Using a physics module with local wisdom in physics learning to train students' independence

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Abstract. Unavailability of a physics module makes students not yet independent of learning. The absence of local wisdom in the learning process less meaningful. The purpose of this study is to train student independence using a physics module with local wisdom. This research was a classroom action research conducted in 2 cycles. Each cycle includes the step of planning, action, observation, and reflection. The subjects were 26 students of class XI SMA 1 Muhammadiyah Banjarmasin. The technique of collecting data used observation and test. The percentage of students' learning achievement increased from the second cycle of 84.6%, Independence of students with independent category (76.92%) and very independent (23.07%) in the second cycle. The conclusion of this research is the use of modules with local wisdom and train students ' independence in learning.

1. Introduction

Student potential (affective, cognitive and psychomotor) can develop optimally through education [1]. Education becomes a strategy to develop students' potential so that they can live a good life [2]. The Government seeks to improve the quality of national education by renewing the curriculum of the CBC with a standardized, effective, efficient, and relevant, and significant, and contributive and significant curriculum for future graduate life [3]. it is better to apply KTSP using the module as a learning system. The module is an independent learning package that includes a set of planned learning experiences and systematically designed to help students achieve learning objectives of mastering defined competencies [4]. The use of modules can train students' independence [5]. The level of student learning independence can be determined based on how much initiative, confidence and responsibility of students to play an active role in terms of learning planning, learning process, and learning evaluation. The greater the student's active role in these activities, indicating that the student has a high level of learning independence [6].

Physical learning will be more meaningful if the learner can develop experience to better understand the real world through physics learning [7]. This can be obtained through the linkage of the application of physical materials to the local potential for the area. Local wisdom is a system in the social, political, cultural, economic, and environmental order of living in the midst of local communities [8]. Knowledge of local potential is closely related to the learners ' experience [8]. The

Regulation of the Minister of Education No. 22 of 2006 states that each educational unit can offer to study in accordance with the interests and talents of learners as well as local potential, cultural environment, economic conditions, and regional needs, with basic competence and basic competencies self-developed [9]. The policy system in Indonesia has provided a great opportunity for teachers to integrate the local wisdom of the learning process.

Based on observations in class XI SMA Muhammadiyah 1 Banjarmasin in the learning process is still the centre of teachers. This is seen in the activities of students that have not been independent of learning such as students no questions asked by students, not express opinions, less attention to teacher explanation. Student learning result obtained from UTS values / valued (mid-semester test) from 26 students only 3 students that fulfill the KKM (Minimum Criterion of Satisfaction). Based on interviews for teachers, there is no physics module that contains local wisdom. Whereas South Kalimantan has local wisdom that can be connected with the study of physics [10]. [11] reveals several factors why teachers do not use local wisdom in the learning process are they have an overload in teaching, the absence of tailored models, facilities, funds, and time. [8] suggested modules can be used as teaching materials that can link science knowledge with local wisdom.

On the subject of static fluids describes the concept of hydrostatic pressure, the laws of Archimedes and Pascal's law. This material can be connected with the local wisdom of Banjarmasin, namely the Floating Market. The floating market is a historical and cultural heritage that was formed from a water trading activity since the days of the Banjar Empire 400 years ago [12]. Banjarmasin as the capital of South Kalimantan was nicknamed " the city of a thousand rivers " to illustrate how much and the importance of the river that flows in this city [13]. The existence of these rivers and floating markets can be integrated into the learning process of static fluid through physics modules. The results of the research [1,2,5,9,11, 14,15] showed that the integration of local wisdom in effective learning to improve student learning outcomes and student character.

Student independence is defined as the responsibility of students to take their own learning activities, such as planning, managing, and reflecting on what they need to learn to achieve the target [16]. In order for students to have independence is required teaching materials. The teaching materials of the form can vary, one of which is the module. [17] stated that the module is a set of teaching materials that are presented systematically so that readers can learn independently. The module has its own explanatory power and the module contains complete learning content. So it can make students learn independently [18]. [1,5] in his research found that the module can train students ' independence. From the description of, then conducted research to describe using a physics module with the local wisdom of physics learning to train students' independence.

2. Introduction

2.1. Location and time research

This research was conducted at SMA 1 Muhammadiyah Banjarmasin. Data collection was conducted from April 2017 until May 2017.

2.2. Subject and object research

Subjects in this study were 26 students of class XI SMA 1 Muhammadiyah Banjarmasin. The object of this research was the use of a physics module with the local wisdom of the topic of static fluid.

2.3. Research methods

The designs in the form of action research design [19] in 2 cycles with each cycle was a process flow that includes 4 stages: (1) planning, (2) action, (3) observation and (4) reflection as in Figure 1.

2.4 Methods of data collection

Data collection technique was by observation and test. This study used the instrument: (1) observation sheet of lesson plan implementation, (2) a learning outcomes tests given at the end of learning cycle and (3) observation sheet of student independence.

2.5 *Data Analysis*

The analytical method used is the descriptive method by looking at percentage after action based on [4]. Improve learning outcomes and student independence can be seen by comparing the percentage of achievement per cycle. The indicator of success in this classroom action research is the percentage of competency competence of at least 75% and the number of students reaching 75% at least 75% of all students.

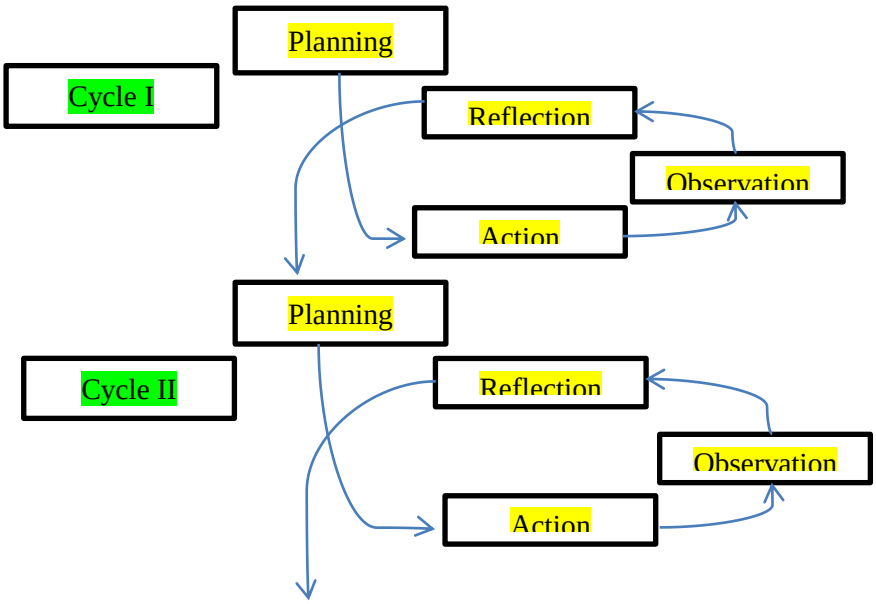

Figure 1. Step classroom action research [19]

3. Result and Discussion

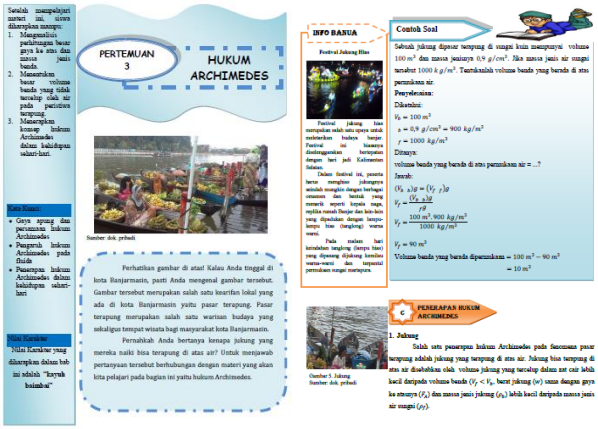

Figure 2 The physics module with local wisdom

The module consists of cover, table of contents, introduction (including module guideline, core and basic competencies, learning indicators and learning objectives), introduction to floating market, mind maps, chapter titles, keywords, material descriptions, student worksheet, summaries, exercise questions, competency tests, bibliography glossary and key answers of the formative tests. The module used to contains the local wisdom of Banjarmasin, the floating market environment in Barito river and

Martapura river as Figure 1. The condition of this floating market environment can be integrated with physics learning, that is static fluid.

3.1. The implementation of the lesson plan

After the physics module with the local wisdom of trained students independence is prepared, then the module is implemented in the learning process. Learning process using cooperative learning model. Working cooperatively with peers, and valuing cooperation can make students feel more valued. [20] Learning with groups can make group members feel free to express their opinions, can develop feelings, thoughts, perceptions, insights, and attitudes that support behaviour to self-control, tolerance, and suggestions to fellow group members [21]. Ease of use of modules can be seen through the implementation of the lesson plan [22]. Lesson plans support the learning process that facilitates the implementation of physics modules with local wisdom. Implementation of lesson plans is also designed to train students ' independence. The implementation of the lesson plan was observed with two observers measured by an observation sheet with the results from Table 1.

Table 1. Lesson plan implementation

Cycle	Meeting	Percentage	Category
I	1	76%	Good
	2	80%	Good
II	1	84%	Highly good
	2	88%	Highly good

Table 1 shows the percentage of lesson plan implementation was a good category because all the learning stages have been done. The use of modules make it easy to organize students in learning, students become easier to find the information contained in the module. This is in line with the constructivist theory that organizing students on the material to be learned will help them to recall-related information to assist in bringing together the new information to be learned [23].

3.2. Learning outcomes

Table 2. Percentage of achievement of learning outcomes

Cycle	Number of students per percentage of learning achievement (%)					Average	Classical completeness
	0-39	40-65	66-79	80-89	90-100	(%)	(%)
I		38.46	46.15	19.24	3.85	74.27	65
II			23.07	50	26.92	83.66	84.6

Table 2 shows an increase in the percentage of achievement of learning outcomes after students use physics modules with local wisdom. Complete criteria for mastery of learning competence are scoring ≥ 75. Table 2 shows that the percentage of mastery of class in cycle I reach 65%, less than 75%. This shows that there are still students that have not completed, as many as 9 students from 26 students. This is because students are accustomed to teacher-centered learning, so students are not used to finding their own information. And the students only receive feedback from key answers exercise questions. So the learning process is continued in cycle II. In the second cycle, the teacher optimizes the use of modules through the cooperative learning model, so that the implementation of the lesson plan according to cycle II based on Table 1 is very good. teachers should be able to act as facilitators for students that have difficulty [24]. In the second cycle, the teacher improves by giving students the opportunity to ask and give reinforcement of students that have not reached completeness in cycle 1. The well-executed lesson plans have a high impact on the teaching and development process of individual students [25]. In to cycle II has reached the completeness of the class. The completeness is due to various factors, such as the role of teachers in implementing learning, the media, in this case, are a good module and learning activities that make students active independently to seek information. Students receive knowledge well with the application of modules. This is supported by the results of

the study [26, 27, 28, 29, 30, 31,32, 33] that the models, media, methods, instruments that are eligible for their validity, practicality and effectiveness will be able to improve and achieve learning objectives.

3.3 Student independence

Table 3. Percentage of students' degree of independence.

Cycle	Number of students by percentage level of independence (%)				
	0-40	41-55	56-65	66-80	81-100
I			61.53	38.47	
II				76.92	23.07

Table 3 shows the students' level of independence has improved on each cycle when using physics modules with local wisdom. Criteria for student independence in cycle 1 are quite independent (61.53%) and independents (38.47%). This shows that students are actively studying independently with their group members. In the learning process, the teacher supervises and provides assistance to students that are having difficulties individually. In to cycle much there is an increase in criteria for student independence, that is independent (76.92%) and very independent (23.07%). At the time of the learning process students play an active role in this learning by taking the initiative to give responses, confident of/about providing questions and responses in conducting experiments. The greater the student's active role in these activities, indicating that the student has a high level of learning independence [6]. This student's independence is due to the existence of a module that can facilitate students to be independent [34]. In line with the theory of constructivism that believes that student activeness in the learning process will help students ' cognitive[25]. It can be seen in Table 2 that student learning outcomes are increasing along with increased student independence based on Table 3. In line with the research findings [35] student independence plays an important role in learning. This shows that the use of the physics module with local wisdom can improve student independence.

4. Conclusion

Based on the discussion of the results of research conducted can be concluded that the learning using physics module with local wisdom performed well, can improve student learning outcomes with classical completeness of 86.4% of students in the second cycle and increase independence of students with independent categories (76.92%) and very independent (23.07%) in the second cycle. This shows that using a physics module with local wisdom in physics learning to train students' independence.

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