Al-Ishlah: Jurnal Pendidikan
Vol.17, 4 (December 2025), pp.7242-7254
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v17i4. 7939

Development of Project-Based Learning E-Modules with Authentic Evaluation to Improve Marketing Skills and Abilities in Higher Education

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ARTICLE INFO

Keywords:

Project-based learning;
e-module;
authentic evaluation;
marketing skills;
higher education

Article history:

Accepted 2025-06-07
Revised 2025-12-11
Accepted 2025-12-31

ABSTRACT

Marketing skills and adaptability are critical competencies in 21st-century higher education, particularly within entrepreneurship learning. However, conventional learning approaches often lack contextual relevance and fail to foster these essential skills. This study aims to develop a Project-Based Learning (PJBL) e-module integrated with authentic evaluation to improve students' marketing competencies and adaptability. This research employed the Research and Development (R&D) method using the ADDIE model, involving stages of analysis, design, development, implementation, and evaluation. Data were collected through expert validation, student and lecturer questionnaires, observations, and tests. The subjects included 6 expert validators, 2 lecturers, and 60 students from an Economics Education program. Data analysis involved qualitative thematic interpretation and quantitative tests (T-test and N-Gain) using SPSS 25. Validation showed the e-module to be highly valid (average score = 4.05) and very practical (average score = 4.09). T-test results indicated a significant improvement ($p < 0.05$) in students' learning outcomes. The N-Gain score was 0.572 (58.88%), categorized as moderately effective in enhancing marketing skills and adaptability. The developed PJBL e-module with authentic evaluation supports interactive, contextual learning and aligns with 21st-century competencies. Its effectiveness indicates potential for broader implementation in similar courses to enhance entrepreneurial readiness and adaptive learning.

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1. INTRODUCTION

Marketing skills and adaptability are two essential competencies students must possess to face the challenges of a dynamic global era. Marketing skills encompass not only the ability to identify market needs and develop marketing strategies, but also analytical thinking, communication, collaboration, and creative problem-solving skills (Keller & Kotler, 2022). ;Armstrong, 2022) . On the other hand, adaptability refers to an individual's readiness to respond quickly, flexibly, and effectively to change, whether in the

context of a social, technological, or disruptive work environment (Bennett et al., 2021; Jackson, 2022). These two competencies are essential elements in developing resilient graduates who are relevant to the needs of the 21st-century workforce.

However, the reality on the ground shows that developing students' marketing skills and adaptability still face various challenges. The predominantly conventional, lecture-oriented learning approach, along with a lack of contextualized practical experience, are major obstacles to optimally developing these two competencies (Supriyanto et al., 2022; Lestari & Pramudito, 2021). Consequently, students tend to be less engaged in learning activities that require active participation, reflective thinking, and collaboration in solving real-world problems. This situation emphasizes the importance of innovation in the development of teaching materials and learning strategies that not only emphasize cognitive aspects but also balance affective and psychomotor aspects as a solution to improve students' marketing skills and adaptability.

Project-Based Learning (PBL) is a proven effective learning approach in encouraging students to learn independently and meaningfully through real-world projects (Thomas, 2020; Krajcik et al., 2021). In PBL, students are exposed to situations that require higher-order thinking, problem-solving, communication, and collaboration skills. It also serves as a vehicle for developing marketing skills and adaptability. To support the success of PBL, learning media that can facilitate interactive and flexible learning experiences are needed, one of which is through e-modules.

PJBL-based electronic modules enable students to learn independently, anytime and anywhere, while systematically completing project assignments. The advantages of electronic modules lie in the integration of engaging digital content, interactive navigation, and multimedia integration such as video, audio, and simulations that support competency achievement (Firmansyah et al ., 2023; Rohimah et al., 2022). Furthermore, the application of authentic evaluation in electronic modules is important as an assessment instrument that describes student competencies holistically and realistically, not only based on written tests but also through project products, performance, and portfolios relevant to the world of work (Mueller , 2021; Widodo et al ., 2023).

Although a number of studies have examined the development of e-modules and the implementation of Project Based Learning (PJBL) in various learning contexts, there is still limited research that specifically integrates PJBL-based e-modules with authentic evaluations to improve students' marketing skills and adaptability. Therefore, this study aims to develop PJBL-based e-modules equipped with authentic evaluations as a learning innovation to optimize both competencies. The research questions asked are: (1) how is the process of developing PJBL-based e-modules with authentic evaluations, and (2) to what extent are these e-modules effective in improving students' marketing skills and adaptability? The results of this study are expected to provide a significant contribution to the development of adaptive, applicable, and relevant learning practices to the demands of the digital era.

2. METHOD

This research uses research and development methods (Research and Development) and Development) ADDIE development model (Analysis , Design, Development, Implementation , and Evaluation). The explanation is as follows from the stages study like following:

2.1 Analysis

The analysis phase was conducted through interviews, observations, and questionnaires with lecturers and students to identify learning needs and challenges in the Entrepreneurship course. The analysis results served as the basis for determining the material, project activities, and features of the PJBL-based e-module to meet the demands of 21st-century learning.

2.2 Design

The design stage includes the preparation of an e-module framework based on PJBL syntax and authentic evaluation, selection of project topics, formulation of problem-based learning scenarios, development of assessment instruments, and design of the appearance and interactivity of the e-module.

2.3 Development

In the development stage, the e-module was created according to the design, then validated by material, media, and language experts with a standard validity value of ≥ 0.80 and instrument reliability of ≥ 0.70. The e-module that had passed the validation was tested on 2 lecturers and 30 Economic Education students who were selected intentionally (purposive sampling).

2.4 Implementation

Implementation was carried out by applying e-modules in Entrepreneurship learning through project activities. Data were collected through response questionnaires , observations, and tests to measure students' marketing skills and adaptability.

5. Evaluation

The evaluation phase in this study focuses on assessing the effectiveness of the e-module by analyzing students' test results, user responses, and learning observations, which collectively provide evidence of its impact on the learning process and its feasibility as an innovative learning medium. The results of this evaluation are then used to refine and improve the e-module to ensure its quality and relevance. In assessing validity, the e-module is evaluated based on the BSNP standards and the learning media assessment instrument developed by Sadiman et al. (2019), covering key aspects of content accuracy, visual appearance, language clarity, and usability, with the assessment conducted using a Likert scale to determine the overall level of validity.

Table 1. Marketing using skills and adaptability

Score	Information
80 < N ≤100	Very Legitimate, Can used without revision
60 < N ≤80	Legitimate, Can used with revision small
40 < N ≤60	Enough Legitimate, Can used with revision in progress
20 < N ≤40	Not enough Legitimate, recommended NO used Because need revision big
0 < N ≤20	NO Legitimate, NO Possible used

In this study, 30 students from the Economics Education Study Program participated in the assessment of a Project-Based Learning (PjBL) e-module accompanied by authentic evaluation. An independent samples t-test was employed to examine the significance of differences in learning outcomes before and after the implementation of the e-module, while the N-Gain test was used to determine its effectiveness in enhancing students' marketing skills and adaptability. The evaluation was based on the assumption that N-Gain scores in the medium to high categories indicate that the developed e-module is effective in optimizing the targeted competencies, whereas scores in the low category suggest that the e-module does not make a significant contribution to the development of students' skills. The criteria for interpreting N-Gain values follow the formula proposed by Hake (1999), which measures the extent of improvement in learning outcomes resulting from the instructional intervention.

Table 2. N-Gain Test Criteria

N-Gain Score (g)	Criteria
$g \leq 0.7$	High
$0.3 \leq g \leq 0.7$	Moderate
$g < 0.3$	Low

The assessment of students' marketing optimization skills and adaptability in this study was carried out using an authentic evaluation instrument developed based on predefined competency indicators. The instrument comprises project-based tasks and a performance assessment rubric designed to measure four key indicators: (i) students' ability to design and implement contextual digital marketing strategies; (ii) analytical skills in identifying market opportunities and challenges through real-life case studies; (iii) adaptability to technological advancements and e-commerce dynamics; and (iv) initiative and independence in completing complex, problem-based projects. To ensure the instrument's validity and reliability, a feasibility review was conducted by experts, followed by empirical analysis using item validity testing and reliability coefficient calculations, the results of which are presented in the following table.

Table 3. Instrument Validation Results

No.	Question Indicator	Signature (2-tails)
A.	**Marketing Skills**	
1.	Market analysis capabilities	0.669
2.	Communication skills	0.655
3.	Digital marketing mastery	0.664
4.	Customer relationship management	0.673
B.	**Marketing and branding strategies**	0.675
1.	Adaptability (Adaptability)	
2.	Flexibility in working	0.656
3.	Stress resistance	0.671
4.	Openness to change	0.657
5.	Learning ability	0.671
	Handling unexpected situations	0.673

The significance values for all authentic evaluation items in this study were above 0.05, as presented in Table 3, indicating that each item contributes validly to the assessment of students' marketing skills and adaptability. Furthermore, the results of the instrument reliability test shown in the subsequent table demonstrate a high level of internal consistency, confirming that the instrument is reliable and appropriate for measuring the intended learning outcomes through the implementation of project-based e-modules.

Table 4. Instrument Validation Results

Cronbach's Alpha	Number of Items
0.666	10

The reliability of the instrument used in this study was above 0.05, with a Cronbach's Alpha score of 0.755, indicating good internal consistency. Therefore, this instrument can be relied upon to measure students' marketing skills and adaptability.

In this study, data analysis was conducted using qualitative and quantitative approaches. For the qualitative analysis, a thematic analysis approach was applied to explore expert opinions on the quality of PJBL-based e-modules. This process allowed researchers to identify patterns or themes that emerged

from expert feedback and then refine the learning materials to be more relevant to students' needs. Meanwhile, to analyze the impact of e-module use on the development of students' marketing skills and adaptability, a quantitative method was applied using the Independent Sample T-Test through SPSS software version 25.0, which allows for the assessment of the effectiveness of the learning materials.

3. FINDINGS AND DISCUSSION

3.1 Analysis Stage

At this stage, researchers conducted an analysis of student needs, curriculum, and characteristics to ensure the development of Project Based e-modules . Relevant and effective Learning (PJBL) in optimizing students' marketing skills and adaptability. Based on the results of the needs analysis, it was found that the learning process of the E- Commerce course tends to be theoretical and less contextual, making students feel less interested and difficult to relate the material to real practices in the world of digital marketing. In addition, the available learning media does not fully support the development of 21st-century skills, especially critical thinking, problem-solving, and adaptation to market dynamics. Based on the curriculum used, the E- Commerce course requires students to master digital entrepreneurship competencies and be able to design technology-based marketing strategies. Meanwhile, from the analysis of student characteristics, it was found that the majority of students showed a high interest in digital entrepreneurship practices, but still had limitations in their collaboration skills and adaptation to technological changes. Therefore, a learning innovation is needed in the form of a PJBL-based e-module accompanied by authentic evaluation that can accommodate the needs, curriculum demands, and student characteristics to optimally improve marketing skills and adaptability.

3.2 Design Stage

In the Commerce course, strategic steps have been taken to produce high-quality, interactive products tailored to students' learning needs. These modules are designed based on project-based learning principles, with each unit encompassing stages that encourage students to actively design, implement, and evaluate digital marketing strategies in a contextualized manner. The Canva platform was used to create engaging and accessible e-module visuals, providing interactive templates , supporting graphic elements, and easy integration of text, images, and multimedia links.

The module design is tailored to learning outcomes, student needs, and the demands of the digital workplace, so it is expected to optimize the skills and adaptability of marketing students.

No	Before	After
Figure 1		
	A simple cover is less professional	The cover has been revised

Figure 2

No videos yet

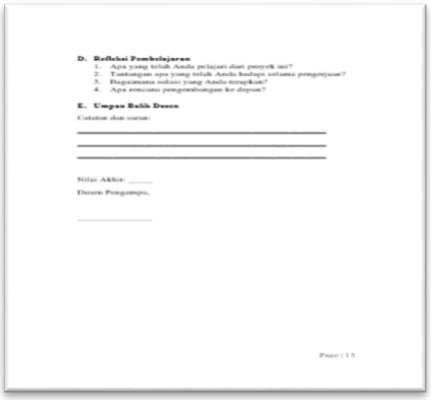
Already equipped with video

Figure 3

There are no illustrations in the presentation of the material.

Equipped with illustrations in the presentation of the material

Figure 4



Reflection learning is not yet interactive

Learning Reflection in the form of interactive questions using QR Scan

The Commerce course incorporates video links to authentic learning materials and assessment tools designed to evaluate students' understanding, skills, and ability to apply digital marketing concepts in real-world contexts. The assessment components include project-based assignments, self-reflection activities, and case studies that promote critical thinking and adaptability to digital work environments. Evaluation questions are aligned with the learning objectives and tailored to student characteristics, enabling a comprehensive assessment of students' marketing performance, skills, and

adaptability. Overall, the e-module design emphasizes integrated technology use, a systematically structured project-based learning approach, and relevant, applicable assessment strategies to create an interactive, meaningful, and effective learning experience.

3.3 Development Stage

This stage involves the development of a Project-Based Learning (PjBL) e-module in an interactive digital format that can be accessed through various electronic devices. The resulting product is then validated by subject matter experts, media experts, and language experts to evaluate the accuracy of the content, the quality of its presentation, and the clarity of the language used. Revisions are subsequently carried out based on the validators' feedback before the e-module is implemented in the learning process.

3.4 Expert Validation Test

At this stage, the validation of the PjBL-based e-module was conducted by a panel of experts comprising subject matter experts, media experts, and linguists to ensure the appropriateness of the content, visual presentation, and language use within the learning context. The validators offered both theoretical and practical feedback regarding the feasibility of the e-module based on established evaluation criteria. This process examined key aspects, including the accuracy and relevance of the e-commerce material, the integration and quality of the visual design, and the readability and clarity of the language. Following the validation, the e-module was revised in accordance with the experts' recommendations to enhance its quality and effectiveness in supporting the development of students' marketing skills and adaptability. The validation results from each expert are presented in the following table.

Table 5. Expert Validation Results

Aspect	Score	Information
Material	4.05	Very Valid
Media	4.09	Very Valid
Language	4.03	Very Valid
Average	**4.05**	**Very Valid**

The PJBL-based e-module teaching materials developed for the E- Commerce course obtained an average score of 4.05 in the validation test by material, media, and language experts, which is included in the "Very Valid" category. This score is a strong indicator that the e-module has met validity standards as an effective learning resource in optimizing students' marketing skills and adaptability. This high validity indicates that the content, visual appearance, and language in the e-module are in accordance with learning needs and are relevant to the demands of 21st-century competencies.

3.5 Practicality Test

The Commerce course e-module was designed to optimize students' marketing competencies, practical marketing skills, and adaptability. The practicality assessment involved two lecturers and 30 students and was carried out using a practicality questionnaire covering four main indicators: ease of use, clarity of display, content comprehensibility, and overall module usability. The trial was conducted by granting respondents access to the validated e-module and subsequently asking them to complete the questionnaire based on their experience using it. The mean scores obtained from the practicality assessment are presented in the following table and serve as the basis for evaluating the feasibility of implementing the e-module in the learning process.

Table 6. Results of Lecturer and Student Practical Tests

No	Aspect	Score	Information
1.	Contents	4.07	Very Practical
2.	Practicality	4.03	Very Practical
3.	Language	4.14	Very Practical
4.	Design	4.12	Very Practical
	Average	**4.09**	**Very Practical**

Based on the results of the data analysis in the table above, an average practicality score of 4.09 was obtained from lecturers and students for the developed PJBL-based e-module. This score is included in the "very practical" category, which reflects a positive response to the ease of use, clarity of content, and usefulness of the e-module in the learning process of the E- Commerce course . This assessment shows that the e-module is not only easy to access and use, but also relevant in supporting the development of marketing skills and student adaptability. Thus, the developed e-module can be said to be very effective and useful as a project-based learning medium that supports student readiness to face the challenges of the digital world.

3.6 Implementation

At the implementation stage, testing of the Project-Based Learning (PjBL) e-module was carried out through two phases: small-group trials and large-group trials. This stage aimed to obtain preliminary data on the effectiveness, quality, and user responses to the Android application–based learning media. The small-group trials were conducted first to identify potential technical issues and content-related weaknesses within the e-module. A limited number of students participated, with observations focusing on ease of use, clarity of the material, and the feasibility of the project-based activities. Feedback from this initial trial served as the basis for revising and refining the e-module before proceeding to broader testing.

Following revisions based on the small-group trial results, a large-group trial was implemented involving a greater number of students in an authentic classroom setting. This phase aimed to evaluate the effectiveness of the e-module in real learning conditions, particularly in enhancing students' marketing skills and adaptability. Learning activities were implemented through entrepreneurial project scenarios embedded in the e-module, allowing students to directly engage in creative, collaborative, and applied problem-solving processes characteristic of the PjBL approach. This implementation phase was essential to ensure that the developed e-module was not only valid and practical, but also effective in achieving learning objectives and in equipping students with entrepreneurial competencies relevant to contemporary workplace demands.

3.7 Small Group Trial

A small group trial phase was conducted to obtain initial feedback on the quality and practicality of the developed Project-Based Learning (PjBL) e-module. This trial involved eleven Economics Education students who were purposively selected based on their suitability to the characteristics of the target users. During the trial process, students were asked to use the application in a guided learning scenario, then asked to fill out a student response questionnaire that had been prepared to measure the level of practicality of the media. The questionnaire included indicators such as ease of use, clarity of project instructions, integration of materials and activities, and ease of accessing the application via Android devices.

Questionnaire data was analyzed to determine the practicality of the application in a lecture context. The results of the practicality test obtained from this stage served as the basis for initial

revisions before the application was piloted on a larger group. A summary of the results of the small group trial is presented in Table 7.

Table 7. Results of small group practicality tests

Respondents	Scores from Respondents	Maximum Score	Percentage	Criteria
R1	85	100	85	Very Practical
R2	87	100	87	Very Practical
R3	85	100	85	Very Practical
R4	84	100	84	Very Practical
R5	79	100	79	Practical
R6	84	100	84	Very Practical
R7	87	100	87	Very Practical
R8	86	100	86	Very Practical
R9	73	100	73	Practical
R10	82	100	82	Very Practical
R11	80	100	80	Practical
R12	87	100	87	Very Practical
R13	77	100	77	Practical
R14	83	100	83	Very Practical
R15	82	100	82	Very Practical
Amount	1,241	1000	1,241	
Average	**82.73**	**100**	**82.73**	**Very Practical**

The results of the small group trial, shown in Table 4, indicate that the developed Project-Based Learning (PjBL) e-module received positive feedback from students. In general, the learning media was considered very practical and easy to use. Students stated that the application was easily accessible via Android devices, the user interface was designed simply and intuitively, and the material presented was systematically structured and aligned with the learning flow. Furthermore, the instructions for each project activity were considered clear enough to help students understand the stages of task implementation. Student responses also indicated that the application's features, such as project instructions, worksheets, and self-evaluation, were well-integrated and supported active engagement in the learning process. These findings indicate that the application has a high level of practicality and is suitable for use in the context of entrepreneurship learning to develop students' marketing skills and adaptive abilities.

3.8 Evaluation Stage

At this stage, an effectiveness test was conducted on the PJBL-based e-module accompanied by an authentic evaluation that had been developed, involving 40 students as respondents. The purpose of this test was to assess the extent to which the e-module was able to optimize students' marketing skills and adaptability after participating in learning using the media. The effectiveness of the e-module was analyzed using a t-test with decision-making criteria based on the significance value (Sig .), which was declared effective if the Sig . value <0.05. The results of the t-test are presented in the following table as a basis for assessing the impact of using the e-module on strengthening student competencies. The following table shows the n gain pretest and posttest shown in Table 8.

Table 8. Results of N gain pretest and posttest

Indicator	Score	Category
Profit Score N	0.572	Quite Effective
Profit Score N (%)	58.88	At the moment

Based on the analysis of learning outcomes improvement through pretest and posttest presented in Table 7, the N-Gain score was 0.572 with a percentage increase of 58.88%. Based on the N-Gain interpretation criteria, this score is included in the "quite effective" or moderate category in improving student learning outcomes. This finding indicates that the use of project-based e-modules (PjBL) accompanied by authentic evaluation can make a significant contribution to the development of student skills, especially in the marketing and adaptive aspects.

The improvement in scores between the pretest and posttest indicates that students not only experienced improved conceptual understanding but also actively engaged in the learning process through contextual projects. Thus, this e-module has proven quite effective in supporting the achievement of more applicable and meaningful entrepreneurship learning.

Discussion

The findings of this study demonstrate that the developed Project-Based Learning (PjBL) e-module is valid, practical, and effective in optimizing students' marketing skills and adaptability. The validity evaluation yielded a high mean score of 4.05, indicating that the e-module meets established standards for content accuracy, instructional design, and media presentation. This suggests that the learning materials, project structure, and assessment components are well aligned with learning objectives and relevant to students' academic and professional needs. In addition, the practicality assessment produced an average score of 4.09, reflecting positive user perceptions regarding ease of use, clarity of presentation, and instructional relevance. Both lecturers and students considered the e-module supportive of the learning process, indicating that it can be implemented efficiently in real instructional settings without significant technical or pedagogical barriers.

From an empirical perspective, the effectiveness of the e-module was confirmed through statistical testing. The results of the t-test showed a significance value of $p < .05$, indicating a statistically significant difference in students' marketing skills and adaptability before and after the use of the PjBL e-module. This finding confirms that the observed learning gains were not incidental but resulted from the instructional intervention. Furthermore, the N-Gain score of 0.57 falls within the moderate-to-high improvement category, suggesting a meaningful increase in students' competencies. These results indicate that the e-module not only facilitates knowledge acquisition but also contributes to the development of higher-order skills such as adaptability, problem-solving, and applied marketing competence.

These findings are consistent with previous studies highlighting the effectiveness of PjBL-based learning media in fostering 21st-century skills. Prasetya et al. (2023) reported that the integration of PjBL into digital learning materials significantly enhances collaboration, critical thinking, and problem-solving abilities. Similarly, Nurhaliza (2024) emphasized that the inclusion of authentic assessment in e-modules supports reflective learning and strengthens students' adaptability to workplace dynamics. Wibowo (2022) further argued that digital PjBL approaches are particularly effective in entrepreneurship education, as they stimulate motivation, creativity, and competitiveness by engaging students in realistic problem contexts. The convergence of these findings suggests that PjBL e-modules represent an effective pedagogical strategy for bridging theoretical knowledge and practical skill development.

PjBL-based e-modules are designed to accommodate current educational developments and learner characteristics, thereby creating interactive, contextual, and engaging learning environments

(Atikah, 2020; Prinandari, 2024). Within this learning model, students are positioned not as passive recipients of information but as active participants who construct knowledge through project engagement, collaboration, and reflection. The incorporation of interactive features—such as hyperlinks to videos, images, and external digital resources—enhances learner engagement and supports the development of meaningful learning experiences (Linardatos & Apostolou, 2023; Zamora et al., 2021). This interactivity increases students' enthusiasm for learning, strengthens lecturer–student interaction, and promotes deeper exploration of marketing concepts. Moreover, these features contribute to the development of marketing literacy, critical thinking, and adaptability, which are essential competencies in an evolving digital economy (Akcanca, 2020, 2021; Fitria et al., 2023).

The effectiveness of the developed e-module can also be explained through multimedia learning theory, which posits that learning is optimized when information is presented through both verbal and visual channels (Apostolou & Linardatos, 2023). By integrating text, images, videos, and interactive elements, the e-module facilitates dual-channel processing, reduces cognitive overload, and enhances conceptual understanding. This multimodal presentation allows students to better grasp abstract marketing concepts and apply them in concrete project scenarios. In parallel, constructivist learning theory emphasizes that meaningful learning occurs when learners actively construct knowledge through experience, interaction, and reflection. The PjBL approach embedded in the e-module aligns closely with this perspective, as students engage in real-life projects that require analysis, decision-making, and problem-solving.

By combining multimedia learning principles with constructivist pedagogy, the PjBL e-module creates an environment that supports active engagement and independent knowledge construction. Authentic assessments embedded in the learning process further reinforce this approach by encouraging students to demonstrate competencies through practical outputs rather than rote memorization. Engaging visual designs, contextual narratives, and project-based tasks stimulate motivation and curiosity, while simultaneously strengthening critical thinking and adaptability. This integration ensures that learning outcomes extend beyond cognitive achievement to include transferable skills relevant to professional contexts.

Compared to conventional teaching materials such as textbooks, printed modules, and Student Worksheets (LKPD), PjBL-based e-modules offer several distinct advantages. First, they enhance student interest and motivation through visually appealing and communicative content presentation (Paridah et al., 2024; Prinandari et al., 2024). Second, they facilitate the understanding of abstract concepts by providing structured visualizations and contextual narratives that make learning more accessible (Susanto et al., 2024). Third, e-modules support learning flexibility, as they can be accessed via smartphones, tablets, or laptops and used individually or collaboratively in classroom settings (Aristi et al., 2023). Finally, they promote imagination, analytical thinking, and independent information-seeking skills, which are essential for lifelong learning (Mayasari et al., 2023; Sebayang et al., 2023; Yulaichah et al., 2024).

Empirical evidence also supports the motivational benefits of visually rich digital learning materials. Hutchison reported that the use of e-comics and similar multimedia resources can increase student motivation and participation by up to 79%. This finding is reinforced by Yonanda (2021), who noted that students are particularly attracted to visual and narrative-based learning media due to their engaging and enjoyable format. Although the present study focuses on e-modules rather than e-comics, the underlying principle remains relevant: visually engaging and interactive digital materials significantly enhance learner motivation and participation. Consequently, the integration of multimedia elements within a PjBL framework contributes to the effectiveness of the e-module in improving marketing skills and adaptability.

In addition to enhancing engagement, PjBL e-modules offer practical advantages in terms of accessibility and learning autonomy. Their compatibility with various digital devices allows students to learn independently anytime and anywhere, making them well suited to the demands of 21st-

century education. This flexibility supports self-directed learning and enables students to revisit materials as needed, thereby reinforcing understanding and skill mastery. Furthermore, the project-based structure encourages creativity, critical thinking, and problem-solving, ensuring that students not only understand marketing theory but can also apply it in authentic, real-world contexts.

Overall, the results of this study indicate that the PjBL e-module, supported by authentic assessment, demonstrates high levels of validity, practicality, and effectiveness. These findings position the e-module as an innovative and relevant digital learning resource capable of supporting meaningful learning experiences and enhancing students' marketing skills and adaptability. By integrating multimedia design, constructivist pedagogy, and project-based learning, the e-module responds effectively to contemporary educational challenges and provides a robust model for future instructional development in higher education.

4. CONCLUSION

In conclusion, this study demonstrates that the development of a Project-Based Learning (PjBL) e-module accompanied by authentic evaluation significantly enhances students' marketing skills and adaptability by actively engaging them in the contextual design, implementation, and reflection of digital marketing strategies. These findings indicate that PjBL-based e-modules have strong potential to be applied in other practice-oriented courses—such as entrepreneurship, digital marketing, and the creative economy—both within the same institution and across different universities to strengthen experiential learning and students' readiness for the workplace. However, this research is limited by its focus on a single course and institution, which restricts the generalizability of the results. Therefore, future research is recommended to implement and examine PjBL-based e-modules across diverse courses, institutions, and skill domains, as well as to explore the integration of more advanced digital features to further enhance the effectiveness and quality of project-based learning in higher education.

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