



# The Learning Development of ICARE-PPR Assisted by BioPhy to Train Kayuh Baimbai Characters and Biodiversity Conservation

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**Abstract.** The lecture process should be able to accommodate developments in the cognitive, psychomotor and affective domains. Development of learning models is an innovation that must be done. Through the right learning model, students can be directed not only to be smart students but also to be able to mold the younger generation to become human beings with good character. The purpose of this study was to describe the validity of the ICARE-PPR learning, the validity of teaching materials of BioPhy Magazine Floating Market based, the response of science teachers candidates to ICARE-PPR learning, the validity of the assessment sheets for the character of Kayuh Baimbai, Kayuh Baimbai character of the prospective science teacher during learning and the form of biodiversity conservation campaigns. The method used is Educational Design Research with Tessmer's formative evaluation. The experimental subjects were students of Physics Education, Chemistry Education, and Biology Education. Data collection was carried out through validation using the RPM and BioPhy validation instruments by 12 experts and questionnaires on responses to learning. Data analysis was carried out quantitatively and qualitatively. The results showed that ICARE-PPR learning was valid through RPM assessment, teaching materials of Biophy Magazine were valid, science teacher candidates' responses to ICARE-PPR learning showed positive categories for each assessment item, Kayuh Baimbai Character of science teacher candidate during the learning process showed a very good category and the form of a biodiversity conservation campaign carried out by science teachers candidate was in the form of outreach through social media such as Instagram and YouTube. Thus, the ICARE-PPR learning development assisted by BioPhy has succeeded in training the character of Kayuh Baimbai as a means of conserving biodiversity.

**Keywords:** ICARE-PPR, BioPhy, Kayuh Baimbai, Conservation, Biodiversity

## 1 Introduction

Innovative learning is needed to achieve quality education. This innovative approach to learning is used to handle issues that appear during the lectures and improve the

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standard of education. Thus, the students can achieve optimal cognitive, psychomotor, and affective learning outcomes. Based on the data obtained from the Basic Physics 1 course, it is well known that the lecturers in the Basic Physics course 1 have not implemented innovative learning strategies to optimize fundamental physics learning for future science teachers. While teaching Basic Physics, the lecturer emphasizes developing students' cognitive capacities more generally as well. Even though a good education can help students grow smarter, it can also help develop the next generation into competent morally upright people. Therefore, it is appropriate that the learning is designed and implemented in such a way as to be able to train students with noble character.

One of the characteristics that are important to train students is Kayuh Baimbai character. This character is a character owned by South Kalimantan society, especially in Banjarmasin. This character is the local wisdom of South Kalimantan which lives and develops among the Banjar people and materialized in the attitudes of the people. Kayuh Baimbai character has even become the motto of the City of Banjarmasin. This character means working together to achieve a goal [1]. The character of this collaboration is essential to be internalized by students because humans are social creatures. In addition, as prospective teachers, after completing their higher education, they become part of society, thus it is only normal for them to possess this personality so they may immediately adapt to the culture in the future.

The right way to train Kayuh Baimbai character is group learning. Apart from group learning, students can observe and experience the benefits of context-based learning [2]. Learning will be more meaningful if connected with local wisdom that exists in the student environment. Learning based on local wisdom makes it easier for students to learn physics and makes them more familiar with the heritage of their ancestors amidst the expansion of foreign cultures [3]. Then, Physics education will be more effective if it integrates local wisdom of physics concepts, principles, theories, and laws. One of the local wisdom in South Kalimantan and easily found by students is the Floating Market. The Floating Market is a legacy of the Banjar tribe's ancestors which has existed for hundreds of years and still exists today. In addition to these local wisdom values, students can also study Physics in the Floating Market, especially those related to static fluid and dynamic fluid materials. Examples are the concept of hydrostatic pressure, Pascal's law, Archimedes' law, the concepts of floating, flying, and sinking, and Bernoulli's law. The local wisdom of the Floating Market can be studied from the point of view of character education and national culture as well as Physics. Floating markets can also be studied from the perspective of Biology, because a variety of biodiversity, including fruits, vegetables, different kinds of seafood, and other widely consumed items, are sold in these markets.

In addition, it can also be studied from the perspective of river ecosystems and the environment. Various culinary items sold at the Floating Market can also be studied from the point of view of Biology, in particular, the composition of the ingredients used can be related to the concept of biodiversity in South Kalimantan. Therefore, learning Physics that is applied in class can be integrated with Biology so that students can have broad scientific insights. Based on the description above, the authors are interested in implementing innovative teaching methods in the form of applying modified ICARE (Introduction, Connection, Application, Reflection, and Extension) learning by integrating it with the PPR (Reflective Pedagogy Paradigm) approach.

The use of ICARE learning will provide opportunities for students to apply what they have learned through group work. Thus, this learning can train students' problem-solving skills, then they can solve various Physics problems and develop students to internalize and apply the character of Kayuh Baimbai.

ICARE-PPR learning can make it easier for students to understand the material and improve learning outcomes [4]. ICARE learning combined with PPR is expected to optimally make students excellent and have good morals. This means they have good problem-solving skills as well as noble character. In addition, the Floating Market-based BioPhy Magazine teaching resources will also support the ICARE-PPR learning that will be put into practice. This teaching material can be a source of learning for students. The Floating Market-based BioPhy Magazine teaching material is a written teaching material with a magazine-like appearance design. This teaching material presents information and insights about the Floating Market which is studied based on the perspective of physics and biology. Based on the research results of [5] it is known that teaching materials with magazine appearances are valid and practical for use by teachers and students in learning. Likewise, the results of research by [6] prove that magazine teaching materials are able to attract the attention of students, get a positive response from them, and are appropriate for use in learning. This research also makes teaching materials with magazine designs as learning support, the difference is that magazines are designed in such a way that is interesting and arranged to include character education content of Kayuh Baimbai and love for the environment. Based on the description above, a study was implemented to describe the validity of ICARE-PPR learning, the validity of Floating Market-based BioPhy Magazine teaching materials, the response of prospective science teachers to ICARE-PPR learning, the character of Kayuh Baimbai of science teacher candidate during the lesson and the form of biodiversity conservation campaigns by the candidate's science teacher.

## 2 Methods

This research is part of the development research from Educational Design Research (EDR) with Tessmer's formative evaluation. RPM and BioPhy validation involved 12 experts. Subject try on one-to-one evaluation there are 18 Physical education students. Subjects trying for the small group evaluation are students of Chemistry Education of 10 students and the subjects trying on field test are Biology Education students, a total of 26 people. Data mining was carried out through validation using the RPM validation instrument, BioPhy, and assessing the character of Kayuh Baimbai, student response questionnaires to learning, and student assignment as-sessment rubrics. The following is an overview of the research method.

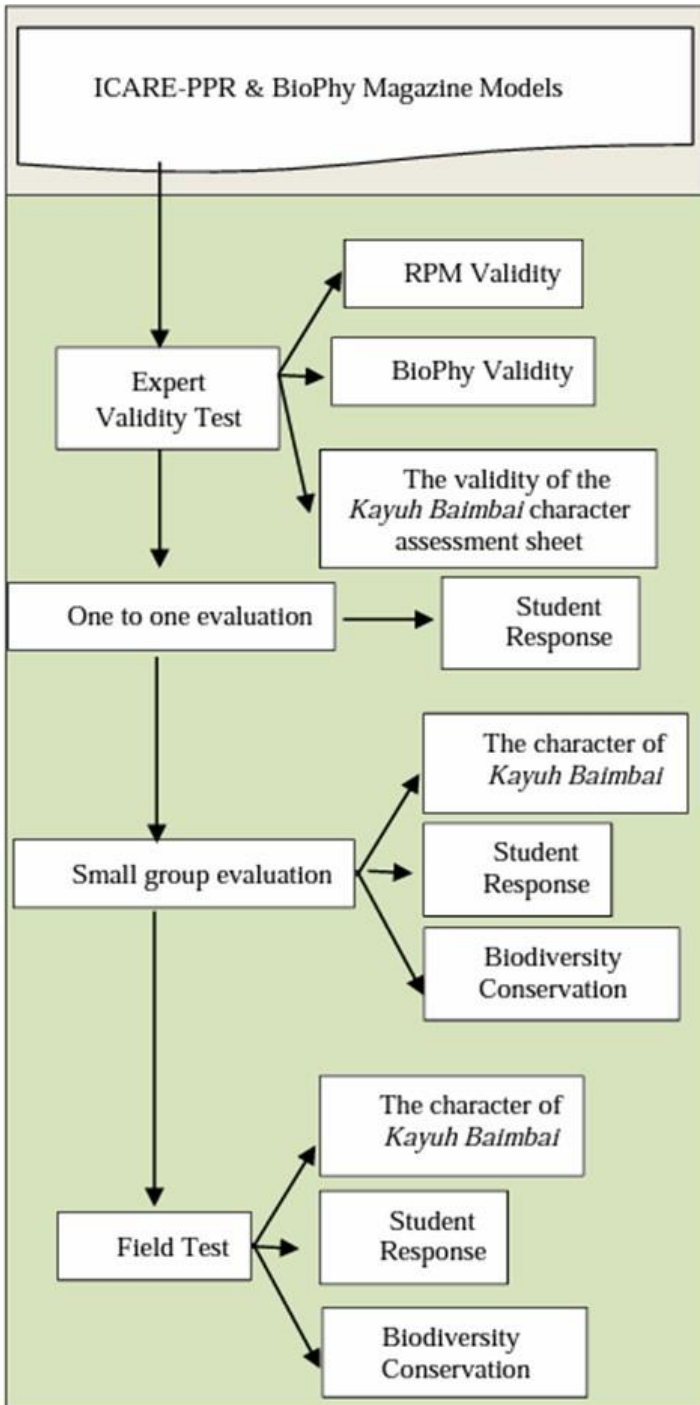


Fig. 1. Research Method

### 3 Results and Discussion

#### 3.1 The Validity of RPM ICARE-PPR Learning Model

The RPM validity of the ICARE-PPR learning model is an item to determine the feasibility level of the developed ICARE-PPR learning model, table1 the following presents the results of the RPM validity of the ICARE-PPR learning model.

**Table 1.** Validity of RPM by Experts

Rated aspect	<i>Vcount</i>	<i>Vrequirement</i>	Category
1	1.00	0.92	Valid
2	0.92	0.92	Valid
3	1.00	0.92	Valid
4	1.00	0.92	Valid
5	0.92	0.92	Valid
6	0.92	0.92	Valid
7	0.92	0.92	Valid
8	0.92	0.92	Valid
9	1.00	0.92	Valid
10	0.92	0.92	Valid
11	0.92	0.92	Valid
12	1.00	0.92	Valid
13	0.92	0.92	Valid
14	1.00	0.92	Valid
15	1.00	0.92	Valid
16	0.92	0.92	Valid
17	0.92	0.92	Valid
18	1.00	0.92	Valid
19	0.92	0.92	Valid
20	0.92	0.92	Valid
21	0.92	0.92	Valid
22	0.92	0.92	Valid
23	1.00	0.92	Valid
24	1.00	0.92	Valid

\**V*= Content validation coefficient based on the Aiken formula

Based on the expert assessment, the developed RPM is classified as valid and can be used for the lecture process [7]. Weekly lesson plans contain competency formulations that are interrelated, clear, and logical, use good and correct language, and integrate local wisdom [8]. The method or strategy is appropriate for application due to its

fit with the CPMK Sub, the learning resources, and the learning characteristics [9]. According to the validator, the validity of RPM is also seen in the suitability of time allocation and the inclusion of relevant learning resources [10]. Assessment aspects that are oriented toward the cognitive and affective domains are also clearly stated in the RPM [11].

### 3.2 BioPhy Validity

The validity of teaching materials that are complementary to the development of learning models can be checked in Table 2 below.

**Table 2.** Validity of BioPhy by Experts

Validity Component	<i>Vcount</i>	<i>VRequirement</i>	Category
Conten Validity	1.00	0.92	Valid
a. Dimensions of Spiritual Attitudes			
b. Dimensions of Social Attitudes	0.92	0.92	Valid
c. Knowledge Dimension	1.00	0.92	Valid
d. Skill Dimension	1.00	0.92	Valid
Presentation Validity	0.92	0.92	Valid
a. Serving Technique	0.92	0.92	Valid
b. Material Presentation Support	0.92	0.92	Valid
c. Presentation of Learning	0.92	0.92	Valid
d. Presentation Completeness	1.00	0.92	Valid
e. Format	0.92	0.92	Valid
f. Organization	0.92	0.92	Valid
g. Attractiveness	1.00	0.92	Valid
h. Letter Shape and Size	0.92	0.92	Valid
Language Validity	1.00	0.92	Valid
a. Suitability with the development of students	1.00	0.92	Valid
b. Communicative	0.92	0.92	Valid
c. Dialogic and interactive	0.92	0.92	Valid
d. Coherence and coherence flow of thought	1.00	0.92	Valid
e. Conformity with the correct rules of Indonesian	0.92	0.92	Valid
f. Use of terms and symbols/symbols	0.92	0.92	Valid
g. grains	0.92	0.92	Valid

\* $V$ = Content validation coefficient based on the Aiken formula

BioPhy is interesting because it has components of local knowledge linked to the idea of learning [12]. BioPhy is valid because it spurs the development of aspects of spiritual, social attitudes, knowledge, and skills through integration with local wisdom [13].

### 3.3 Student Response to the Learning

Student responses to learning are presented in Table 3 below.

**Table 3.** Student Responses

No.	Response	One to One (%)	Small Group (%)	Field Test (%)
1	Learning materials with Biophy Magazine, how the lecturers teach, and how students learn after participating in fun and interesting learning activities	100	100	100
2	Learning materials with Biophy Magazine, the way lecturers teaching and the way students learn is something new and very helpful for student learning	100	90	91.67
3	Learning materials with Biophy Magazine, how the lecturers teach, and how to learn students is not new but helps students learn.	0	1	8.33
4	During the learning process, students can express opinions to answer questions	75	80	87.5
5	During the learning process, students can solve the problems and use Biophy Magazine	87.5	80	95.83
6	Students are interested in participating the activities again.	100	90	95.83
7	After following this learning, the results obtained by students agree that they are able to reflect on the usefulness of the knowledge learned so that they are encouraged to behave positively.	75	70	58.33
8	After following this learning the results obtained by students strongly agree that they are able to reflect on the usefulness of the knowledge learned so that they are encouraged to behave positively.	25	30	41.67
9	Studentagreethat learning uses the assisted ICARE-PPR model Biophy Magazine able to direct students to become superior and moral	62.5	60	54.17

According to the responses given by students, most of them gave a positive assessment of the implementation of the teaching materials assisted learning model developed. The ICARE-PPR-assisted learning model BioPhy Magazine created pleasant lecture conditions so as to provide facilities for students to express opinions in class, participate in solving problems, and be a good stimulus for students to enjoy the subjects being taught [14]. Active discussions that take place during learning implement the syntax of the ICARE-PPR model to encourage students to exchange opinions and solve problems [15], [16]. Students also stated that learning with models and teaching materials developed was able to improve attitude learning outcomes [17], thus students agreed and strongly agreed that learning models direct students to be superior and have good morals because they are used to positive behavior.

### 3.4 Character Assessment Sheet Validity of Kayuh Baimbai

To observe the character of Kayuh Baimbai on each science teacher candidate who is the object of this study, the character assessment sheet is validated first. Table 4. The following presents the data validation results on the character assessment sheet Kayuh Baimbai that develops in prospective science teacher students during learning takes place.

**Table 4.** Validity of Character Assessment Sheets of Kayuh Baimbai

Rated aspect	<i>V</i> <sub>count</sub>	<i>V</i> <sub>requirement</sub>	Category
Character description accuracy of Kayuh Baimbai into the parameter statement	0.87	0.87	Valid
Readability/language	1.00	0.87	Valid
Likely observable	1.00	0.87	Valid
Determination of assessment criteria	1.08	0.87	Valid
Possibly it can be used as a character observation instrument for students of Kayuh Baimbai	1.08	0.87	Valid
The order of each statement and the assessment score	1.17	0.87	Valid

\**V* = Content validation coefficient based on the Aiken formula

The character assessment instrument is valid and can be used to measure character [18], [19], [20]. The validity obtained based on the assessment of the experts above showed that based on the six aspects that make up the assessment items it is considered to have become a measuring tool for the criteria to be assessed [20]. Each item that becomes a character assessment is classified as representative as an assessment indicator [21]. The validity of the character assessment instrument of Kayuh Baimbai, the outcomes demonstrate that the tool can be utilized to assess the emergence and growth of characteristics in a learning environment learning [22], [23].

The instruments developed are considered to be able to extract data from the characters of Kayuh Baimbai precisely according to the indicators of these characters [24]. The statements on the instrument have been prepared in such a way as to represent the embodiment of the character as the object to be measured [25]. Thus, the developed instrument is feasible to be tested in measuring character [26].



### 3.5 The Character of *Kayuh Baimbai*

The character of *Kayuh Baimbai* is formed in students' observation through the assessment of observers and lecturers during small group tests and field tests. The observation results are presented in Figure 2 below.

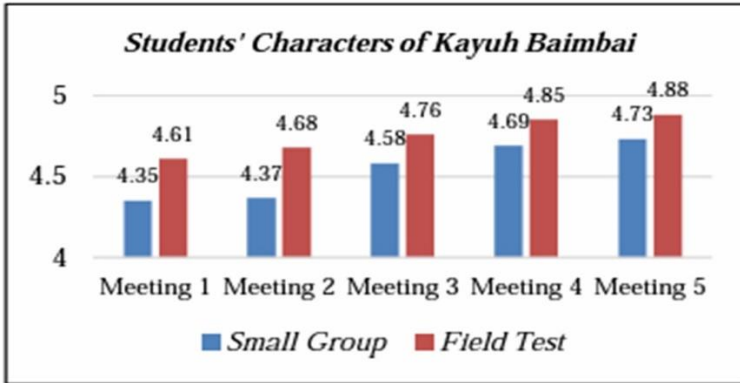


Fig. 2. Students' Characters of *Kayuh Baimbai*

Figure 2 above presented data related to performance character of *kayuh baimbai* in small group tests and field tests for five meetings. It can be seen that there has been an increase in character performance of *kayuh baimbai* in both trials. This indicated the development of student character from one meeting to the next [27]

According to [28] character of *kayuh baimbai* the main components are planning, division of tasks and clear targets. During the learning process, giving assignments to students to work on in groups following the syntax of the ICARE-PPR learning model has been able to guide students to carry out strategies for sharing assignments in groups, then they can effectively complete targeted common goals.

The ICARE-PPR learning model which is actually based on constructivism theory has succeeded in directing students to get used to a culture of cooperation in building their own knowledge [29]. At the Application stage, students are set to carry out discussion activities in solving joint problems. At this stage students are required to actively cooperate with one another [30]. This collaborative effort between fellow students is a manifestation of character bamboo paddle in the learning process.

### 3.6 Biodiversity Conservation

In addition to training the character of *Kayuh Baimbai* of students, the development of learning models with the help of BioPhy Magazine teaching materials can also contribute to realizing the involvement of every student in biodiversity conservation programs. The form of a biodiversity conservation campaign through ICARE-PPR learning assisted by BioPhy by science teacher candidates is shown in Figure 3 and Figure 4 below.



Fig. 3. Conservation Campaign via Instagram

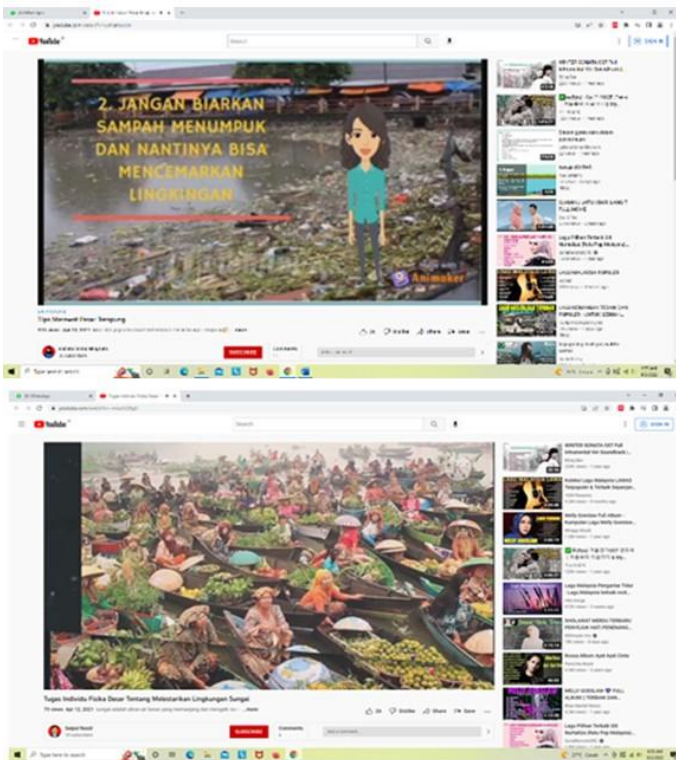


Fig. 4. Conservation Campaign via Youtube

Figure 3. and Figure 4. Showed the form of a campaign carried out by prospective science teachers through Instagram and YouTube media. The messages conveyed are directed to influence so that the reader followed the directions given by the message maker. The message conveyed in the photo is achieved, people who see it then feel

concerned [31]. In Figures 3. and 4 it can be seen that the social media used by prospective science teachers gives positive messages in efforts to conserve biodiversity. This is in accordance with the research of [32] social media presence is beneficial as long as it is used for positive things.

## 4 Conclusion

Based on the results of the research and discussion described, it can be concluded that ICARE-PPR learning is valid for using in the classroom with a content validity coefficient of 0.92-1.00; Biophy Magazine teaching materials based on Floating Market are valid for use by students in learning with a content validity coefficient of 0.75-1.00; the response of prospective science teachers to ICARE-PPR learning shows a positive category for each assessment item on the Department of Physics, Department of Chemistry and Department of Biology; kayuh baimbai character assessment sheet is valid based on expert judgment; the character of kayuh baimbai of science teacher candidates during the learning process showed very good categories for Department of Chemistry and Biology students and a form of biodiversity conservation campaign carried out by science teacher candidates in the form of out-reach through social media such as Instagram and Youtube. This research can be developed for other teaching materials by integrating various disciplines as an effort to train character development for students.

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