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Practicality Test of the HOTS-Oriented Module on Biology Material for the Second Semester of Grade X in Senior High School/Madrasah Aliyah

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ABSTRAK

Kepraktisan penggunaan modul sebagai bahan ajar sangat menunjang keberhasilan pembelajaran. Penelitian bertujuan untuk memperoleh modul berorientasi HOTS yang praktis berdasarkan keterlaksanaan modul serta respon guru dan peserta didik. Instrumen penelitian yang digunakan adalah lembar observasi keterlaksanaan modul, angket respon guru, dan angket respon peserta didik. Pengumpulan data kepraktisan dilakukan dengan memberikan lembar observasi keterlaksanaan kepada pengamat serta angket respon diberikan kepada guru dan peserta didik. Hasil penelitian menunjukkan bahwa Keterlaksanaan modul memiliki nilai rata-rata 4.59 dengan kategori terlaksana dengan sangat baik, hasil analisis angket respon guru memiliki nilai rata-rata 4.58 dengan kategori praktis, dan hasil analisis angket respon peserta didik memiliki nilai rata-rata 4.54 dengan kategori praktis. Kesimpulan penelitian ini adalah modul berorientasi HOTS pada materi biologi semester genap kelas X SMA/MA yang dikembangkan telah memenuhi kriteria keterlaksanaan dengan kategori terlaksana dengan sangat baik serta respon guru dan peserta didik menunjukkan bahwa modul yang dikembangkan praktis digunakan dalam pembelajaran.
Kata kunci: HOTS; Kepraktisan; Modul.

ABSTRACT

The practicality of using modules as teaching materials really supports the success of learning. This study aims to obtain a practical HOTS-oriented module based on the implementation of the module and the response of teachers and students. The research instruments used were module implementation observation sheets, teacher response questionnaires, and student response questionnaires. Practical data collection is carried out by providing implementation observation sheets to observers and response questionnaires are given to teachers and students. The results showed that the implementation of the module had an average score of 4.59 with the category carried out very well, the results of the teacher response questionnaire analysis had an average value of 4.58 with the practical category, and the results of the student response questionnaire analysis had an average value of 4.54 with the practical category. The conclusion of this study is that the HOTS-oriented module on biology material in the even semester of class X high school / MA developed has met the implementation criteria with the category of very well implemented and the response of teachers and students shows that the developed module is practically used in learning.
***Keywords**: HOTS; Practicality; Module.*

INTRODUCTION

Education in the 21st century serves as an exceptionally effective means to enhance the quality of human resources. It enables students to discover, develop, and harness their potential (Ramadhana et al., 2023; Suhartono & Kirana, 2020). To support the optimal implementation of 21st-century education, several supporting systems are necessary, including the instructional materials used in the learning process (Rosidah, 2020). Instructional materials can be defined as comprehensive and systematically organized educational resources containing knowledge information utilized by both teachers and students during the learning process (Pribadi & Putra, 2019). These materials should align with the characteristics of their users and guide them toward achieving learning objectives (Nurhikmayati & Jatisunda, 2019).

Modules are one of the most frequently used instructional materials in education and are essential as an alternative solution to overcome issues in the learning process (Diana et al., 2018). A module is a type of instructional material in which the content is systematically organized in an easily comprehensible language appropriate to the user's knowledge level and age, allowing for both independent and group learning. Additionally, modules encompass more comprehensive components compared to other instructional materials, thereby facilitating the learning process for students (Depdiknas, 2008).

Furthermore, 21st-century students are challenged to possess foundational skills known as the 4Cs: Critical Thinking and Problem Solving, Collaboration, Communication, and Creativity (Adnan et al., 2021; Sinaga, 2020; Kumalasani & Kusumaningtyas, 2022). Implementing these 4Cs in school learning can positively influence future generations in facing 21st-century life challenges (Adnan et al., 2022). These four skills are part of higher-order thinking skills (HOTS). The Australian Council for Educational Research (ACER) in Ariyana et al. (2018) states that higher-order thinking skills involve analyzing, reflecting, providing arguments (reasons), applying concepts to different situations, organizing, and creating. HOTS is an essential skill that should be ingrained in students. Correspondingly, the curriculum demands that students acquire and habituate higher-order thinking (Noviani & Wijaya, 2020; Yayuk et al., 2019; Septikasari & Rendy, 2018; Setiawati et al., 2018).

Based on preliminary studies, it has been found that the implementation of HOTS-oriented cognitive biology teaching by 10 biology teachers in Makassar is still very low. This is evident from the accumulated percentage of HOTS content (cognitive domain C4-C6) in the learning objectives aspect, which stands at 29.27%, and the assignment section, which is only 6.25%. This finding aligns with the research by Dini et al. (2022) and Rejeki et al. (2022), which revealed that learning objectives and assignments in the teaching process in schools are still imbalanced, with the cognitive domain of LOTS still highly dominant. Meanwhile, the government, through the Department of Education and Culture (2017), expects that learning should incorporate HOTS, and that learning tools such as lesson plans (RPP), student worksheets (LKPD), instructional materials, and other assessments should

include HOTS elements. However, in schools, learning tools that implement HOTS are still very limited.

HOTS-oriented modules require students to think beyond mere memorization, engaging in analysis, evaluation, and even creation. Learning with modules can encourage students to better understand the material and create a more enjoyable learning experience (Pratama et al., 2018). HOTS-oriented modules can help students gain a deeper understanding of the material and develop broader thinking skills, which can be applied to various real-life situations (Adnan, 2022).

The use of HOTS-oriented modules in teaching helps teachers connect learning with everyday life, making it more meaningful, enjoyable, easier to understand, and capable of improving learning outcomes (Rofiah et al., 2018). Several studies have also concluded that biology teaching modules developed are valid, practical, and effective (Arsal et al., 2019; Syamsiah et al., 2019). The practicality test of the module on a large group obtained a practicality score of 85%, categorized as "very good" (Irfan et al., 2019). Additionally, the design and implementation of HOTS-oriented modules were found to be appropriate for use, with an average percentage score of 86.6% (Puspitasari et al., 2020). This indicates that modules in biology learning are highly practical to use.

Based on the aforementioned description, a practicality test of the Higher Order Thinking Skills (HOTS) oriented module on biology subjects for the second semester of grade X in senior high schools (SMA/MA) will be conducted. This research aims to develop a HOTS-oriented module that is practical, based on the module's implementation and the responses from both teachers and students as practitioners.

METHOD

This study is a type of Research and Development (R&D) using the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model, conducted from February to March 2023. Before the product is used in schools, it undergoes a product validation test. Once validated, the module proceeds to the practicality test phase. A module is deemed valid based on the evaluation of content feasibility, presentation feasibility, graphical components, and language feasibility by two expert validators.

The research subjects are 34 students of class X.2 enrolled in the 2022/2023 academic year and three biology teachers at SMA Negeri 2 Makassar. The instrument used to measure the practicality of the HOTS-oriented module aims to determine whether the product can be easily used during the trial period. The research instruments include an observation sheet for module implementation, a teacher response questionnaire, and a student response questionnaire. These questionnaires are developed by the researchers, considering several aspects: content feasibility, language, appearance, and benefits. The practicality measurement instruments (module implementation observation sheet, teacher response questionnaire, and student response questionnaire) are validated by two expert validators and are deemed valid and suitable for use.

Module implementation data are collected by observers who monitor the researcher conducting the classroom teaching. The researcher provides the observation sheet to the observer to use for assessing the implementation aspects during the classroom teaching, following the given guidelines. The assessment criteria for the HOTS-oriented module implementation use a Likert scale (1 to 5). The student and teacher responses to the HOTS-oriented module are collected via questionnaires, which gather information to be used as considerations for improving the developed module. These response questionnaires also use a Likert scale (1 to 5).

The data analysis in this study employs descriptive statistical analysis. The practicality data of the HOTS-oriented module analyzed include the results of the module implementation observations, teacher responses, and student responses. The average observation of module implementation is adjusted to the product implementation criteria presented in Table 1.

Table 1. Criteria for Module Implementation

Interval	Criteria
K ≥ 4.5	Very well implemented
4.0 ≤ K ≤ 4.4	Well implemented
3.5 ≤ K ≤ 3.9	Moderately implemented
3.0≤ K ≤ 3.4	Poorly implemented
K< 2.9	Very poorly implemented

(Source: Sudjana, 2005)

The average responses from teachers and students refer to the practicality level of teaching materials, as presented in Table 2.

Table 2. Criteria for the Practicality Level of the Module Based on Teacher and Student Responses

Interval	Criteria
RR = 5	Very Practical
4 ≤ RR < 5	Practical
3 ≤ RR < 4	Moderately Practical
2 ≤ RR < 3	Less Practical
1 ≤ RR < 2	Not Practical

(Source:Hobri, 2010)

Note:

- **RR:** Average score of responses for all aspects The HOTS-oriented module is considered practical if at least the implementation of the module falls into the category of "well-implemented" and if the responses from students and teachers fall into the categories of "practical" or "very practical."

RESULTS AND DISCUSSION

The practicality test was assessed based on the implementation of the product and the responses of teachers and students towards the developed product. The

purpose of this practicality test was to evaluate the ease of use of the developed product in the learning process.

Results of HOTS-Oriented Module Implementation Analysis in Learning

Data on the implementation of the HOTS-oriented module was obtained through observation sheets. Observations were conducted by three observers during the learning process. The results of the data analysis obtained over three meetings are presented in Table 3.

Table 3. Results of HOTS-Oriented Module Implementation Analysis in Learning

No.	Aspect	Indicator	x̄ ± SEM	Category
1.	Initial Activity	Students attentively observe the teacher presenting Learning Outcomes (LO), Learning Objectives (LO), and Indicators of Learning Objectives (ILO)	4.78 ± 0.11	Very Well Implemented
2.	Core Activity	Students attentively observe the teacher presenting the main content	4.11 ± 0.11	Well Implemented
		Teacher directs and guides students in studying the material in the module	4.78 ± 0.11	Very Well Implemented
		Students read the material in the module	4.11 ± 0.40	Well Implemented
		Students complete assignments in the module	5.00 ± 0.00	Very Well Implemented
		Assignments in the module are completed by students within the allotted time	4.11 ± 0.11	Well Implemented
3.	Closing Activity	Students complete the assessment in the module	5.00 ± 0.00	Very Well Implemented
		Students conduct self-evaluation at the end of the lesson before proceeding to the next learning activity	4.11 ± 0.22	Well Implemented
Average			**4.59 ± 0.04**	**Very Well Implemented**

Table 3 shows that the average score obtained across all aspects is 4.59, which falls within the implementation criteria interval of K ≥ 4.5. This indicates that the aspects observed during the implementation of the HOTS-oriented module are categorized as "very well implemented."

Data from the observation of the HOTS-oriented module implementation for the initial activities aspect is 4.78, categorized as "very well implemented." This indicates that the teacher effectively carried out the initial stages of learning using the HOTS-oriented module, evidenced by students' careful observation when the teacher presented Learning Outcomes (LOs), Learning Objectives (LOs), and Indicators of Achievement of Learning Objectives (IAO).

Data from the observation of the HOTS-oriented module implementation for the core activities aspect is 4.42, categorized as "well implemented." This suggests that the core activities of the HOTS-oriented module were effectively carried out, with students carefully observing the key material presented by the teacher, reading the module content, and completing assignments within the allotted time. The

assignments provided in the module assist both teachers and students in the learning process, as they require application of the material to real-life situations rather than mere copying of text from the module. Additionally, the HOTS-oriented assignments can be completed individually or in groups. According to Diana et al. (2018) and Laili et al. (2019), modules are valuable educational tools that support classroom learning and can be used for both independent and group study.

Data from the observation of the HOTS-oriented module implementation for the concluding activities aspect is 4.56, categorized as "very well implemented." This suggests that at the end of the lesson, students can complete the module's assessment and conduct self-evaluation before moving on to the next learning activity, indicating that the concluding activities are very well conducted.

The overall average for the implementation of the HOTS-oriented module is 4.59, which falls within the interval of K ≥ 4.5. This means that the aspects observed during the implementation of the HOTS-oriented module over three sessions were categorized as "very well implemented." The observation results indicate that the developed HOTS-oriented module is effectively usable in the learning process and assists both teachers and students in the teaching and learning activities.

Results of Teacher Responses to the HOTS-Oriented Module

Data analysis of teacher responses aims to gather field data on the practicality and teacher evaluation of the HOTS-oriented module developed by the researcher. The questionnaire was distributed to three biology teachers of Class X at SMA Negeri 2 Makassar. The results of the teacher responses to the HOTS-oriented module are presented in Table 4.

Table 4. Analysis of Teacher Responses to the HOTS-Oriented Module

No.	Aspect	$\bar{x}$ ± SEM	Category
1.	Content Suitability	4.57 ± 0.12	Practical
2.	Appearance	4.73 ± 0.16	Practical
3.	Language Suitability	4.67 ± 0.19	Practical
4.	Benefits	4.33 ± 0.17	Practical
Average		**4.58 ± 0.09**	**Practical**

The practicality of the HOTS-oriented module based on teacher responses is evaluated across four aspects: content suitability, appearance, language suitability, and benefits. The results are as follows:

Content Suitability: The score for this aspect is 4.57, categorized as practical. This indicates that the learning materials in the module are relevant to assessment indicators, learning objectives, and achievement outcomes. Additionally, the module contains comprehensive components and assignments predominantly at cognitive levels C4-C6 (HOTS).

Appearance: The score for this aspect is 4.73, categorized as practical. This suggests that the module's font type and size are clearly readable, the quality of images or tables is clear and easily understood, and the placement of images or tables meets the needs of the content. This makes the HOTS-oriented module

engaging and suitable for the teaching process. This aligns with Sudarisman's (2015) view that images are used to attract student attention, clarify ideas, and illustrate facts, making them less likely to be forgotten.

Language Suitability: The score for this aspect is 4.67, categorized as practical. This indicates that the language used in the HOTS-oriented module adheres to proper spelling conventions, is simple and easy to understand, and is free from ambiguity. According to Depdiknas (2008), effective educational materials should use clear, understandable language and be presented attractively with appropriate illustrations.

Benefits: The score for this aspect is 4.33, categorized as practical. This signifies that the HOTS-oriented module is user-friendly in the learning process, helps students engage in critical thinking, creativity, and problem-solving, and encourages active participation in learning activities. This is consistent with Laili et al. (2019), who found that modules can activate student engagement in learning. Thus, the HOTS-oriented module significantly supports biology instruction.

Average Score Analysis of Teacher Responses to the HOTS-Oriented Module. The average score for all aspects in the teacher response questionnaire regarding the practicality of the HOTS-oriented module is 4.58, which falls within the interval of $4 \leq RR < 5$. This indicates that teachers categorize the HOTS-oriented module as practical. This implies that the developed HOTS-oriented module is practical and suitable for use in biology instruction, specifically for the second-semester material of Class X. In line with this, Haviz (2016) states that the practicality of a developed product is determined by its ease of use and user satisfaction under normal conditions.

Research on the practicality of modules based on teacher responses has also been conducted by Asmiyunda et al. (2018), who reported an average teacher response score of 90%, categorizing the module as very practical, meaning that the module is easy to use in teaching activities. Similar findings were reported by Rismayanti et al. (2022), who found that teacher responses to the module yielded a score of 83%, also categorizing it as very practical. Additionally, Romayanti et al. (2020) found that the developed chemistry e-module was categorized as highly feasible with an average practicality score of 4.32.

Analysis of Student Responses to the HOTS-Oriented Module

The analysis of student responses to the HOTS-oriented module was conducted to determine the ease with which students can use the module during the learning process. Data were collected through a questionnaire completed by 34 students. The results of the student responses to the HOTS-oriented module are presented in Table 5.

Table 5. Analysis of Student Responses to the HOTS-Oriented Module

No.	Aspect	$\bar{x}$ ± SEM	Category
1.	Content Suitability	4.57 ± 0.10	Practical
2.	Appearance	4.67 ± 0.03	Practical
3.	Language Suitability	4.54 ± 0.10	Practical
4.	Benefits	4.34 ± 0.11	Practical

Average	**4.53 ± 0.07**	**Practical**

The practicality of the HOTS-oriented module based on student responses is assessed across four aspects: content suitability, appearance, language suitability, and benefits. The findings are as follows:

Content Suitability: The score for this aspect is 4.57, categorized as practical. This indicates that the biology instruction is well-supported by the HOTS-oriented module. The module includes comprehensive components, and both the material and questions are easily understood by students (Suhartono & Kirana, 2020).

Appearance: The score for this aspect is 4.67, categorized as practical. This suggests that the module's font type and size are clear and readable, the quality of images or tables is high, and their placement is appropriate, making the module engaging and suitable for teaching.

Language Suitability: The score for this aspect is 4.54, categorized as practical. This indicates that the language used in the module adheres to proper spelling conventions, is straightforward and easy to understand, and avoids ambiguity. This aligns with Depdiknas (2008), which emphasizes that effective educational materials should use clear, comprehensible language and be presented attractively.

Benefits: The score for this aspect is 4.34, categorized as practical. This means that the HOTS-oriented module is user-friendly in the learning process, with assignments and assessments helping students to think critically, creatively, and solve problems.

Student Responses to the HOTS-Oriented Module. The student responses to the HOTS-oriented module in terms of appearance yielded an average score of 4.67, categorized as practical. This indicates that the module effectively captures students' attention through its font type, size, and the quality of illustrations or images. Regarding language suitability, the module scored 4.54, also categorized as practical. This suggests that the module's presentation and use of Indonesian language adhere to the Enhanced Spelling System (EYD), is straightforward, easy for students to understand, and avoids ambiguity. This is supported by Depdiknas (2008), which states that all teaching materials should consider linguistic components in accordance with the criteria for language suitability, ensuring that sentence structure and systematic material organization facilitate students' understanding of the content.

In terms of benefits, the module received a score of 4.34, categorized as practical. This indicates that the HOTS-oriented module is user-friendly in the learning process, with assignments and assessments facilitating students' critical thinking, creativity, problem-solving skills, and self-directed learning. This aligns with the views of Diana et al. (2018) and Laili et al. (2019), who state that modules are effective teaching tools that support both individual and group learning. Thus, the HOTS-oriented module significantly enhances biology instruction.

The average score for student responses to the HOTS-oriented module was 4.53, which falls within the interval of $4 \leq RR < 5$, indicating that the module is categorized as practical. This finding is consistent with research by Nurhayati et al.

(2021), which reported an average score of 4.31, also categorized as practical. Van Den Akker (in Rochmad, 2012) asserts that a teaching device is considered practical if practitioners or experts affirm that it can be effectively applied in the field. Nieveen (in Rochmad, 2012) further notes that the practicality of a teaching device can be evaluated based on ease of use and the support it provides in practice. The practicality of the module also includes whether teachers can effectively implement the learning process using the device.

Practicality is essential to facilitate both students and teachers in using the HOTS-oriented module in the learning process. Faridah et al. (2022) state that a teaching material is considered practical if it meets theoretical practical indicators, such as requiring minimal or no revisions, and practical indicators, such as average response scores from students and teachers categorizing it as practical.

CONCLUSION AND RECOMMENDATION

Based on the research findings, it can be concluded that the HOTS-oriented module for the second-semester biology material of Class X in SMA/MA meets the implementation criteria with a "very well implemented" category. Additionally, both teacher and student responses indicate that the developed HOTS-oriented module is practical.

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