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DEVELOPMENT OF SCIENCE MODULE INTEGRATING LOCAL WISDOM OF BIOTECHNOLOGY MATERIALS FOR CLASS IX JUNIOR HIGH SCHOOL

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ABSTRACT
The purpose of this research is to describe: (1) the validity of the science module integrating local wisdom on biotechnology, (2) the practicality of the module, and (3) the effectiveness of the module. Module development implements only three stages of the 4D model, namely (define, design, and develop). The instruments implemented in the research include learning achievement tests, student response questionnaires, and science module validation sheets. The research resulted in validating the science module integrating local wisdom from experts who showed very valid criteria by obtaining a score of 3.86. The learning outcomes test in this module is also very valid, with a score of 3.82. The results of the practicality of the module obtained a value of 86.18% which was indicated by efficient criteria. The IPA module integrates local wisdom and is also declared effective by obtaining an n-gain of 0.82 with high criteria. From these results, it can be concluded that the science module integrating local wisdom in the biotechnology material developed can be implemented as teaching material because the test results are feasible and valid.

Keywords: local wisdom, biotechnology, science module, smpn 2 banjarmasin.

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INTRODUCTION

Science learning is learning in which the concept of actual events in the natural surroundings is emphasized so that students can experience them directly and develop their competence (Safitri et al., 2022). The goals of science include making science and technology (IPTEK) more developed, helping people's daily life problems more, and trying to make environmental sustainability more guarded by humans (Listianthy et al., 2021). Not only focusing on mastering the concepts and theories contained in the book, but students must also allow students to learn things related to themselves and the surrounding environment (Misbah & Fuad, 2019).

The science is usually called a product because it contains and presents facts about natural phenomena to be analyzed so that a scientific attitude is embedded (Istianah, 2022). Unfortunately, the situation on the ground revealed that collaboration between interrelated elements had not yet been implemented. This happens because teaching materials implemented in the field still contain content summaries and practice questions with theoretical concepts. At the same time, the role of science in everyday life is rarely discussed (Listianthy et al., 2021). An essential component in a learning process that is more compelling is teaching materials through information conveyed by the media. Problems that occur in teaching materials will affect the quality of learning (Rahmatullah et al., 2021).

Based on the relevant literature review, several views found deficiencies in teaching materials, especially at the Junior High School (SMP) level, namely students who still needed help being skilled

in explaining phenomena around them by implementing the knowledge they had. The need for more contextual content in teaching materials is a contributing factor. That means content material in general and abstract concepts still dominate the presentation. This makes students memorize existing material without knowing the material's relationship with their daily lives. Learning is instilled in students to be skilled at processing abstract concepts that can be applied in their daily life, which is good learning (Irhasyuarna & Hafizah, 2022).

Engaging media or device innovations can grow students' interest in learning and increase their understanding (Safrina, 2021). This can be realized as an effort to improve the maximum learning structure. Among them are teaching materials for students to learn independently, developed using modules (Listianthy et al., 2021).

States that the module aims to allow students to adapt freely, in which the implementation is accompanied or unaccompanied by a teacher through a book (Yuniarti et al., 2021). With the module, students must be more independent and not depend on the teacher so that learning is not focused on the teacher and the teacher is only a facilitator (Wahab et al., 2021). Things that are contained in the basic module are in the form of targets, material or substance, and learning assessment. The planning and creation of the compiled modules can be adjusted based on how the circumstances and conditions and circumstances of the learning will be carried out. Thus, students are expected to be able to move, help, find, and grow ideas, as well as their more tremendous enthusiasm for independent learning (Listianthy et al., 2021). Middle school students are very suitable for learning using modules according to the challenges of learning in the 21st century. This is because the module's characteristic is that it is structured, coherent, and able to simplify the complexity of biological material. One is by integrating learning with habits or the environment around students (Sari et al., 2020).

Module development must be under the curriculum based on what students need, namely teaching materials with characteristics similar to their surroundings (Rahmatullah et al., 2021). Characteristics of junior high school students in the cognitive domain include the ability to understand abstract things, have a high sense of knowing, and think critically. The characteristics of junior high school students also cover the social realm, where junior high school students tend to want to be part of a group or work with a team. In line with these characteristics, students certainly easier to accept learning if it is related to the environment around students. The interrelationship between the characteristics of students and the surrounding environment is also expected to create students who have concerns for the life of the surrounding environment. However, in science learning, what the teacher tries to do with the environment around students could be more optimal. The surrounding environment is the realm of culture and local wisdom around students. Therefore, integrating local wisdom into learning science can make wisdom a source of knowledge for students (Herwandi et al., 2021).

Local wisdom-based modules are very suitable for junior high schools, with learning activities introducing indigenous and scientific knowledge. With a modular design based on the needs of students, it is hoped that students' learning activities can be supported so that they become better, especially in the development of skills (Sari et al., 2020). Students can easily understand and be more effective because the module helps teachers deliver material online or offline. Developing modules

based on ethnoscience according to related material can also increase insight into local culture. Apart from that, students' attention can also be attracted to modules, students can be motivated because they get new things, and their enthusiasm for increasing knowledge about local culture also increases (Istianah, 2022).

Science learning with modules based on local wisdom has various discussions due to the many cultural, ethnic, racial, and religious diversity in Indonesia. Indonesia has islands with diverse customs and cultures between regions. Each region has very varied and diverse advantages. The teaching and learning process should be driven by this cultural wealth so that it becomes meaningful (Misbah & Fuad, 2019). For students to become familiar with their environment, the potential and advantages of each region must be developed and given special attention by the government. Local wisdom values in biology material can be applied in schools by developing modules based on local wisdom (Lestari et al., 2019).

Indonesian people generally inherited a tradition from their ancestors (Ravico, 2019). However, over time, the existing tradition has faded. Therefore, conservation efforts need to be made. The learning process in schools is the fastest medium for instilling and disseminating the values contained (Siregar & Ravico, 2021). The implementation aims to pay more attention to the social life, surrounding environment, and students' culture. Therefore, local wisdom is expected to provide students with more meaningful insights. The output of learning that is held is more meaningful, resulting in the application of a learning process that can connect the basic concepts of science with the activities of the community around the students' environment, especially regarding culture and customs. Therefore, it is necessary to form an identity for indigenous regional culture as the root of learning in science or science education in Indonesia (Arifin, 2019).

Local wisdom can include beliefs, customs, traditional houses, traditional ceremonies, regional clothing, and traditional foods, such as some traditional foods in South Kalimantan, namely Pakasam, Wadi, Tapai Gambut (Tape), and Mandai, where the traditional food processing is appropriate. The syllabus for science subjects in science material for grade IX junior high school, namely the concept of biotechnology, for example regarding how to make some fermented foods such as tape (tape). However, besides Tape (tapas), there are several foods from the fermentation process that can be made in a simple way that integrates local wisdom values, such as Pakasam, Wadi, Tapai Gambut (Tape), and Mandai typical of South Kalimantan, where these fermented foods are also one of the products conventional biotechnologies that utilizes microorganisms.

Modules in providing material if there is no variation in the manufacture, then the module seems ordinary. Therefore, variations such as adding learning models in modules are necessary. Biotechnology material requires practicum activities to fulfill essential competencies, namely making one of the biotechnology products. So, to support the understanding of biotechnology material, an innovative practicum-based learning model is implemented, namely PjBL (Project Based Learning). In the PjBL (Project Based Learning) learning model, students must be actively involved in problem-solving activities and group work and create a product of value by utilizing the project as a learning media model (Melinda & Zainil, 2020). PjBL can help achieve a student center that will be useful during meaningful teaching and learning activities.

The information obtained from the interviews with teachers of SMP Negeri 2 Banjarmasin is that science learning at this school, especially on Biotechnology material, is mainly done with a lecture approach. Biotechnology material should require a simple experiment to meet the basic competency standards in the skills domain. Many learning resources, such as traditional fermented foods, can be found in the school environment. Another problem is the limited learning resources that only use publishers, and there needs to be a science module that integrates local wisdom to support learning, especially biotechnology material. Based on the background above, this research aims to find out and analyze the development of science modules integrating local wisdom on biotechnology material for class IX of junior high school.

METHODS

This research belongs to development research or R&D (Research and Development), a technique with a function to validate and develop products (Fajarianti, nd). In research, R&D design techniques are implemented to develop products that can increase the understanding of class IX students of SMP Negeri 2 Banjarmasin regarding biotechnology material in the form of a science module integrated with local wisdom.

The product model developed applies 4D. The 4D model is based on explanation (Listianthy et al., 2021); (Herwandi et al., 2021). There are four steps: define, design, develop, and disseminate. However, this research only implemented three steps, namely defining, designing, and developing, while the deployment stage still needs to be carried out. This development model was created to create viable products under the research objectives, namely to produce science modules integrating local wisdom on biotechnology materials for class IX in junior high school.

The research instrument is the equipment used in data collection. The instruments implemented in the research include (1) an instrument to measure the level of effectiveness of the Science module through a learning achievement test and (2) an instrument to measure the practicality of the module used, namely through student response questionnaires. (3) the instrument for measuring the validity of a module is the module validation sheet.

In this research, the testers for the validity of the module were one science teacher at SMP Negeri 2 Banjarmasin and two lecturers from the Science Education FKIP, Lambung Mangkurat University. So, there are three module validity testers. Next, testing will be carried out on 34 class IX C students of SMP Negeri 2 Banjarmasin for the 2022/2023 school year after going through the validator test stage.

A module can be declared valid, as seen by matching the validation results carried out by the validator with the predetermined validity criteria. The analysis of the validity of the data results can be described through the following formula (Nahdaturrugaisiyah, 2014):
The equation for the average value of each category from the validation results by the validator is:

$$(\overline{K_i}) = \frac{\sum_{j=1}^{n}(\overline{V_{ij}})}{n}$$

Explanation:

n = Number of validators

$\overline{V_{iJ}}$ = The value given by the validator to the i-th category

$\overline{K_i}$ = Average category i

Equation of the average value of each aspect:

$$(\overline{A_i}) = \frac{\sum_{j=1}^{n}(\overline{K_{iJ}})}{n}$$

Explanation:

n = Number of categories

$\overline{K_{ij}}$ = Mean of the ith aspect of the jth criterion

$\overline{A_i}$ = Mean of the i-th aspect

Total average value equation:

$$(\overline{V_a}) = \frac{\sum_{j=1}^{n}(\overline{A_i})}{n}$$

Explanation:

n = Number of facets

$\overline{A_i}$ = Mean of the i-th aspect

$\overline{V_a}$ = Average total

Based on the explanation (Nahdaturrugaisiyah, 2014) the determination of validation categories can be seen from ($\overline{V_a}$) the total average, ($\overline{A_i}$) the aspect average, and ($\overline{K_i}$) the validity criteria for each criterion. Table 1. represents the validity criteria.

Table 1. Module Validity Level Criteria

Mark	Criteria
$\mathbf{1,5 \geq V \geq 0}$	Invalid
$\mathbf{2,5 \geq V \geq 1,5}$	Valid Enough
$\mathbf{3,5 \geq V \geq 2,5}$	Valid
$\mathbf{4 \geq V \geq 3,5}$	Very Valid

Source: Trianto, 2015

Explanation: $V = the\ average\ value\ of\ validity\ of\ all\ expert\ validators$

Practicality can be examined seen from the students' responses regarding the modules that have been developed. The response questionnaire used can describe students' responses to interest, feelings of pleasure, and ease of learning the components in the module. This questionnaire includes the object of ease of use, benefits, and timeliness. Then calculate the average value of the questionnaire data obtained from students, then convert it according to the criteria for the level of practicality using the following formula (Kumalasani, 2018).

$$V_P = \frac{TSE_p}{S - max} \times 100\%$$

Information:

V_P = practical value of students

TSE_p = Student scores

$S - max$ = Total maximum score

Table 2. Module Practicality Criteria with Percentages

Criteria	Category	Information
00.00% - 25.00%	Not practical	It cannot be used
25.01% - 50.00%	Less practical	Should not be used
50.01% - 75.00%	Practical	Usable, but with revisions
75.01% - 100%	Very practical	It can be used without revision

Source: (Kumalasani, 2018)

Furthermore, the effectiveness of learning activities will be measured based on *the post-test* and *pre-test* of the learning outcomes test. Determination of cognitive aspects of students' learning outcomes based on the score obtained is categorized by applying the standard categorization method by the Ministry of Education and Culture (KEMENDIKBUD), namely:

Table 3. Categories of Learning Outcomes

Proficiency Level	Category
9-34	Very low
35-54	Low
55-64	Currently
65-84	Tall
85-100	Very high

Source: Trianto, 2015

Normalized gain formula (*N-gain*) is used to determine the cognitive level of students from learning outcomes, as the equation is:

$$(g) = \frac{posttest\ score - pretest\ score}{maximum\ score - pretest\ score}$$

Table 4 represents the criteria for the effectiveness of student learning outcomes, namely:

Table 4. *N-Gain Criteria*

Intervals	Criteria
$0{,}7 \leq g$	Tall
$0{,}7 > g \geq 0{,}3$	Currently
$0{,}3 > g$	Low

Sources: (Hake, 1998); (Fajariani, 2019); (Nita, 2020)

RESULTS AND DISCUSSION

Based on the researched development, a product was produced, namely a science module that integrates local wisdom with biotechnology which is the main discussion in class IX semester two junior high school. It makes it easier for students to complete the realm of skills and become more literate about science because learning involves local wisdom often found in everyday life (Sya'ban et al., 2017).

Module Validity

Results of the Validation Test of the Science Module Integrated with Local Wisdom on Biotechnology Materials

At the data collection stage of this study, data recapitulation of the results of the validation of the Science module integrated with local wisdom was obtained from 3 expert validators consisting of 1

science teacher at SMP Negeri 2 Banjarmasin and two lecturers in science education FKIP Lambung Mangkurat University which contains three aspects of assessment consisting of the feasibility of presentation format, the feasibility of content, and language. Table 5 shows the results of the module validation in detail based on the aspects and indicators.

Table 5. IPA Module Validation Results

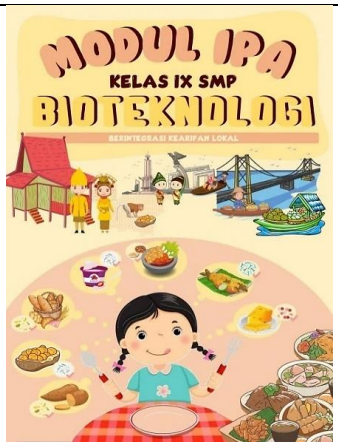
Aspect	Indicator	Average $\overline{K_i}$	$\overline{A_i}$	Criteria
Feasibility of Presentation Format	Module Formats	3.73	3.81	Very Valid
	Serving Technique	3.67		
	Presentation Support	4.00		
	Coherence and Completeness of Presentation	3.83		
Content Eligibility	Alignment with KD	3.93	3.92	Very Valid
	Material accuracy	3.93		
	The latest level of material	4.00		
	Curiosity drive	3.75		
	Benefits and Usability of the Module	4.00		
language	directness	4.00	3.84	Very Valid
	communicative	4.00		
	Interactivity and dialogue	4.00		
	Alignment of student development	3,33		
	Congruence of Indonesian language teachings	3.89		
Total Validation Average			3.86	Very Valid

Judging from the results of the module validity analysis, it was found that in the feasibility aspect, the presentation format in the module met the very valid criteria with a value of 3.81. The assessment indicators covered are module format, module presentation techniques, module presentation support, and the coherence and completeness of the module presentation. Then on the content feasibility aspect, a value of 3.92 was obtained, fulfilling the very valid criteria. In this aspect, the assessment benchmarks include the use of modules, usefulness, the curiosity of students, the accuracy of teaching materials, up-to-date teaching materials, and KD (Basic Competence).

The linguistic aspect of the module also meets very valid criteria, with a value of 3.84. The linguistic aspect includes assessment indicators that include sentences that are used simple, easy to understand, open, and interactive and follow the student's language and the rules of Indonesian.

Based on the analysis of some of the aspects above, it is produced that the genuine validation of the modules from 3 validators has a value of 3.86 with very valid criteria. Even though from the results of the validity test, the module is said to be very valid, improvements still need to be made to improve the module based on input from the validator. This module has the advantage of containing information on local wisdom, so it needs special attention in its preparation to contain information on teaching materials based on local wisdom. Local wisdom can fulfill learning achievements in everyday life. Table 6 presents suggestions and input for the results of improving the IPA module integrating local wisdom from the validator, namely:

Table 6. Module Repair Results

Suggestions or Feedback	Before Revision	After Revision
Adding illustrations of bacteria or fungi on the cover to better describe the contents of the material		
Some images adapted to the student's educational level are replaced with original ones.		
Clarify the image quality of the module.		

Enlarge the pictures contained in the module.


PENDAHULUAN

Hallo semuanya, apa kabarnya hari ini? Pernahkan kalian melihat manusia, kucing, atau bunga? Manusia, hewan, dan tumbuhan tersebut merupakan makhluk hidup yang diciptakan oleh Tuhan Yang Maha Esa. Mengapa Tuhan menciptakan makhluk hidup? Setiap makhluk hidup memiliki peran dan manfaat untuk kehidupan manusia. Banyak teknologi yang dikembangkan oleh manusia untuk memenuhi kebutuhan hidupnya dengan memanfaatkan makhluk hidup, misalnya seja memanfaatkan bakteri dan jamur. Penerapan atau pemanfaatan makhluk hidup dalam proses produksi barang dan jasa untuk meningkatkan kesejahteraan umat manusia dan menghasilkan suatu produk yang bermanfaat bagi manusia disebut dengan bioteknologi.

Penerapan bioteknologi salah satunya pada bidang pangan, dengan memanfaatkan mikroorganisme dalam proses pengolahan makanan sehingga dihasilkan jenis makanan baru dari berbagai bahan baku. Banyak makanan yang kita konsumsi merupakan hasil dari bioteknologi. Indonesia sebagai negara kepulauan memiliki keberagaman suku dan budaya, salah satu keragamanan terdapat pada beraneka macamnya makanan tradisional khas tiap daerah yang merupakan hasil bioteknologi. Setiap daerah memiliki makanan khas masing-masing. Coba sebutkan makanan khas yang ada di daerahmu? Di daerah Gambut, Kalimantan Selatan terdapat tapai Gambut (Tape dalam bahasa Indonesia), tapai Gambut ada yang terbuat dari singkong dan beras ketan, sedangkan di daerah Kabupaten Barabai, Hulu Sungai Tengah, Kalimantan Selatan terdapat makanan khas pakasam dan wadi yang terbuat dari ikan yang difermentasi. Selain itu, Mandai merupakan kulit bagian dalam buah yang difermentasi dari buah tiwadak (cempedak) yang biasa dijadikan lauk pauk dalam masyarakat Banjar, dan masih banyak lagi makanan-makanan khas daerah di Indonesia.

Makanan-makanan ini menjadi sumber ekonomi karena dijadikan makanan oleh-oleh khas yang diburu oleh para wisatawan ketika mengunjungi tempat-tempat wisata di berbagai pulau di Indonesia. Mengapa kamu harus mempelajari Bioteknologi? salah satunya agar kamu bisa menjaga kelestarian keberagaman makanan tradisional ini, menjaga makanannya tetap ada dan memiliki nilai ekonomis serta ikut melestarikan tumbuhan atau hewan sebagai sumber bahan pembuatan makanan tradisional ini. Ayo kita pelajari lebih lanjut!

1 IPA KELAS IX | MODUL BIOTEKNOLOGI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1 IPA KELAS IX | MODUL BIOTEKNOLOGI

Change the font color in image captions and use one space.

Sumber : Docobook.com

Gambar 3. Ikan Hasil Budidaya dengan Memanfaatkan Rekayasa Genetik (Atas) dan Ikan Hasil Budidaya Biasa (Bawah)

Sumber : Docobook.com

Gambar 3. Ikan Hasil Budidaya dengan Memanfaatkan Rekayasa Genetik (Atas) dan Ikan Hasil Budidaya Biasa (Bawah)

Add aspects of local specialties such as local folklore or science.


MINUMAN BERALKOHOL

Hallo, semuanya! Tadi kalian sudah mengetahui makanan apa saja yang bisa dibuat melalui bioteknologi. Selain makanan, minuman juga bisa, lho! Yup, itu aku. Bioteknologi juga banyak dimanfaatkan dalam pembuatan minuman beralkohol, misalnya bir dan wine. Bir merupakan minuman beralkohol yang terbuat dari biji serealia, sedangkan wine terbuat dari ekstrak buah anggur.

Pembuatan minuman beralkohol juga melibatkan proses fermentasi yang dilakukan oleh *Saccharomyces*. Jenis *Saccharomyces* dan jenis bahan baku yang berbeda mampu menghasilkan aroma dan rasa yang khas pada jenis-jenis minuman beralkohol. Lama proses fermentasi memengaruhi jumlah alkohol yang dihasilkan. Semakin lama proses fermentasi minuman, semakin tinggi kandungan alkoholnya.

Ayo, Cari Tau!

Selain tapai, yoghurt, keju, tempe, kecap, roti, dan minuman beralkohol masih banyak produk bioteknologi dalam bidang pangan, misalnya *nata de coco*, asam cuka, mentega, dan minuman tuak. Ayo, Coba galilah informasi mengenai produk bioteknologi tersebut bersama temanmu!

Sumber : a) siberone.com ; b) cellar.asia.id

Gambar 10. a) Minuman Beralkohol, b) Proses Fermetasi Wine

IPA KELAS IX | MODUL BIOTEKNOLOGI 16


MINUMAN BERALKOHOL

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Tahukah kamu, di Kalimantan Selatan juga terdapat minuman tradisional yang termasuk minuman beralkohol? Coba kalian perhatikan gambar 13 pada halaman 19. Pada pembuatan tapai gambut dihasilkan alkohol dan air. Air dan alkohol yang dihasilkan dari pembuatan tapai sebenarnya dapat dimanfaatkan untuk membuat minuman beralkohol lho. Minuman tersebut dikenal dengan sebutan tuak. Tuak dihasilkan dari fermentasi sari tapai (tape). Dengan kata lain, tuak terbuat dari ketan yang dicampur ragi dan dibiarkan beberapa lama. Namun selain ketan bahan yang dapat digunakan yaitu singkong, beras, nira kelapa, atau aren. Tuak biasanya dibuat untuk upacara atau pesta adat, misalnya perkawinan, panen padi, penyambutan tamu, dsb. Pada dasarnya tradisi minum tuak ini melambangkan semangat kebersamaan, kekeluargaan, dan persahabatan. Pada zaman dahulu masyarakat Kalimantan biasanya meminum tuak untuk menghangatkan tubuh ketika cuaca dingin dan dipercaya dapat meningkatkan daya tahan tubuh.

Sumber : a) siberone.com; b) cellar.asia.id ; c) mycity.co.id d) pak.pandani.web.id

Gambar 10. a) Minuman Beralkohol, b) Proses Fermetasi Wine, c) Tuak, d) *Saccharomyces sp.*

IPA KELAS IX | MODUL BIOTEKNOLOGI 16

Each word is interactive; add a cartoon illustration as if interacting.		
Replacing the evaluation questions in number 13	13.Proses kimia yang terjadi pada pembuatan tape (tapai) singkong adalah... a. Glukosa → CO_2 + H_2O + Energi b. Glukosa → CO_2 + Alkohol + Energi c. Glukosa + O_2 → CO_2 + H_2O + Energi d. Glukosa + O_2 → CO_2 + Alkohol + Energi	13.Mikroorganisme yang berperan pada pembuatan tape (tapai) singkong adalah... a. *Saccharomyces cerevisiae* b. *Rhizopus oryzae* c. *Neurospora crassa* d. *Acetobacter xylinum*

Learning Outcomes Test Validation Test Results (THB)

In this study, to estimate whether the developed module was practical, a learning achievement test was carried out. The learning achievement test is an accurate method to determine student understanding regarding teaching materials (Arikunto, 2021). Effectiveness can be seen from the achievement of learning objectives by developing products that will be used to carry out the learning process (Alfiriani & Hutabri, 2017). Teaching material can be effective if the results are under the research objectives. So, it becomes necessary to validate the learning outcomes test to determine the validity of the instrument being carried out. In this study, the learning outcomes test comprised 15 multiple-choice questions and five description questions, so there were 20 questions. This effectiveness test can be used in post-test or pre-test sheets so that student scores before using the developed module or after can be seen. In Table 7, the student learning outcomes test is detailed based on the form of validation results in questions.

Table 7. Results of Learning Outcomes Test Validation

Question Form	Average $\overline{K_i}$	Criteria
Multiple choice	3.78	Very Valid
Description	3.87	Very Valid
Total Validation Average	3.82	Very Valid

Based on the analysis of the validity of the learning outcomes test, a validity value of 3.78 was obtained for the multiple-choice questions, which were in the outstanding category. For the questions in the form of descriptions, a value of 3.87 was obtained, which fulfilled the very valid criteria. Based on the total number of questions in multiple-choice or description, a total validity value of 3.82 was obtained with very valid criteria. Even though the three validators stated that the

learning outcomes test was very valid, the suggestions and input given to improve the module were still carried out by researchers to produce even better learning outcomes tests. Some questions that received suggestions from the validator for improvement are as follows.

Table 8. Suggestions for Learning Outcomes Tests

No. Question	V1	V2	V3	$(\overline{K_i})$	Suggestion
					A. MULTIPLE OPTIONS
1	3	4	4	3.67	The question changed to realm C2
2	4	4	4	4.00	-
3	3	4	4	3.67	The following sentences are better omitted
4	3	4	4	3.67	
5	4	4	4	4.00	-
6	4	4	4	4.00	-
7	4	4	4	4.00	-
8	4	4	4	4.00	-
9	4	4	4	4.00	-
10	4	4	1	3.00	The questions are not following the cognitive domain being tested
11	4	4	3	3.67	Corrected question narration
12	4	4	4	4.00	-
13	4	3	2	3.00	Look for more apparent answer choices or substitute them
14	4	4	4	4.00	-
15	4	4	4	4.00	-
					B. DESCRIPTION
1	3	4	4	3.67	-
2	4	4	4	4.00	-
3	4	4	4	4.00	-
4	3	4	4	3.67	Avoid two question words in one problem
5	4	4	4	4.00	-

Module Practicality

Practical, that is easy to use from preparation techniques and easy to use by others. A device can be practical if learning is easy to implement in its application (Arifin, 2019). If the learning device is easy to implement, then the device is practical. Practicality can be seen from whether or not the product can be applied. Learning that is carried out must be engaging, meaningful, fun, and valuable and can enhance students' learning creativity by referring to learning modules developed by users (teachers and students) (Alfiriani & Hutabri, 2017). This questionnaire consists of 3 aspects, namely ease of use, benefits, and timeliness, with seven negative statements and 13 positive statements, so there are 20 items. This response questionnaire includes ease of use, benefits, and time efficiency. The results of the practicality calculation based on the several aspects above are as follows.

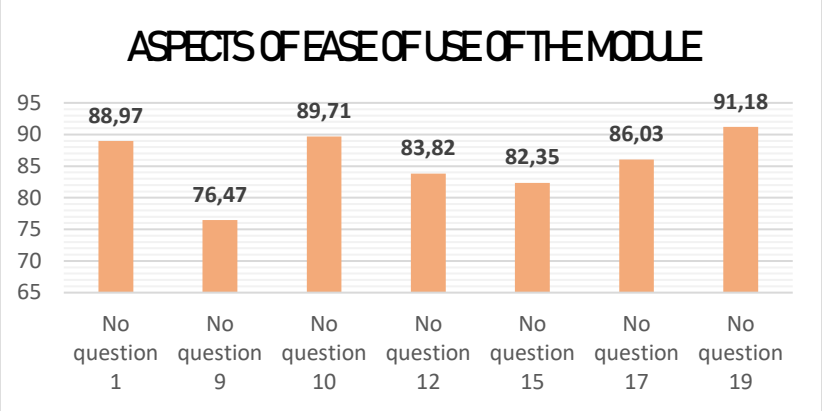

Figure 1. Ease of Use Aspect Diagram

The statements in the ease-of-use aspect are numbers 1, 9, 10, 12, 15, 17, and 19. This aspect contains six positive statements and one negative statement in number 19. Based on the analysis of the diagram above, the value of the ease-of-use aspect item is the highest. Statements 1, 10, and 19 are in the convenient category because the average scores are 88.97%, 89.71%, and 91.18%, respectively. This statement is that the Science module integrates local wisdom and attracts the attention of students; students feel that the Science module integrates local wisdom can help in learning the material more easily. Another statement is that students are interested in the Science module, which integrates local wisdom, and the needs of students can be met. This subject represents the teaching materials in the module that students can understand with examples in everyday life. This is to the user-friendly function, which states that users and modules must be friendly to each other (Sirate & Ramadhana, 2017).

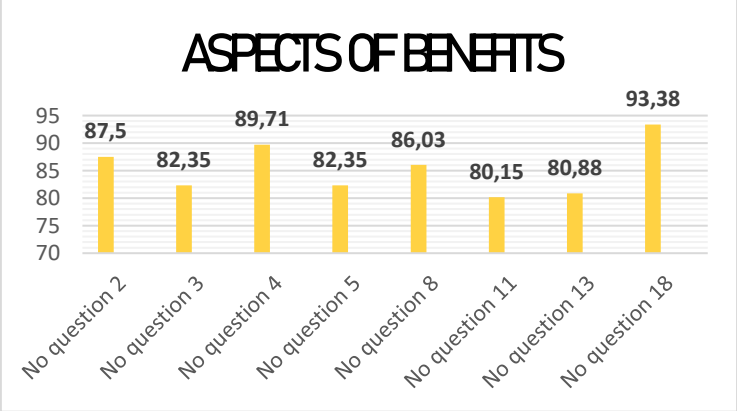

Figure 2. Benefit Aspect Diagram

Statements containing aspects of benefits are statements number 2, 3, 4, 5, 8, 11, 13, and 18. On the benefit aspect, there are three positive statements, namely numbers 5, 8, and 13, and 3 negative statements, namely numbers 4, 11, and 18. From the diagram above, statement number 18 is in the convenient category because it gets the highest score, with an average of 93.38%. Students feel interested in biotechnology material because there is a science module that integrates local wisdom and contains real-life examples. This is in line with research (Rahmawati & Atmojo, 2021), which states that the surrounding environment has many things to learn; for example, in the

South Kalimantan area, there is a floating market. At the elementary school level, this floating market is used as teaching materials for utilizing Indonesia's Natural Resources, such as rivers and boats or klotok. Students will easily interpret and think naturally in their lives with ethnoscience learning which is believed to be more effective.

Modules could encourage independent learning. This is evidenced by students learning the concepts presented in the module. Feelings of responsibility for the tasks shared in the module can be developed. Learning can progress on its own with little or no help from others.

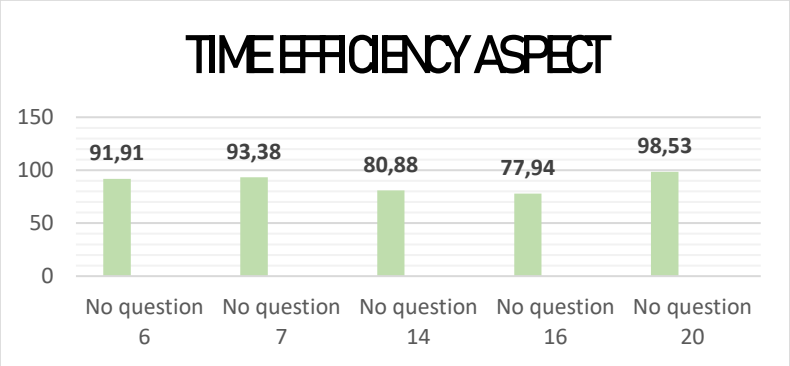

Figure 3. Time Efficiency Aspect Diagram

Statements containing aspects of time efficiency are statements 6, 7, 14, 16, and 20. Regarding time efficiency, there are two positive statements, namely numbers 14 and 16, and 3 negative statements, namely numbers 6, 7, and 20. Students assess that learning with the IPA module integrating local wisdom makes learning complete on time according to class hours with an average score of 91.91%, efficient criteria. Statement number 7 states that preparing the material's content in the Science module integrates local wisdom, making it easy for students to learn it; this statement obtains an average score of 93.38%. In addition, with the IPA module integrating local wisdom, students understand the material more quickly than usual. This statement produces an average value of 80.88% which is very practical.

Then the existence of this IPA module also makes it easy for students to understand lessons when learning takes place or when repeating subject matter, and the link between material and local wisdom makes students more diligent in learning when learning takes place or when repeating subject matter. This is evidenced by the acquisition of student response questionnaire scores on statements 16 and 20, obtaining an average score of 77.94% and 98.53%, respectively. The existence of this response questionnaire can determine that the existence of a science module that integrates local wisdom has a perfect aspect of learning time efficiency. The conclusions on the practicality of the module can be seen in table 9.

Table 9. The practicality of the Module

Assessment Aspects	Overall Score	Overall Criteria
Ease of Use Benefit Effectiveness	86.18%	Very Practical

This response questionnaire was distributed to 34 students in class IXC. The results of distributing this questionnaire obtained five students assessing the practicality of this module. Other students, totaling 29 people, rated the practicality of this module as very practical. When viewed from every aspect, the easy aspect is in the convenient category because it has an average value of 85.50%. The benefits aspect is in the convenient category because it has an average value of 85.29%, and the time efficiency aspect is 88.53% which is included in the practical criteria. From the analysis of the three aspects above, the total practicality of this module scores 86.18%, which means it is in the efficient criteria. These results prove that the science module which integrates local wisdom that is developed can be expressed as practical in learning.

Module Effectiveness

The learning outcomes test in the form of description questions totaling five items and multiple choice questions totaling 15 items, so there are 20 items. The design of questions based on learning objectives guided by basic competence 3.7 "Applying the concept of biotechnology and its role in human life." 4.7 "Making one of the conventional biotechnology products in the surrounding environment. "

The evaluation given to students functions so that the module's effectiveness can be known in achieving learning objectives. The effectiveness of the developed module can be seen through the student learning outcomes tests (Nita, 2020). Learning outcomes in this study were measured by looking at the results of *the post-test* and pre-*test*.

Based on the categories of learning outcomes applied by the Ministry of Education and Culture (KEMENDIKBUD), the pretest scores of students can be concluded in table 10; it is found that out of 34 students in class IXC at the time of the pretest as much as 44% or 15 people in the shallow criteria while the rest are in the low criteria of 56% or 19 people. As for the high and very high categories, they have yet to fulfill them.

Table 10. Pretest Results

Number of Students	Criteria	Percentage
15 people	Very low	44%
19 people	Low	56%

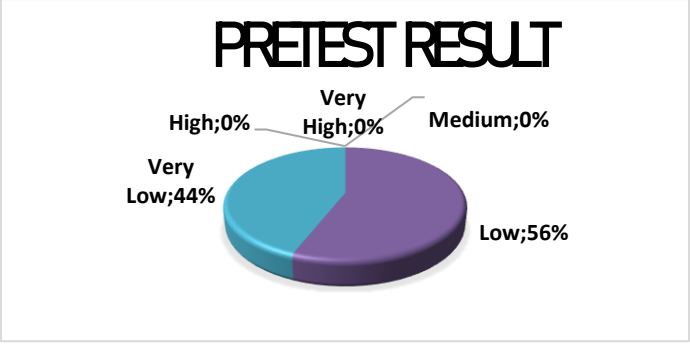

Figure 4. Pretest results

In contrast to *the pre-test, the post-test* scores obtained by students after participating in learning activities using the Science module integrating local wisdom on biotechnology material resulted in 4 people obtaining scores in the moderate category with a percentage of 12%. Nine

students with a high category percentage of 26%, and 21 people with a very high category score of 56% of students. Based on this, after students take part in learning using this module, there are no more students who score under the moderate category as in the pretest, and it can be concluded that students' cognitive abilities have increased.

Table 11. Posttest results

Number of Students	Criteria	Percentage
Four people	Currently	12%
Nine people	Tall	26%
21 people	Very high	62%

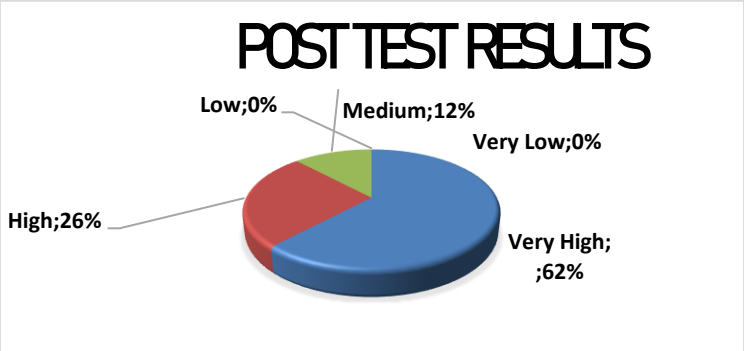

Figure 5. Posttest Results

The Post-test score was 88.18, and the *pre-test* score was 35.88. There are differences in student learning outcomes test answers when before attending lessons and after attending lessons. The score obtained when *the pre-test* is less than *the post-test*. This is in line with research (Nita, 2020) that the effectiveness of the developed module can be seen by looking at the higher *post-test scores* than *the pre-test*. Furthermore, the determination of the gain value is based on the results of the reduction of *the post-test* with *the pre-test*. So, based on the results of the *n-gain* analysis, the real learning achievement test obtained an average gain value of 34 students in class IXC of 0.82 with high criteria. In Table 12, the results of *the n-gain criteria* in the use of modules in class IX C are:

Table 12. N-gain Calculation Results

Number of participants	N-gain	N-gain criterion
34 people	0.82	Tall

In the research conducted, a small-scale test was also tried on ten students in class IXC to provide suggestions and input related to the development of the module being carried out. This trial will help to perfect the IPA module that integrates local wisdom that was developed. The suggestions can be seen in table 13, which is below.

Table 13. Suggestions for Small-Scale Trials

Suggestion
The image is enlarged, and the writing is clarified again
It is better if the module is reproduced with examples and more detail
I think the questions are tricky, but the practical guide is easy to follow
Images to be further clarified and enlarged

Suggestion
Words and sentences must be clear, concise, and easy to understand. Very interested in the practicum given through this module.
This IPA module which integrates local wisdom, is quite interesting to me. My suggestion is more detailed in order to provide more information.
The module is straightforward to understand because it always includes exciting pictures.
This module further details the material with local wisdom stories related to the examples given.
The videos in this module make it very easy to do experiments
The tasks in this module have funny pictures and caught my attention

CONCLUSION

The results of the research development carried out, the integration of the IPA module on local wisdom on biotechnology material for class IX of junior high school is suitable for use in learning activities because the research findings can be concluded that the IPA module was developed with the integration of local wisdom on biotechnology material for class IX of junior high school at the expert validation stage obtained a value of 3.86 which meets very valid criteria. A validator also carried out the learning outcomes test in this module, scoring 3.82 in the outstanding category. This module is also stated for its practicality at the percentage level of 86.18% of the results of the student response questionnaire, so it is included in the convenience category. As well as the IPA module integrates local wisdom, which was declared effective by obtaining an n-gain value of 0.82 which is in the high criteria and proves that there is an increase in students' cognitive abilities in biotechnology material.

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