



## The Role of Electronic Student Worksheets Based on Project Based Learning (PjBL) in Entrepreneurship Learning: A Systematic Literature Review

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**ABSTRACT:** This study aims to systematically examine the role of Project Based Learning (PjBL)-based electronic student worksheets in entrepreneurship learning, particularly in improving students' skills in product and service marketing. The method used is a Systematic Literature Review (SLR) with the PRISMA approach. Data were obtained from Google Scholar, Scopus, and ERIC databases with a publication range of 2015–2025. The selection process resulted in 36 articles that met the inclusion criteria. Data analysis was carried out qualitatively descriptively through the process of identification, grouping, and synthesis of research findings. The results of the study indicate that the integration of Project Based Learning (PjBL)-based electronic student worksheets is consistently able to improve student engagement, learning outcomes, and higher-order thinking skills such as critical thinking, creativity, and problem solving. In the context of entrepreneurship, this approach also contributes to developing students' competencies in designing products and understanding business processes in an applicable manner. However, the results of the synthesis reveal that aspects of service marketing skills, particularly in customer service and service marketing strategies, have not been studied in depth. Therefore, this study emphasizes the importance of developing PjBL-based electronic student worksheets that specifically integrate product and service marketing skills to meet the needs of the business and industrial world.

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### INTRODUCTION

The development of 21st-century education demands a transformation in learning that focuses not only on mastering knowledge, but also on developing critical thinking, creativity, collaboration, and communication skills (Trilling & Fadel, 2016; Voogt & Roblin, 2017). In line with this, advances in digital technology encourage the integration of electronic-based learning media to create a more interactive, flexible, and student-centered learning process (Bond et al., 2020; Redecker, 2017). One relevant form of innovation is the use of electronic student worksheets which enable the presentation of learning materials in a more engaging manner through the integration of multimedia, interactivity, and rapid feedback (Clark & Mayer, 2016; Mayer, 2017).

The use of electronic student worksheets not only serves as a medium for delivering material, but also as a means to encourage independent learning and increase student engagement in the learning process (Schunk & Greene, 2018; Zimmerman, 2018). However, the effectiveness of learning media is greatly influenced by the learning model used. Therefore, the integration of electronic student worksheets with innovative learning models such as Project Based Learning (PjBL) is important. PjBL is a learning model that emphasizes the active involvement of students in contextual and meaningful project-based activities, thereby developing higher-order thinking skills and collaborative abilities (Bell, 2018; Condliffe et al., 2017; Krajcik & Blumenfeld, 2018).

In the context of entrepreneurship learning, the application of PjBL is very relevant because learning is not only oriented towards understanding concepts, but also on developing practical skills such as designing products, managing businesses, and implementing marketing strategies (Fayolle & Gailly, 2018; Neck & Greene, 2018). Entrepreneurship learning requires authentic and contextual learning experiences so that students are able to understand business processes comprehensively, including aspects

of service and marketing (Lackéus, 2020; Rae, 2017). Therefore, the integration of PjBL-based electronic student worksheets has the potential to be a solution in creating more applicable entrepreneurship learning.

The integration of PjBL-based electronic student worksheets is supported by various modern learning approaches that emphasize activity, interaction, and contextuality in the learning process. Constructivism views that knowledge is built through direct experience (Fosnot, 2017), which is in line with the characteristics of PjBL. The approaches of student-centered learning, inquiry-based learning, and problem-based learning emphasize the importance of active student involvement in learning (Hmelo-Silver, 2017; Savery, 2019; Weimer, 2017). From a technological perspective, the theory of multimedia learning and digital literacy explains that the use of interactive digital media such as electronic student worksheets can increase the effectiveness of learning through the presentation of multimodal information (Mayer, 2017; Ng, 2018). Furthermore, the development of 21st-century skills, such as critical thinking, creativity, and collaboration, has become a central focus in various contemporary learning theories (Dillenbourg, 2017; Facione, 2015; Runco & Acar, 2017). In the context of entrepreneurship, entrepreneurship education and innovation learning approaches emphasize the importance of authentic and contextual learning experiences (Fayolle & Gailly, 2018; OECD, 2018).

Although theoretically the integration of PjBL-based electronic student worksheets has strong potential, initial findings in the field indicate that students' service marketing skills have not yet developed optimally. Based on the evaluation of industrial work practices, students tend to be less communicative, have not been able to provide responsive service, and lack initiative in interacting with consumers. This indicates low marketing communication skills possessed by students. In addition, the business world and the industrial world also emphasize the importance of the ability to serve consumers and strategies in attracting and retaining customers.

Furthermore, students also experience difficulties in comprehensively understanding consumer needs and tailoring the services provided. In the context of service businesses, service quality is an integral part of marketing, so limitations in this aspect can impact low customer satisfaction and loyalty. This situation indicates that students' service marketing skills are still not optimally developed despite participating in entrepreneurship education at school.

These findings also indicate a gap between the demands of entrepreneurship learning outcomes and the learning practices students receive. Marketing learning, which should be practical and based on real-world experiences, has not been fully facilitated systematically. Furthermore, the limited availability of contextual and practice-based teaching materials means students lack clear guidance on how to directly implement marketing activities. The learning process, which is still dominated by verbal explanations and written assignments, impacts students' conceptual understanding and skills in product and service marketing.

A number of previous studies indicate that the implementation of project-based learning (PjBL)-based electronic student worksheets significantly enhances students' engagement, learning outcomes, and higher-order thinking skills, including critical and creative thinking (Marwa et al., 2025; S. A. N. Putri et al., 2022; Yudianta et al., 2024). Internationally, PjBL has also been shown to be effective in improving learning motivation and 21st-century skills (Bell, 2018; Condliffe et al., 2017; Kokotsaki et al., 2016). However, studies specifically integrating PjBL-based electronic student worksheets in entrepreneurship learning, especially in the context of developing service marketing skills, are still relatively limited.

In contrast to previous studies that generally focus on product development or effectiveness testing in a limited context, this study offers novelty in the form of a systematic synthesis of the role of electronic student worksheets based on Project Based Learning in entrepreneurship learning, with a particular emphasis on the development of service marketing skills and the identification of gaps between learning practices in schools and the needs of the business world and the industrial world.

Based on the description, this study aims to conduct a systematic literature review to identify research trends, main findings, and research gaps related to the integration of PjBL-based electronic student worksheets in entrepreneurship learning.

## **METHOD**

This study uses the Systematic Literature Review (SLR) method with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach to systematically and transparently identify, evaluate, and synthesize relevant research results. Data sources were obtained from several scientific databases, namely Google Scholar, Scopus, and ERIC, using a combination of keywords "electronic student worksheets", "Project Based Learning (PjBL)", "entrepreneurship learning", and "marketing skills" combined using Boolean operators (AND and OR). The literature search was limited to articles published in the 2015–2025 period to ensure the novelty and relevance of the research. The article selection process was carried out through the PRISMA stages which include identification, screening, eligibility, and inclusion. At the identification stage, 120 articles were obtained, then after the process of eliminating duplication and filtering based on titles and abstracts at the screening stage, the number of articles was reduced to 80, with 40 articles eliminated due to irrelevance. Furthermore, at the eligibility stage, a thorough review of the remaining articles was conducted, and 4 articles were eliminated because they did not meet the inclusion criteria. Thus, 36 articles that met all criteria were used in the analysis of this study.

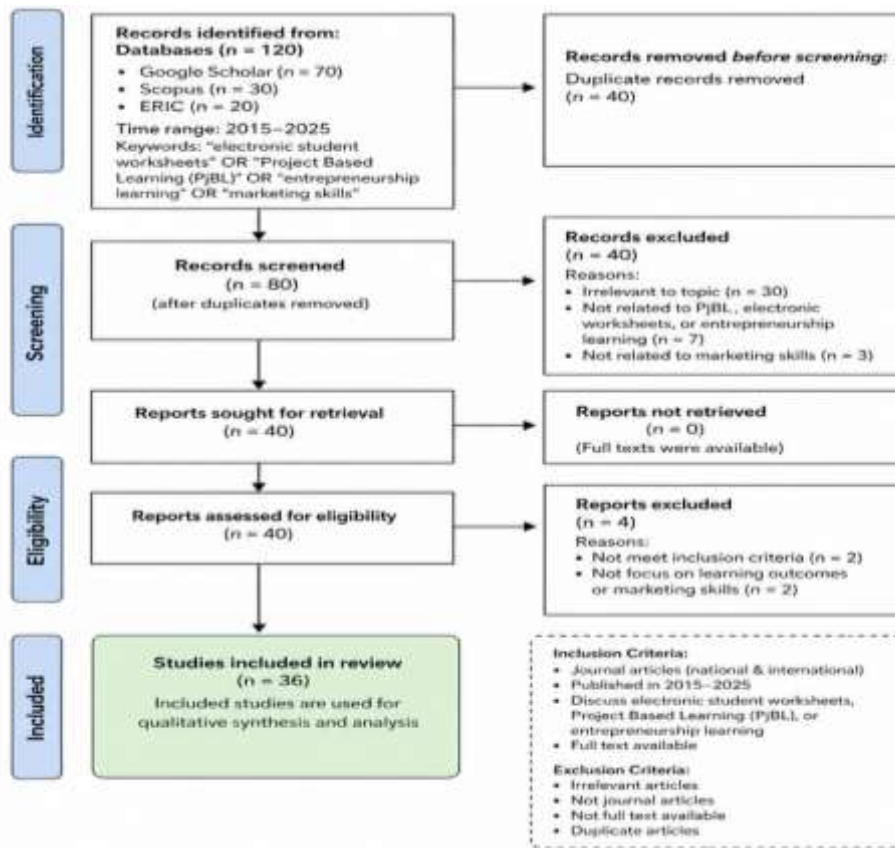


Figure 1. PRISMA Flow Diagram of Article Selection Process

The inclusion criteria included national and international journal articles published in the last 10 years, discussing electronic student worksheets, Project Based Learning, or entrepreneurship learning, and available in full-text form. Meanwhile, the exclusion criteria included articles that were irrelevant, not scientific journal publications, not fully available, and duplicate articles. The data obtained were then analyzed using descriptive qualitative analysis techniques by grouping, comparing, and synthesizing research findings to identify trends, key findings, and research gaps related to the integration of electronic student worksheets based on Project Based Learning in entrepreneurship learning.

## RESULTS AND DISCUSSION

To gain a more comprehensive understanding of the role electronic student worksheets based on Project Based Learning (PjBL) in entrepreneurship learning, an analysis was conducted on 36 articles that had gone through a selection process based on inclusion and exclusion criteria. These articles cover various research approaches, such as experiments, research and development (R&D), qualitative studies, and systematic literature reviews, which generally focus on the integration of project-based learning and the use of digital technology. The analysis was conducted by identifying the research objectives, methods and characteristics of the sample, the instruments used, and the main findings of each study. The results of the analysis were then synthesized to find patterns, trends, and research contributions to the development of entrepreneurship learning, particularly in improving service marketing skills. A summary of the results of the literature review is presented systematically in Table 1 below.

Table 1. Synthesis of Research Results

No	Author and Year	Research purposes	Methods	Instrument	Key Findings	Synthesis
1	Martatiyana et al. (2024)	To develop STEM-PjBL-based electronic science worksheets to enhance students' collaboration skills	R&D	Validation sheets, collaboration questionnaire	The developed electronic worksheets were found to be valid, practical, and effective in enhancing students' collaboration skills	STEM-PjBL-based electronic worksheets effectively foster collaboration skills

No	Author and Year	Research purposes	Methods	Instrument	Key Findings	Synthesis
					through STEM-PjBL activities	
2	Putri et al. (2022)	To develop PjBL-based electronic worksheets and evaluate their impact on students' critical thinking skills	R&D	Expert validation, critical thinking test	The implementation of PjBL-based electronic worksheets significantly improved students' critical thinking skills	Electronic worksheets effectively promote higher-order thinking skills
3	Yudiana et al. (2024)	To investigate the effect of PjBL worksheets on students' critical thinking and learning independence	Experimental	Critical thinking test, questionnaire	PjBL significantly enhanced students' critical thinking and learning autonomy	PjBL promotes active and independent learning
4	Kokotsaki et al. (2016)	To examine the effectiveness of PjBL in enhancing student motivation and engagement	Review	Literature analysis	PjBL enhances student motivation and engagement through contextual and meaningful learning experiences	PjBL supports student-centered learning
5	Condcliffe et al. (2017)	To analyze the impact of PjBL on students' academic achievement	Meta-analysis	Secondary data	PjBL demonstrates a consistent positive effect on academic outcomes, particularly when systematically implemented	PjBL shows broad effectiveness across contexts
6	Bell (2018)	To explore the role of PjBL in fostering 21st-century skills	Literature review	Document analysis	PjBL facilitates the development of communication, collaboration, creativity, and critical thinking skills	PjBL aligns with 21st-century competencies
7	Hmelo-Silver (2017)	To investigate how problem-based learning enhances students' problem-solving abilities	Experimental	Test	Problem-based learning improves students' ability to solve complex problems through analytical reasoning	Problem-solving skills are significantly enhanced
8	Lackéus (2020)	To examine the impact of experiential entrepreneurship learning on student competencies	Empirical	Observation	Experiential learning enhances entrepreneurial competencies, including creativity, innovation, and risk-taking	Contextual learning is essential

No	Author and Year	Research purposes	Methods	Instrument	Key Findings	Synthesis
9	Fayolle & Gailly (2018)	To evaluate the impact of entrepreneurship education on students' attitudes and innovation	Review	Literature	Entrepreneurship education promotes creativity and innovation through experiential and reflective learning	Creativity and innovation are fostered
10	Rae (2017)	To explore the role of experiential learning in entrepreneurship education	Qualitative	Interview	Experiential learning provides deeper understanding compared to theoretical instruction	Authentic experience is crucial
11	Marwa et al. (2025)	To examine the effectiveness of PjBL worksheets in improving critical thinking skills	Experimental	Critical thinking test	A significant improvement in students' critical thinking skills was observed	PjBL worksheets strengthen higher-order thinking
12	Ulfiah et al. (2025)	To develop and evaluate PjBL-based electronic worksheets using Liveworksheet	R&D	Validation, questionnaire, test	The worksheets were valid, practical, and effective in enhancing critical thinking skills	Digital worksheets support independent learning
13	Pane et al. (2017)	To evaluate the effectiveness of adaptive learning in improving student outcomes	Experimental	Test	Adaptive learning improves learning outcomes by tailoring content to individual needs	Adaptive learning is effective
14	Graham (2019)	To review current research on blended learning	Review	Literature	Blended learning enhances interaction between students and teachers	Hybrid learning is effective
15	Traxler (2018)	To examine the role of mobile learning in education	Conceptual	Analysis	Mobile learning enables flexible and accessible learning environments	Learning flexibility is enhanced
16	Ng (2018)	To analyze the role of digital literacy in contemporary education	Literature	Analysis	Digital literacy is essential for effective technology integration in learning	Crucial for electronic worksheets
17	Mayer (2017)	To investigate the effectiveness of multimedia learning in improving understanding	Experimental	Test	Multimedia integration significantly enhances conceptual understanding	Multimedia is highly effective
18	Zimmerma (2018)	To explain the role of self-regulated learning in academic achievement	Theory	Analysis	Self-regulated learners demonstrate greater independence and effectiveness	Self-regulation is essential

No	Author and Year	Research purposes	Methods	Instrument	Key Findings	Synthesis
19	Dillenbourg (2017)	To examine the impact of collaborative learning on student interaction	Experimental	Observation	Collaborative learning improves teamwork and communication skills	Collaboration is fundamental
20	Runco & Acar (2017)	To analyze the development of creativity in educational contexts	Theory	Analysis	Creativity develops through open-ended and exploratory learning environments	Creativity is nurtured
21	Facione (2015)	To define and explain critical thinking in education	Theory	Analysis	Critical thinking enhances analytical and evaluative abilities	Essential for HOTS
22	Jonassen (2017)	To examine problem-solving as a core component of learning	Conceptual	Analysis	Problem-solving is central to meaningful learning and PjBL	Core element of PjBL
23	OECD (2018)	To analyze key competencies required for future education	Report	Global analysis	Innovation is identified as a key competency in 21st-century education	Future-oriented learning
24	Bond et al. (2020)	To map research on educational technology and student engagement	SLR	Literature	Technology integration enhances student engagement and participation	Digital learning is effective
25	Herrington et al. (2016)	To examine the concept of authentic learning environments	Conceptual	Analysis	Authentic learning enhances real-world relevance in education	Contextual learning is important
26	Lee et al. (2019)	To investigate the impact of technology-enhanced PjBL	Experimental	Test	Technology-integrated PjBL significantly improves students' skills	Integrative approach is effective
27	Chen & Yang (2019)	To evaluate the effect of PjBL on student achievement and motivation	Experimental	Test	Student motivation increases due to active engagement in projects	Active learning is effective
28	Krajcik & Blumenfel (2018)	To explain the framework and effectiveness of PjBL	Conceptual	Analysis	Well-structured PjBL improves learning effectiveness	Instructional design is critical
29	Sagala et al. (2019)	To examine the effect of PjBL worksheets on critical thinking skills	Experimental	Critical thinking test	PjBL significantly improves critical thinking skills	Effective for HOTS development

No	Author and Year	Research purposes	Methods	Instrument	Key Findings	Synthesis
30	Anazifa & Djukri (2017)	To investigate the impact of PjBL on higher-order thinking skills	Experimental	Test	PjBL enhances higher-order thinking skills	HOTS improvement
31	Ilana & Cintamulya (2022)	To develop and validate PjBL-based electronic worksheets	R&D	Validation, test	The worksheets are valid and improve students' critical thinking skills	Suitable for classroom implementation
32	Agnafia & Anfa (2024)	To develop PjBL-based electronic worksheets integrating local wisdom	R&D	Validation, test	Integration of local wisdom enhances engagement and critical thinking	Contextual learning strengthens outcomes
33	Fitriani et al. (2022)	To examine the effectiveness of PjBL in entrepreneurship learning	Experimental	Test	PjBL significantly improves entrepreneurial competencies	Relevant to business skills
34	Handayani et al. (2023)	To investigate strategies for improving students' marketing skills	Experimental	Observation	Marketing skills improve through hands-on practice and simulations	Practical experience is essential
35	Putri et al. (2022)	To evaluate the effect of e-learning on student engagement	Experimental	Questionnaire	Digital learning significantly enhances student engagement	Digital learning is impactful
36	Rahmawati et al. (2023)	To examine the effectiveness of digital PjBL in improving learning outcomes	Quasi-experimental	Test	The integration of PjBL and digital technology improves learning outcomes	Integrative learning is effective

Based on the synthesis results presented in Table 1, the discussion focuses on analyzing research findings, methodological tendencies, and their implications for the development of entrepreneurship learning. In general, the analyzed studies show a consistent trend in the use of project-based learning approaches and the use of digital technology to improve learning quality. From a methodological perspective, most studies utilize experimental designs, research and development (R&D), and literature studies. This indicates that the topics of electronic student worksheets and Project Based Learning (PjBL) have been comprehensively studied, both in the development of learning products and in empirically testing their effectiveness.

In terms of research objectives, the majority of studies focus on improving student engagement, learning outcomes, and developing higher-order thinking skills, such as critical and creative thinking. Furthermore, several studies also highlight the development of entrepreneurial competencies, particularly in the areas of creativity, innovation, and the ability to produce products or services. These findings demonstrate that project-based learning is not only oriented toward cognitive achievement but also toward developing practical skills relevant to the needs of the workplace.

When reviewed from the main findings, almost all studies show positive results on the implementation of Project Based Learning and electronic student worksheets. PjBL is proven to be able to increase student engagement through contextual and collaborative learning activities, while the use of electronic student worksheets as a digital medium strengthens the effectiveness of learning through interactive and systematic presentation of materials. The integration between the two produces a more meaningful learning experience, because students not only understand the concepts, but are also able to apply them in real situations. This finding is in line with research stating that PjBL is able to increase student motivation and engagement through student-centered learning (Bell, 2018; Kokotsaki et al., 2016), and is supported by the use of technology that increases learning engagement (Bond et al., 2020).

Furthermore, the synthesis results indicate that the development of higher-order thinking skills is one of the most significant impacts of the implementation of PjBL. Students are trained to analyze problems, design solutions, and evaluate their work independently and collaboratively. This is in line with critical thinking theory, which emphasizes the importance of analytical and evaluation skills in learning (Facione, 2015) as well as research showing that PjBL significantly improves students' critical thinking skills (Anazifa & Djukri, 2017; Putri et al., 2022). Furthermore, problem-solving skills also develop optimally because students are faced with situations that require decision-making based on data and experience (Jonassen, 2017)

In the context of entrepreneurship, several studies have shown that project-based learning positively contributes to the development of students' entrepreneurial competencies. Through project activities, students gain hands-on experience in product design, understanding consumer needs, and developing marketing strategies. This finding aligns with the concept of experiential learning, which emphasizes the importance of hands-on experience in entrepreneurial learning (Lackéus, 2020; Rae, 2017). However, the synthesis also shows that the service marketing skills aspect has not been thoroughly studied in many studies. Most studies emphasize product development and creativity, while service aspects and marketing strategies have not been the primary focus.

In addition, the analysis results also revealed a gap between theoretical potential and implementation in the field. Although various studies have shown the effectiveness of PjBL and electronic student worksheets, in practice there are still obstacles such as limited contextual teaching materials, lack of systematic learning guides, and low student readiness in developing marketing skills independently. This indicates that innovation is needed in the development of teaching materials, especially PjBL-based electronic student worksheets that are designed to be more applicable and integrated with the needs of the business world and industry.

Thus, the synthesis of the 36 articles shows that the integration of Project Based Learning-based electronic student worksheets has great potential in improving the quality of entrepreneurship learning. However, there are still open research opportunities, especially in the development of learning models that specifically target service marketing skills. Therefore, this study has an important contribution in filling this gap by offering the development of Project Based Learning-based electronic student worksheets that are more directed at improving students' product and service marketing skills.

## CONCLUSION

Based on the results of a systematic literature review of 36 articles, it can be concluded that the integration of Project Based Learning (PjBL)-based electronic student worksheets has a significant role in improving the quality of entrepreneurship learning. This approach has been proven to be able to increase student engagement through contextual and collaborative learning activities, and is supported by the use of electronic student worksheets as an interactive and systematic digital media. In addition, the implementation of PjBL-based electronic student worksheets also contributes to developing higher-order thinking skills, such as critical thinking, creativity, and problem-solving abilities. In the context of entrepreneurship, this approach is able to encourage students to be more active in generating ideas, developing products, and understanding business processes in an applicable manner. However, the results of the synthesis show that aspects of product and service marketing skills, especially in customer service and service marketing strategies, are still not the main focus in most studies.

These findings have important implications both theoretically and practically. Theoretically, this study strengthens the relevance of constructivist approaches and project-based learning in creating meaningful learning experiences, while expanding the study of technology integration in learning through the use of electronic student worksheets. Practically, the results of this study provide a reference for teachers to design entrepreneurship learning that focuses not only on product creation, but also on the development of marketing skills, including customer service and customer attraction strategies. The use of PjBL-based electronic student worksheets can be a solution in providing more structured, interactive, and contextual learning guides. In addition, from a policy perspective, the results of this study demonstrate the importance of developing project-based digital teaching materials that are integrated with the needs of the business world and industry, particularly in improving students' work readiness.

Thus, this study confirms that the development of PjBL-based electronic student worksheets that specifically integrate product and service marketing skills is a strategic innovation direction in entrepreneurship learning. Therefore, further research is recommended to develop and test learning models that are more focused on service marketing aspects, as well as examine other supporting variables such as digital literacy, learning motivation, and work readiness to obtain more comprehensive results.

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