



## Biology learning evaluation module development based on higher order thinking skills and local wisdom value



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### ABSTRACT

Modules are teaching materials that can support learning objectives. Modules can be studied independently so they are very helpful for lecturers in teaching. The purpose of this study was to determine the validity and practicality of the Biology Learning Evaluation Module based on Higher Order Thinking Skills (HOTS) and Local Wisdom values at IAIN Batusangkar. This research uses the type of R&D research with the 4D model (Define, Design, Develop, and Disseminate). The results of the due diligence were obtained from the results of expert validation with a score was 84.85% (very valid), while practical results obtained a score was 87.20% (very practical) from students and a score was 92.5% (very practical) from lecturers. So it can be concluded that the Biology Learning Evaluation Module based on Higher Order Thinking Skills and Local Wisdom Values is very feasible and very practical to use in the learning process of evaluating biology learning.

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### INTRODUCTION

Colleg is one of the formal institutions that carries out the function of improving the quality of Indonesian human resources through education. One of the colleg whose function is to prepare the nation's professional teacher candidates is the teacher training college. To create professional teachers must start from quality tertiary institutions (Efferi, 2015). Therefore, it is an obligation for trustees in tertiary institutions to develop a good learning process so as to produce teachers who have high potential in the future.

Biology Education is one of the study programs at the Batusangkar State Islamic Institute of Higher Education, which will produce professional teachers in the field of biology. One of the important subjects studied by Biology education students as future teacher candidates is Biology Learning Evaluation. This course studies how to prepare, implement, and process learning evaluations in schools later. In order to achieve the learning objectives in the Biology Learning

Evaluation course, the mandate of the lecturer in charge of the course must be able to function as a motivator and facilitator for students to develop their potential optimally by utilizing all available learning facilities and a conducive learning system (Qurbani, 2017).

Based on observations of the implementation of biology learning evaluation lectures in semester 5 at the IAIN Batusangkar Biology study program, lecturers carry out lectures using the discussion and presentation method, even though they are student-centered but it is still seen that active students are only dominated by a few people. When the lecturer asked about the topic of discussion, there were still many students who had not mastered the concepts being studied, and most of them answered according to the language of the book, not many could develop in their own language. As students, they should be able to apply higher order thinking skills (HOTS) in exploring lecture material. This is in accordance with the demands of 21st century society which focuses on developing Higher Order Thinking Skills (Basuki, 2014).

The main objective of higher order thinking skills is how to improve students' thinking skills at a higher level, especially those related to the ability to think critically in receiving various types of information, to think creatively in solving a problem using the knowledge they have and make decisions in situations complex situation (Saputra, 2016). To create students who are ready to face the demands of the 21st century society, of course lecturers must be able to cultivate the application of higher order thinking skills in the lecture process. With higher order thinking skills students can distinguish ideas or ideas clearly, argue well, be able to solve problems, be able to construct explanations, be able to hypothesize and understand complex things more clearly (Widodo & Kadarwati, 2013). If you have cultivated high-level thinking in every lecture, it will give birth to students who are critical, creative and able to solve problems.

In biology learning evaluation lectures, lecturers have suggested using various book sources for reference, but from observations, students only use one or two handbooks. But many also do not bring books when lectures take place. The lack of references makes students do not have much insight, only waiting from lecturers. (Hardini et al., 2013) stated that the success of learning carried out by the teacher was influenced by the existence of teaching materials. Teaching materials can help educators achieve learning goals smoothly, so it is very necessary to provide teaching materials for students.

The module is one of the teaching materials that can be used as a guide for teachers and students. The module is a unitary program that can measure objectives which are seen as program packages arranged in the form of certain units for learning purposes consisting of learning objectives, learning materials, learning tools and resources and evaluation systems (Rusyna, 2014). A good module must be arranged systematically, attractively, and clearly. Modules can be used anytime and anywhere according to the needs of students. (Daryanto & Darmiatun, 2013) states that the modules are systematically designed in accordance with the applicable curriculum, then packaged into the smallest learning units and allow students to study independently within a certain time unit, so that students can achieve the competencies being taught.

Lack of references used in evaluation lectures, this research was conducted to develop modules as teaching materials in biology learning evaluation lectures. The developed module does not only contain information about the material being studied, but later the module will also be able to train students' high-level thinking skills, such as critical thinking, creative and problem solving. (Rofiah et al., 2018) states that modules based on higher order thinking skills are appropriate for use in improving students' critical thinking skills.

Recently, due to the swift flow of globalization with many outside influences that have entered our country, it has resulted in the decline of local wisdom values as a characteristic of the Indonesian nation. Value is defined as a description of what is desired, appropriate and valuable, which influences the social behavior of those who have these values. Value is closely related to

culture and society, every society or every culture has certain values about something. Meanwhile, Setiadi defines values as general concepts about something that is considered good, appropriate, worthy, appropriate whose existence is aspired to, desired, internalized and implemented in everyday life and becomes the goal of living together in community groups (Darul, 2015).

Local wisdom is closely related to traditional society. Local wisdom can be passed down from generation to generation to posterity. By being taught from generation to generation, it can be called a tradition. Local wisdom can be found in songs, proverbs, sesanti, advice, mottos, and ancient books that are embedded in the behavior of everyday life. Usually local wisdom is reflected in the habits of people's lives that have lasted a long time and in its development have transformed into traditions, although the process takes a very long time (Haryanto, 2014).

The values of local wisdom are values that were passed down from the ancestors of the Indonesian nation which are actually still there and maintained today. These local wisdom values can be found in indigenous peoples. Indigenous peoples who still exist today are scattered in various regions in Indonesia (Sukmayadi, 2018). one of which is the Minang Kabau which is a tribe found in the province of West Sumatra. The Minang Kabau people have various local wisdom values.

One of the values of Minang Kabau local wisdom is "Adat basandi syara', syara' basandi Kitabullah, syara' mangato adat mamakai, alam takambang jadi guru". The meaning of the above expression is that Minangkabau culture is based on Islam, meaning that if there are customs and transitions of the Minang people that conflict with the Islamic religion, then what must be followed is the truth of Islam, because syara' means that Islam is based on the Qur'an and sunnah. As for the purpose of nature takambang being a teacher is that this nature has a learning dimension from every creation of Allah SWT (Darul, 2015).

The current decline in the preservation of local wisdom values is due to the understanding and love of the community for the importance of preserving culture. For this reason, it is the role of the nation's youth who are responsible for preserving the existing culture (Rohani et al., 2018). This is also related to the vision of the Tadris Biology study program, which is integrative and interconnected in science, local wisdom, global reputation. So that graduate students from Biology education can apply local wisdom values, the authors are interested in developing a Biology Learning Evaluation module based on higher order thinking skills and local wisdom values at IAIN Batusangkar. The results of this research are expected to be teaching materials for Biology lecturers in biology learning evaluation lectures, and with this module students can also practice their higher-order thinking skills.

## RESEARCH METHODS

### Research Design

This study uses the Research and Development method (Haviz, 2013). This Research and Development method is used to develop products in the form of Biology Learning Evaluation modules based on higher order thinking skills and local wisdom values at IAIN Batusangkar. The stages in this development use a 4-D model, which is simplified to 3-D namely Define, Design and Develop.

### Population and Samples

This research was conducted at the State Islamic Institute (IAIN) Batusangkar. The subjects in this study consisted of 3 expert validators, 1 lecturer of the learning evaluation course and 6th semester biology education study program students who took part in the Biology learning evaluation course for the 2020/2021 academic year. The research data is in the form of quantitative data and qualitative data. Quantitative data was obtained from the average value of the module logical validation questionnaire which consisted of didactic, construct, technical and



linguistic aspects. In addition, quantitative data was also obtained from the average value of the practicality questionnaire from lecturers and students. While the qualitative data was obtained from the results of interviews and observations with lecturers as well as notes from the validator's suggestions for product improvement.

### Instruments

The instrument used in this study was a module validation questionnaire consisting of didactic, construct, technical and linguistic aspects. This instrument is used to test the feasibility level of the developed module. In addition, the second instrument in this study was a practicality questionnaire consisting of aspects of ease of use, benefits obtained, and the effectiveness of learning time.

### Procedures

The stages of this research are (1) Define, this stage aims to find out and analyze the fundamental problems in schools so that they become the basis for module development, these distinct stages are: a) Front-end analysis, b) Learner analysis, c) Task analysis, d) Concept analysis, and e) Specifying instructional objectives (2) Design, at this stage, namely designing modules according to product specifications (3) Develop, modules that have been made will be validated by 3 validators to obtain valid modules. Valid modules will then be tested for practicality on lecturers and students of the 6th semester biology education study program who are taking the Biology learning evaluation course to obtain practical modules.

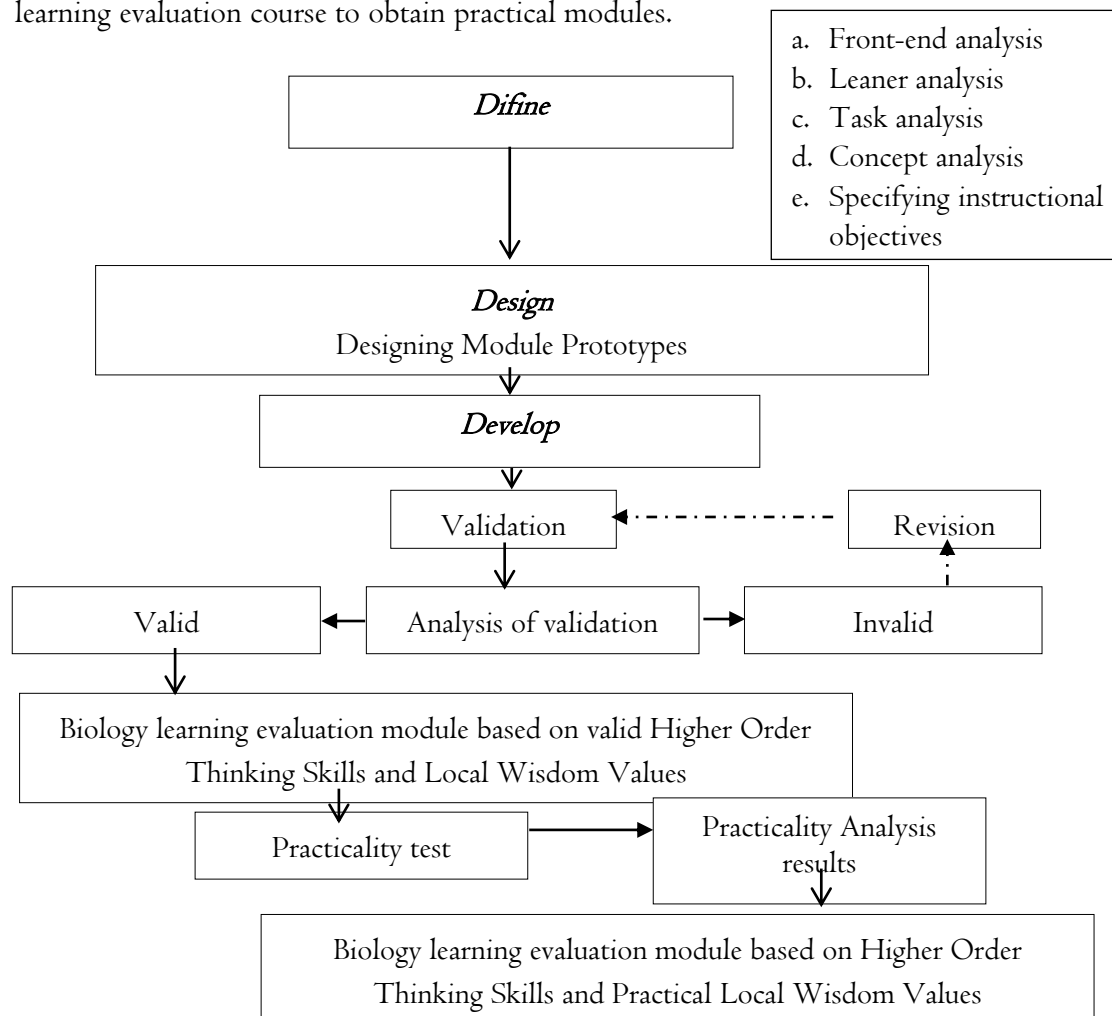


Figure 1. Development procedure diagram

### Data Analysis

In getting the results of the validity data here the researcher uses a data collection technique based on a questionnaire using a Likert scale which contains the scoring in Table 1 and Table 2.

**Table 1.** Score answers using a Likert scale

Score	Category
4	Strongly agree
3	Agree
2	Disagree
1	Strongly disagree

(Riduwan & Sunarto, 2014)

After getting the validation results from the validators, the percentage for each aspect is sought using data analysis techniques using the formula:

$$\text{score \%} = \frac{\sum \text{average score obtained}}{\sum \text{average max score}} \times 100$$

**Table 2.** Score answers using a Likert scale

Range	Category
0%-20%	Invalid
21%-40%	Less valid
41%-60%	Pretty valid
61%- 80%	Valid
81%-100%	Very valid

(Riduwan & Sunarto, 2014)

The practicality questionnaire in this study also uses a Likert scale, then the data is processed using the formula:

$$\text{score \%} = \frac{\sum \text{average score obtained}}{\sum \text{average max score}} \times 100$$

### RESULTS

This research produced a product in the form of a Biology Learning Evaluation module based on higher order thinking skills and local wisdom values at IAIN Batusangkar. This module consists of a cover, preface, instructions for using the module, competency descriptions, local wisdom values, table of contents, learning activities containing lecture material, student worksheets in the form of answering higher order thinking skills questions, knowledge sharing and conclusions. The results of the validation test from the validator can be seen in Table 3.

**Table 3.** Module Validation Results

No	Aspect	Validator			Σ	%	Categories
		1	2	3			
1	Didactic	29	30	27	86	89.58	Very Valid
2	Construct	47	46	49	142	84.52	Very Valid
3	Technical	10	9	9	28	77.78	Valid
4	Language	7	7	7	21	87.50	Very Valid
Average						84.85	Very Valid



After the module is declared very valid, practicality tests are then carried out on lecturers and students. Practicality data from lecturers for the Biology learning evaluation course can be seen in Table 4.

**Table 4.** Lecturer practical results

No	Aspect	$\Sigma$	Score max	%	Categories
1	Ease of use	19	20	95	Very practical
2	Benefits gained	36	40	90	Very practical
	Average	55	60	92.5	Very practical

Practical data from 6th semester Biology education study program students who took the Biology learning evaluation course can be seen in Table 5.

**Table 5.** Results of Student Practicality

Assessment criteria	Inside convenience Use	Benefits that can be obtained	Effectiveness	Average %	Categories
Average	86.50	86.11	89.00	87.20	Very practical

## DISCUSSION

### Validity of the Module

The module is said to be feasible to use if it has been validated by the validator. The Biology Learning Evaluation Module based on higher order thinking skills and the values of Local Wisdom at IAIN Batusangkar has been validated by 3 validators and has been declared very valid with an average score of 84.85%. (Sawitri et al., 2014) stated in his research that learning modules that are of good quality and suitable for use must go through the assessment stage of experts or experts. The validator assesses this module logically with aspects of its content and construct assessment. (Haviz, 2013) states to test the feasibility of a development product can be seen from the aspect of content and construct validation. The feasibility results of the contents of this module are seen from the didactic aspect which scores 89.58% in the very valid category, this assessment is based on the modules that have been developed in accordance with the KKNi curriculum and the Outcomes of the Biology Learning Evaluation course. A good module must be arranged in a systematic, attractive and clear manner and in accordance with the applicable curriculum (S.Sirate & Ramadhana, 2017). From the construct aspect, the module obtained a score of 84.52% with a very valid category. This is shown from the developed module consisting of an attractive cover, there is a competency component to be achieved, there are instructions for using the module, local wisdom values presented in tabular form containing the wise expression of Minang Kabau along with the character values it contains. The learning evaluation material in the module is presented in an interesting and clear manner, and to regrow Minang Kabau local wisdom values, in the presentation of the material there are Minang Kabau local wisdom values as shown in Figure 2.

Nilai-nilai Kearifan Lokal Minang Kabau		
No	Karakter	Ungkapan Bijak Minang Kabau
1	Religius	Adat Basandi Syara' Syara' Basandi Kitabullah, Syara' mangato adat mamakai, Alam takabang jadi guru
2	Jujur	Nan Bana ditagokkan
3	Toleransi	Tenggang Raso
4	Disiplin	Taguah
5	Kerja Keras	Diasak indak layua, dicabuk indak mati
6	Kreatif	Ndak Rotan Aka pun jadi
7	Mandiri	Savuek aia mandikan diri, indak maongok kalau badan
8	Demokrasi	Saciok bak ayam sadurancang bak basi, sayo sakato, duduk samo randah tagok samo tinggi
9	Rasa ingin tahu	Tau dinan ampek, alun takilek lah takalam takilek ikan dalam aya lah tantu jantan dan batinyo
10	Semangat berbangsa	Satu ndak depek diasakgala ndak depek diogial, kampuang ndak depek dituka
11	Cinta Tanah Air	Cinto ka nagari
12	Menghargai Prestasi	Kok manang jan manapuk dado, kok salah jan manysa, nan cadiak tampek batanyo, nan bijak tampek batyo
13	Bersahabat/komunikatif	Nan tuo dihormati, nan ketek disuyangi
14	Cinta Damai	Saiyo sakato
15	Gemar membaca	Alam takambang jadi guru
16	Peduli lingkungan	Jago nagari jan binaso, Baso Basi, Raso jo Pareso
17	Peduli Sosial	Depek masibah bahambuan, mandapek kebaikan bahimbuan
18	Janggung Jawab	Tangan mancancang Bala mamkua, anak dipangku kamankan dibimbang, urang kampuang dipatenggangan
19	Waspada	Dalam awa akhie nambayang, dalam batak kanalah buruak; dalam galak tangih kok ribo; hati gadang hutang kok tumbali
20	Prediksi	Alun rabah lah kajung; alun pail alah babalak; alun dibali lah baju; alun dimikan lah taraso
21	Cermat	Dihawai sahabih raso; dikaruak sahabih gaung
22	Prioritas	Mangeji dari alif; babalang dari aso
23	Sikap Rasional/Masuk Akal	Mancancang balandasan; malomek basitumpu.

Figure 2. Minang Kabau Local Wisdom Values

From the Learning Evaluation Module based on local wisdom values, it is hoped that it will be able to instill Minang character values back into students of the Biology education study program at IAIN Batusangkar. At this time because the development of technology makes people forget about the traditions or culture of society in managing the environment, local culture is often considered something that is outdated, so development policies do not involve local wisdom-based communities, even though this is very important to base education as content and preserve it through curriculum. Local wisdom is an inner teaching that teaches aspects of humanity, local wisdom is a characteristic of people with noble culture, it does not stop at ethics but extends to norms, behavior and actions, so that local wisdom has religious value which is guided by the community in behaving and acting well in everyday life and determine human civilization in the future (Darul, 2015).

This evaluation module is also equipped with student worksheets in the form of answering higher order thinking skills questions to train students' higher order thinking skills. In answering questions about higher order thinking skills, students also apply character through Minang Kabau wisdom values. The process of making higher order thinking skills questions in this module begins by analyzing the learning outcomes in the Biology Learning Evaluation semester lesson plan, thinking about stimuli, then analyzing learning outcomes that fall into the category of higher order thinking skills, compiling a grid, and writing questions. (Sani, 2019) states the steps for making questions in the form of higher-order thinking skills, namely analyzing basic competencies, thinking about stimuli, compiling a grid of questions and writing questions. Questions in the form of higher-order thinking skills are designed by taking into account criteria based on Bloom's Taxonomy levels, namely from C4 to C6, this is in accordance with the opinion of Anderson & Krathwohl which states that questions of higher-order thinking skills generally measure abilities in the realm of analyzing (C4), evaluating (C5) and create (C6) (Sani, 2019). Besides that, the higher order thinking skills questions in the module have been developed according to opinion (Ariyana et al., 2018) that higher order thinking skills questions are divided into four types of questions, namely (1) inferential questions, namely questions that aim to find out what students can understand after observing what is presented by the lecturer, after they read the material in the module they are able to answer the questions " of the 3 terms namely measurement, assessment and evaluation which has the most influence in the evaluation of learning? Explain your opinion!", (2) interpretation questions, namely questions in the form of incomplete information, or material that

is not presented by the teacher, but students are asked to provide meaning, for example the question "in your opinion is evaluation important?", (3) transfer questions, namely questions that aim to deepen the problem and broaden horizons, for example the question "what do you think is the effectiveness of evaluation in the online learning process?" then what is the urgency of evaluating online learning?"

*Modul Evaluasi Berbasis HOTS dan Nilai-nilai Kearifan*

### Lembar Kerja Mahasiswa I

Ada beberapa tugas yang akan kamu kerjakan, namun perhatikanlah peraturan di bawah ini:

Nan Bana ditagakkan (JUJUR)

Mangaji dari alif; bablang dari aso (PRIORITAS)

**NILAI**

Mancancang balandasari; malompek bastumpu. (LOGIS)

Dihawal sahabih raso; dikaruak sahabih gaung (CERMAT)

Kerjakanlah soal-soal HOTS di bawah ini dengan prinsip di atas:

- Dari 3 istilah yaitu pengukuran, penilaian dan evaluasi mana yang paling berpengaruh dilakukan dalam evaluasi pembelajaran? Jelaskanlah pendapatmu!  
.....  
.....
- Menurut pendapatmu, apakah evaluasi itu sangat penting?  
.....

Figure 3. Student worksheets based on higher order thinking skills and local wisdom values

In the module there is also knowledge sharing and conclusions, which aim to ask students to discuss material, questions about higher order thinking skills that have been answered and teach students to share information and apply Minang Kabau local wisdom values.

*Modul Evaluasi Berbasis HOTS dan Nilai-nilai Kearifan*

### Sharing Pengetahuan

Setelah menjawab soal HOTS di atas, buatlah kelompok dengan beranggotakan 2-4 orang. Kemudian diskusikan jawaban kalian dengan menerapkan pepatah minang dibawah ini.

*Saciok bak ayam sadancing bak basi, saiyo sakato, duduk samo randah tagak samo tinggi*

*Tenggang Raso*

*Kok manang jan manupak dado, kok salah jan manyasa, nan cadiak tampek batanyo, nan bijak tampek baiyo*

### Kesimpulan

.....  
.....

Figure 4. Knowledge Sharing and conclusions

Based on the components and steps contained in the Biology Learning Evaluation Module based on higher order thinking skills and local wisdom values at IAIN Batusangkar, this already refers to the components or elements in the module as explained by (Prastowo, 2012) the module components consist of (1) title, (2) preface, (3) table of contents, (4) Core Competencies (KI), (5) Basic Competencies (KD), (6) learning objectives, (7) instructions for use module, (8) module material, (9) evaluation. The Biology Learning Evaluation Module based on higher order thinking skills and the values of Local Wisdom at IAIN Batusangkar can also make students learn

independently, because it has clear instructions and steps, this is in accordance with the characteristics of the module, namely self-instruction (Daryanto & Darmiatun, 2013).

Assessment of the technical aspects of the module obtained an average score of 77.78% with a valid category, this can be seen from the developed module using a clear font type and size, the module display design is also attractive and displays clear images that support understanding of learning evaluation material. Meanwhile, from the linguistic aspect, an average score of 87.50% is obtained with a very valid category, this module already uses Indonesian language rules according to EYD, the language developed in the module is easy to understand or communicative. Based on the explanation above, the module can be said to be suitable for use according to the validator because it has been well developed and meets the characteristics of a module, namely self-instruction, self-contained, stand-alone, adaptive, and user friendly (Sawitri et al., 2014).

### Practicality of Modul

To see the practicality of a product, it is necessary to test the use of the product. (Haviz, 2013) states that the practical aspect is determined from the results of the assessment of use or application. Assessing practicality by users or users, seen from the answers to the questions: (1) do practitioners think that what is developed can be used under normal conditions, (2) does the reality show that what has been developed can be applied by practitioners. So in this study the practitioners of the Biology Learning Evaluation Module based on higher order thinking skills and local wisdom values at IAIN Batusangkar are lecturers and students.

After the module was used in the lecture process, it was found that according to students this module was very practical with an average score of 87.20% and according to the lecturer it was also very practical with an average score of 92.5%. From these data it can be said that the module is easy to use and understand by lecturers and students. The results of practicality explain that students are interested in the Biology Learning Evaluation Module module based on higher order thinking skills and Wisdom values, students think that the module is easy to understand, the material is complete, it also fosters local wisdom values through Minang Kabau wise expressions, and they are in lectures look very interested and happy, because they are very enthusiastic and motivated because of the values of local wisdom. Besides that, students can also practice higher order thinking skills with the questions on student worksheets. It can be seen that during discussions and presentations they have the courage to express their opinions based on the answers to the higher order thinking skills questions that have been done. Likewise, the lecturers in the biology learning evaluation course feel helped by the existence of the Biology Learning Evaluation Module based on higher order thinking skills and the values of this Wisdom. The results of the practicality of this module are in accordance with the opinion (Isharyadi & Ario, 2019) The module is said to be practical if the practitioner has no difficulty understanding the material contained in the module, easy to use and complete with clear instructions.

### CONCLUSION

Based on the validation results with an average score of 84.85%, it can be stated that the Biology Learning Evaluation Module based on higher order thinking skills and Wisdom values at IAIN Batusangkar is very feasible to use in the lecture process for evaluating biology learning. Meanwhile, based on the practicality test results of the Biology Learning Evaluation Module based on higher order thinking skills and Wisdom values at IAIN Batusangkar, an average score of 92.5% was obtained from lecturers and 87.20% from students, so it can be concluded that this module has been very practical to use in the process of evaluating learning biology lectures. The results of the development of this module can assist lecturers in teaching learning evaluation

courses, besides that this module can train students' HOTS abilities and preserve Minang Kabau local wisdom values.

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