



Preparing Students of SMKN 7 Kota Serang for 21st Century Work Environment Through PjBL

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Abstract

The 21st-century work environment presents new challenges for education. Therefore, preparing students to face the 21st-century work environment requires innovative and relevant educational approaches. This study aims to analyze the preparation of SMKN 7 Serang City students in facing the 21st-century work environment through a project-based learning (PjBL) approach. This research uses a descriptive quantitative approach, data in the form of questionnaires are analyzed to identify teamwork, project management, communication skills, interpersonal skills, and problem-solving. The results showed that PjBL has made a positive contribution to improving students' 21st-century skills. Students involved in PjBL have a deeper understanding of the application of theoretical concepts in the context of the work environment. The conclusion is that PjBL is an effective learning method in preparing students of SMKN 7 Serang City for the 21st-century work environment. The results of this study confirm the importance of innovative approaches in vocational education to ensure students have skills and knowledge relevant to future developments.

Keywords:

21st-century work environment, PjBL, student preparation, students' 21st-century skills, vocational education innovation.

INTRODUCTION

Education is crucial in preparing future generations to face the challenges and opportunities of the 21st century. It is the foundation for a country's progress and development (Isma et al., 2023). With the rapid changes in technology, economy, and social dynamics, education must adapt to remain relevant and effective in preparing students for an increasingly complex work environment. Students must not only comprehend concepts and theories but also equip themselves to handle real-life situations in a rapidly changing work environment. The 21st century is characterized by extensive and global integration of information and technology (Nurtanto et al., 2019). Education is widely acknowledged as the most crucial element in life. Education shapes and develops quality and sustainable human resources in accordance with the times (Hidayat & Abdillah, 2019).

In the 21st century, there has been a significant shift in response to rapid advances in Science and Technology. This shift includes changes in the learning paradigm, such as curriculum, media use, and technology (Rahayu et al., 2022). The era of Industry 4.0 has brought about a world where technology controls human activities and conditions. The rapid development of science and technology is evident. Therefore, humans must inevitably face and adapt to this rapid development (Fitriyah & Ramadan, 2021). Science and technology are interrelated, and the application of technology in the teaching and learning process cannot be separated from the development of science in the 21st century (Kusumaningrum et al., 2021). Continuous updates are necessary to achieve educational goals in the field of education (Nurhaedah et al., 2020).

Education in the 21st century is based on four main pillars: learning to know, learning to do, learning to be, and learning to live together. Therefore, it is necessary to innovate in learning, including the use of educational technology (Banarsari et al., 2023). Technology enables students

to experience learning events or phenomena that they cannot witness directly (Awaluddin et al., 2021). The 21st century is commonly referred to as both the industrial and knowledge era. In this era, the acquisition of skills and fulfillment of life needs are largely based on knowledge (Mardhiyah et al., 2021).

Project-based Learning (PjBL) is an educational approach that is gaining more attention due to its effectiveness in preparing students for the challenges of the 21st century work environment. SMKN 7 Kota Serang utilizes PjBL as one of its approaches to prepare students for the workforce. Project Based Learning (PjBL) is a method that enables students to acquire knowledge and skills by exploring and solving real problems or significant questions. It has become increasingly popular in vocational education, including at SMKN 7 Serang City. PjBL is an approach that exposes students to real-world situations, preparing them for the 21st-century work environment (Yoto et al., 2022). Project-Based Learning (PBL) is an approach to learning in which students actively design and create projects aimed at solving relevant problems in everyday life. This model encourages innovation and provides real-world learning contexts (Sinta et al., 2022).

PjBL aims to develop 'deep learning' skills, including critical thinking, problem-solving, and teamwork (Edalex, 2021). These skills are categorized into three main areas: learning, literacy, and life. Learning emphasizes critical thinking and creativity, literacy emphasizes information and media literacy, and life emphasizes leadership and social skills (Indeed, 2022). PjBL at SMKN 7 Kota Serang aims to enhance students' work readiness to meet the challenges of the 21st-century work environment. The skills required to remain relevant in this environment include flexibility, adaptability, initiative, self-direction, and social and cross-cultural skills (Bonev, 2017). Therefore, PjBL at SMKN 7 Serang City is a crucial initiative in preparing students for success in the 21st-century work environment.

METHODS

This research uses a quantitative approach by giving questionnaires to 33 students of class XII Mechanical Engineering SMKN 7 Serang City who have implemented PjBL-based learning in each productive subject. This questionnaire was answered by students after completing their projects and reports in one of the productive subjects of mechanical engineering, namely a subject called CNC & CAM Manufacturing Machining Techniques and having carried out industrial practice. The duration of this study was for 2 months, from September to October 2023.

A survey questionnaire was designed and administered to 33 grade XII (twelve) students who had completed the CNC & CAM Manufacturing Machining Technique subject project and compiled the report in groups, the project task required students to work in groups of 2-3 people. This questionnaire consists of five components to obtain students' responses to project-based learning and relevant soft skills based on the analysis of the following opinions (Hamzah et al., 2023; Wagiran, 2009) :

- a. Kerja sama tim
- b. Manajemen Proyek
- c. Keterampilan Komunikasi
- d. Keterampilan Interpersonal
- e. Pemecahan Masalah

The questionnaire utilized a 1-4 point Likert scale with 1 being Disagree and 4 being Strongly Agree. Section A consists of statements that test students' perceptions of project-based learning in teamwork, Section B surveys students' perceptions of project management in PjBL, Section C collects students' perceptions of their communication skills when engaged in PjBL, Section D

collects students' perceptions of interpersonal skills, while, Section E collects information on problem-solving skills. Students were asked to answer the questionnaire after completing their project work. Findings from the questionnaires were analyzed using SPSS version 22. Student responses were analyzed using descriptive statistics in the form of frequencies and percentages. The results were analyzed and discussed in a descriptive quantitative manner.

RESULTS AND DISCUSSIONS

This section presents the research findings based on five components namely: teamwork, project management, communication skills, interpersonal skills, and problem solving skills. This section discusses the extent to which PPA in project work has equipped students with soft skills relevant in the 21st century workplace environment.

Student Responses on Teamwork

This section consists of 4 statements to get feedback and students on what they gained in teamwork while working on the project Table 1 below shows students' responses on teamwork.

Table 1. Teamwork

	Statement	Responses (%)			
		STS	TS	TP	S
A1.	I learned how to actively listen to my group members.	9.1	9.1	15.2	66.7
A2.	I learned how to ask and respond appropriately among group members.	3	9.1	21.2	66.7
A3.	I learned how to be assertive when brainstorming with group members	9.1	9.1	15.2	66.7
A4.	I learned that good teamwork contributes to a successful project outcome.	6.1	3	9.1	81.8

After undergoing the PjBL process for almost 7 weeks, students were asked to provide feedback on the soft skills learned from teamwork. The majority of respondents or 66.7% agreed that they learned to actively listen to their group members (A1). When students can listen attentively and understand what is being said to them, it enhances their ability to ask further questions and give appropriate responses. This was evident when 66.7% of students answered that they could ask and respond appropriately to any questions posed by their group members (A2). Nonetheless, about 66.7% of students admitted that they became more assertive when they learned and practiced to express and exchange ideas through PBL (A3). In addition, 81.8% of students recognized that good teamwork contributed to a successful project outcome (A4).

This finding shows that students have successfully worked in groups in managing the tasks assigned in the project work. (Kozlowski & Ilgen, 2006) emphasizes that learners develop questions as a group. divide the work among individuals or pairs to find answers to selected questions using various sources such as the internet or sources. (Melguizo-Garín et al., 2022) also states that the criteria for project work are, learners work in groups to select topics of interest and decide the direction of their learning: they rely on the insights of their peers while providing feedback to others, they may use the teacher as a resource, but by and large, they create their own knowledge.

Student Responses on Project Management

This section consisted of 4 statements that required students to provide feedback on the influence of PBL on their project management skills. These responses revealed insights into the processes involved in managing projects as shown in Table 2 below.

Table 2. Project Management

Statement	STS	Responses (%)		
		TS	TP	S
B1. I am confident to make suggestions freely among group members.	15.2	3	15.2	66.7
B2. I learned how to generate ideas and pass on ideas appropriately with group members.	-	12.1	24.2	63.6
B3. I understand and am able to gather information for the project.	6.1	6.1	18.2	69.7
B4. I learned how to identify relevant ideas from reading materials about the project work.	12.1	6.1	18.2	63.3

Projects that are successfully completed as a result of teamwork efforts also help develop individual soft skills, especially project management. It is clear that when students are able to work in teams, they show confidence in giving advice. A total of 66.7% of respondents admitted that they feel they have the confidence to give advice without worry (B1). However, only 63.6% stated that they learned how to brainstorm and convey ideas appropriately to group members after undergoing PjBL, while 12.1% of students believed that they did not acquire the skills to brainstorm and convey ideas (B2). It can be interpreted that students did not face any problem in giving suggestions and were convinced by the ideas proposed by one or two group members. These bright ideas provided an avenue to search for current and relevant materials related to the project work.

Gathering information and reading materials is a skill needed in doing projects. 69.7% agreed that they could understand and gather information for the project, based on the reading material, but 18.2% were unsure (B3). This shows that almost three-quarters of students are quite skilled in gathering information from reading materials and only about a quarter need help in gathering information. Teachers should encourage students to gather information from various sources such as academic books, journals, and articles in addition to the internet that students often refer to. Finally, the findings showed that 63.3% agreed that they learned how to identify relevant ideas from the reading materials collected related to the project work. This means that through PjBL, students have acquired relevant reading skills such as skimming and scanning. gathering information and identifying relevant ideas related to the project done by their group.

Student Responses on Communication Skills

This section consisted of 5 statements that required students to provide their responses on the influence of PBL on communication skills. These responses revealed insights into students' perceptions of the communication skills acquired as shown in Table 3 below.

Table 3. Communication Skills

Statement	STS	Responses (%)		
		TS	TP	S
C1. I feel able to convey ideas and thoughts clearly to my teammates in project-based learning projects.	3	-	9.1	87.9
C2. I feel confident in communicating with my teammates in projects that involve teamwork.	9.1	-	15.2	75.8

C3.	I feel that my communication skills have improved after being involved in project-based learning projects.	-	12.1	18.2	69.7
C4.	I feel that the communication skills I have developed through PjBL projects will be beneficial in preparing me for the 21st century work environment in the future.	3	6.1	12.1	78.8

It is not enough for a vocational student to acquire hard skills alone as employers are looking for more than just knowledge and technical skills of a discipline. They highly value communication skills. Job applicants who can demonstrate that they have developed these skills will have a real advantage. Given the current situation, project-based learning provides a huge opportunity for students to develop their communication skills as shown in the following findings. A total of 87.9% learned and presented ideas related to workplace settings (C1). In addition, 75.8% responded favorably regarding being confident in communicating involving the team based on the assigned project (C2). However, only 69.7% were familiar with being able to develop communication with project-based learning in the workplace (C3). This highlights the role of the teacher to ensure that students are familiar with email writing conventions. A significant number of students (78.8%) learned to organize in preparation for developing their communication skills (C4).

These findings suggest that students greatly benefit from developing their communication skills in accordance with the work environment. (Crespi et al., 2022) suggest that communication and language skills can be delivered in project-based learning (PBL) requiring collaborative work, where some of the students' teamwork skills and social competencies are relevant to meet 21st century labor market needs.

Students' Responses on Interpersonal Skills

This section consisted of 4 statements that required students to provide their responses regarding the influence of PBL on interpersonal skills. These responses revealed insights into students' perceptions of the interpersonal skills acquired as shown in Table 4 below.

Table 4. Interpersonal Skills

Statement	STS	Responses		S
		TS	TP	
D1. I became more perceptive and sensitive to the needs of others during group work.	6.1	-	30.2	63.6
D2. I learned to work well with students from different social and cultural groups	6.1	9.1	9.1	75.8
D3. I learned to use formal and informal language in appropriate discourse contexts.	6.1	-	12.1	81.6
D4. I improved my social skills to be prepared when meeting and speaking with employers and workers in a company.	9.1	-	12.1	78.8

As for interpersonal skills, more than half of the respondents, 63.6% agreed that they became responsive and sensitive to the needs of others (D1). When working with others from different social and cultural backgrounds, almost 75.8% agreed and 9.1% were unsure (D2). In carrying out project work, respondents are required to use formal and informal language according to different discourse contexts, almost all of the 81.6% student respondents agree that they have acquired these

skills (D3). They have also tried to prepare in improving their social skills as much as 78.8% of respondents. However, about 12.1% of students were not sure about this (D4).

The findings in Table 4 show that 12.1% to 30% of the respondents gave an uncertain answer to statements (D1-D4) indicating that there are a significant number of students who are unsure whether they have acquired interpersonal skills. This could imply that they were unable to develop their interpersonal skills while undergoing project work. It may be due to their limited language skills, as a result students in the future may face communication problems when interacting with staff in the workplace. Therefore, further training needs to be provided to students to enable them to acquire the necessary interpersonal skills to meet the requirements of the 21st century labor market needs.

Student Responses on Problem Solving

This section consisted of 5 statements that required students to provide their responses regarding the effect of PBL on problem solving skills. These responses revealed insights into students' perceptions of the problem-solving skills acquired as shown in Table 5 below.

Table 5. Problem Solving Skills

Statement	Responses (%)			
	STS	TS	TP	S
E1. I was motivated to speak up and express my opinions in identifying problems and solutions.	6.1	-	18.2	75.8
E2. I learned how to assess solutions and identify good views among group members.	3	3	12.1	81.8
E3. I have to read a lot about workplace issues.	-	3	24.2	72.7
E4. I had to read a lot about workplace issues.	3	3	18.2	75.8
E5. I learned how to draw conclusions from findings.	9.1	6.1	-	84.8

The findings above show the problem-solving skills acquired by respondents during the project. Most respondents (75.8%) agreed that they were motivated to speak up and express opinions in identifying problems and solutions (E1). 81.8% of respondents were also able to assess good solutions and identify good views among group members as shown in the results (E2). In this project, respondents were asked to read the problems in the workplace and the results showed that 72.7% agreed with the statement (E3). In addition, 75.8% can easily focus on the main idea needed for the project (E4). In learning about how to draw conclusions from the findings, the result of 84.8% shows the highest percentage of problem solving skills obtained.

With regard to problem solving skills, the findings show a very significant result of 70% and above in conveying ideas and opinions as well as identifying and assessing good views from group members (E1 and E2). This project work has enabled students to share and exchange ideas in finding solutions related to problems faced in their respective workplaces. This is supported by a fairly high result of 84.8% (E5) in drawing conclusions from the findings obtained by students in project work. However, some students faced the problem of 24.2% unsure in reading problems related to the workplace (E3) due to lack of exposure to workplace situations.

CONCLUSIONS

PjBL plays an important role in the development of various relevant soft skills. Students' participation in PjBL projects has strengthened their ability in teamwork, by providing real-life experience in collaborating in teams. Project management is a major focus in PjBL, teaching students to plan, organize, and manage time efficiently. Students' communication and interpersonal

skills are also significantly improved, as they have to interact with teammates, teachers, and other stakeholders. In addition, PjBL also encourages students to face challenges and solve problems that arise during the project, which are important skills in facing a dynamic work environment. Thus, the results of this study confirm that PjBL is effective in preparing students of SMKN 7 Kota Serang with soft skills essential for success in the 21st century work environment.

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