Journal of Higher Education and Academic Advancement
Homepage : https://journal.antispublisher.id/index.php/EJHEAA
Email : admin@antispublisher.com

e-ISSN : 3032-1123
JHEAA, Vol. 2, No. 11, November 2025
Page 511-522

Project Based Learning Module in The Screen Printing Course at The Indonesian Institute of The Arts Padang Panjang

Mulyadi[1], Vanesha Miswar[2], Ade Putra[3], Miswar[4]
[1,2,3,4] Indonesian Institute of the Arts Padang Panjang, Indonesia

DOI : https://doi.org/10.61796/ejheaa.v2i11.1444

Sections Info

Article history:
Submitted: July 23, 2025
Final Revised: August 11, 2025
Accepted: August 25, 2025
Published: September 10, 2025

Keywords:
Learning module
Project based learning
Screen printing

ABSTRACT

Objective: *This research is motivated by efforts to achieve learning outcomes for students who face various learning challenges, such as the need to improve creativity in solving problems during the learning process. These challenges include a lack of references and inadequate learning resources, which impact students' ability to develop problem-solving thinking, and so far, students still rely on the material explained by the lecturer at the beginning of the course meeting, without any learning resources or teaching materials as a guide in implementing the practice.* ***Method:*** *This type of research is development research or known as Research and Development (R & D), and this research approach uses the ADDIE approach which consists of five research stages, namely: Analyze, Design, Develop, Implement and Evaluate, while validation was carried out by three expert validators, each on the aspects of material, design and language, and each validator was asked to fill out the assessment instrument using a Likert scale of 1–5 against a number of indicators that had been prepared.* ***Result:*** *The recapitulation results showed that the material validator gave a score of 41 out of a total maximum score of 45 with a percentage of (91.11%), the design validator gave a score of 44 out of a total maximum score of 50 with a percentage of (88%) and the language validator gave a score of 46 out of a total maximum score of 50 with a percentage of (92%), and the results of the practicality data analysis of the learning module were at a practicality level of 88.56% with an interpretation category that was very practical to use in the learning process.* ***Novelty:*** *These findings indicate that the developed module not only meets expert validation criteria but also achieves a very practical level for implementation, which highlights the novelty of providing effective and validated teaching materials that address the lack of references and inadequate resources in student learning.*

INTRODUCTION

The learning outcomes for Craft Education students in the Screen Printing course include learning the basics of screen printing production on t-shirts and tote bags, creating brands (branding) for the t-shirts they produce, including creating price tags, labels, and simple, attractive packaging. These learning outcomes refer to the abilities acquired through the absorption of knowledge, attitudes, skills, competencies, and experience [1]. In their efforts to achieve these learning goals, students face various learning challenges, such as the need to improve their creativity in solving problems during the learning process. These challenges include a lack of references and inadequate learning resources, which impact their ability to develop problem-solving thinking. So far, students still rely on the material explained by the lecturer at the beginning of the course, without any learning resources or teaching materials as a guide in carrying out the practice.

Based on the data problems, students need learning resources to improve their understanding of learning materials and apply them practically. One of these learning resources is modules. Modules are learning resources that have independent learning characteristics [2], [3]. In the independent learning process, lecturers act as facilitators, motivators, and discussion partners who encourage students to solve real-world problems through projects. Lecturers are obliged to create a learning climate that supports students to actively seek, explore, discover, understand, and construct concepts and learning materials independently and collaboratively.

Based on observations made on the learning process in the Screen Printing course in the Craft Education study program at the Indonesian Institute of the Arts, Padangpanjang, it was obtained information that during the learning process implemented, students have not been placed as active subjects in completing real projects collaboratively and independently to develop knowledge and skills. Students have difficulty in understanding the basic concepts and techniques of Screen Printing given by lecturers due to the lack of learning resources for students to learn independently. In addition, the results of the author's interview with the Head of the Craft Education Study Program who is also the lecturer in charge of the Screen Printing course explained that so far there has been no Teaching Module for students in the Craft Education Study Program at the Indonesian Institute of the Arts, Padangpanjang. The learning resources used by students in the current learning process are in the form of internet searches and power point slides presented by. This condition makes students often experience difficulties in developing learning creativity to solve problems independently in the learning process. The results of interviews with the lecturer in charge of the Screen Printing course explained that as a lecturer, he really needs teaching materials in the form of modules in the learning process, both in groups and independently.

The lack of learning resources will impact students' creative thinking skills, especially in the Screen Printing course for independent problem solving and will impact student learning outcomes. One effort that can be made to overcome the above problems is to increase the effectiveness of learning through teaching materials in the form of Project Based Learning- based learning modules that suit student needs. Project Based Learning- based learning modules are one of the innovative learning methods that can motivate students to be actively involved and think creatively in understanding, exploring, and solving their own problems [4]. Project Based Learning modules can help students think creatively in understanding concepts and learning materials. Modules can be used as teaching materials if they meet valid and practical criteria. Validity is measured by the results of the instrument validated by experts. Practicality is measured by the module's implementation in a practical learning process [5], [6].

Based on research conducted [7] explains that Project Based Learning- based learning modules can improve 21st-century learners. Project-based learning is a learning management process that focuses on providing opportunities for students to learn independently [8]. The use of modules encourages student-centered learning and improves teaching and learning in the classroom [9]. Project-Based Learning has a

positive impact on the learning process because it uses problems as a stimulus and focuses on student activity [10]. The design of this module is expected to increase student motivation and active participation in the learning process and provide them with valuable practical experience. Furthermore, the module can serve as a reference for lecturers in designing and implementing more innovative, effective learning that aligns with the existing curriculum.

The problems and urgency of research on Project-Based Learning (PjBL) modules in the Screen Printing course at the Indonesian Institute of the Arts (ISI) Padang Panjang can be explained through several fundamental aspects, including challenges in the learning process, the need for a more effective approach, and the importance of developing modules that are appropriate to student characteristics and curriculum demands.

First, in the context of teaching the Screen Printing course, several challenges are faced by students and lecturers. One major issue is the lack of comprehensive and structured learning modules. Currently, the learning process relies primarily on Semester Learning Plans (RPS) and PowerPoint presentation materials, without detailed written guidance on technical steps, learning flows, and project-based assessments. This often makes it difficult for students to understand the important stages of the screen printing process, especially those without prior knowledge. Furthermore, students' lack of note-taking habits is also a problem, as they tend to repeat the same questions even after verbal and visual explanations.

Another issue that arises is the diversity of students' background knowledge. Some students are already familiar with screen printing techniques, so they tend to be more relaxed during lectures. However, for students who have never encountered screen printing before, the initial learning phase is often confusing. This creates a gap in understanding and skills among students, which can ultimately affect the quality of learning outcomes. Furthermore, during the practical phase, many students struggle to grasp color separation techniques, especially for designs consisting of two or more colors. Their understanding of the working principles of multi-color designs remains weak, while single-color designs tend to be easier to grasp. Another obstacle is the limited availability of tools and materials, which often require students to borrow from seniors, but the borrowed equipment is often in poor condition or not ready for use.

In this context, the Project-Based Learning (PjBL) approach is considered an appropriate solution to address these issues. PjBL is a learning approach that emphasizes real-life projects as the core of the learning process. In the Screen Printing course, this approach can help students become more actively involved in the learning process, as they will work directly on real-life projects such as screen-printed t-shirts or tote bags. However, although the PjBL approach has been implemented in practice, the lack of supporting learning modules remains a major weakness. A comprehensive and structured module is essential to guide students through every stage of the project, from planning and implementation to evaluation.

The urgency of this research lies in the need to develop a PjBL-based learning module that can address these challenges. The developed module is expected to provide a clear and structured guide for students, enabling them to understand and master the screen printing process in a step-by-step and systematic manner. Furthermore, this module is also expected to assist lecturers in guiding the learning process, enabling more effective and efficient delivery of material.

The PjBL-based learning module developed in this study is designed to cover several important aspects, including: a brief theory as an introduction to basic concepts, practical work steps that can be directly applied in the studio, and an evaluation sheet that helps students reflect on their learning outcomes. This module is also designed in communicative and popular language, making it easier for students to understand, especially those who are not familiar with technical terms in the world of screen printing. In addition, this module is equipped with a QR code that directs students to a video tutorial created by the lecturer in charge of the course. This video contains practical demonstrations of the techniques and processes being studied, so students can access the material visually and flexibly, and is a solution for those who need to repeat explanations outside of class.

RESEARCH METHOD

The type of research used by researchers is Development Research or better known as Research and Development (R&D). R&D research is a type of research that aims to develop or create new products, methods, or procedures that can be used to solve problems or meet certain needs. In the context of education, R&D research is focused on developing more effective and innovative teaching materials, learning media, learning modules, or learning technologies. Through this research, it is hoped that applicable solutions can be created that are able to improve the quality of learning or performance in a particular field.

R&D research is conducted through a series of systematic and structured stages, starting with a needs analysis, where researchers identify existing problems or needs in a field. This stage involves observation, interviews, or literature studies to understand what users or students actually need. The results of this analysis then form the basis for designing an appropriate product or method. Next, researchers move on to the product or method design stage, where a blueprint or initial design of the product or method is created, including determining its features, structure, and appropriate format. This design must consider pedagogical aspects, technology, and user needs so that the product or method developed can truly address existing needs.

Once the design is complete, the researcher proceeds to the product or method development stage. At this stage, the product or method begins to be developed in real terms, such as creating teaching materials, learning modules, or learning media. This development is carried out by following relevant development principles, such as learning design principles, educational technology principles, and product development

principles. The development stage also involves internal testing to ensure that the product or method meets its stated objectives.

Once the product or method is developed, researchers enter the implementation phase. At this stage, the developed product or method is tested in real-world situations, such as in the classroom or during a learning process. The purpose of this implementation is to assess how the product or method functions in a real-world context and how users respond to it. Researchers observe and record any obstacles or problems that may arise during use, and evaluate the extent to which the product or method is effective in achieving the stated goals.

The final stage in R&D research is evaluation. At this stage, researchers assess the success of the product or method that has been developed. Evaluation is carried out to see whether the product or method is effective in solving problems or meeting previously identified needs. Evaluation can be conducted through various methods, such as tests, questionnaires, or observations. The results of this evaluation will serve as the basis for revising or refining the product or method, if necessary. Therefore, R&D research doesn't stop at the development stage; it also ensures that the resulting product or method is truly applicable and capable of having a positive impact in the context of its use.

In this study, the researcher used the ADDIE approach as a development model. ADDIE stands for Analyze, Design, Develop, Implement, and Evaluate. This model was first developed in the 1970s and has become one of the most widely used models in product development or learning design modules. The ADDIE approach provides a clear and structured framework for developing products or methods that meet user needs. The Analyze phase focuses on identifying needs and problems to be solved, while the Design phase involves creating a framework and specifications for the product or method. The Develop phase is where the product or method begins to be actually created, while the Implement phase involves testing the product or method in real-world situations. Finally, the Evaluate stage aims to assess the success of the product or method that has been developed.

The main objective of R&D research is to produce products or methods that are applicable and can improve the quality of learning or performance in a field. In the context of education, this research aims to develop more effective and innovative teaching materials, learning media, or learning technologies. The products or methods resulting from this research are expected to solve problems in the learning process, increase student motivation, and assist teachers in delivering learning materials more effectively. Thus, R&D research has great potential to make a significant contribution to improving the quality of education and learning. Through a systematic ADDIE approach, this research can produce products or methods that are not only innovative but also relevant to user needs, thus being able to provide a positive impact in the long term.

RESULTS AND DISCUSSION

This module was developed using the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The Analysis stage

aims to identify student needs and characteristics. Design develops the module plan and learning strategies. Development produces the initial product and undergoes expert validation. Implementation tests the module, and Evaluation assesses its effectiveness. The ADDIE syntax is linear and systematic, but flexible because each stage can be revised according to findings in the field.

A. Needs Analysis

Based on field observations and interviews with Mr. Amrizal on Friday, May 16, 2025, as the lecturer in charge of the course, it was discovered that the Screen Printing learning at ISI Padangpanjang has practically implemented a project-based learning approach, although it has not been equipped with official documents in the form of learning modules. So far, the learning process has been structured and involves practical assignments that require students to produce real products, such as screen-printed t-shirts and tote bags. However, the absence of a comprehensive written module is a major weakness in this course. Lecturers only rely on Semester Learning Plans (RPS) and presentation materials in PowerPoint format, without detailed guidance on technical steps, learning flows, and project-based assessments [11],[12] .

In its implementation, challenges arise from the variety of student backgrounds. Some students are already familiar with screen printing techniques, so they tend to be more relaxed during lectures. However, for those new to screen printing, the initial learning phase can often be confusing. Even when the material is explained verbally and visually, understanding isn't always established. One reason is the lack of note-taking among students. In an interview with Mr. Amrizal, he stated that students often repeat the same questions because they don't take notes during explanations, even though this course is intended for adult learners who should be taking the initiative to learn independently.

Another problem was encountered during the practical phase, particularly in creating screen printing designs. Many students lacked a grasp of color separation techniques, particularly for designs consisting of two or more colors. Understanding of the working principles of multi-color designs is still weak, while single-color designs tend to be easier to understand. Once the design has been approved and converted into a film, the next obstacle is the availability of tools and materials. Students often come without the equipment they were instructed to use, and are forced to borrow from seniors. However, the borrowed equipment is often in poor condition or not ready for use.

B. Product Design

The initial design of the Screen Printing learning module was prepared as a basic foundation to guide the further development process. This module is designed to answer the practical and theoretical learning needs of 4th semester students who are studying screen printing techniques. In this initial stage, the module is systematically formatted into six main chapters, namely: (1) introduction, (2) tools and materials, (3) design process, (4) printing, (5) screen printing practice, and (6) evaluation of results. Each chapter represents a logical flow of the screen printing stages that students will go through, so that they can understand and master the process sequentially.

Each chapter in the module includes a brief theoretical introduction to the basic concepts, practical work steps that can be directly applied in the studio, and an evaluation sheet to help students reflect on their learning outcomes. This format aims not only to provide theoretical understanding but also to encourage mastery of practical skills. This structure also allows lecturers to more easily guide the course of the lecture according to the stages in the module.

The language used in this initial module is designed with a popular and communicative approach. This is intended to make the module's content easier to understand for students, especially those unfamiliar with technical terms in screen printing. The straightforward language is expected to encourage students to read and understand the module's contents independently, without feeling overwhelmed by overly formal academic language.

In this initial design stage, the modules are laid out for printing in physical form. An interactive digital version that allows students to access it through electronic devices is not yet available. This was an initial limitation recognized by the development team, but they plan to gradually expand the digital version in the future to increase accessibility and learning flexibility.

With this initial design, the module developer has a strong enough framework to begin limited testing. Fieldwork and lecturer interviews indicate that the format reflects students' basic needs. However, the availability of printed modules alone is still considered suboptimal, and this will be an important consideration in formulating the next hypothetical design.

The hypothetical design of the Screen Printing learning module for 4th semester students is designed with a more structured and integrative approach. This module consists of eight learning units, tailored to the number of sessions in a semester. Each unit represents a topic or key stage in the screen printing process, from a basic introduction to printing practice and work evaluation. This approach is intended to guide students toward gradual and continuous learning.

Each unit in the module is structured systematically and consistently, encompassing five main components: (1) learning objectives that explain the competencies that students must achieve, (2) brief theoretical material that summarizes important concepts, (3) project work steps that explain the stages of the practicum, (4) student reflection to encourage critical awareness of the work process and results, and (5) formative assessment in the form of questions or light assignments to measure understanding of each unit. This structure aims to balance the cognitive, psychomotor, and affective aspects of the learning process.

One of the key features of this hypothetical design is the inclusion of QR codes in each unit. These QR codes direct students to video tutorials created by the course instructor. These videos provide practical demonstrations of the techniques and processes being studied in that unit. This innovation allows students to access the material visually and flexibly, and provides a solution for those who need to repeat explanations outside of class.

The modules are prepared in two formats, namely a printed version for use in the studio during practice, and a PDF format that can be downloaded from SIAKAD through the student account. Availability in these two formats provides easy access and adapts to student learning preferences. For students who prefer digital learning, the PDF format is particularly helpful, while the printed version is convenient for use in hands-on practice situations.

It is assumed that with this structured module, students will be more independent in their learning process and more easily understand the screen printing workflow systematically. This module serves not only as a technical guide but also as a supporting tool to develop students' theoretical understanding and reflective skills. Thus, learning focuses not only on the final printed product but also on the process of critical thinking, design, and evaluation.

C. Development

This module is structured not only to meet pedagogical and academic standards but also to make its content more understandable and visually appealing for students. All components of the module, from the foreword to the author profile, were created using Microsoft Word, while the front and back covers were designed separately using Canva for a more professional look. Visually, the module is dominated by blue and purple, giving it a calming, creative, and professional feel, with harmonious additional color combinations to highlight important sections without disrupting reading comfort. Each page is marked with a page number at the bottom for navigation, and the beginning of each chapter is marked with a large title on a blue background. This overall design aims to create a structured, enjoyable learning experience that motivates students to be more active in project-based learning.

The researchers designed the front and back covers using the Canva app on an iPad. Here's what the front and back covers of the module look like.

After designing and realizing the teaching material product, the researcher developed instruments in the form of a validity questionnaire, an effectiveness questionnaire, and a practicality questionnaire to test the feasibility and practicality of the product developed. This instrument consists of three types, namely an effectiveness questionnaire for students, a validity questionnaire filled out by three expert validators, and a practicality questionnaire aimed at students and lecturers teaching the course. The preparation of the questionnaire began with the creation of a grid as a reference in formulating questions that correspond to the assessment indicators for each aspect.

Focus Group Discussion (FGD) regarding the Project Based Learning (PjBL) based Screen Printing learning module that the researcher developed was held on Thursday, June 26, 2025 at R2 Postgraduate ISI Padangpanjang. This activity was attended by several expert lecturers in related fields from the Indonesian Institute of the Arts Padangpanjang, namely Vice Rector II Dr. Iswandi, S.Pd., M.Pd as an expert lecturer in Postgraduate Art Education, Head of Postgraduate Art Education Study Program Dr. Novina Yeni Fatrina, S.Sn., M.Sn, Art Education lecturer Dr. Yurniati Munaf, M.Pd., Kons as Examiner 1, Dr. Mulyadi, M.Pd as Supervisor, and Head of Craft Education Study

Program Amrizal, S.Pd., MA as a lecturer in charge of the Screen Printing course. In addition, several Postgraduate Art Education students of ISI Padangpanjang actively participated in the discussion. The presence of these diverse perspectives greatly enriched the input received for module improvement.

Validation assessment was carried out by three expert validators, each on the aspects of material, design and language. Each validator was asked to complete the assessment instrument using a Likert scale of 1–5 against a number of indicators that had been prepared. The recapitulation results showed that the material validator gave a score of 41 out of a maximum total score of 45 with a percentage (91.11%), the design validator gave a score of 44 out of a maximum total score of 50 with a percentage (88%), and the language validator gave a score of 46 out of a maximum total score of 50 with a percentage (92%). Thus, based on the feasibility interpretation category (80–100% = very valid), the developed module is declared very valid and worthy of further testing.

D. Implementation

After the learning module has been declared valid and feasible by the validator, the next step is to implement the learning module to students to understand the material included in the learning module so that it can improve student learning outcomes. Practicality in the trial is useful to determine the practicality of the learning module that has been developed. Based on the results of the practicality data analysis, the learning module is at a practicality level of 88.56% with an interpretation category of very practical to use in the learning process.

The final stage of the ADDIE development model is the evaluation stage. The results of this stage are used by analyzing research data obtained from the validity analysis of the project-based learning Screen Printing learning module from validators (experts) by lecturers. Then, practicality is seen from the lecturer and student response questionnaires. Meanwhile, the analysis of effectiveness data is seen in the student learning outcome test with the aim of seeing the effectiveness of the learning module applied to students of the craft education study program who take the screen printing course. In this study, what needs to be considered is the product being developed, namely the learning module, so before conducting research, the learning module that has been developed must be validated by the validator.

At the evaluation stage of this study, the researcher did not conduct an in-depth evaluation due to time constraints. Of course, a good product requires thorough revision for perfection. One of the revisions the author made was adding a screen-printed lesson plan (RPS), as during the trial, the author only designed the RPS for a few meetings. Based on the validator's recommendation, the RPS should be outlined for one semester.

The development of project-based learning screen printing module teaching materials is an alternative learning resource for students. The type of research used is Research and Development (R&D) as stated [13]. The development model used in this study is the ADDIE model which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation.

In the Analysis stage, a series of activities are carried out to identify needs, analyze the curriculum, and understand student characteristics. The main objective of this stage is to ensure that the module to be developed truly aligns with student needs, curriculum demands, and real-world conditions. Thus, the resulting module can be an effective solution in the learning process. Next, in the Design stage, activities carried out include developing research instruments, designing the learning module framework, and preparing the initial design of the project-based learning module. This stage aims to create a blueprint or initial design that is systematic and structured, so that the module can be developed with a clear direction.

Once the design is complete, the Development phase begins. At this stage, the learning module is validated by a validator who is a lecturer from the postgraduate program at the Indonesian Institute of the Arts, Padangpanjang. Aspects that are validated include material, design, and language. This validation is performed to ensure that the module meets the required quality standards and is ready for testing. The next stage is Implementation, where the project-based learning screen printing learning module is tested on students of the craft education study program who are taking the screen printing course. This trial aims to determine the acceptability of the module and the effectiveness of its use in learning. Through this implementation, it can be seen how the module functions in real situations and how students respond to the module.

Finally, at the Evaluation stage, an analysis of research data obtained from validated test questions, response questionnaires, and student learning outcomes was carried out. This stage aims to assess the extent to which the developed module is effective in achieving learning objectives. The results of this evaluation are then used to refine the learning module, ensuring that the resulting module is better suited to user needs. Thus, through the systematic steps of the ADDIE model, the developed learning module is expected to be an effective and applicable tool for improving the quality of learning.

The development of a screen printing learning module based on project-based learning is a framework for addressing the learning process. Validation is a measure that indicates the level of validity or authenticity of an instrument or teaching material. Instruments or teaching materials are said to be valid if they are able to measure the grid that has been determined [14]. The overall validation results of the learning module in the feasibility interpretation category (80–100% = very valid), then the developed module is declared very valid and worthy of further testing.

The practicality of the learning module refers to the clarity of the module developed. Practicality is said to be achieved if there is a match between expectations and assessments [15]. Practicality relates to the ease and progress students make in using teaching materials and other products. Practicality assessment aspects include ease of use, language, conceptual suitability, and implementation [9]. The practicality of the project-based learning screen printing module in this study was tested through a practicality sheet completed by the lecturer. Lecturers are asked to assess the module according to the instructions available on the instrument.

Based on the responses from lecturers and students, the project-based screen printing learning module is considered capable of helping students be more enthusiastic and focused in discovering new things in the learning process. The module's display, which includes images and instructions, makes students interested and motivated to learn. The module's practicality is demonstrated by its ease of use, making learning meaningful, interesting, enjoyable, and useful for students' lives, as well as increasing creativity and the effectiveness of learning outcomes [6].

The results of the practicality test show that the average practicality value of the project-based learning screen printing learning module based on lecturer responses with a practicality level of 88.56% with the interpretation category being very practical to use in the learning process.

CONCLUSION

Fundamental Finding : The development of a Project-Based Learning (PjBL) Screen Printing learning module uses the ADDIE model consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation, where the Analysis stage identifies student needs and characteristics, including challenges such as varying background knowledge and the lack of written modules, the Design stage produces a systematic module design with six main chapters, complete with brief theories, practical work steps, and evaluation, the Development stage involves compiling a module with an attractive visual appearance using Microsoft Word and Canva, as well as validation by experts who stated that the module is highly valid (scores of 91.11% for material, 88% for design, and 92% for language), the Implementation stage tests the module on students with practicality results reaching 88.56%, indicating the module is very practical to use, and the Evaluation stage analyzes the validity, practicality, and effectiveness of the module. **Implication :** So, this module is expected to improve students' understanding and skills in screen printing techniques systematically and independently, while also serving as an innovative learning resource for vocational education. **Limitation :** Although the module has shown high validity and practicality, an in-depth evaluation has not been conducted due to time constraints, which limits the comprehensive measurement of its long-term effectiveness. **Future Research :** Recommended revisions include improvements to the Semester Learning Plan (RPS) for one semester and further research is suggested to conduct a more detailed evaluation of the module's impact on student learning outcomes and skill mastery across different contexts.

REFERENCES

[1] M. Santoso, "Capaian Pembelajaran Dan Kompetensi," in *Paradigma Capaian Pembelajaran*, 2020, pp. 1–10.

[2] Lasmiyati and I. Harta, "Pengembangan Modul Pembelajaran Untuk Meningkatkan Pemahaman Konsep Dan Minat SMP," *PYTHAGORAS J. Pendidik. Mat.*, vol. 9, no. 2, pp. 161–174, 2014, doi: 10.21831/pg.v9i2.9077.

[3] R. Yulia, A. Rahmi, and Samsiarni, "Hubungan Motivasi Belajar Dengan Keterampilan Menulis Teks Eksplanasi Siswa Kelas Xi Sma Pembangunan Laboratorium Unp," *J. Pendidik. Dan Pembelajaran Bhs. Indones.*, vol. 11, no. 1, pp. 1–10, 2022, doi:

10.23887/jurnal_bahasa.v11i1.939.
[4] E. Rikado, S. Halidjah, and R. Pranata, "Pengembangan Modul Berbasis Project Based Learning (Pjbl) Pembelajaran Tematikkelas III Sekolah Dasar Negeri 09 Pontianak Tenggara," *J. Rev. Pendidik. Dan Pengajaran*, vol. 7, no. 1, pp. 2760–2765, 2024.
[5] G. Gumanti, Y. Roza, and A. Murni, "Pengembangan Modul Ajar Dengan Menggunakan Model Project Based Learning Untuk Meningkatkan Kecakapan Pemecahan Masalah Matematis Siswa SMP," *J. Cendekia J. Pendidik. Mat.*, vol. 8, no. 1, pp. 542–551, 2024, doi: 10.31004/cendekia.v8i1.3001.
[6] R. T. Mangesa, N. R. Ashadi, M. S. Syafri, and V. A. Tandirerung, "Pengembangan Modul Pembelajaran Berbasis Project Based Learning Pada Mata Pelajaran Dasar Produktif Kejuruan Di SMK Negeri 2 Makassar," *J. Mediat.*, vol. 7, no. 2, pp. 11–14, 2024, doi: 10.59562/mediatik.v7i2.2282.
[7] C. Santos *et al.*, "Science Education through Project-Based Learning: A Case Study," *Procedia Comput. Sci.*, vol. 219, pp. 1713–1720, 2023, doi: 10.1016/j.procs.2023.01.465.
[8] I. M. Dewi, Eddiyanto, and L. H. Siregar, "Pengembangan E-Modul Berbasis Project Based Learning Dengan Menggunakan Kvisoft Flipbook Maker Pada Materi Asam Basa," *J. Pendidik. Kim. FKIP Univ. Halu Oleo*, vol. 9, no. 2, pp. 193–206, 2024.
[9] H. Soepriyanti, U. Waluyo, H. Suryaningsih, and L. O. A. H. Munandar, "Pengembangan Modul Ajar Pembelajaran Berbasis Proyek (Project-Based Learning) Bagi Guru-Guru SMPN 1 Sukamulia Lombok Timur," *Darma Diksani J. Pengabdi. Ilmu Pendidikan, Sos. Dan Hum.*, vol. 5, no. 1, pp. 144–158, 2025, doi: 10.29303/darmadiksani.v5i1.7085.
[10] N. Agusdianita, "Model Pembelajaran PJBL Untuk Meningkatkan Hasil Belajar Mahasiswa Pada Perkuliahan Pengembangan Pembelajaran Tematik," vol. 4, no. 1, pp. 1–23, 2023.
[11] K.-Y. Lin, H.-S. Hsiao, Y.-S. Chang, Y.-H. Chien, and Y.-T. Wu, "The Effectiveness of Using 3D Printing Technology in STEM Project-Based Learning Activities," *Eurasia J. Math. Sci. Technol. Educ.*, vol. 14, no. 12, p. em1633, 2018, doi: 10.29333/ejmste/97189.
[12] C. C. Chang, "Educational values and challenges of i-STEM project-based learning materials," *Front. Psychol.*, 2022, doi: 10.3389/fpsyg.2022.976724.
[13] A. Asyhari and H. Silvia, "Pengembangan Media Pembelajaran Berupa Buletin Dalam Bentuk Buku Saku Untuk Pembelajran IPA Terpadu," *J. Ilm. Pendidik. Fis. Al-Biruni*, vol. 5, no. 1, pp. 1–13, 2016, doi: 10.24042/jpifalbiruni.v5i1.100.
[14] Darniyanti and others, "Pengembangan Bahan Ajar Bahasa Indonesia Berbasis Komik Untuk Meningkatkan Minat Baca Siswa Kelas III SDN 152 Rantau Panjang," *J. Pendidik. Dan Konseling*, vol. 4, no. 5, pp. 450–461, 2022.
[15] R. D. Salita, E. Estuhono, and M. R. Mahmudi, "Pengembangan Model IPA Berbasis Model Research Based Learning Untuk Mengembangkan Keterampilan Four Cs Pada Tema Lingkungan Sahabat Kita Di Sekolah Dasar 210 Tanjung Dani," *Cons. Educ. Couns. J.*, vol. 1, no. 2, p. 232, 2021, doi: 10.36841/consilium.v1i2.1201.

*__Mulyadi (Corresponding Author)__
Indonesian Institute of the Arts Padang Panjang, Indonesia
Email: mulyadi161084@gmail.com

Vanesha Miswar
Indonesian Institute of the Arts Padang Panjang, Indonesia

Ade Putra
Indonesian Institute of the Arts Padang Panjang, Indonesia

Miswar
Indonesian Institute of the Arts Padang Panjang, Indonesia