# Project Based Learning Pedagogical Design in STEAM Art Education

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**Abstract**: This paper explores the potential of Project-Based Learning (PBL) approach in a multidisciplinary art classroom involving STEAM (Science, Technology, Engineering, Art, and Mathematics) education. The PBL approach involves a dynamic classroom approach, which emphasises on long-term learning, interdisciplinary and student-centred art activities. This implementation would benefit the teaching strategies in art projects; helping students understand lessons, improving communication and soft skills, as well as enhancing leadership skills and creativity. However, there are some concerns related to the PBL approach: i) difficulties in finding appropriate teaching strategies, ii) choosing suitable projects, iii) selecting relevant measurement tools or assessing rubrics, and iv) developing learning content to suit the objective and the main purpose of the art curriculum. In identifying this approach's potential, a study was carried out involving two art teachers in their respective classrooms. Data was collected through interviews, observations, and document analysis of their teaching strategies, which included three main phases of PBL implementation in creating art projects. The findings suggest that the PBL pedagogical design has the ability to improve teaching strategies and with potential to replace a traditional, teacher-led art classroom. The approach is effective in guiding teachers to manoeuvre an authentic art lesson while benefiting the students through emphasis on the artistic process of creating a STEAM project, while focusing on culminating the necessary art content through active collaboration, exploration of real-world challenges and curricular activities' problem-solving. However, a number of challenges were identified, such as curriculum demand, learning content, teachers' and students' attitude, and access to instruments. Hence, a number of suggestions and recommendations are proposed to help resolve the challenges. The implications of the study on arts curriculum, school systems and other higher institutions are also discussed.

**Keywords**: Project-Based Learning, Art Education, STEAM

## 1. Introduction

Art teachers learn to plan activities for students to teach essential skills, techniques and terminology, to help them with curriculum demands. Planning art projects is challenging (Douglas et al., 2018), and perhaps the most fundamental questions while teaching art education are "What do we teach when we teach art? Does our teaching practice support our intentions? Will students understand the content and what it offers?".

In fact, art education should be an authentic and open exploration that precedes an unpredictable process towards diverse possibilities. It should be self-initiated projects, socially compelling, and generating vibrant inspiration as it unfolds (Douglas et al., 2018). Art curriculum should meet the varied

needs of all students; at all possible levels and abilities and provides sufficient scope in achieving the desired objective. Art approach needs to be adaptable, can be assimilated, intentionally generalised, allowing interdisciplinary choice while meeting benchmarks, standards and expectation (Douglas et al., 2018). Problem Based Learning (PBL) approach has been stimulated by the STEAM elements, as students participate in designing challenges that incorporate all of these aspects (James, 2016). The synergy of these collaborative subjects leads to changes in the implementation of art education pedagogy through a diverse, multicultural authentic learning, which inculcates the 21st century critical skills (Tally 2015).

The composite of a well-planned pedagogy design, emergent topics and lesson, and blend intended curriculum are highlighted in this study. This paper explores the findings and discusses the PBL authentic approach in a multidisciplinary art classroom involving STEAM projects. Three main phases in the PBL implementation of creating projects are highlighted, along with the PBL fundamental, essential elements, and PBL upon creating the STEAM project. The PBL steps are described in detail and illustrated in the form of art pedagogical design.

## 2. Background of the Study

PBL is based on Piaget's and Dewey's theory on constructivism that encourages students to carry out tasks based on 'real-life' experience (Govers et al., 2014). PBL involves a dynamic classroom approach, which emphasises on long-term learning, interdisciplinary and student-centred art activities. This kind of implementation would benefit teaching strategies in art projects in various ways, for example, helping students to understand a lesson, improving communication and soft skills, enhancing leadership skills, as well as encouraging spiritual ethics and national identity (Ministry of Education, 2013).

A successful PBL environment in art education requires five elements namely: being holistic, having autonomy, ownership, and integrating collaboration and emergence (Govers et al., 2014; Gude, 2013). Obviously, PBL can help students to polish their reasoning skills in addressing the requirements of 21st century learning and help them understand the learning process in the art classrooms (Tally, 2015; Dobbs, 1998; Wittber, 2017). The transformation in art education programme will assist schools to create a successful and effective PBL approach in art classroom, providing diversity in learning, and promoting a multi discipline lifelong learning (Gude, 2013).

### 2.1 STEAM Education

One of the important objectives in Malaysian Education blueprint is to implement a comprehensive transformation by establishing a clear vision and aspiration for a better-educated nation (Ministry of Education, 2013). The ministry believes that the development of students' soft skills and 21st century skills (5C's) will ensure the future generation to be ready to compete globally. Therefore, education stakeholders should focus more on developing individuals' creative talents rather than only producing technicians or intellectuals.

The new focus in education requires application, creation and ingenuity. In one of the initiatives to promote creativity among students, STEAM involves the critical process of creativity and innovation. It allows students to connect to the established elements of STEM in art practices, design principles and assessment (James, 2016). These STEAM components include an integrated approach to learning that requires an intentional connection between standards, assessments and lesson design. The core standard of STEAM promotes inquiry, collaboration and emphasises on project-based learning approach, which assimilates the authenticity of art curriculum (Oner et al., 2016). Hence, the curriculum in schools or universities should be adjusted to accommodate the principle of STEAM, by incorporating these practices into the present teaching and learning process of art education.

### 2.2 PBL Pedagogical Design

To date, there are different interpretations of PBL's phases with various overlapping terms by various researchers, but overall, there are three main common phases namely 'planning', 'testing' and 'reflecting' in creating the project. These phases usually involve teachers for preparing the initiation of

a 'problem solving', 'self-directed learning' and finally the 'implementation, reflection or outcome' of the project (Erdogan & Bozeman, 2015). Table 1 below shows the main phases and elements in the concept of PBL pedagogical design.

**Table 1**. Three Main Phases of PBL Pedagogical Design

| Phases | Wurdinger & Haart | Element | Wee | Element |
|---|---|---|---|---|
| Phase 1 | Planning | Problem<br>(topic, question) | Meeting 1 | Crafting Problem,<br>Thinking Process |
| Phase 2 | Testing | Plan (process)<br>Test (product) | Self-Directed<br>Learning (SDL) | FILA, Specific Topic,<br>Learning Session,<br>Curriculum Adoption |
| Phase 3 | Reflecting | Reflect<br>(assessment) | Meeting 2 | Implementation<br>Explanation<br>Outcome |

FILA, Facts, Idea, Learning Issue, Action Plan

In addition to the phases and elements of PBL, there are certain processes or steps to implement PBL in the classroom. With regards to the PBL implementation in elementary school, there are four PBL processes that suit the need and complement the current Malaysian art education curriculum and pedagogical practices, especially in STEAM projects. The processes of PBL are shown in Table 2 below.

**Table 2**. PBL Process in Pedagogical Design

| | **Steps** | **Focus** | **Activity** |
|---|---|---|---|
| **PBL Process** | **S1. Essential** | Observe, Think, Question (OTQ)<br>Questioning Planning | Get Idea (Problems, solution)<br>Title topic content<br>Define Problems |
| | **S2. Plan** | Content Standard<br>Project Ownership<br>STEM-Subject Integration<br>Material & Resources | Design Project (Backward planning)<br>Research problem<br>Develop Solution |
| | **S3. Schedule** | Timeline<br>Time Allocation<br>Project Direction<br>Manage Time<br>Deadlines | Tune project (monitor & control)<br>Understanding stakeholders<br>Plan Project |
| | **S4. Monitor** | Process Facilitating<br>Mentoring<br>Utilise Rubrics<br>Group Members<br>Project Progress | Do Project<br>Determine possible solution<br>Execute Plan |
| | **S5. Assess** | Authentic Assessment<br>Type of Assessment | Exhibit Project<br>Develop plan<br>Implement plan<br>Monitor, control progress |
| | **S6. Evaluate** | Individual<br>Groups<br>What works?<br>Changes<br>Idea Sharings | Reflect (expert advice)<br>Summarize, evaluate & reflect.<br>Close project (reflect, present) |

A successful implementation of PBL in a project should collaboratively engage the students in many processes such as introducing complex entry questions to motivate students' inquiry, identifying the timeline of the project, drafting the process and benchmarks, and finally, assessing and reflecting the process of the final product. When designing the project, it is important to understand the curriculum content, and plan a multi discipline standard by integrating various subjects (STEAM) into the project. Teachers need to have good ideas on materials or resources that can be used, assist the students during the PBL process, assist them on time management, and finally, assess their projects upon completion. In short, here is an overview of the developed pedagogical design on PBL phases during the process of creating the STEAM art projects.

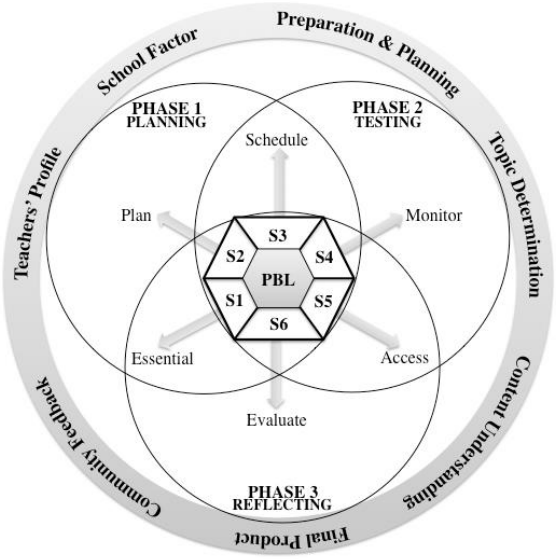


**Fig. 1** PBL STEAM Art Pedagogical Design

Specifically, the implementation of this PBL approach is based on the principle of 6As, as Adria Stenberg described them as the 6 key elements of PBL implementation approach in integrated learning. Besides, this PBL design is also guided by Charity Allen who described 9 elements of the PBL approach using four main methods: i) Big Picture Planning, ii) Feedback & Revision; iii) In-depth Planning and, iv) Feedback and Reflection, which are essential for teachers to implement an effective PBL lesson in art classrooms (Macmath et al., 2017).

## 2.3 Essential Question

In PBL, essential question (EQ) is central to the inquiry process; normally it emerges during the early phase of PBL, which is the phase of the planning of the project activities (Ministry of Education, 2006). Ideally, a good EQ in PBL should (i) spark ideas, inquire students' knowledge when solving problems, (ii) drive and capture project themes (big idea), and (iii) not easily solved and answered (Patton, 2012; MacMath, 2017). However, when crafting EQ, the level of complexity, coherence, and authenticity need to be considered (Ministry of Education, 2006).

An essential question requires multiple activities and synthesis of different types of information before it can be answered (Patton, 2012; MacMath, 2017). EQ drives the inquiry process of students and motivates them to evaluate, synthesize and analyse the problems, hence, it will spark their curiosity to understand certain issues or the unexplained by creating insights (Ministry of Education, 2006). EQ promotes multidisciplinary investigations, requiring students to apply skills and various contents from science or social studies. In addition, teachers would be able to implement thematic and cross-curricular teaching and learning practices effectively while carrying out PBL projects using EQ elements and frameworks (Patton, 2012; MacMath, 2017).

## 3. Problem Statements

Almost every teacher in the school desires the ability to create a strong and impactful learning experience in the art classroom. Stanley (2018) highlighted that learning nowadays should emphasize on preparation, encourage critical thinking, be relevant, multidisciplinary, authentic and interactive. In addition, meaningful interactions between students and their teachers are also essential in order to provide high quality learning experience (Tadesse, Manathunga, & Gillies, 2020). Thus, effective learning should provide various learning opportunities, be able to integrate and apply what they have learnt across different subject areas, be seamlessly integrated with assessment and allow competitive solutions and outcomes (Stanley, 2018).

However, there are some concerns related to the recent pedagogical practices, as many teachers have expressed their confusion or hesitation upon choosing the right approach in teaching arts (Norrila & Zaleha, 2015). Despite being exposed to many teaching approaches and strategies, previous studies show that teachers still have problems in teaching and learning such as encountering difficulties in finding appropriate teaching strategies, choosing a suitable project, selecting relevant measurement tools or assessing rubrics, and developing appropriate learning content to suit the objective of the art curriculum (Govers et al., 2014; Gude, 2013; Macmath, 2017).

While many studies show that PBL approach is inscribed as one of the solutions to the highlighted issues, obviously, PBL has the advantages in helping teachers to implement effective pedagogical practices, thus, making learning experience more interesting and impactful for students (Govers et al., 2014, Gude, 2013). Nevertheless, in order to implement this approach, some aspects need to be addressed to ensure that the learning process is well implemented and can provide benefits to everyone at school. Hence, the importance of competent and quality teachers should be emphasised via the PBL concept, and teachers should in fact serve as agents or facilitators in the classroom during the teaching and learning process (Gude, 2013; Dobbs, 1998).

According to Habok and Nagy (2016), teachers need to receive adequate training in the implementation of PBL, as teacher's guidance is one of the important fundamentals in PBL. Besides theoretical training, in order to fully exploit PBL, teachers also need to receive practical training upon this method. It is essential for teachers to understand the elements of PBL and learn other key contributing factors such as suitable curriculum content knowledge, relevant resources and materials for adopting PBL approach and teaching strategy (Stanley, 2018; Govers et al., 2014). In addition, many teachers are concerned with the challenges to implement PBL in the art classrooms (Harris, 2014). The challenges are not only limited to time constraints to complete the project according to the school's schedule, hence, coping with projects endures a prolonged time (Harris, 2014; Gude, 2013).

Therefore, this study discusses how PBL approach has the potential to enhance pedagogical practices and help teachers to plan a project, based on the proposed pedagogical design that includes the three main phases of PBL fundamentals. Furthermore, the PBL design method emphasises the artistic processes of creating projects and provides appropriate scaffolding and guidelines for students to be more independent, active and responsible in discovering ideas or solving problems using the PBL concept during the project completion. While providing essential information and guidelines for teachers in helping students to learn essential art concepts and required skills via this learning approach, the study also highlights some of the challenges in implementing the PBL, and how other educational institutions could be benefited and adapt more knowledge upon implementing the PBL approach in their respective fields.

## 4. Research Design Methodology

The case study analysed how two teachers used Project-Based Learning (PBL) approach in a multidisciplinary art classroom involving STEAM projects. The collection of descriptive data was carried out using adaptations of the PBL pedagogical design concept proposed by several experts in the PBL and 21$^{st}$ century learning concepts (Stanley, 2018; Wurdinger & Haar, 2007; Lambros, 2002; Wee,

2004), experts in arts education (Douglas et al., 2018; Dobbs, 1998) and experts in subject integration and curriculum content (Patton, 2012; Allen, 2015; MacMath, 2015).

### 4.1 Measures

The data collection was conducted using interviews, classroom observations and document analysis methods based on Stakes, Simon and Yin's research collection technique (Wurdinger et al., 2007). This method was chosen because it fitted the topic and the research questions. The assessment process in the PBL approach involves assessment instruments or rubrics that can evaluate students' learning process, knowledge, creativity and soft skills. Several PBL authentic instruments were adapted and tailored to the national curriculum evaluation standards to be utilised by teachers in art classrooms (Stanley, 2018; Douglas et al., 2018). Therefore, the teachers were able to evaluate the students' performance in various phases and areas such as the PBL learning process, problem solving, STEAM creativity, final product as well as their personality or soft skills during the project creation (Stanley, 2018; Douglas et al., 2018). Several sets of observation forms were prepared by the researchers to record the data. Data on the observation was analysed based on the different aspects such as the implementation of PBL pedagogy practices, the PBL process during STEAM project creation, collaborative strategy, and personality value involving teachers and students (Stanley, 2018; Wurdinger & Haar, 2007; Lambros, 2002; Wee, 2004).

### 4.2 Participants

This study which focused on the implementation of the PBL approach in a multidisciplinary classroom on STEAM project took about 3 to 6 months from the beginning of the preparation process to the presentation of the art project. In this study, a primary school in Kuala Lumpur was selected to carry out this study, which involved students from a Year 3 class and a Year 4 class. There were a total of 48 students participating in the study. Besides, two art teachers in their respective classrooms were also involved in this study.

## 5. Data Analysis

Data collection was divided into several key points (based on concepts, phases and processes in the PBL approach) which include factors of : (a) teacher profile (options, knowledge, and skills), (b) school (classroom layout, art studio, infrastructure), (c) preparation and planning, (d) topic determination (SDL, crafting question, FILA), (e) content understanding (subject integration, PBL-process, stages), (f) final product (STEAM project), and (g) community reflection (Douglas & Jaquith 2018; Stanley, 2018; Wurdinger & Haar, 2007; Lambros, 2002; Wee, 2004).

### 5.1 Teacher's Profile

From the interviews and observations conducted, it found that both teachers were qualified in teaching in the school whether they are degree holders in Fine Arts from local university, or diploma holders in education. Both categories of teachers have been teaching Arts education in primary schools for more than 8 years, and have been exposed to pedagogical workshops conducted by the schools and the Ministry of Education. They have vast knowledge of 21$^{st}$ century teaching, the integration of STEAM subjects, and they are familiar with the PBL pedagogical design. Their openness to the new pedagogical art knowledge is attributed to related pedagogical skills, which are effective and refined, hence, making their lessons fun and interesting.

### 5.2 School Factor

Basically, the school administrators in this study support all PBL related activities and art projects at school. As a result of having good support in terms of infrastructure, facilities and financial resources, the teachers are able to engage students with many activities and international participation such as design competitions and art-project exhibitions, thus, receiving various recognitions from outside stakeholders. The support from school administrators and the managerial department has reduced certain constraints faced by art teachers by providing essential resources, instruments and equipment for art projects. In-house training, workshops and pedagogical practices that are related to PBL fundamental elements can be exercised among teachers to increase the effectiveness of multidisciplinary PBL implementation at school.

### 5.3 Preparation and Planning

At an early phase of the planning, the teacher determined the 'exit outcomes' for each project. This 'backward planning' is an important element in demonstrating the effectiveness of project initiation as well as facilitating teachers to create problems, crafting questions and thinking skills while planning project content. Planning also takes into account aspects or factors such as school session, financial planning, human resources, implementation skills and student assessment ability. In the learning process, the final result or learning impact on the achievement of the objective has been achieved and demonstrated the effectiveness of the project on student outcomes based on the planned exit outcomes.

### 5.4 Topic Determination

To ensure that teachers are skilful in selecting the topic, creating problems and crafting essential questions, they need to use the FILA component of PBL (Wee, 2004) by underlining the Facts, Ideas, Learning Issues, and Action Plan while initiating the lesson. The teachers also collaborated ideas with the students, listened to their ideas on choosing interesting topics for their projects (student voice), hence, making them more engaged and motivated to solve the problems before moving on to the next phase of learning.

### 5.5 Content Understanding

For the next phase of PBL approach, the teachers prepared an annual and daily lesson plan based on the standard content of the art education curriculum. This content serves as a guide for determining the topic, the types of activities, tools, media or materials that can be used. The teachers also stressed on the practice of using 'artistic' terms or language during the artwork appreciation session. Therefore, the teachers need to understand the content of every topic in the curriculum to avoid misleading confusion while delivering the lesson.

The learning strategies also involve the application of constructivism theory, simulation and scaffolding concept, and mind mapping. Next, the 21$^{st}$ century learning strategy namely 'LeapEd' was adapted from the cooperative learning theory. For example, the teachers encouraged the students to interact and engage with various activities using techniques such as 'reviewing', 'questioning', 'popcorn', 'i-think map', 'differentiation', 'rewarding', 'template' and others. They also integrated PBL with other subjects or elements across the curriculum relevant into the STEAM project by incorporating other educational subjects or elements such as creativity, entrepreneurship and information technology.

The project needs to be completed twice a year, which inquires preparation and presentation of the final project at the end of each semester. The planning of the project indicated a lesson plan that emphasises the concept, phases, elements and process of PBL in the classroom. The teaching strategy is described in detail, step by step, to facilitate implementation by students. The following are the steps of PBL that are translated into their teaching and learning.

- Step 1: Beginning with essential questions that are open-ended, multipurpose and require many solutions. The questions engage students to real-world topics, culminate an in-depth authentic and impactful investigation. Most important of all, the questions are relevant and relatable to the students' surroundings and life.

- Step 2: Selecting an appropriate content and involving students when designing a plan for the project. The activities promote diverse selection based on the curriculum and support the authentic problems/questions.
- Step 3: Creating a schedule and timeline for the students. The lessons should be more flexible, and subject to any changes. They need to be reminded when to finalise their thoughts, findings, and evaluations. The teachers provide guidelines to help them stay on course, without setting too much limitation.
- Step 4: Monitoring students' progress, facilitating the process and encouraging collaborative effort. Teachers play an important role to evaluate the students' progress using team rubric and individual rubric with the provided resources, guides, and instruments.
- Step 5: Evaluating progress and giving feedback to students on how well they understand the information and what they need to improve on. Assessments also help teachers to design instructions to teach more effectively. Self-assessment among students is also allowed using designated evaluation instruments.
- Step 6: Making reflection on daily activities during the learning process. The teachers allow individual reflections in journaling, group reflection and discussion. Students can share their feelings and experiences, thus reflecting their work progress, changes, idea-sharing and evaluation process.

### 5.6 Final Product

Once the project was successfully completed, the students were required to present their work. The presentations were made up of (i) a presentation that involved the appreciation process after each project was completed, as students described the process and produced their work directly, on a small scale presentation; (ii) a presentation after the project, involving several completed activities, and was implemented on a large scale exhibition. The presentation involved students in the group to explain the whole process from the initial process of preparing the materials, and ideas-sketching to display the product. Finally, the teachers evaluated the final products using appropriate instruments when evaluating throughout the PBL process based on the curriculum content and planned exit outcomes.

### 5.7 Community Feedback

At the end of the exhibition, the school community such as the administrators, students, teachers and parents responded to the displayed products during the project exhibition. These responses were done through various mediums such as feedback forms, short questionnaires, or oral appreciations. Constructive responses or feedback can enhance the quality of PBL approach, and provide an opportunity for teachers and students to make future improvements.

## 6. Discussion

The PBL approach focuses on the enhancement of the 21$^{st}$ century learning skills (Tally, 2015), and students' achievement by enhancing students' soft skills through various interdisciplinary projects and activities (Stanley, 2018). Douglas and Jaquith (2018), Stenson (2015), Patton (2012) and MacMath (2017) have stressed on the importance of teachers in mastering the PBL fundamentals and developing effective teaching strategies when creating multidisciplinary projects in the classroom.

As with other teaching approaches, there are various challenges in implementing this PBL approach. According to Norrila and Zaleha (2015), one of the most critical challenges in PBL is the difficulty to foster leadership in teaching and learning that encourages students to work together on a project. Challenges such as defining topics, identifying problems, crafting essential questions, and setting up the project's goal and teamwork among students were also highlighted by Bell (2010) during the implementation of PBL approach. These drawbacks can affect students' achievement and reflect inefficiency of PBL's pedagogical process during the teaching and learning process (Bell, 2010).

Therefore, the proposed PBL pedagogical design elements accentuate teachers' ability to create 'self-directed learning' and encourage teachers to design a 'personalized' or 'trademarked' pedagogical practice especially for this STEAM Arts Education. In this study, teachers have the freedom to choose

any topic, formulate problem solving or questions using FILA techniques based on curriculum content, and apply PBL authentic approach during the art classroom (Wurdinger & Haar, 2007; Wee, 2004; Lambros, 2002).

This study also highlighted one of the important aspects in PBL - the teachers' ability to assimilate the contents of the curriculum, and infuse them into the project using effective pedagogical design (Lambros, 2002; Wee, 2004; Stanley, 2018; Douglas et al., 2018). Furthermore, teachers are able to design appropriate lesson plans, list down relevant materials, and select evaluation instruments to assist their art projects' management (Lambros, 2002; Wee, 2004; Stanley, 2018; Douglas et al., 2018). In addition, teachers should know how to evaluate the end product, starting with the preparation, production process and the final assessment of the project (Lambros, 2002; Wee, 2004).

Alternatively, by using the PBL pedagogical design strategy in art lessons, teachers would have clear guidelines on how to teach art education more interestingly, in a more current way. An authentic, multidiscipline PBL lesson will encourage students to participate, cooperate and engage with the lesson actively, resulting in them gaining more knowledge and mastering important skills during the lesson. PBL also enables the students to confidently evaluate the works of other groups from the start of the project, the development process, the artwork production and the presentation stage, with better guidelines (Stanley, 2018; Douglas et al., 2018). Stanley (2018) also mentioned that teachers or students can utilise various assessment tools or instruments to evaluate their PBL implementation such as observation rubrics (Hetland, 2007; Bartel, 2012) and self-assessment forms (Lambros, 2002; Wee, 2004; Fluckinger, 2010), generated from the exit outcomes of the planned project.

This study also emphasises on the use of authentic instruments that require teachers to customize the content of the art education curriculum and the exit outcomes of PBL and multidisciplinary STEAM projects. Besides, the approach enables art teachers to evaluate the whole lesson thoroughly and let students or other stakeholders such as parents to be involved in evaluating the process and final product of the project (Douglas et al., 2018).

Briefly, this study outlines some benefits of implementing the PBL approach in STEAM art education projects. The pedagogical design is unique as it implies live simulation or scaffolding techniques during the lesson. The authentic and multidisciplinary implementation of the pedagogical design is seen to have a positive impact on the students' personality development, skills, and knowledge upon creating STEAM art education projects. Consequently, the PBL approach can enhance the quality of teachers, shape a student's personality, and encourage the production of quality artworks through a better pedagogical design approach in related academic institutions.

## 7. Conclusion

The PBL approach helps teachers to assess, evaluate and provide feedback on teaching, hence, improving the quality of the art education lesson. The pedagogical design in this study does not put sole-focus on the final product, but technically, the planning of every phase is carefully measured, and all the intensive processes are appraised, as they could inflict the effectiveness of the approach, hence reflecting students' good achievement in art education. This would also diminish the perception of PBL approach of 'only focusing the end product', rather than the process or preparation involved during the lesson (Harris, 2014).

The outcome of the study can help educators to evaluate the effectiveness of the approach, hence justify the success of the pedagogical practices as it provides essential input to aid curriculum developers and academicians to evaluate the effectiveness of the PBL approach as one of the pedagogical strategies in various educational areas, mainly for schools and higher education institutions. Overall, the findings of this study could provide an opportunity for stakeholders to obtain information on student learning and achievement, in the latest Art Education curriculum. Such study needs to be further expanded to provide consistent and systematic exposure to the implementation of PBL methodologies in arts teaching and learning. Alternatively, academicians can design and produce project-based learning modules and guidelines for the use and convenience of educators in implementing PBL to enhance the quality of teaching and learning.

However, to implement this approach, some aspects need to be underlined to ensure that the learning process is well implemented, and will prolong the academic benefits to the education system. A thorough analysis should be conducted to analyse the challenges associated with PBL implementation

of STEAM project. Any occurring problems need to be overcome, and the weakness of the implementation should be resolved to reflect the potential and effectiveness of this PBL pedagogical design.

In a nutshell, the reform of arts education in this study advocates the fluidity of the curriculum, and with the appropriate pedagogical design or strategy, this study would bestow an essential idea of the PBL learning in the 21st century, and how an underrated art subject can be transformed into impressive, riveting and ingenious platform of learning. Moving further, stakeholders, academicians or varsities will engage in an effective action plan to ensure that university graduates are served through a quality teaching and learning process, in line with the goals of the Higher Education Development Plan (2015-2025) that emphasise global marketability of graduates in the future.

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