This study is a mixed method with a *sequential explanatory* design, where quantitative methods are used in the early stages to explore information broadly, followed by qualitative methods to deepen information and strengthen findings (Creswell & Creswell, 2018). The research was conducted in three universities, namely Singaperbangsa University Karawang, Buana Perjuangan University of Karawang, and Nusantara Islamic University Bandung.

The sampling technique uses *stratified random sampling* to ensure a balanced representation of the three universities. The sample consisted of 150 students, with each college contributing 50 randomly selected respondents. The research procedure includes instrument preparation, questionnaire distribution, survey data collection, qualitative interviews, and data analysis.

Quantitative data were collected using a 5-point Likert scale closed questionnaire designed to measure students' perception of the effectiveness of PBL with the Heutagogi approach, the challenges faced, the use of technology, and the level of satisfaction and learning outcomes. The questionnaires were distributed offline to increase participation and ensure the validity of the data by providing an opportunity for researchers to explain direct instructions to respondents.

For qualitative data, interviews were conducted with subjects selected by *purposive sampling* from the survey results, involving 6 students (2 from each university, including male and female representatives). Interviews are conducted face-to-face using semi-structured guidelines to explore students' experiences, challenges, and views related to PBL and Heutagogy. In addition, observations are made to see first-hand project-based learning activities, while documentation collects supporting data such as activity notes and other relevant documents. Quantitative data were analyzed using descriptive analysis assisted by IBM SPSS version 24, while qualitative data was analyzed through triangulation, coding techniques, and thematic analysis to identify key themes. The qualitative analysis process is also supported by artificial intelligence technology (Chat-GPT) to ensure accuracy and efficiency in processing data.

3. FINDINGS AND DISCUSSION

3.1 Findings

Based on the findings through interviews, observations and document studies, 7 steps of Project Based Learning (PBL) through the Heutagogic approach in higher education were identified, including 1) Problem or Project Identification; 2) Formulate learning objectives; 3) Designing a project completion strategy; 4) Information Collection and Research; 5) Project Implementation; 6) Presentation and Evaluation of Results; and 7) Continuous Reflection and Learning.

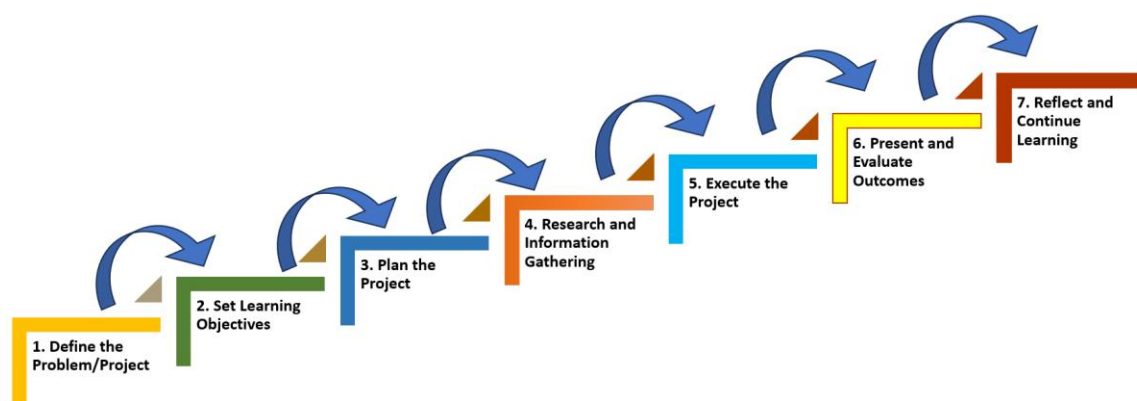


Figure 1. 7 Steps Of Project Based Learning (PBL) Through A Heutagogi Approach In Higher Education

According to the results of interviews with students at Buana Perjuangan University, the advantages of the heutagogic-based PBL flow lie in its flexibility, collaboration and autonomy. This is explained in the following interview results:

“The learning applied is indeed challenging but explores potential. With community-based learning integrated with heutagogi, learning becomes more flexible where we as students have the freedom to determine the direction of the project according to their interests and needs, so that they feel more motivated. This approach also encourages collaboration with teammates, allowing students to develop collaboration skills while still maintaining individual autonomy in decision-making. In addition, the reflection process applied helps students instill a lifelong learner mindset, encouraging them to continuously evaluate and improve themselves. Technology is also an important element, empowering students with various digital tools that support the learning process effectively and efficiently, especially in accessing resources and communicating across time and location”.

Meanwhile, the results of the survey through the questionnaire showed that most students showed a positive perception of the effectiveness of Project Based Learning (PBL) with the Heutagogi approach.

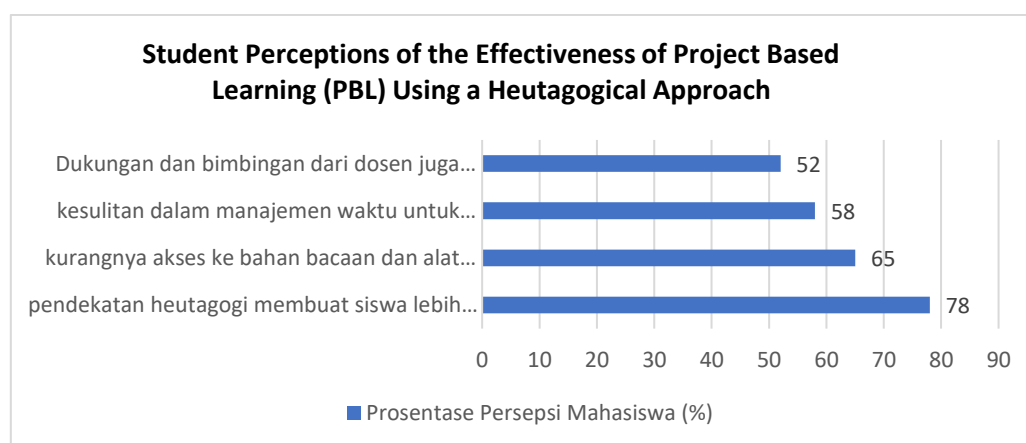


Figure 2. Student Perception of the Effectiveness of Project-Based Learning (PBL) with a Heutagogi Approach

Quantitative data showed that 78% of respondents strongly agreed that this approach made them more active in the learning process. However, several challenges are faced in the implementation of PBL. The main challenges identified by students included limited resources, where 65% of respondents stated that lack of access to reading materials and technological tools hindered the learning process. In

addition, 58% of students admit difficulties in time management in completing projects effectively, especially when they have multiple assignments from other courses. Support and guidance from lecturers were also felt inadequate by 52% of respondents, which led to confusion in completing the project.

In terms of the use of technology, students generally recognize the importance of technology in supporting PBL with a Heutagogi approach. As many as 70% of respondents use online communication tools such as WhatsApp and Zoom to collaborate with their teams. In addition, 62% of students utilize learning platforms such as Google Classroom or Moodle to access materials and collect assignments. As many as 55% of respondents use presentation tools such as PowerPoint and Canva to convey the results of their projects. The data also showed a fairly high level of satisfaction among students with the Heutagogi approach to PBL, with 72% of respondents stating that they were satisfied or very satisfied with their learning experience. In qualitative interviews, students revealed that this approach allows them to learn more deeply and practice the theories learned in real-life situations. Learning outcomes also showed improvement, with 68% of respondents reporting that they felt better prepared to face the challenges of the world of work. In an interview with a student of the University of Singapore Karawang, it was stated that:

"I feel that PBL's approach with Heutagogi is very helpful for us to learn independently, especially in utilizing technology. Team collaboration has become easier with WhatsApp and Zoom, and we can also access materials more flexibly through Google Classroom. Additionally, the use of tools like Canva and PowerPoint makes presentations more creative. I became more confident to face the world of work because this learning process really taught us how to think critically and solve problems in real situations."

The implementation of PBL through the Heutagogi approach in three universities shows variations in approaches and results. Some of the factors that affect this implementation include institutional support and the readiness of lecturers and students. Universities with strong institutional support, such as the provision of facilities and training for lecturers, tend to have more successful implementations. The level of readiness of lecturers and students in adopting this new method also has a significant effect on the success of implementation. Colleges that provide more intensive training and guidance show better results.

Project-Based Learning through the Heutagogic approach in higher education has great potential to improve students' skills and learning outcomes, although there are several challenges that need to be overcome. The use of technology, institutional support, and the readiness of lecturers and students are key factors in the successful implementation of this method. The results of this research can be the basis for the development of more effective policies and strategies in implementing PBL with a Heutagogi approach in higher education.

3.2 Discussion

Project Based Learning (PBL) through the Heutagogic approach in higher education is a student-centered learning method, where they have greater control over their own learning process. This approach emphasizes the development of independent learning skills, critical thinking, and problem-solving skills through relevant and real projects (Yoto et al., 2022). Project-Based Learning (PBL) integrated with the Heutagogical approach in higher education involves a structured process consisting of seven main steps which include: 1) Problem or Project Identification; 2) Formulate learning objectives; 3) Designing a project completion strategy; 4) Information Collection and Research; 5) Project Implementation; 6) Presentation and Evaluation of Results; and 7) Continuous Reflection and Learning.

The initial stage begins with the identification of a problem or project, where students are given the freedom to choose topics relevant to their interests, but still receive minimal guidance from lecturers. This approach encourages independent learning and the development of critical thinking

skills, as students are required to identify, analyze, and solve problems independently (Heda et al., 2024). However, criticism of this approach includes challenges in implementation, such as the need for greater resources and the potential confusion of students in determining how far they should study without clear guidance.

The second stage continues with the formulation of learning objectives independently, allowing students to determine the knowledge, skills, and attitudes they want to achieve. This approach encourages student independence and responsibility in the learning process, which can increase motivation and relevance of learning to individual needs. However, criticism of this approach includes challenges in implementation, such as the need for high self-management skills and potential gaps in the achievement of learning goals if there is no adequate guidance from educators (Hiryanto, 2017).

The third stage is collaborative project completion strategy planning, which still provides space for students to make their own decisions, creating a balance between teamwork and individual autonomy. This stage of strategic planning allows students to develop effective collaboration and communication skills, as well as improve their ability to adapt to change (Nadhiroh & Trilisiana, 2020). However, without adequate guidance, students can face challenges in organizing performance and decision-making, which can hinder learning effectiveness.

Furthermore, in the fourth stage, students collect information and conduct research independently. This activity encourages the development of critical thinking skills and learning independence, which is essential in higher education, and is in line with the principles of student-centered learning (SCL) which can improve the utilization of various resources, including technology and field experience, that are relevant to the needs of the project (Stoten, 2021). However, Lock et al (2021) underline the main challenge in the form of the need for adequate guidance from lecturers to ensure that students stay on the right track, so a balance between student independence and support from educators is needed.

In the fifth stage, which is the implementation of the project, students apply the plan that has been prepared, while continuing to reflect on their progress to adjust the strategy if necessary. The implementation of the project by students is a crucial stage where they implement the plan that has been prepared while continuing to reflect on their progress. Heutagogi-based PBL not only encourages students to be actively involved in the learning process, but also develops critical and creative thinking skills, which are very important in solving real problems faced in the field (Septiana & Ibrahim, 2020). However, criticism of heutagogi-based PBL includes challenges in group management and the potential for uneven contributions between members, which can affect overall learning outcomes (As-Sa'idah et al., 2022).

Once the project is complete, the sixth stage is the stage where the results are presented to the relevant audience, where students receive feedback to evaluate the success of the project and their learning process. The heutagogic approach encourages students to take control of their learning process, which contributes to the development of critical thinking skills and the ability to evaluate feedback independently, which is crucial in higher education (Halim et al., 2023). However, despite the many positive potentials of this approach, challenges such as unequal access to technology and the need for greater support from teachers in facilitating self-paced learning remain a concern.

The final stage is deep reflection, where students analyze the challenges faced, the successes achieved, and areas for improvement, thus instilling a lifelong learner mindset. The heutagogy approach, which puts students in control of their own learning process, allows for the development of critical thinking skills and adaptability necessary to face the complexities of today's world of work (Abraham & Ramnarayan, 2016). Although this approach offers many advantages, such as increased cognitive engagement and learning autonomy, Teichgräber et al. (2020) underline challenges such as uncertainty in technology mastery and the need for greater support from teachers remain a concern.

This study shows that most students have a positive perception of the effectiveness of Project Based Learning (PBL) through the Heutagogi approach. As many as 78% of respondents stated that this approach increases their involvement in the learning process, strengthening critical thinking skills,

creativity, and independent learning skills. These results are in line with the findings of Žerovnik & Nančovska Šerbec (2021) which stated that PBL can improve students' cognitive and affective skills through real project-based activities. A study by Blaschke (2012) has confirmed that Heutagogy can improve self-learning skills and adaptability in the context of higher education. However, it should be borne in mind that the implementation of PBL and Heutagogy requires significant support from educational institutions in the form of teacher training and the development of appropriate curricula. In addition, long-term evaluation of learning outcomes and skills developed through this method is also necessary to ensure its sustainability.

Although the results of the study showed significant benefits of PBL, some key challenges were identified. Limited resources are one of the biggest obstacles, with 65% of respondents reporting that limited access to reading materials and technological tools hinders the learning process. This is consistent with the findings in a study by Hafeez (2022) which showed that adequate infrastructure and access to technology are critical factors in PBL success. In addition, time management is also a challenge, with 58% of students finding it difficult to manage their time to complete projects effectively, especially when they have a lot of assignments from other courses. Inadequate support and guidance from lecturers, which was felt by 52% of respondents, also added to the difficulty in completing the project. This is in line with findings from previous studies that underscore that poor time management skills can negatively impact students' academic performance (Ma & Chen, 2022).

Furthermore, inadequate support and guidance from lecturers, which was felt by 52% of respondents, exacerbated this situation. According to a study conducted by Turner & Patrick (2008), effective tutoring from lecturers can help students develop better time management skills, which in turn can improve their academic performance. Therefore, improving the quality of guidance and developing time management training programs can be an effective solution to overcome this challenge.

Technology plays an important role in supporting PBL with a Heutagogy approach. As many as 70% of respondents use online communication tools such as WhatsApp and Zoom for team collaboration, while 62% utilize learning platforms such as Google Classroom or Moodle. In addition, the use of presentation tools such as PowerPoint and Canva by 55% of respondents showed that technology helps students better convey project results. Recent research confirms that technology does play a significant role in supporting project-based learning (PBL) with a heutagogy approach. A study by Crespí et al (2022) showed that the use of online communication tools such as WhatsApp and Zoom can improve team collaboration and interaction between students. In addition, learning platforms such as Google Classroom or Moodle not only facilitate access to learning materials, but also provide space for constructive discussion and feedback (Benta et al., 2014). Rajesh Kannan et al. (2016) emphasized in their research, the use of presentation tools such as PowerPoint and Canva has also been proven to improve students' ability to convey project results more effectively. Therefore, the integration of technology in learning not only increases the efficiency and effectiveness of the learning process, but also enriches the overall student learning experience.

This study shows a high level of satisfaction with problem-based learning (PBL) with a heutagogy approach, which supports the finding that this method is effective in improving students' readiness for the world of work. Gupta & Gupta (2022) stated that higher education institutions must adopt the philosophy of heutagogy to meet the demands of the changing times, where this approach allows for more in-depth and applied learning. This is in line with the results of the study where 72% of respondents felt satisfied or very satisfied and 68% felt more prepared to face the challenges of the world of work. By prioritizing independence and the development of critical thinking skills, heutagogy has been proven to improve learning outcomes and student satisfaction (Jailani et al., 2020). Therefore, the integration of heutagogy in PBL is not only relevant but also urgently needed to produce graduates who are ready to work and adaptive to industry changes.

The implementation of PBL through the Heutagogy approach in three universities shows variations in approaches and results, influenced by institutional support and the readiness of lecturers

and students. Universities with strong institutional support, such as the provision of facilities and training for lecturers, tend to have more successful implementations. The level of readiness of lecturers and students to adopt this new method also has a significant effect on the success of implementation. Colleges that provide more intensive training and guidance show better results. This is in accordance with research conducted by Hashim et al (2019), which emphasizes the importance of institutional support in the implementation of new learning methods.

Although this study shows many benefits of PBL with a Heutagogi approach, some aspects require further attention. First, limited resources and technology indicate the need for greater investment in educational infrastructure. Without adequate access to learning tools and materials, PBL implementation will not reach its full potential. Second, challenges in time management and support from lecturers indicate the need for more effective project management and mentoring skills development for lecturers. A study by . (2017) suggests that intensive training and mentorship for lecturers in project management can overcome this challenge. Additionally, while technology plays a crucial role in supporting PBL, overreliance on technology can be problematic if not balanced with adequate face-to-face interactions. Technology should be used as an aid, not a substitute, for direct interaction between lecturers and students. Finally, the variation in implementation success between universities indicates the need for an approach that is more tailored to the local context of each institution. Institutional support and training tailored to the specific needs of lecturers and students can increase the effectiveness of PBL with a Heutagogi approach.

This study finds that the integration of Project Based Learning (PBL) with the Heutagogi approach in higher education has great potential to improve students' critical thinking skills, creativity, and independent learning ability. However, the main limitations in this study include the lack of adequate technological resources and reading materials, as well as challenges in time management and lecturer guidance that are not always optimal. The implications of this study show that institutional support and readiness of lecturers and students are very important for the successful implementation of this method. Recommendations include increased investment in technology infrastructure, the development of project management training programs for lecturers, and institutional policy adjustments to support a more autonomous and collaborative approach to learning.

4. CONCLUSION

Project Based Learning (PBL) with a Heutagogi approach in higher education has proven to have great potential in improving students' critical thinking skills, creativity, and independent learning skills. Project-Based Learning (PBL) with a Heutagogic approach in higher education involves 7 systematic steps including: 1) Problem or Project Identification; 2) Formulate learning objectives; 3) Designing a project completion strategy; 4) Information Collection and Research; 5) Project Implementation; 6) Presentation and Evaluation of Results; and 7) Continuous Reflection and Learning. The implementation of this method is faced with various challenges, including the need for adequate lecturer guidance, time management, and limited technological resources and learning materials. Technology plays a critical role in supporting collaboration, access to resources, and presentation of project results, but its success depends heavily on institutional readiness and faculty competence. To ensure its sustainability and effectiveness, investments in educational infrastructure, teacher training, and policies that support autonomous and collaborative learning are needed.

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