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Development of Biology Learning Module Based on Local Potential Types of Fish in Sibolga Waters

Fatimah Prawita Putri Samri Tanjung[1*], Nirwana Anas [2], Melfa Aisyah Hutasuhut [3]
[1]Universitas Islam Negeri Sumatera Utara, Indonesia
[2]Universitas Islam Negeri Sumatera Utara, Indonesia
[3]Universitas Islam Negeri Sumatera Utara, Indonesia

***Correspondence: E-mail:** fatimahprawita17@gmail.com

Abstract: Application of local values in Sibolga City in learning at school will certainly help students recognize local potential and the culture around it. Efforts where students are capable of knowing the scientific names of the types of fish around them. This experiment aims to describe the results of the development of a biological module based on the local potential of fish species in Sibolga waters to determine the development of a valid, practical, and effective module in animalia material. This research was conducted at Senior High School Darur Rachmad which is located at Kerala, Sibolga, Sambas, Sibolga City. The subjects studied were students of class X consisting of 30 students. This study uses the ADDIE development model, namely analysis, design, development, implementation, and evaluation. The instruments used in this research were questionnaires and pretest-posttest question sheets. Based on the research results, the N-gain score on the students' pretest and posttest was 0.77 with the high criteria. So, converted into a percentage to measure effectiveness, a value of 77% was obtained in the effective category. The results of research on the development of biology modules based on the local potential of fish species in Sibolga waters are expected to increase student achievement.

Keywords: Animalia, Local Potential, Module

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INTRODUCTION

Each region has local potential that needs to be developed. Potency owned by each region varies greatly. The diversity of regional potential is the development of regional potential and excellence local government needs special attention children are familiar with their own area and understand very well about own regional potential. So that children can develop and empower their regional potential in accordance with the demands of the global economy which has been approved by the Indonesian government. The learning process does not only understand the material theoretically but the material learned is developed based on the environment of the place live in the community (Saputra et al., 2023). As stated in government regulation number 22 year 2006 confirmed that: "Every educational unit can offer learning in accordance with the interests and talents of students, as well as potential local, cultural environment, economic conditions, and regional needs with self-developed competency standards and basic competencies so that the learning process is more meaningful" (Permendiknas No. 22 Tahun 2006, 2006)**.**

Several previous studies regarding module-based development local potential. For example in their research obtained the result that the use of local potential-based modules on the topic. Ecosystems have an effect on increasing understanding of concepts and attitudes care about the environment of students and the most optimal increase in understanding student concept (Umar et al., 2022). The module was declared feasible and effective in increasing conceptual understanding and environmental care attitude of students (Prabowo & Nurmiyati, 2016). The learning process uses teaching materials in delivery one of the materials uses printed form, namely modules. Use module teaching materials will help educators deliver material to students, because the material in the module can be adapted to the needs of students so that students can learn independently (Marzuki et al., 2017).

Suratsih defines a module as a unit printed learning (Suratsih, 2010). In essence, the module is designed with a purpose facilitate students to achieve a set of learning objectives. Module is a unit of teaching and learning program that can be studied by students with minimal assistance from the teacher. This unit contains objectives to be achieved practically, instructions to be followed, materials and tools needed, teacher assessment tools that measure student success in working on the module (Diana, 2017). The module will be meaningful if students can easily use it. Learning with modules makes it possible a learner who has a high speed in learning will be more quickly complete one or more basic competencies compared to other students. Thus, the module must describe the basic competencies to be achieved by students, presented with use good language, interestingly equipped with illustrations (Harahap, 2019).

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To produce modules that can improve motivation to learn, module evelopment must pay attention to the characteristics that required as a module (Ahmad Zaki, 2020).

Based on the definitions above, it can be concluded that the aim of this research is to develop a module based on local potential that is valid, practical and effective so that it can be used as very useful biology teaching material, especially vertebral material.

METHOD

This type of research uses Research and Development (R&D). This product development was carried out in the city of Sibolga. The content of the product developed is related to biology learning in animalia material, especially in the vertebrae sub-material for class X Natural Sciences. Research and development aims to produce something products that have been developed to test their effectiveness. Research model developed is the ADDIE model which includes stages analysis, design, development, implementation, and evaluation.

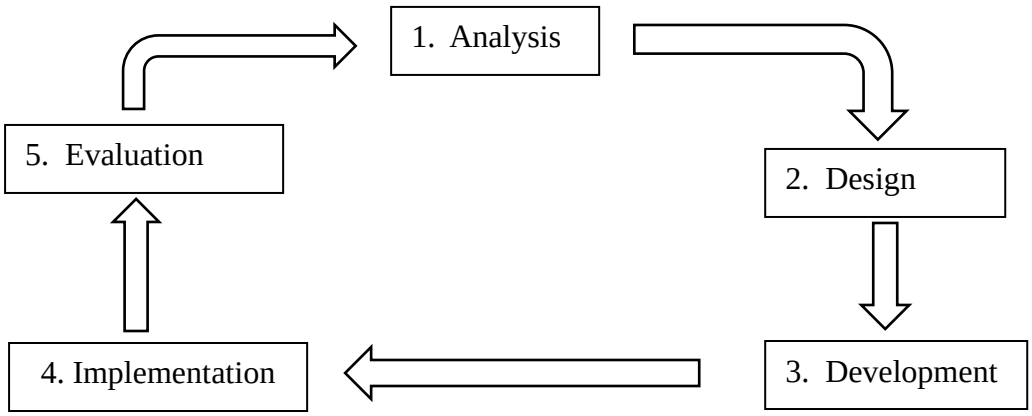

Figure 1. Stages of development of the ADDIE

This development research using the ADDIE model stands for analyze, design, development, implementation, and evaluation. This model was chosen because of the model ADDIE is often used because of the stages the ADDIE model illustrates systematic approach to instructional development. As for product development procedures with the ADDIE model can be seen in the **Figure 1**.

Information collected as part of the module development on the regional potential of fish species in the Sibolga waters is available in the form of qualitative data. During module development, this qualitative data was obtained from notes and contributions from various research participants. And the resulting module is considered good if it meets three the criteria: verification criteria, efficiency, and practicality. Therefore, three types of data should be

considered when determining the quality of the modules produced: effectiveness, practicality and effectiveness.

The tool used in this study is the module feasibility assessment sheet. It consists of material expert verification sheet, media expert verification sheet and sheet. Linguistic validation to measure the validity of developed modules. Another method used is for teachers and students to complete questionnaires. To measure module utility and subjective test questions. It consists of one question and is used as a pretest and posttest question. Used to measure module effectiveness.

Expert validation sheets and teacher and student response questionnaires using a likert scale. The likert scale is used to measure attitudes, perceptions, and opinions about something (Ahdhianto et al., 2021). The Likert scale is arranged in shapes statement followed by five responses indicating level. Likert scale used with intervals 1-5. Highest score of 5 and the lowest score of 1 is shown in **Table 1**.

Table 1. Likert scale

Type	Score	Classification
SS	5	Strongly agree
S	4	Agree
TB	3	Neutral
TS	2	Disagree
STS	1	Strongly disagree

The expert validation instrument contains statements supplemented by five response based on a Likert scale. Data analysis was performed with calculate the eligibility value of the questionnaire based on the validation of material experts, media experts, and linguists (Magdalena et al., 2020). The value of the implementation level category that can be seen at the interval determining the level of practicality in **Table 2.**

Table 2. Criteria for assessment of the implementation of learning activities

Score	Classification
80% < x ≤ 100 %	Very practical
60% < x ≤ 80%	Practical
40% < x ≤ 60%	Moderately practical
20% < x ≤ 40%	Less practical
0% < x ≤ 20%	Impractical

Data on the results of the assessment of the feasibility of the product development of teaching materials Biology was analyzed descriptively (Indriyani, 2019). Determination of product feasibility level in **Table 3**.

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Table 3. Product eligibility level

Score	Classification
81- 100	Very Worth it
61-80	Worthy
41-60	Decent Enough
40-21	Less Eligible
0-20	Very Inadequate

Student learning outcomes before and after using the module were tested with normalized gain (N-Gain). Normalized gain test is performed for find out the increase in student learning outcomes after being given treat. The normalized Gain score results are divided into three categories in **Table 4**.

Table 4. Normalized gain criterion

Score	Classification
N-gain > 0,7	High
0,3 ≤ N-gain ≥ 0,7	Medium
N-gain < 0,3	Low

FINDING AND DISCUSSION

Finding

Description of a analysis

Phase the analysis phase tries to identification activities syllabus development for study material curriculum and teaching. In addition, an analysis was also carried out characteristics namely, by analyzing the syllabus on Biology subjects according to the curriculum and applicable teaching. Analysis on the ADDIE development research model was carried out by analysis on content, learners, needs, and instructional outcomes. Analysis on content determine with literature review obtained from books and relevant journals from previous research. Analysis of needs carried out using an information search process that is in accordance with practice in the field that provides information about the abilities of students, learning scenarios, and student characteristics. So that instrument produced according to field practice.

Description of a design

The design phase is carried out by planning product development. Researchers plan and design product designs that will developed. This stage is also known as designing. Researchers do the design in accordance with the product to be developed. In the design there are several steps, including: (1) Conducting an analysis of core competencies and basic competencies, (2) determining learning objectives, (3) determining subject matter, (4) determining module writing structures, (5) sketching module arrangements, and (6) creating modules. Module design developed as in **Figure 2**.

Figure 2. Module Design Developed

Description of a development

At this stage the researcher did the making local potential-based module consisting of: compiler, introduction, map Sibolga City, table of contents, introduction, learning activities, evaluation, and list references. After the product is developed, a feasibility test will be carried out carried out with 3 (three) experts, namely media experts, material experts, and language experts. In accordance opinion that the product being developed should be validated using two or more experts as material consideration and comparison (Ningrum, 2009).

Expert validation was carried out by material experts, media experts, and linguists. Expert the material validates the contents of the material in the module that has been according to basic competencies. Meanwhile, media experts validate on the supporting components and the visual appearance of the module. Linguist validate the language used in the Module. The following is the result of the validation of three (3) experts, namely media experts, material experts, and language experts. The following are the validation results from the experts in **Table 5**.

Tabel 5. Revision of local potential-based modules based on validation suggestions from validators.

Validator	Criticism and Suggestions	Repairing
Validator 1	1. Module title fixed. 2. The learning goals for the class should be clear listed on the cover. 3. Use of font type and size must be consistent with each other.	Has been corrected according to input from media experts

	4. The symbol is too flat so disproportionate structure so it must be changed to shape proportional. 5. Add the author's name in the section cover so that the author is clear.	
Validator 2	Nothing to revise	Has been corrected
Validator 3	1. The use of spacing between paragraphs must be the same as between lines; 2. On page 4, writing foreign terms should be written use italics such as fishing ground, etc. 3. On page 5 of paragraph 3, there must be punctuation before conjunctions comma (,) because the text specifies more than 2 elements; 4. Each picture should be given a picture description and the source of the image, so that it is clear which source we are using as an example image as a study reference; 5. Fix the writing of words that still have typography or layout the face of writing that is in accordance with the rules of the language; 6. Exposure between sub-headings should be parallel to the sub-headings before and do not align with the numbering. 7. On page 24, write a hyphen (-) in the word "his back" should be written with the word "his back". 8. Fix the beginning of sentences that do not use capital letters with a capital letter prefix.	Has been corrected according to input from linguists

The research results received criticism and suggestions which were taken into consideration when reviewing the local potential-based biology module. The validation results from the validators can be seen in **Table 6**.

Tabel 6. Expert validation results

Validator	Score	Classification
Validator 1	85,55%	Very worth it

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Validator 2	92,8%	Very worth it
Validator 3	82,85%	Very worth it
Average	**86,95%**	**Very worth it**

Based on the table above it can be seen that the assessment of media experts is 85.55%, material experts is 92.8%, and linguists are 82.85% which, if the average is 86.95%, is in a very valid/very decent category.

Description of a implementation

After the validation process is carried out by the three validators, it will be obtained suggestions and input on the Module that has been developed. In this step the developer tests the practicality and effectiveness module to obtain student response data and practicality from practitioners field, namely the biology teacher concerned. Before done testing the module to students, the module is revised first according to expert input. At this stage, the researcher tested the practicality. The module that has been developed by giving a response questionnaire to the teacher and students to assess the feasibility of the module in terms of practicality. Based on the distribution of questionnaires, the results can be obtained in **Table 7**.

Tabel 7. The results of the assessment by field practitioners

Practicioners	Score	Classification
Teacher	80%	Practice
30 students as praticipants	99,09%	Very practice
Average	**89,54%**	**Very practice**

Based on the table above it can be seen that the percentage of the average value the practicality of students through the distribution of questionnaires was obtained at 89.54% in the "very practical" category.

After the practicality test, the researcher conducted an effectiveness test. Test effectiveness is carried out to measure changes in student learning outcomes after given treatment using a potential-based biology learning module local fish in Sibolga using pretest and research instruments posttest presented in **Table 8**.

Tabel 8. Recapitulation of comparison of pretest and posttest scores

Test Type	Average
Pretest	50
Posttest	86,67

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Based on the recapitulation table of pretest and posttest values of 30 students obtained an average score of 50 for the pretest and after it was done posttest obtained an average value of 86,67.

Tabel 9. Normalized test results

Test Type	Average
Pretest	50
Posttest	86,67
Score n-gain	**0,77**
Criteria	**High**

Based on the **Table 9**, it can be seen that the acquisition of the N-gain score on students' pretest and posttest of 0.77 with the criteria of "high". So converted in percentage form to measure effectiveness obtained a value of 77% with the "effective" category.

Description of a evaluation

At this stage the researcher evaluates the prototype and presentation of the material on the module based on inputs and revisions from experts. Evaluation carried out to examine and determine the things that need to be improved so that products that are created more effectively and efficiently. It's the same as opinion Purwanto et al that summative evaluation has a function of providing information and considerations related to efforts to improve learning in the development process (Nuryasana & Desiningrum, 2020).

Discussion

Based on the research described above, it was conducted at Senior High School Darur Rachmad Sibolga, City of Sibolga, North Sumatra. In the past, in school education, teachers only used teaching aids provided by the school. So far, education seems boring because most schools are only standard, moreover Senior High School Darur Rachmad does not use biology modules based on local potential. The use of the environment as a means of learning the local potential of the area can be utilized as a useful learning resource. This research was conducted in the context of developing a biology module based on the local potential of various types of fish in Sibolga waters as a biological study.

This research uses the development model or in language English is called Research and Development (R&D). Study development is the research method used to produce certain products, and to test the effectiveness of these (Fatikhah & Izzati, 2015). This development

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research uses the ADDIE model. Model ADDIE consists of five stages including analyze, design, development, implementation, and evaluation.

In the analysis stage, the researcher conducted an analysis on content, learners, needs, and instructional outcomes. Analysis on content determine with literature review obtained from books and relevant journals from previous research. Analysis of needs carried out using an information search process that is in accordance with practice in the field that provides information about the abilities of students, learning scenarios, and student characteristics. So that instrument produced according to field practice. Needs analysis activities carried out by observing at the Senior High School Darur Rachmad Sibolga school as well as conducting interviews with one of the subject teachers biology.

Next is the design stage, at this stage the researcher designed the prototype module for the purposes of the module preparation process. The design includes pictures, cover designs, introductory words, student worksheets, subject matter, competency standards, practice questions. all of which are important elements that must exist in every development of a prototype arrangement of a module. so that the module can be used independently by students.

The next stage is the development stage. researchers make local potential-based module consisting of: compiler, introduction, map Sibolga City, table of contents, introduction, learning activities, evaluation, and list references. After the product is developed, a feasibility test will be carried out carried out with 3 (three) experts, namely media experts, material experts, and language experts. During the development, the results achieved were as follows:

a. Validation of local potency-based biology modules

   At the time of decision making, the assessment results from media experts (validator 1) received 85.55%, material experts (validator 2) received 92.8% and linguists (validator 3) received 82.95%. Based on the calculation of the average obtained by 86.95% with a very valid category.

b. Local potential-based biology module validation by field practitioners

   Based on the distribution of questionnaires to field practitioners, namely teachers and 30 students, obtained data of 80% and 99.09%, respectively. From these data an average of 89.54% is obtained which if converted according to the table is included in the very practical category.

c. Local potential-based biology module effectiveness

   The results of the analysis of student learning outcomes show that the module based on local potential of various types of fish in Sibolga waters related to the concept of

vertebrates is obtained with a normalized gain score of 0.77 and reported as high, if converted into a percentage of 77% with the effective category.

As a result of implementing local potential-based biology learning modules in Sibolga waters it can facilitate student learning activities independently and make students very enthusiastic in learning because of interesting media. Therefore, practical learning is needed in the world of education which contains materials and teaching that can motivate students to improve learning outcomes. Changes in student learning outcomes indicate that there is the success of the learning process. In accordance with Aroyandini's opinion that the results learning is the result of student learning, which is an indicator of basic competence and the degree of change in the behavior concerned (Aroyandini et al., 2020).

Local potential is the main attraction of students in the learning process in order to improve learning outcomes. According to Mustafida, said that local potential-based learning is contextual learning leads to the utilization of various regional potentials in the form of potential resources natural resources, human resources, economic resources and so on. As a means all of which have benefits for development competence of learners (Mustafida, 2016). Based on the previous opinion it can be concluded that we need to present local potential and wisdom in the process learning that is part of a local culture to be introduced to students. As an effort to realize the learning process based on potential and local wisdom, material development is needed teach biology modules based on local potential, as one of the efforts to achieve competence and educational goals (Hafizah et al., 2022).

Learning activities and teaching the target is learning outcomes, if the way and motivation to learn is good, it is expected that the learning outcomes are also good. The understanding of learning outcomes that stated by Sajidan that learning outcomes are abilities possessed by the student after he received the learning experience (Maflukha et al., 2017). The term learning outcomes is arranged of two words, namely: "outcome" and "learning". Then it is also supported by the opinion of Alimah "results" means something that is held by something effort, while "learning" has many meanings including: Learning is a change that occurs in a person after going through process (Alimah et al., 2018).

Local potential-based learning is basically contextual learning that utilizes local potential as a means of student learning associated with learning biology concepts in class. So that student learning outcomes are expected to increase along with the increase in students' reasoning and analytical abilities because students can relate biological concepts in class to regional potential. This students can master the concept a biologist will continue to pay attention to the local potential of the area and know the environment around where he lives, and the most important

thing is that he can play a role in providing solutions to various problems that occur in the surrounding environment.

Based on this explanation, it can be concluded that the development of biology learning modules based on the local potential of fish species in Sibolga waters can be valid, practical, and effective in improving the learning outcomes of class X Science students at Senior High School Darur Rachmad Sibolga City.

CONCLUSION

The biology module based on local potential is very valid, very practical, and effective for use as teaching material on animalian vertebrae, according to the research findings. The N-gain score on the students' pretest and posttest was 0.77 with the high threshold, according to the research findings. Therefore, when effectiveness was expressed as a percentage, the effective category yielded a value of 77%.

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