Edukasi Islami: Jurnal Pendidikan Islam, VOL: 12/NO: 04 November 2023 **P-ISSN: 2252-8970**
DOI: 10.30868/ei.v12i04.4856 **E-ISSN: 2581-1754**

Development of E-Module For Chemistry Based on Bengkulu's Local Wisdom To Improve Student Learning Outcomes

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ABSTRACT

The purpose of this research is to develop a chemistry e-module based on local wisdom in Bengkulu using Canva and Flip PDF Professional. It also aims to determine the effectiveness, efficiency, and practicality of e-modules as well as the degree to which they raise students' chemistry learning outcomes. A module based on customs from the Bengkulu people. The ADDIE development stages analysis, design, development, implementation, and evaluation are used in this study's use of the Research and Development technique at MAN 2 Bengkulu City. Questionnaires and assessments of learning outcomes are two methods used to collect data. Following the use of the e-module, student learning outcomes were 80.59, with an 88.24% completion rate. The t test findings show that the e-module is beneficial in enhancing learning outcomes; for alpha = 5%, the t count of 15.52 is greater than the t table of 1.694. The average student assessment for the product efficiency component of the chemistry e-module was 3.5, falling into the good category with an 87.5% percentage, according to the results of the student questionnaire. In contrast, the average student evaluation for the product's usefulness factor was 3.53, placing it in the good category with an 88.25% percentage.

Keywords: Chemistry, e-Module, Learning Outcomes, Local Wisdom

A. INTRODUCTION

The evolution of information and communication technology has a profound effect on many facets of life, including education. The learning process is one area in which this technology has an impact on the field of education. In the sphere of education, it is advantageous to have easy access to information via networks and technology (Jamun, 2018). The employment of instructional aids in classrooms and other educational settings has been impacted by scientific and technological advancements (Raja & Nagasubramani, 2018). Technology in education has developed into a system that produces efficient, effective, and systematic learning environments for problem-solving (Salsabila et al., 2020).

The development of information and communication technology is also influenced by the existence of the internet. The existence of the internet nowadays is quite a necessity for humans to face global developments, where this condition can also have an influence on student behavior and can also influence students' learning styles (Pashler et al., 2008). In its role, technology and the internet can be an innovation for teachers in creating learning that is full of creativity so that learning does not take place in a monotonous manner (Shahroom & Hussin, 2018). There are many innovations that have emerged by integrating technology and the internet in learning, such as learning media, teaching materials and technology-based learning resources.

Improving education quality is crucial for all educational levels, from primary school to tertiary education, as it is anticipated that education would generate competent and trained labor resources (Wijaya et al., 2016). The 21st century necessitates reform in education. It is anticipated that behavior would change from simple to complicated, and that learning activities will become more technology- and skill-based (Afandi et al., 2016). Based on pedagogical concepts, students' digital capacities are linked to their ability to use information and communication technology (Prayogi, 2020). Of course, critical thinking abilities, problem solving, communication, literacy, creativity, and character are among the 21st century talents that must be learned (Gufran & Mataya, 2020). Thus, it is believed that by teaching pupils 21st century skills, they will be able to lead successful lives (Zubaidah, 2016).

Analyzing the needs of the students is the first step in creating instructional materials. This exercise aims to identify instructional resources that meet the needs of both educators and learners. Twenty students in class XI completed a questionnaire that was used for this investigation. The examination of students' needs for instructional materials revealed the following findings: 80% of students said that textbooks were hard to understand, 85% said that

they were boring, and 95% said that they needed engaging, portable, and easily obtainable instructional materials.

A computer or other device can read an e-module, which is an electronic version of a printed module created with the Canva and Flip PDF Professional apps as supporting software (Elvarita et al., 2020). In the meantime, the Bengkulu local wisdom-based e-module is a digital document that includes content connected to Bengkulu local wisdom activities in the form of writing, photos, videos, and other media. E-modules can be used for autonomous learning by using the internet and an Android smartphone (Afifah et al., 2018). They are also inexpensive, lightweight, and convenient to carry along. The e-module may be utilized anytime, anywhere, and is made to be conveniently accessed through a laptop or smartphone (Zulkarnain et al., 2015).

The goal of incorporating local wisdom into education is to facilitate students' comprehension of the subject matter. It is simpler to explain the content that pupils have been taught when the culture and customs of the neighborhood are used. The following are some advantages of local wisdom-based education: (1). generating generations of capable and helpful people;(2) reflecting cultural values;(3) taking part in the process of forming the nation's character;(4) helping to create a sense of national identity; and (5) contributing to the preservation of culture. In the classroom, the value of local wisdom is included into the teaching process (Utari & Degeng, 2017). In addition to maintaining and preserving local wisdom the idea of "think globally, act locally" students must be prepared to meet the challenges of modern changes (Wati et al., 2020).

Batik is a type of traditional fabric with a number of decorative designs and some patterns created using a dyeing procedure employing batik wax as a color blocking substance (Prasetyo, 2016). One of local wisdom in Bengkulu Province (one of province in Indonesia) is Batik Besurek. Batik Besurek is one of the well-known Indonesian batiks that originates from Bumi Raflessia (Bengkulu) (Ranelis & Washinton, 2016). The motifs used in Besurek batik differ from those used in batik from other locations in certain ways (Oksaputri et al., 2018). Besurek Batik is Arabic for "cloth with letters." The Arabic script on the Besurek batik (Haryono, 2012), mixed with the Raflessia Arnoldi blossom the biggest bloom in the world that only grows in Bengkulu gives the batik a religious vibe the icon of Bengkulu Province (Putra, 2021).

Bengkulu does not have a lot of batik artisans. This does not, however, rule out the likelihood that the Besurek batik market will eventually expand. Unfortunately, Bengkulu's batik business does not give much thought to protecting the environment. The batik business

only pays attention to how quickly and cheaply the production process can be completed. Solid trash, liquid waste, and hazardous toxic waste (B3) are the waste types created during production activities (Jahar et al., 2022). Environmental circumstances are becoming more and more concerning as a result of careless industrial practices. According to (Sumarni et al., 2020), the batik business typically generates liquid waste that is released into the environment and pollutes the environment.

Research on "development of chemistry e-modules based on Bengkulu local wisdom to improve student learning outcomes" is of interest to researchers, based on the description provided above. The goal of this project is to create an environmentally friendly chemical e-module that processes waste basurek batik waste into waste that is safe for the environment. The following formulation of the problem takes into account the background context of the research: (1) How is a chemistry e-module designed using traditional Bengkulu knowledge? (2) What are the outcomes of the chemistry education of students utilizing e-modules based on Bengkulu local wisdom in converting garbage besurek batik into waste that is ecologically friendly? (3) What is the effectiveness, efficiency and practicality of chemical e-modules based on Bengkulu local wisdom in processing besurek batik waste into environmentally friendly waste?

B. METHOD

This study employed research and development as its methodology. Selecting quality development will lead to the production of quality items. Research and development is used to test a product's usefulness, efficacy, and efficiency after it has been designed. The ADDIE model which stands for Analyze, Design, Development, Implementation, and Evaluation—is used in this development research. Because the ADDIE model's stages provide a methodical approach to instructional development, it was selected (Sugihartini & Yudiana, 2018). The following are the R n D stages:

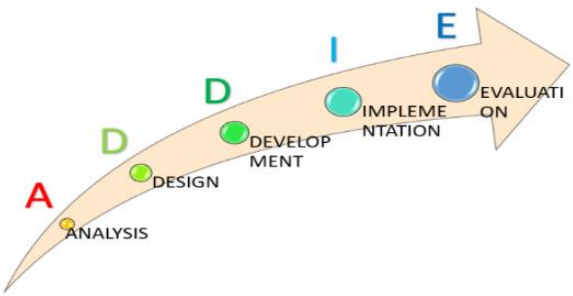

Figure 1. ADDIE model's stages

The e-module developed in this research is a chemistry e-module based on local Bengkulu wisdom with the help of the Canva application and flip PDF Professional. The place of research was carried out at MAN 2 Bengkulu City class X with a total of 34 students. Data collection techniques are questionnaires and learning outcomes tests. The questionnaire is used to determine the validity of the product as assessed by experts, to see the effectiveness, efficiency and practicality of the e-module that has been developed. Questionnaires were given to students. The learning outcomes test used is in the form of multiple choice.

a. Validity Analysis of Chemistry e-modules

Data analysis of chemistry e-module validation results was carried out by looking for the average total validator assessment of the e-module. Next, determine the validity category by matching the total average with the validity category (Siwi & Khabibah, 2018), which is shown in the following table:

Table 1. e-Module Validity Categorization Criteria

Interval Score	Validity Categorization
$3 \leq RTV < 4$	Valid
$2 \leq RTV < 3$	Less Valid
$1 \leq RTV < 2$	Invalid

b. Analysis of Student Questionnaire Data

In order to examine student reactions to chemistry learning through e-modules, data from student questionnaires were converted into descriptions of the local wisdom regarding the conversion of trash besurek batik into environmentally pleasant waste. The average overall questionnaire evaluation for the e-module was found in order to analyze the data from the student questionnaire. The performance, effectiveness, and usefulness of the Chemistry e-module can also be explained by the questionnaire analysis results. Next, match the overall average to the categories listed in the following table to ascertain the evaluation category:

Table 2. Learning Media Assessment Criteria for Student Questionnaires

Interval Score	Assessment Criteria
$3 \leq RTV < 4$	Good
$2 \leq RTV < 3$	Less Good
$1 \leq RTV < 2$	Low

c. Analysis of Student Learning Outcomes

The student learning outcomes referred to in this research are student scores obtained by taking the learning outcomes test given after the end of the learning process which uses a chemistry e-module based on local wisdom in the form of processing besurek batik waste into

environmentally friendly waste. Based on the minimum chemistry completeness criteria set by MAN 2 Bengkulu City, students are assessed as complete individually if they get a score ≥ 75. The percentage of classical completeness is calculated by the formula:

$$\% \text{ Completeness} = \frac{Number\ of\ student\ who\ completed}{Number\ of\ student} \text{ x } 100\ \%$$

Class success (classical completeness) is seen from the number of students who complete at least 75% of the total number of students in the class. From these results it can be seen how high student learning outcomes are after implementing a chemistry e-module based on local Bengkulu wisdom in the form of processing besurek batik waste into environmentally friendly waste.

d. Test the Effectiveness of Chemistry Learning Outcomes

First, the validity and reliability of the instrument are tested before it is used. The actual level that will be used in validity testing is $\alpha = 0.05$. If a question item has a Product Moment correlation coefficient (r_{xy}) or $r_{count} > r_{table}$, it is considered valid. Next, the Alpha Cronbach formula is applied to ascertain the instrument's reliability. If $r_{alpha} > 0.7$, the correlation is high.

The test instrument can be used to assess the efficacy of learning outcomes once it has been proven to be valid and reliable. Using an e-module based on local wisdom converting waste besurek batik into environmentally pleasant waste this efficacy test compares the chemistry learning outcomes before and after the implementation of chemistry learning. The before-and-after experimental design that was employed has the following characteristics:

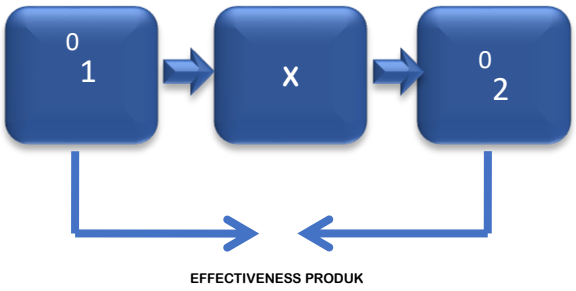

Figure 2. ***Before-After Experiment Design***

This graphic explains how the experimental design used to compare the learning results of O_1 and O_2 was used to conduct the efficacy test. O_1 is the outcome of chemistry coursework followed by the use of an online chemistry module based on Bengkulu traditional knowledge, namely the conversion of waste besurek batik into waste that is environmentally beneficial. On the other hand, O_2 is the outcome of chemical education through the use of an online curriculum that incorporates traditional knowledge by converting waste batik from Besurek into eco-

friendly waste. Effective learning outcomes can be achieved if the O_2 value exceeds the O_1 value.

Next, use the t test to prove the significance of differences in chemistry learning outcomes before and after using the product. In this research, the following hypothesis is formulated:

H_0 : $\mu 1 \leq \mu 2$ (The average learning outcomes after using the product are less good or the same as the learning outcomes before using the product)

H_1 : $\mu 1 > \mu 2$ (The average learning outcomes after using the product are better than the learning outcomes before using the product)

This research uses significant $\alpha = 0{,}05$ or 5%

Criteria: H_0 is rejected if $t_{count} > t_{table}$.

C. RESULT AND DISCUSSIONS

The development of e-module teaching materials based on Flip PDF Professional software on the material for processing basurek batik waste into environmentally friendly waste is carried out using the ADDIE stage which consists of stages (Analyse, Design, Development, Implementation and Evaluation). This development process starts from the validity test, test practicality. After data collection, the results of the data collection are described as follows

a. Results of Analyze (A) Stages

In class X A MAN 1 Bengkulu City, an analysis of the needs of the students was done at the analysis stage of the learning process. According to the results of the questionnaire research, students require an engaging e-module with a variety of graphics to make the subject matter easier for them to understand. In addition, pupils require e-modules that are portable and useful everywhere. In addition to examining the needs of students, researchers analyze curricula. It is recognized that MAN 2 Bengkulu City demands innovative learning employing engaging learning media based on local wisdom, based on the findings of observations and analysis of the curriculum needs questionnaire in class X.

b. Results of Design (D) Stages

The following are the findings of the chemical e-module's planning stages, which were based on traditional Bengkulu knowledge and were completed by researchers: (1) Cover; (2) Preface; (3) Contents Table; (4) General information including the following: target students, learning model, facilities and infrastructure, Pancasila student profile, module identity, and initial competencies; (5) Core components including learning objectives, meaningful understanding, trigger questions, learning preparation, learning activities, assessment, enrichment and remediation, and reflection from both students and teachers; (6) Attachments

include student worksheet (LKPD), reading resources for teachers and students, glossary, and bibliography. The opinions expressed here regarding the chemistry e-module are based on Bengkulu cultural heritage.

Here are a few examples of chemical e-module displays that authors have created using local Bengkulu wisdom:

Figure 3. Several e-module display examples

c. Results of Development (D) Stages

The product will go through validation following publication to determine the viability of the e-module that will be created. Two validators—media experts and material experts—are involved in this validation. The quality and presentation aspects of the learning material scored 92.85% and 90.63%, respectively, according to the material expert validation questionnaire results. The following table displays the full findings for the material expert validation of several areas of the quality of learning materials:

Table 3. Validation of Subject Matter Experts on Learning Material Quality Aspects

No	Indicator	Score	Category
1	Suitability of material to learning outcomes	4	Very Good
2	Suitability of material to learning objectives	4	Sangat Baik

3	e-modules help students work on projects	3	Good
4	Ease of understanding material by students using e-modules	3	Good
5	Content in the e-module is appropriate for the needs of the students.	4	Good
6	The learning process is completed more quickly with e-modules	4	Very Good
7	Local wisdom's adherence to the material's content	4	Very Good
	Total	26	
	Average	3.71	Valid

The average outcome of the material expert assessment is 3.71, with the material experts receiving a total validation score of 26 out of 7 indicators for the quality features of the learning content. Given the validity classification criteria, this aspect's assessment is deemed legitimate.

The following table displays the full findings for the material expert validation of the various parts of the learning material presentation:

Table 4. Validation of Subject Matter Experts on Display of Learning Material

No	Indicator	Score	Category
1	The materials for learning are presented clearly	4	Good
2	The materials for learning are directed at student activity	4	Very Good
3	The materials for learning are complete according to the scope of the e-module	3	Good
4	The materials for learning are simple to learn with.	3	Good
5	The display of learning material is systematic	4	Very Good
6	e-modules support students for independent learning	4	Very Good
7	The use of language in the e-module is correct	4	Very good
8	Easy to understand the integration of local wisdom in e-modules	3	Good
	Total	29	
	Average	3.63	Valid

The average material expert assessment result is 3.63 based on the validation score of 29 out of 8 parameters for the presentation of the learning material. Given the validity classification criteria, this aspect's assessment is deemed legitimate.

In addition, out of a possible total of 100%, the findings of the media expert validation questionnaire showed that the operational and display design aspects scored 89.28% and

89.28%, respectively. The following table displays the full findings of the media expert validation of the display design elements:

Table 5. Validation of Subject Matter Experts on Display Design

No	Indicator	Score	Category
1	Attractive e-module cover design	3	Good
2	Picture size as needed	4	Very Good
3	The image is clear / not blurry	3	Good
4	Interesting color composition	4	Good
5	There is local wisdom in the e-module display	3	Good
6	The text is easy to read	4	Very Good
7	e-learning modules are engaging	4	Very Good
	Total	25	
	Average	3.57	Valid

The average media expert assessment result is 3.57, with the media experts receiving a total validation score of 24 out of 7 indications for the display design quality element. Given the validity classification criteria, this aspect's assessment is deemed legitimate.

The following table displays the full findings for the operational factors validated by media experts:

Table 6. Validation of Media Experts on Usage Aspects

No	Indicator	Score	Category
1	The instructions on the e-module are easy to use	3	Good
2	Instructions on the e-module are in accordance with the material presented	3	Good
3	Student worksheet (LKPD) helps students learn the content in the e-module	4	Very Good
4	The workflow for e-modules can be easily to comprehend.	3	Good
5	E-modules can be used individually or in groups	4	Very Good
6	The e-module instructions are simple and easy to use in operation	4	Very Good
7	Local wisdom in the e-module is easy to understand and useful	4	Very Good
	Total		25
	Average	3.57	Valid

The average material expert assessment result is 3.57, with media experts receiving a total validation score of 25 out of 7 indications for the utilization element. Given the validity classification criteria, this aspect's assessment is deemed legitimate.

Internal testing has established that the media goods meet the required material and media criterion indications. This media output is legitimate for the reasons listed below, among other reasons. Generally, validators select good and very good options (between a score of 3 and a score of 4) for each inquiry. First, on average, all aspects fall into the valid group. Second, in the instrument feasibility option, the validator selects "suitable for field testing with revisions according to suggestions". Third, the content included in media goods has been tailored to the desired outcomes and created in compliance with the requirements of the current curriculum. Fourth, the media items are attractively displayed with a range of colors, graphics, and text. Thus, the study instrument is valid because of these variables.

The validator made the following recommendations for chemistry learning materials utilizing chemistry e-modules, taking into account the local knowledge of turning waste besurek batik into environmentally pleasant waste: (1) Material Expert Suggestions: To make the e-module look more appealing, the LKPD should not be segregated from it; instead, it should strive to be blended into the media. (2) Media Expert Suggestions: More images depicting local Bengkulu wisdom would be ideal. In addition, the e-module was updated based on recommendations from media and content specialists. Students take a field test in the classroom following revisions to the product.

d. Results of Implementation (I) Stages

E-module products were put through their paces in the classroom by being applied directly to the chemistry curriculum in class X MAN 2 Bengkulu City. Following that, a questionnaire based on traditional knowledge—namely, the processing of trash basurek batik—was distributed to class X pupils to assess the chemistry e-module. Ten indications are included in this questionnaire sheet. The average evaluation findings, which fall into the Good category, demonstrate that students responded positively to the field test results. Therefore, the chemical e-module's contents have not been altered further in accordance with Bengkulu customs, which involve processing waste basurek batik.

1. Product Performance

Validity data on product performance is gathered through the completion of validity sheets by media and material specialists. According to expert validity results, learning media falls into the "valid" category with an average rating of 3.636. The following table displays the information:

Table 7. Validation of Learning e-modules

No	Aspect	Average	Category
1	Quality of learning materials	3.71	Valid
2	Display of learning materials	3.63	Valid
3	Quality display design	3.57	Valid
4	Utilization	3.57	Valid
	Total Average	3.62	Valid

Based on the table of results from the questionnaire assessment of grade X students regarding learning media, the average result obtained for the product performance aspect was 3.5 (good category) or 87.5%. The complete results are presented in the following table:

Table 8 Learning e-module Performance Assessment by Students

No	Indicator	Average	Criteria
1	E-module is easy to use	3,4	Good
2	The display of images and text on the e-module is attractive	3,6	Good
3	The contents of the e-module are in accordance with the learning material	3,5	Good
4	E-modules create more enjoyable learning activities	3,6	Good
	Total Average	3.5	Good

This shows that the performance of the chemistry e-module based on Bengkulu local wisdom for processing Basurek batik waste is good and suitable for use in chemistry learning.

2. Product Effectiveness

a. Validity and Reliability Test

An objective test (multiple choice) instrument is the data gathering tool used in this study. To determine whether the questions in the data collection instrument are appropriate for use as a data collector, the instrument is first tested in the field, specifically by passing through a validity test and a reliability test.

The results of testing the research instrument consisting of 12 question items on 34 class XI students are due to the fact that $r_{count} < r_{table}$ and the r_{table} value is 0.339, questions 11 and 12 are not legitimate. Since all $r_{count} > r_{table}$, the remaining question items are deemed valid in the interim. Therefore, the research instrument consists of ten questions. Additionally, ralpha = 0.804 was discovered for the reliability test, indicating a strong correlation/reliability.

b. Effectiveness test

After the question items are valid and reliable, the questions are given to students before using the product and after using the product. There were 10 question items tested on 34 students in class XI.

The average score of the students was 46.47 before they used learning media with a chemistry e-module based on local wisdom in the form of processing basurek batik waste. After using learning media with a chemistry e-module based on local wisdom in the form of processing basurek batik waste, the students' final average score was 80.59. Thirty of the 34 pupils received a score of at least 75. As a result, the percentage of classical completion is 88.24% (% Complete = $\frac{30}{34}$ x 100%), which is deemed complete because it is greater than or equal to 75%.

Additionally, it was discovered from the t test findings that, for alpha = 5%, t_{count} was 15.518 and t_{table} was 1.694. The average student learning outcomes after using chemistry learning media with local wisdom-based chemistry e-modules in the form of basurek batik waste processing are significantly higher, as can be seen from the t test, which indicates that $t_{count} > t_{table}$. As a result, Ho is rejected. greater than the typical student learning outcomes prior to the use of chemistry e-module media that are based on traditional knowledge in the form of waste processing from basurek batik. This demonstrates that using chemical learning resources with e-modules based on traditional knowledge, such as processing waste from basurek batik, is useful in enhancing student learning outcomes.

3. Product Efficiency

Based on the results of the class XI student questionnaire assessment of learning media for the product efficiency aspect, the average student assessment was 3.5 (good category) or 87.5%. The details are presented in the following table:

Table 9. Assessment of Learning Media Efficiency by Students

No	Indicator	Rata-rata	Kriteria
1	E-modules help students complete learning material more quickly	3.5	Good
2	E-modules help students complete practice questions more quickly	3.4	Good
3	Throughout educational activities, students don't feel bored or sleepy.	3.6	Good
	Total Average	3.5	Good

The chart demonstrates the effectiveness of chemistry education through the use of e-module learning resources based on traditional knowledge, such as the processing of waste basurek batik. This is seen in the way that pupils study chemistry, where they pick things up more rapidly and readily. The user-friendly, portable Canva and Flip PDF programs greatly enhance the e-module's visual appeal. The Bengkulu knowledge found in the e-module feels familiar to the students, which encourages them to put in greater effort in their studies. All of this can expedite the completion of the basurek batik waste processing project process by assisting students in comprehending the notion of waste processing.

4. Product Practicality

Based on the results of the class XI student questionnaire assessment of learning media for product practicality aspects, the average student assessment was 3.53 (good category) or 88.25%. The details are presented in the following table:

Table 10. Assessment of the Practicality of Learning Media by Students

No	Indicator	Average	Criteria
1	E-modules make it easier for students to understand learning material	3.5	Good
2	E-modules help students to learn independently	3.5	Good
3	E-modules are more practical when used	3.6	Good
	Total Average	3.53	Good

The table illustrates how it is more practical to learn chemistry through chemistry e-modules that are based on traditional Bengkulu knowledge, such as processing trash basurek batik. There are undoubtedly a number of reasons why practical learning materials are not as readily available. Below is an explanation of these factors: First, educational materials are created in compliance with the requirements of the school curriculum. Second, the educational materials are interactive and have an eye-catching blend of content, color, and imagery thanks to the Canva program and professional PDF flip. Third, the creation of educational materials considers the learning goals of the pupils. Fourth, learning materials come with LKPD (Student Worksheet) aids.

e. Results of Evaluation (E) Stages

When the product is still in the review stage of development, revisions are made. This adjustment was made in compliance with the assessment rubric and the recommendations and

remarks provided by media and material experts on the validation questionnaire sheet. Additionally, evaluation was done on the remarks and recommendations made by students in their trial responses during the implementation stage. This is done in order to refine and enhance the products that are being created. According to Sari (2021), this is done since the evaluation stage is crucial for identifying or minimizing faults so that the final output is high-quality and usable.

D. CONCLUSION

The results of the validation of e-module based teaching material products using Canva and Flip PDF Professional software on basurek batik waste processing material for class X A MAN 2 Bengkulu City were deemed "valid" by the two expert validators, based on the analysis and questionnaire data that have been provided. Following the use of learning materials utilizing local wisdom-based chemistry e-modules, student learning outcomes were 80.59. Thirty of the 34 pupils received a score of at least 75. KKM was therefore calculated as follows: % Complete = $\frac{30}{34}$ x 100% = 88, 24%, and it was deemed complete since ≥ 75%.

The chemistry learning media for chemistry e-modules based on local wisdom is effective in improving learning outcomes, as evidenced by the results of the t test which shows that t_{count} is 15.52 and ttable is 1.694 for α = 5%. From the t test, it is known that $t_{count} > t_{table}$, so H_0 is rejected. So it was concluded that the average student learning outcomes after using the local wisdom-based chemistry e-module were significantly higher than the average student learning outcomes before. Furthermore, based on the table of student questionnaire assessment results on learning media for the product efficiency aspect, the average student assessment is 3.5 in the good category with a percentage of 87.5%. The average student assessment was 3.53 in the good category with a percentage of 88.25%, according to the table of questionnaire assessment findings on learning media for the product practicality element. Since this learning resource can be used for independent study based on needs, it is thought to be more useful for pupils.

E. ACKNOWLEDGEMENT

We acknowledge all stakeholders and respondents who help us in this valuable project. Thanks to Principal, for giving us an opportunity having supporting material in this project. Thanks to the editorial team of Atlantis Press for reviewing our paper.

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