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The Effectiveness of Heutagogy Approach on Student Learning Achievement

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ABSTRACT

This study examines the effectiveness of the heutagogy approach in learning digital entrepreneurship for learners of intermediate-level equivalency programs at Community Learning Centres (CLCs) or *Pusat Kegiatan Belajar Masyarakat (PKBM)*. This research used a parallel group experimental design involving 40 learners that naturally divided into control and experimental groups. Both groups received the same material in an equal amount of time but with different learning approaches: the control group used conventional direct learning methods, while the experimental group followed heutagogy-based learning. Learning outcomes were evaluated through knowledge measurement using the same instrument, and differences between groups were analyzed using the ANCOVA parametric statistical test, taking into account covariates to increase the validity of the analysis. The results showed that the group that followed the heutagogy approach experienced a significant increase in learning outcomes compared to the control group. The questionnaire results reinforced findings, which revealed that heutagogy-based learning increased learners' awareness of learning needs, independence, and self-reflection. This research confirms that the heutagogy approach is efficacious in improving the cognitive aspects of learning and encourages the development of character and independent learning competencies that are very important in non-formal education. This finding implies that the heutagogy approach strengthens independent learning strategies in developing non-formal education, especially in the equivalency program at PKBM.

Keywords: heutagogy approach; effective learning; digital entrepreneurship learning.

INTRODUCTION

Equality programs in non-formal education pathways, especially the equivalent education program (Paket C), have a strategic role in equipping students with skills that are relevant and adaptive to socio-economic dynamics, especially in facing the era of the Industrial Revolution 4.0. In this context, digital entrepreneurship competence is an urgent need that reflects mastery of technology and the ability to think critically, innovate, and adapt to disruptive changes in the world of work (Paul et al., 2023; Ratten & Usmanij, 2021). Unfortunately, implementing learning in the field has not fully reflected these ideal conditions. Many learners in equivalency programs still experience barriers in developing digital and entrepreneurial skills due to conventional, tutor-centered learning with minimal independent exploration.

This condition shows a gap between the ideal condition - independent, adaptive, and innovative learners - and the real condition - namely, learners who are still passive and less actively involved in the learning process. One of the roots of the problem lies in the learning approach that has not fully encouraged learning independence and ownership of the learning process by the learners. This problem is a serious concern in the pedagogical design of the equivalency program, which should encourage meaningful, flexible, and contextual learning according to the needs of adult learners.

The heutagogy approach is an alternative to this challenge. Heutagogy, or self-determined learning, is a learning approach that gives learners full autonomy in determining their learning goals, processes, and evaluation (Agonács & Matos, 2019). In contrast to pedagogical and andragogical approaches, heutagogy places learners as active subjects responsible for developing their competencies. In the context of equivalency education, this approach is very relevant because it encourages learners, who are generally adults and have

previous learning experiences, to be more reflective, independent, and contextualized in their learning (Blaschke at al., 2018; Onwuatuegwu, 2023).

Previous research results also reinforce the urgency of implementing the heutagogy approach. A study conducted by (Ishaq et al., 2024) showed that learning with the heutagogy approach significantly improves student learning outcomes compared to conventional learning, especially in decision-making and critical thinking skills development. Furthermore, research by (Yoto et al., 2022) revealed that heutagogy can increase the effectiveness of digital project-based learning and motivation through reflective processes and self-determination of learning goals. The study also noted that learners' engagement in heutagogy-based learning activities was higher than in conventional, instructive, one-way approaches. These findings strengthen the theoretical foundation that heutagogy is not just an alternative pedagogical approach but a necessity in learning systems that want to prepare learners for the challenges of a technology-based world of work.

Moreover, previous experimental reports indicate that applying heutagogy improves students' digital and entrepreneurial skills, especially in learning with information technology integration (Yoto et al., 2022). This finding suggests that heutagogy is relevant in formal academic settings, and community-based equivalency education programs could also adopt this learning approach. Thus, the researchers designed this study to empirically examine the effectiveness of the heutagogy approach in teaching digital entrepreneurship to students in the equivalency program. This research is expected to enrich the pedagogical treasures in non-formal education and provide innovative alternatives in designing learning based on the needs and characteristics of adult learners. So, the study of this article investigates the efficacy of the heutagogy strategy in teaching digital entrepreneurship to students enrolled in intermediate-level equivalency programs at *Pusat Kegiatan Belajar Masyarakat (PKBM)* or Community Learning Centers (CLCs).

RESEARCH METHOD

To achieve the research objectives, we experimented with a parallel group design, in which the independent variable, the learning approach, was manipulated to determine its effect on the dependent variable, namely students' learning outcomes. This experimental design is considered complex because it involves collecting data through various techniques, such as questionnaires, tests, observations, and comparisons, in order to obtain a comprehensive understanding of the object of research. The use of experimental methods combined with measurement and comparison techniques allows researchers to obtain empirical data that can be scientifically confirmed, as well as provide a basis for testing the effectiveness of the learning approach used.

The experiment was conducted in 2024 and involved two secondary school-level equivalency programs at Community Learning Centres (CLCs) in the Bandung City area, Indonesia, namely PKBM Bina Cipta Ujungberung and PKBM Sukamulya. A total of 40 students participated and were divided into two groups: an experimental group (20 students) and a control group (20 students). Both groups underwent the learning process in the same timeframe and conditions, with different educators but comparable backgrounds. The main difference lies in the learning approach: the control group received learning through conventional methods based on direct instruction, while the experimental group followed the heutagogy approach, emphasizing independence and self-determined learning. In an effort to minimize and eliminate other influences other than free variables, the researcher determined the following control variables.

Table 1. Control Variables in Research

Component	Experimental Classes	Control Class
Learners	✓ Total 20 people ✓ Age 17 - 47 years old ✓ 9 women; 11 Male	✓ Total 20 people ✓ Age 17 - 52 years old ✓ 12 girls; 8 Men
Educators	✓ Woman ✓ Age 26 ✓ Master of Education ✓ Have a digital marketing training certificate	✓ Woman ✓ Age 26 ✓ Master of Education ✓ Have a digital marketing training certificate
Learning locations	✓ PKBM Classroom Bina Cipta Ujungberung	✓ PKBM Sukamulya Classroom
Learning time	✓ Sunday ✓ 90-minute time allocation	✓ Sunday ✓ 90-minute time allocation
Learning materials	✓ Digital Marketing Concept ✓ Online Marketing on Digital Platforms ✓ Content Creation for Digital Marketing	✓ Digital Marketing Concept ✓ Online Marketing on Digital Platforms ✓ Content Creation for Digital Marketing
Evaluation tools	✓ Pre-posttest ✓ Attitude assessment rubric	✓ Pre-posttest ✓ Attitude assessment rubric

	✓ Skills assessment rubric ✓ A Survey of the Perception of the Learner	✓ Skills assessment rubric ✓ A Survey of the Perception of the Learner

In implementing the heutagogy approach, we grouped the learners to work collaboratively. We gave learning objectives that cover cognitive (mastery of digital entrepreneurship concepts), affective (character development such as responsibility and independence), and psychomotor (digital business planning practices, digital platform management, and technology-based marketing strategies) aspects. The teachers involved had been given prior training and accompanied the students from the beginning to the end of the intervention, including during the assessment and evaluation process. The design of the digital entrepreneurship learning heutagogy modified from Blaschke & Hase (2016) shown in Figure 1.

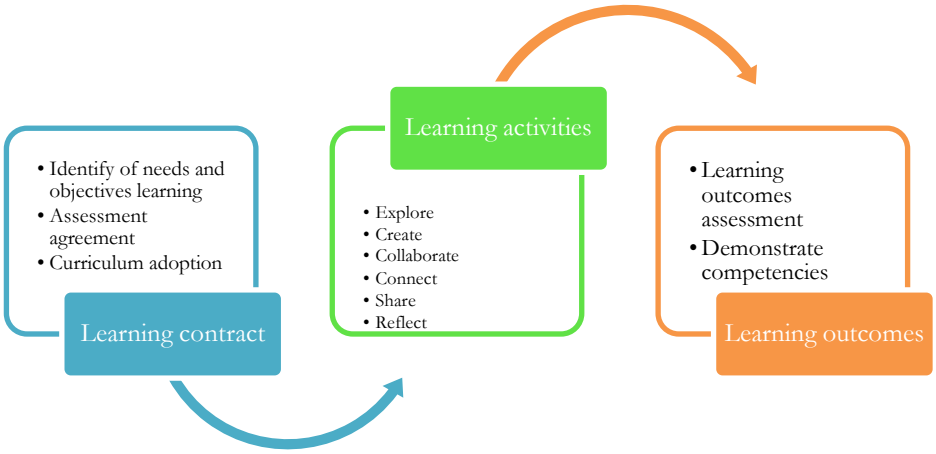

Figure 1. Digital entrepreneurship learning of heutagogy design

The research instruments in this study have undergone a validity and reliability testing process to ensure the quality of data measurement. Using Aiken's V technique, content validity was tested by involving five learning experts and five entrepreneurship material experts. The calculation results show that all items on the learner perception questionnaire and the digital entrepreneurship basic skills test instrument have a V value above 0.68, which indicates that the instrument has adequate validity and is classified in the high to very high category. The reliability test was conducted with an internal consistency approach using Cronbach's Alpha coefficient. The test results show an alpha value of 0.860 for both instruments, namely learner perceptions and basic digital entrepreneurship skills in cognitive aspects, which indicates that the instruments have very high reliability. Thus, the instruments used in this study can be declared valid and reliable as a measuring tool in evaluating the effectiveness of the heutagogy approach in learning digital entrepreneurship in equivalency programs at PKBM.

Learning outcomes were evaluated using the same test in both groups, and data analysis was conducted using inferential statistical methods. The analysis of Covariance (ANCOVA) test was used to compare the results between experimental and control groups by controlling covariate variables to eliminate the possibility of bias. Schwarz (2025) emphasized that using ANCOVA allows for adjusting dependent variable scores by controlling covariate variables that may affect experimental results. This approach also helps reduce the error variance, making the results more statistically valid. In addition to measuring learning outcomes, the researchers assessed students' perceptions of the heutagogy approach using a questionnaire. The data were analyzed using IBM SPSS version 25.0 software, including descriptive analysis, content analysis, and ANCOVA test. This analysis provides a basis for assessing the effectiveness of the heutagogy approach in improving learning outcomes and student engagement in equal learning in non-formal education contexts.

FINDINGS AND DISCUSSION

After the learning process in both the control and experimental groups, the researchers measured students' learning outcomes using a cognitive competency test. They designed the test to assess a basic understanding of digital entrepreneurship, with a maximum score of 70 points. The results of the knowledge test are shown in Table 2 as follows:

Table 2. Descriptive statistics of the results of the control group and experiments.

Characteristics	Group control	Experimental group

Count	20	20
Minimum	45	50
Maximum	50	70
Lingkup	34	20
Median	22.75	61,54
Arithmetic average	22.26	60.25
Standard deviation	20.508	6.304
Standard errors	6.485	1.901
Kurtosis	−0,658	-1.111
Slope	-.377	-.039

From the descriptive statistics above, the experimental group showed a substantially higher average achievement of the test results than the control group. The mean score of the experimental group was 60.25, with a lower standard deviation, indicating a more homogeneous distribution of data. In contrast, the control group had a much lower mean score of 22.26, with a high standard deviation, signaling irregular achievement between individuals.

To statistically test the significance of this difference, we set two hypotheses:

H0 (Null hypothesis): There is no significant difference between the learning outcomes of the control and experimental groups.

H1 (Alternative hypothesis): Learning with a heutagogy approach significantly improves the digital entrepreneurship skills of Paket C equivalency program students.

We conducted all analyses at a significance level of 0.05. Before the Analysis of Covariance (ANCOVA) analysis, the basic assumption, namely equality of variance, was first tested through the F-test. The significance value of the F-test is 0.673 ($p > 0.05$), which means there is no significant difference in variance between groups, so the assumption of homoscedasticity is fulfilled.

ANCOVA analysis was conducted by considering students' perceptions as a covariate to control the influence of outside variables on learning outcomes. The results of the analysis are shown in Table 3 below:

Table 3. ANCOVA test results

Research Variables	df	F	Sig.	α
Corrected Model	2	21.967	0.000	0.05
Intercept	1	0.000	0.992	0.05
Perception	1	8.817	0.008	0.05
	1	41.374	0.000	0.05
Approach				

The ANCOVA test results show that the learning approach variable significantly influences learning outcomes ($F = 41.374$; $p = 0.000 < 0.05$), so the alternative hypothesis is accepted. This result means that the heutagogy approach is significantly more effective in improving digital entrepreneurship skills than the conventional approach based on direct instruction. In addition, the covariate of perception also contributed significantly to the dependent variable ($F = 8.817$; $p = 0.008 < 0.05$). The values indicate that students' perception of the learning approach also affects the learning outcomes obtained. The overall correction model was also significant ($F = 21.967$; $p = 0.000$), strengthening the analytical model's validity.

The findings suggest that integrating learning approaches centered on student learning independence, such as heutagogy, can significantly improve learning outcomes in non-formal education, particularly the Paket C equivalency program. This study aims to examine the effectiveness of the heutagogy approach in learning digital entrepreneurship in the Paket C equivalency program. The results show that the heutagogy approach can increase students' positive perceptions of the learning process, starting from the planning, implementation, and evaluation stages. This result aligns with various kinds of literature that emphasize the importance of independent, flexible, and student-centered learning in supporting the improvement of 21st-century skills.

Learning Planning through Learning Contracts

Applying the heutagogy approach in equivalency programs, especially in digital entrepreneurship learning in Paket C, emphasizes the importance of participatory and flexible learning planning. One concrete form of applying the heutagogy principle is using learning contracts. In this context, learning contracts are both a pedagogical tool and a strategic instrument to develop learners' independence, responsibility, and active involvement in their learning process.

Conceptually, learning contracts are formal, negotiated agreements between learners and facilitators about what to learn, how to teach it, and how learning outcomes will be evaluated (Sumarsono & Permana,

2023; Swartz, 2019). In the heutagogical approach, this contract is an individualized roadmap based on learners' needs and goals, thus supporting autonomy and learner-centered learning. The research findings show that learners in the Paket C equivalency program positively perceive the learning contract. This contract provides a clear framework for students to organize their independent learning. This state is significant in flexible and adaptive non-formal education, as adult learners often have diverse backgrounds, needs, and motivations. This study corroborates the findings of Juin (2016), who stated that learning contracts improve active and responsible learning behaviour. Li (2023) and Lan, Liu, & Baranwal (2020) also confirmed that learning contracts play an important role in developing students' independent learning abilities. In other words, learning contracts encourage systematic learning planning and form a reflective and adaptive learning habitus. The learning contracting process involves students' active participation in identifying relevant needs or problems, setting learning objectives, selecting learning resources, and determining the form of evidence of goal achievement (Koehler & Meech, 2022; Martens, Meeuwissen, Dolmans, Bovill, & Könings, 2019). This research encourages learners to design learning activities that suit their interests and context, such as developing simple social media or e-commerce-based digital entrepreneurship projects. The role of the facilitator in this context is no longer as the sole source of knowledge but as a companion and learning partner (Hadar & Brody, 2021; Madsgaard et al., 2022). This state reflects the paradigm shift from teacher-centered to learner-centered, which is the essence of the heutagogy approach.

Learning contracts provide several proven benefits in various educational contexts. Firstly, it enhances learning independence, as students must design, monitor, and evaluate their learning process (Lan et al., 2020b; Zandi et al., 2015). In the Paket C program, this approach is particularly relevant given the characteristics of learners who tend to be mature and have previous learning experiences, both formal and informal. Secondly, learning contracts increase students' intrinsic motivation as they control the content and learning methods (Oh JW, Huh B, 2019; Zandi et al., 2015). In digital entrepreneurship, learners tend to be more motivated when choosing projects relevant to the real world and their daily lives, such as creating a digital product catalog, promoting products through social media, or designing an online marketing strategy. Thirdly, this approach also encourages collaboration between students and teachers. The process of negotiation and discussion in drawing up the contract strengthens respectful pedagogical relationships (Adeoye et al., 2024; Ripatti-Torniainen & Stevanovic, 2023), creating a supportive and empowering learning atmosphere. In the context of non-formal education, such as equivalency programs, the heutagogy approach supported by learning contracts follows andragogy principles. Zhang et al., (2025) asserts that adult learners need to understand the urgency of the material being learned and tend to be motivated by the relevance of learning to real life. In this study, learners actively c must provide sufficient initial training or guidance and build trust and openness during the contract negotiation. Time and resource allocation are also constraints. Drafting and monitoring contracts take much time, especially in large classes or heterogeneous groups. In this study, peer support and group work proved to help the efficiency of learning contract implementation, as learners can discuss and share learning strategies. The findings from this study reinforce the position of learning contracts as an adaptive planning approach to skills-based learning contexts, such as digital entrepreneurship. In a study by Oh (2019) in nursing education, learning contracts improved learning outcomes in practical competencies. Something similar can be found in digital entrepreneurship, where learners learn concepts and apply knowledge in real projects. By integrating practical elements such as marketing simulations, digital content creation, and online store management, learning contracts simultaneously allow students to develop digital and entrepreneurial competencies. In addition, as the process is based on personal needs and interests, the meaningfulness of learning is also increased.

Identifying Learning Needs as a Critical Process

Identification of learning needs is a key foundation in the heutagogy approach, which emphasizes independence, self-reflection, and the active role of learners in managing their learning. In the context of this research, the data shows that learners have the highest perception of the learning needs identification component. This finding indicates their active involvement in building a more contextualized, meaningful, and personalized learning process. The result shows the strengthening of learner agency (Abdelrahman, 2020; Stanton et al., 2021) and supports the development of learners' metacognitive awareness of their own learning goals and processes.

Within the heutagogy framework, identifying learning needs occupies a central position as it is a starting point in planning and implementing learning. Kulchan, Pimdee, & Sukkamart (2025) emphasized that learning needs assessment is a crucial first step in designing effective and relevant learning. Learning can only target the competency gap between current and expected knowledge or skills through this process. This approach is particularly appropriate in non-formal education, such as the Paket C equivalency program, where most participants are adult learners with diverse learning experiences and needs. The active participation of students in identifying their own needs also reflects the principle of andragogy as proposed by Knapke et al., (2024),

namely that adults learn more effectively when they are aware of their learning needs and can relate them to their personal experiences and life goals. In this study, learners' involvement in this reflective and exploratory process facilitated a deeper understanding of what they need to learn, how they want to learn it, and why it is important for their personal and professional development.

In its implementation, the process of identifying learning needs can be done through various methods. Colomer et al., (2020) emphasize the importance of reflective approaches and SMART-based personal development plans (PDP) to explore meaningful learning experiences. On the other hand, the critical incident method introduced by Davis & Knight (2023) also effectively identifies learning needs based on real challenges learners face in work and daily life. This strategy is very relevant in digital entrepreneurship learning in the Paket C equivalency program, where students can formulate their needs based on fundamental problems in the community or business world they face. With the development of educational technology, the identification of learning needs can also be strengthened through digital-based data analysis. Wong et al., (2023) demonstrate that educators can use behavioral profiles, learning performance, and learner interactions in digital environments to map learning needs more objectively. Integrating this approach into blended or online learning provides an excellent opportunity to design learning strategies that suit individual needs.

One of the main contributions of the learning needs identification process is the increased relevance of learning perceived by learners. Studies show that participant engagement in this process has implications for improving clarity of objectives, focus of teaching materials, and appropriateness of learning strategies (Diep et al., 2019; Wong et al., 2023). In the context of this research, learners demonstrate an increased ability to design their learning activities, including selecting digital business topics that align with their local interests and potential. The result shows that the heutagogy approach can facilitate a more personalized, contextualized, and sustainable learning process. Additionally, involvement in needs identification also strengthens learners' intrinsic motivation. When students feel that learning departs from the real needs that they identify, there will be an internal drive to learn more intensely and responsibly. This finding aligns with the study of (Beasleigh et al., 2023), who highlighted the importance of relevance and personal experience in designing competency-based learning, especially in professional fields and applied skills.

Although learners play the leading role in managing their learning process, facilitators still have an important role as companions, mentors, and sources of inspiration. Nurfadhilla (2020) emphasize that educators in adult education must balance providing a structure that facilitates learning with allowing the freedom that fosters independence. In this study, the facilitator played a role in facilitating group discussions, providing reflective feedback, and helping participants formulate realistic and measurable learning objectives. This shift from content deliverer to learning facilitator is an important transformation in today's learning ecosystem. Especially in equivalency programs, where resources are limited, and student backgrounds are diverse, facilitators play a key role in ensuring program success by actively encouraging students to identify their needs.

While learning needs identification offers many advantages, its implementation is not free from challenges. One of the main challenges is students' readiness to engage in a deep reflective process. Some learners may not be used to self-reflection or do not have enough learning literacy to state their needs explicitly. In this context, the role of the facilitator becomes crucial in guiding the identification process through open-ended questions, group discussions, and contextual simulations. Another challenge relates to the time and resources needed to conduct a thorough needs identification, especially in study groups with large participants or low levels of digital literacy. Therefore, an adaptive, efficient, and simple technology-based identification model is needed to reach all levels of learners. Educators can develop strategies such as using paper-based self-reflection instruments or structured Google Forms, training facilitators in heutagogy and needs assessment approaches, and providing learning toolkits that guide students in formulating their learning goals and strategies.

The results of this study have significant implications for curriculum design in the Paket C equivalency program. Curriculum designed in a top-down manner, without considering the learning needs of learners, risks producing a mismatch between teaching materials and real needs in the field. Therefore, the heutagogy approach through identifying learning needs opens up great opportunities to develop an adaptive, contextualized curriculum based on local needs. For example, the identification results in this study led participants to explore topics such as digital marketing, simple financial management, and visual content creation using mobile phones. These topics were then designed as projects or learning modules relevant to their socio-economic context, thus improving understanding and making a real contribution to the lives of learners and their communities.

Learning Process: Non-Linear, Participatory, and Reflective

One key finding in implementing the heutagogy approach is that the learning flow is not linear. The learning approach does not require students to follow a rigid sequence of material; instead, it allows them to access and develop knowledge based on their interests, needs, and experiential context. This alignment allows

the learning process to be self-determined, in line with the main principle of heutagogy, as stated by Nwogu et al., (2025), namely that adult learners can self-direct their learning process. This non-linear learning process provides space for knowledge exploration through various sources, especially technology and internet-based. This flexibility reflects the dynamics of the ever-changing digital world, so learners must be able to navigate information independently and critically. According to Barbosa et al., (2024), adaptive non-linear learning facilitates the formation of deeper understanding as it allows the adjustment of learning strategies as the context and learning needs change. Jiang et al., (2017) also reinforce this finding by emphasizing that effective reflective learning often occurs not in a sequential flow but through repetition, adjustment, and deep experience processing. In this context, students actively manage their learning process, which is the hallmark of authentic heutagogical learning.

The implementation of the heutagogy approach also shows the characteristics of participatory learning. The facilitator's role is not as the primary source of knowledge but as a responsive learning partner supporting participants' collaborative process. The relationship between facilitators and participants is egalitarian, which fosters a dialogical atmosphere and encourages students to actively contribute to shaping the learning process. This approach aligns with the views of Larkins & Satchwell (2023), who state that participatory learning encourages collaboration and recognizes each individual's unique competencies and experiences. In equality education, this approach is particularly significant as it creates space for students - the majority of whom are adolescents and young adults - to feel valued and empowered. Shaby, N., Peleg, R., & Coombs (2024) and Agaoglu et al., (2025) emphasize that participatory learning should involve all parties in every stage of learning, from planning to evaluation. In this study, students were involved in designing digital project tasks, selecting relevant digital business topics, and developing implementation strategies based on their local context. This involvement increases learning motivation and strengthens the sense of ownership of the learning process and outcomes. Furthermore, students' active participation in discussions, exploration of learning resources, and cross-group collaboration reinforces the learning community-based approach. Korfiatis & Petrou (2021) pointed out that this model builds learners' confidence and creates an inclusive and supportive learning environment, which is particularly important for marginalized or non-traditional groups such as equivalency program participants.

The reflective element in the heutagogy approach is an important foundation in supporting personal transformation and meaningful learning. In the observed process, reflection was conducted individually and in groups through experience-sharing sessions, open discussions, and self-assessment of the process and outcomes of the digital entrepreneurship project. Sari dkk., (2025) emphasize that reflection is about reviewing past experiences, understanding their implications for the future, and changing ineffective mindsets. In this context, students learn from what they do and how and why they do it. Reflection is also a means of developing higher-order thinking skills such as problem-solving, creativity, and decision-making. This state is consistent with Sutarjo et al., (2025) findings that the heutagogy approach can improve critical thinking skills through project-based learning activities and reflection. Andari (2024) also stated that collective reflection can improve professional autonomy and learning practice outcomes by exchanging perspectives in constructive dialogue. In this learning practice, reflective dialogue is used to build shared understanding between students, facilitators, and learners. Affandi & Mohamad (2023) points out that reflective dialogue collectively strengthens the formative evaluation structure and creates a culture of continuous learning.

The three key elements in this learning process- non-linearity, active participation, and reflection mutually integrated and contribute to shaping an adaptive, innovative, and resilient digital entrepreneurial mindset. Learners acquire technical knowledge about digital entrepreneurship and develop an attitude of independence, confidence, and lifelong learning skills, which is the essence of the heutagogical approach. Blaschke & Marín (2020) states that heutagogy encourages learners to become capable learners who not only master specific skills but are also able to develop new competencies in changing situations. This state is particularly relevant in a digital economy that demands flexibility and constant innovation. In addition, the results of implemcenting this approach support the literature showing that flexible, contextualized, and reflective project-based learning can increase learning engagement and strengthen participants' social and cognitive skills (Guo et al., 2020; Guo et al., 2021).

Evaluation and Reflection as the Core of Heutagogy

The heutagogy or self-directed learning approach has become an increasingly relevant paradigm in 21st-century learning, especially in the face of the complexity and uncertainty of the digital world. One of the fundamental elements of this approach is reflection-based evaluation, which positions learners as active agents in determining, managing, and evaluating their learning process. This research shows that learners in equivalency programs, especially in Paket C, show a very high level of perception of reflection as a form of learning evaluation, which is also a strong indicator of cognitive and affective engagement in heutagogy-based learning.

In the heutagogy approach, evaluation no longer serves solely as a tool to measure the achievement of standardized learning outcomes. Instead, it emphasizes self-assessment and the development of lifelong learning capabilities. Hainsworth et al., (2022) state that this approach allows learners to set learning goals, evaluate progress, and adjust learning strategies flexibly according to individual needs. The findings in this study corroborate this, showing that students not only assess the result but also analyze the process, challenges, and strategies used during learning. Furthermore, reflection in the context of heutagogy is a retrospective activity that proactively shapes metacognitive awareness. Reflection allows learners to understand how they learn, evaluate the effectiveness of their learning approach, and design improvements for the following process. As explained by Blaschke et al., (2018); Hase & Blaschke, (2021), profound reflection is at the core of authentic self-determined learning, which is the primary goal of the heutagogical approach.

In digital entrepreneurship learning, reflection has a very high strategic value. Digital entrepreneurship demands adaptability, quick decision-making, and resilience to failure and uncertainty. Through a continuous reflective process, learners learn to evaluate the outcomes and logic of thinking, patterns of action, and business strategies they apply in simulations or digital projects. Self-reflection in learning allows learners to identify their strengths and weaknesses in solving entrepreneurial problems and map out more creative and adaptive solutions. This process strengthens problem-solving, decision-making, and personal planning skills - essential characteristics for a digital entrepreneur. Gonzales et al., (2025) assert that engaging in reflection within heutagogy enhances learners' self-learning capacity and strengthens their autonomy, which they need in the professional and business world. This study found that integrating reflection into evaluation activities positively impacted students' intrinsic motivation, as evidenced by their enthusiasm for developing self-learning strategies and designing digital projects with greater confidence.

One of the distinctive features of evaluation in heutagogy is that it is seen as part of the learning process itself rather than at the end of it. In other words, evaluation is formative and ongoing. The process involves learners engaging in self-review, peer assessment, learning contract review, and reflective journals to achieve deep understanding rather than merely accumulating grades. In the context of this research, implementing reflection-based evaluation allows students to understand better how they learn and why specific approaches are more effective than others. In addition, it encourages them to set realistic and meaningful personal targets and develop flexible and adaptive learning strategies. According to Lynch et al., (2021), educators can facilitate heutagogical assessment by utilizing technology to create authentic and meaningful learning experiences. An example is using social media or digital platforms to showcase projects to real audiences so students get immediate feedback from relevant communities. This practice assesses knowledge and skills and builds students' confidence and intrinsic motivation.

Although many educators widely recognize reflection as a central component in heutagogy, they still face several challenges in implementing it. Mohaffyza, Foong, Masek, Heong, & Putra, (2020) noted that the domain of reflection tends to be less practiced than other domains, such as creativity, especially among engineering students in Malaysia. This finding suggests that educators and learners must increase reflective awareness and literacy. Furthermore et al., (2019) stated that there are still limitations in empirical research supporting the effectiveness of heutagogy-based evaluation, especially those involving quantitative and longitudinal data. Therefore, further efforts are needed to develop valid and reliable reflective evaluation instruments and systematic learning strategies to guide students in conducting meaningful reflections. In the context of equivalency programs such as Paket C, the challenges of reflection can also be related to diverse academic backgrounds, varied learning motivations, and limited access to technology. Therefore, educators need to design reflective approaches contextually, considering learners' characteristics and the learning environment. For example, using paper-based learning journals or reflective discussions in small groups can be an effective alternative in conditions of limited technology.

Heutagogy-based reflection and evaluation contribute significantly to shaping the profile of learners who are independent, critical, and orientated towards continuous self-development. Gillaspy & Vasilica (2021) state that learning designs that integrate the principles of heutagogy, including reflection, can develop digital self-determined learners who can manage knowledge, skills, and values autonomously. The implications of these findings are highly relevant to the world of non-formal education and alternative education, such as equivalency programs. In situations where learners may experience a disconnect with the formal education system, the heutagogy approach can provide an empowering framework to rebuild confidence and identity as learners. Stoten (2021) even suggests that heutagogy has great potential in developing adaptive management capabilities amidst changing socio-economic conditions. Therefore, integrating reflection and self-evaluation in digital entrepreneurship learning is important for academic achievement and for shaping resilient and visionary entrepreneurial characters.

Implications for Digital Entrepreneurship Skills

The results of this study show that the heutagogy approach has significant implications in developing digital entrepreneurship skills in learners of equivalency programs, especially at the Paket C level. Heutagogy, which focuses on self-determined learning, allows the formation of adaptive learner characteristics that are very relevant to the demands of today's digital entrepreneurship world. The learning process directs students to master conceptual material and internalize critical thinking, reflection, and adaptability to technological and market changes. In the context of digital entrepreneurship education, 21st-century skills such as critical thinking, problem-solving, collaboration, creativity, and digital literacy are key foundations. The findings reveal that the heutagogical learning design naturally integrates all these aspects. The research is consistent with Gillaspy & Vasilica (2021) view that heutagogy encourages the formation of reflective and autonomous digital learners, which is essential in managing digital entrepreneurship's dynamic and disruptive challenges. Heutagogy encourages non-linear learning, where participants do not follow a linear curriculum but actively explore and personalize the learning process according to their needs, interests, and goals. It creates space for students to develop metacognition and double-loop learning, the ability to correct mistakes, and evaluate and reconstruct their frameworks (Sewell & Harris, 2019; Tunstall et al., 2021).

Learning independence developed through heutagogy is the primary foundation for developing digital entrepreneurs. Learning activities designed based on project-based and experiential learning require learners to manage time, strategize, and make their own decisions in creating and running digital-based businesses. This research is in line with the findings of Motta & Galina (2023), who stated that experiential learning in the context of entrepreneurship increases innovation and entrepreneurial intention. Self-reflection is an important component of this approach. Through reflection, learners evaluate their learning process, identify successes and obstacles faced, and formulate strategies to improve the effectiveness of their business in the future. This in-depth reflection enables personalized innovation and enhanced digital entrepreneurial capabilities. This finding aligns with Chen, & Ifenthaler (2023), who highlighted the importance of reflection in developing digital entrepreneurship competencies through online-based practical training. In addition, the trainers taught participants to identify business opportunities in a digital context, take initiative in designing products, manage marketing through social media, and utilize e-commerce platforms. These activities reflect Tunstall & Neergaard (2021) research that emphasizes the importance of social-experiential activities in fostering an entrepreneurial mindset.

The results of this study also show that integrating digital learning technology is an important element in the success of the heutagogy approach. The blended learning model allows learners to access learning resources flexibly, deepen independent exploration, and apply digital technology in entrepreneurial projects. Satar et al., (2024) stated that blended learning that adopts the principles of heutagogy is proven to improve graduates' digital entrepreneurship competence and job readiness significantly. Additionally, using media such as Google Classroom and other interactive platforms encourages active digital collaboration and communication among learners. Online discussions, virtual presentations, and cross-group collaboration exemplify the enhanced collaborative skills necessary in the digital corporate environment. The strengthening of collaborative communication skills aligns with the findings of Aysi, Susilaningsih, & Sabandi (2024), who demonstrated that heutagogy-based digital learning enhances student engagement and productivity in entrepreneurial settings.

While this study highlights the strong potential of heutagogy in digital entrepreneurship education, facilitators still need to address several implementation challenges. Firstly, the readiness of the facilitator to act as a mentor or c, engagement, and adaptability. In addition, education policy needs to support the training of facilitators in understanding and implementing heutagogy. The government and educational institutions must encourage meaningful technology integration and ensure adequate digital access for all participants in the equivalency program. With adequate policy support, the heutagogy approach can catalyze the transformation of non-formal education towards a learning ecosystem that is more adaptive and relevant to community needs.

CONCLUSION

The results of this study show that the heutagogy approach is significantly more effective than the conventional approach in improving learners' basic digital entrepreneurship skills in the Paket C equivalency program. Through learning that centers on independence and self-determination in the learning process, learners in the experimental group showed significant improvements in cognitive, affective, and psychomotor aspects. Statistical analysis using the ANCOVA test showed that the heutagogy approach and learners' perception of learning significantly contributed to learning outcomes. The findings confirm the potential of the heutagogy approach as a relevant and adaptive strategy in non-formal education contexts, especially in developing 21st-century competencies such as creativity, responsibility, and critical thinking skills. This research contributes to developing heutagogy studies in the context of non-formal education, which is still relatively limited, especially in Indonesia. The findings expand the empirical scope of the heutagogy approach's effectiveness by demonstrating its impact beyond the commonly studied contexts of higher education and

professional training. In addition, using experimental methods with a quasi-experimental approach and ANCOVA analysis also strengthens the causal evidence of the relationship between learning approaches and learning outcomes, providing a stronger basis for data-driven decision-making in learning innovation of the equality education program. We recommend that PKBM adopt the heutagogy approach in learning and provide training to tutors to support the implementation of independent and learner-centered learning.

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