EVALUATION OF THE IMPLEMENTATION OF THE PROJECT-BASED LEARNING (PJBL) PROGRAM BASED ON SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEAM)

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ABSTRACT

This research aims to find, reveal, and analyze the success of the implementation of the STEAM-based PjBL program. This research is evaluative by evaluating the implementation of STEAM-based PjBL at Putri Mazaya Assunnah Middle School to improve students' conceptual and critical thinking skills. The evaluation model used is a qualitative approach using the Countenance Evaluation Model developed by Robert Stake, including the background context of the program, the program implementation process, and the output of program implementation achievements. Participants in this research included school principals, teachers, and students. Observations, interviews, and documentation were used to collect research data. Data validity with source triangulation. Evaluation findings: first, in the context of the background and implementation objectives, it is by the vision, mission, and objectives through the implementation of the implemented curriculum. Second, in the program implementation process, there needs to be an evaluation of the STEAM-based PjBL implementation time analysis and consistency in carrying out monitoring activities during program implementation. Third, the output from the implementation of the STEAM-based PjBL program can make it easier for students to achieve learning goals. In facing challenges and obstacles, it is necessary to reflect and evaluate with all teachers to facilitate the preparation of follow- up plans for the STEAM-based PjBL program. The implications of the research results need to be reviewed regarding the technical aspects of preparing program implementation plans and analyzing the implementation time for project completion.

Keywords: Implementation Evaluation; PjBL; STEAM; Junior High School; Countenance Evaluation Model

INTRODUCTION

The world has now entered the 21st century, marked by openness and globalization. The 21st century demands qualified human resources with skills in technology and information management, learning, and innovation. These demands necessitate breakthroughs in thinking, conceptualizing, and

implementing appropriate actions. One way to create qualified human resources is by improving the quality of education. The current challenge in education is to prepare and equip students with 21st-century skills (Halim et al., 2013). To address the challenges of the 21st century, the Indonesian government has implemented changes and improvements to the curriculum, from the 2006 Curriculum to the 2013 Curriculum. These curriculum changes were made to enhance the previous curriculum, taking into account current developments and student needs.

With technological advancements, educators and students are now expected to be able to think critically in solving problems and applying technology in the educational process, thus enabling them to face complex challenges. One way to achieve the ability to face life's challenges is by applying STEAM-based learning (Science, Technology, Engineering, and Mathematics).

This is in line with observations made at Mazaya Assunnah Girls' Middle School, whose vision is to realize Muslim women with pious faith, noble morals, and a sound understanding within the framework of the Qur'an and Sunnah. The goal of this vision is to produce graduates with a faith aligned with the Qur'an and Sunnah, possess commendable morals in their relationships with others and with the Creator, and produce graduates who are meaningful, who are useful in their lives. Achieving this vision requires an educational process to ensure graduates possess competencies that can be applied in life. To achieve this vision, Mazaya Assunnah Girls' Middle School has implemented a Project-Based Learning (PjBL) model. The use of the PjBL model is frequently used in the learning process. The choice of learning model plays a crucial role in achieving learning objectives. The implementation of the PjBL model at Mazaya Assunnah Girls' Middle School is not confined to a single subject but is integrated across several subjects. The program utilizes a PjBL learning model based on Science, Technology, Engineering, and Mathematics (STEAM), which aims to enhance students' conceptual and critical thinking skills, enabling them to apply them to everyday life. Furthermore, as a strategy based on the curriculum structure at Mazaya Assunnah Girls' Middle School, which implements the 13-year curriculum and a special curriculum for women's and Islamic studies (Keputrian Keputan dan Diniyah). To facilitate learning assessment and help students understand how to implement the knowledge they have learned, the program is implemented through a STEAM-based project.

The implementation of the aforementioned program is expected to facilitate the learning process, particularly as it targets assessments according to the applicable curriculum. However, the reality is that the implementation of STEAM-based PjBL in some subjects has not been optimally implemented. Educators still find it difficult to formulate core competencies for each subject in collaboration with other subjects, resulting in numerous separate assessment processes. This can be seen from the Academic Plan Card (KRA) used by students as a reference for assessments conducted throughout each semester. The KRA shows that only one core competency is implemented in the STEAM-based Project-Based Learning (PjBL) program.

Based on the above, a study was conducted to evaluate the implementation of the Science, Technology, Engineering, and Mathematics (STEAM)-based Project-Based Learning (PjBL) program at SMP Putri Mazaya Assunnah Depok.

METHOD

In qualitative research, the concepts of population and sample are referred to as research subjects or units of analysis. The concept of research subjects relates to what or who is being studied. The source of the data is called the observation unit. Research data sources can be people, objects, documents, or processes of an activity, among others. Research subjects are entities that influence research design, data collection, and data analysis decisions. A population is a subject or object within a research topic area and meets certain requirements related to the people within the research unit or unit of analysis being studied (individuals, groups, or organizations) (Abdussamad, 2021). In this study, the research subjects were Mazaya Assunnah Girls' Middle School, with respondents from Mazaya Assunnah Girls'

Middle School as teachers, students, and parents.

Based on the above, the sample for this research was Mazaya Assunnah Girls' Middle School, with respondents including the principal, curriculum representative, teachers, and students.

The approach used in this evaluation was a qualitative approach. In (Abdussamad, 2021), Bogdan and Taylor (1982) state that qualitative research is a research procedure that produces descriptive data in the form of written or spoken words from people and observable behavior; the approach is directed at the setting and individuals holistically. Kirk & Miller explain that qualitative research is a particular tradition in the social sciences that fundamentally relies on observing (of) humans in their own context and relating to those people in their language and terminology. This research is qualitative research using evaluative research methods. According to (Ambiyar & Muhardika D, 2019), program evaluation is the application of systematic scientific procedures to assess the design and then present information for decision-making regarding the implementation and effectiveness of a planned and sustainable system (program).

Research activities and processes must be scientific in nature, not planned or manipulated. To discover information and elements in this qualitative evaluation research, the Countenance Evaluation Model approach was used.

The reasons for using the Countenance Stake Model in research on STEAM-based PjBL programs are: (1). Description and Judgment direct the collection and processing of data as well as drawing conclusions and decision recommendations through the stages of input (antecedents), process (transactions) and output (outcomes); (2) With the Countenance Stake model, program evaluation activities are carried out by comparing field data with the specified standards; (3) Researchers can conduct research on the implementation of STEAM-based PjBL seen from the components of input (antecedents), process (transactions), and output (outcomes) data compared not only to determine whether there is a difference between the objectives and the actual situation but also compared with absolute standards, to assess the benefits of the program. Thus, the Countenance Stake Model can provide a detailed picture of program implementation. Furthermore, by using this Countenance Stake model, to compare information about teacher perceptions that the difficulties of implementing STEAM-based PjBL in learning can be used measurement instruments. The measurement instruments in question are instruments that are useful for helping internalize the results of learning implementation. In this connection to obtain more accurate data and information, triangulation of data sources is carried out. This means that data and information sources are not only obtained from one key informant but efforts are made to obtain other data sources.

FINDINGS AND DISCUSSION

Collaboration in the learning process to improve students' Communication, Collaborative, Creative, and Critical Thinking skills is crucial in this era of education, where teachers are no longer the sole source of information. Students can utilize a multitude of learning resources, especially digital ones. One way to achieve this collaboration is through the implementation of STEAM-based PjBL (Problem-Based Learning) in the learning process.

Mazaya Assunnah Girls' Middle School, in particular, operates a full-day school concept that utilizes the 13-point curriculum structure in accordance with Ministerial Regulation Number 35 of 2018 concerning the 2013 Curriculum for Junior High Schools/Islamic Junior High Schools.

Subjects	Time Allocation Per Week		
	Grade VII	Grade VIII	Grade IX
Group A (General)			
1. Religious Education and Character Development	3	3	3

Subjects	Time Allocation Per Week		
	Grade VII	Grade VIII	Grade IX
2. Pancasila and Citizenship Education	3	3	3
3. Indonesian Language	6	6	6
4. Mathematics	5	5	5
5. Natural Sciences	5	5	5
6. Social Sciences	4	4	4
7. English	4	4	4
Group B (General)			
1. Arts and Culture	3	3	3
2. Physical Education, Sports, and Health	3	3	3
3. Handicrafts and/or Informatics	2	2	2
Total hours per week	38	38	38

Description:

1. Group A subjects are subjects whose content and references are developed centrally.
2. Group B subjects are subjects whose content and references are developed centrally and can be supplemented with local content/content.
3. Group B subjects can be stand-alone local content subjects.
4. Local content can include regional languages.
5. One lesson hour of face-to-face learning is 40 (forty) minutes.
6. The learning load of structured assignments and independent activities is a maximum of 50% of the face-to-face learning time for the subject in question.
7. Educational units may increase the learning load per week according to student learning needs and/or academic, social, cultural, scientific and technological needs, and other factors deemed important, but the maximum is 2 (two) hours per week, as determined by the Government.
8. For Arts and Culture subjects, educational units are required to provide at least 2 of the 4 provided aspects. Students participate in one of the provided aspects each semester, and the aspect they participate in may be changed each semester.
9. For Craft and/or Informatics subjects, educational units offer one or both of these subjects. Students can choose either Craft or Informatics, provided by the educational unit.
10. j. If an educational unit chooses Craft, the educational unit is required to offer at least two of the four available aspects. Students participate in one of the provided aspects each semester, and the chosen aspect can be changed each semester.
11. k. Specifically for Madrasah Tsanawiyah (Islamic Junior High Schools), the curriculum structure can be developed according to the needs stipulated by the Ministry of Religious Affairs.
12. l. Extracurricular activities include Scouting (mandatory), school health programs (UKS), youth Red Cross (PMR), and others, according to the conditions and potential of each educational unit.
13. This is complemented by the unique curriculum of SMP Putri Mazya Assunnah, consisting of the Diniyyah and Keputrian (Female and Female) curriculum, resulting in a fairly large number of subjects offered each week at SMP Putri Mazya Assunnah. Furthermore, based on the technical competencies that must be achieved in

Curriculum 13, which aligns with Minister of Education, Culture, Research, and Technology Regulation Number 35 of 2018 concerning the 2013 Curriculum for Junior High Schools/Islamic Junior High Schools, the description of Core Competencies for Junior High Schools/Islamic Junior

High Schools (SMP/MTs) can be seen in the following table.

Table 4.4 Core Competencies of Junior High School/Islamic Junior High School

CORE COMPETENCIES GRADE VII	CORE COMPETENCIES GRADE VIII	CORE COMPETENCIES GRADE IX
1. Appreciate and internalize the teachings of the religion they adhere to.	1. Appreciate and internalize the teachings of the religion they adhere to.	1. Appreciate and internalize the teachings of the religion they adhere to.
2. Appreciate and internalize honest, disciplined, responsible, caring (tolerance, cooperation), courteous, and self-confident behavior in effective interaction with the social and natural environment within their range of association and existence.	2. Appreciate and internalize honest, disciplined, responsible, caring (tolerance, cooperation), courteous, and self-confident behavior in effective interaction with the social and natural environment within their range of association and existence.	2. Appreciate and internalize honest, disciplined, responsible, caring (tolerance, cooperation), courteous, and self-confident behavior in effective interaction with the social and natural environment within their range of association and existence.
3. Understand knowledge (factual, conceptual, and procedural) based on curiosity about science, technology, arts, culture, related to visible phenomena and events.	3. Understand and apply knowledge (factual, conceptual, and procedural) based on curiosity about science, technology, arts, culture, related to visible phenomena and events.	3. Understand and apply knowledge (factual, conceptual, and procedural) based on curiosity about science, technology, arts, culture, related to visible phenomena and events.
4. Try, process, and present in the concrete realm (using, analyzing, arranging, modifying, and making) and in the abstract realm (writing, reading, calculating, drawing, and composing) according to what has been learned in school and other sources in the same viewpoint/theory.	4. Process, present, and reason in the concrete realm (using, analyzing, arranging, modifying, and making) and in the abstract realm (writing, reading, calculating, drawing, and composing) according to what has been learned in school and other sources in the same viewpoint/theory.	4. Process, present, and reason in the concrete realm (using, analyzing, arranging, modifying, and making) and in the abstract realm (writing, reading, calculating, drawing, and composing) according to what has been learned in school and other sources in the same viewpoint/theory.

Therefore, to achieve learning objectives and the required competencies, implementing STEAM-based PjBL is one program that can be implemented in the learning process. The implementation of this program begins with the socialization stage, lesson plan development, implementation, monitoring, and student outcomes. Based on research, the program's implementation has been successful. Evaluation of the technical preparation undertaken by teachers during the project and the duration of the project should be evaluated to ensure it is not too short, thus facilitating student completion.

CONCLUSION

The evaluation results of the STEAM-based PjBL program implementation at Mazaya Assunnah Girls' Middle School, Depok, using the Countenance Stake model indicate that:
1. The contextual evaluation of the background and objectives of the STEAM-based PjBL program align with the vision, mission, and implementation of Curriculum 13 in improving students' thinking skills and align with the unique curriculum structure used at Mazaya Assunnah Girls' Middle School.

2. The evaluation of the STEAM-based PjBL implementation demonstrates that collaborative planning, aligned with program objectives, and activity implementation are carried out as planned. However, it is necessary to analyze project implementation timelines and conduct equitable monitoring across all projects.

3. Regarding output evaluation, the implementation of STEAM-based PjBL can be implemented throughout the learning process and facilitates students' understanding of the relevance of learning objectives to the core competencies learned and their implementation in daily life. It also facilitates the fulfillment of assessment requirements based on the Curriculum 13 assessment guidelines.

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