Development of Interactive E-Module on *Biye* Tradition to Improve Students' Learning Outcomes

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Abstract. The lack of learning materials available to students, especially regarding local wisdoms that are close to them is feared to have a negative impact on their overall learning processes. This study is trying to address this very issue, specifically in the context of South Sumatra through the development of an interactive e-module surrounding a local tradition where people are working voluntarily together called *Biye* in one of the areas in the province. What is meant by "interactive" in this sense is that not only does the learning medium use texts and images (or illustrations), but also active feedbacks between the students and the learning material they are using. In doing so, the e-module is developed following the stages in the ADDIE development model using Microsoft PowerPoint. The ADDIE model consists of five development stages, namely analysis, design, development, implementation and evaluation—hence the name. Each of these five stages has their own specific, systematic approaches and steps to carry out, often depending on what is being made and developed. The five main stages in the ADDIE development model will guide through all the detailed developmental process of the e-module, in which the prototype will be designed, expert-validated, tested, and revised. The testing implementation of the e-module suggests a strong, positive indication that such approach would work well in classroom context, shown from the quite high score improvements the students were able to achieve from the pretest to the posttest sessions—i.e. a 35.95% average score improvement.

Keywords: Interactive E-Module, Biye Tradition, Learning Outcomes

1 Introduction

Implementing technology into educational systems would definitely affect the teaching and learning process [1]. In ways that hopefully make it more practical, innovative and effective in facilitating the students' learning processes **[2] [3].** The most general form of technological innovation that almost everyone has their hands on are mobile phones and portable computers (laptops) [4]. However, there are obstacles that often occurs in implementing technology in education context.

A. Nugroho Widiadi et al. (eds.), *Proceeding of the 3rd International Conference on Social Knowledge Sciences and Education (ICSKSE) 2023 "Change and Continuity in Southeast Asia"*, Advances in Social Science, Education and Humanities Research 800, https://doi.org/10.2991/978-2-38476-168-5_26

However, all these grand ideas and plans on implementing technology into the world of education surely have obstacles and challenges associated with them. One of the most prominent obstacles is students' lack of thorough understanding towards the use of technologies available to them[5]. Especially related to their study [6] This undeniably causes the learning process to not go as well as what is hoped for [7]**.** To overcome this issue, the teachers must put more focus on how these technological innovations are implemented in the teaching and learning process and how they are supposed to be used by the students [8].

A teaching material is a very good solution to overcoming challenges found in technology-based teaching and learning process [9] [10]. A teaching material is defined as a collection of subject materials that are arranged in a structured, systematic way to make it more interesting and thus easier to understand [11]. In its nature, a teaching material can be (re)arranged in such a way to make it more suitable to the various needs the students have that would allow it to be more effective [12]. An innovative way of integrating technology and effective teaching materials is through an interactive e-module.

E-modules can be referred to simply as a modified version of existing—usually paper-based—teaching materials put into a digital form for easier access and use [13] [14]. Through e-modules, the implementation of technology in a teaching and learning process is expected to provide new impressions and nuances to the students [15] [16]. E-modules can be composed, arranged and presented through devices the students can easily access, such as their laptops, classroom projectors or even their smartphones [17]. Using e-modules are also expected to make the teaching and learning process more interactive following its structured and adapted development, all to make the students more interested in the materials and thus absorb them better through active feedback between the material and the user (the students in this case) [18].

One main advantage of e-modules is that they are more accessible than its paper-based counterparts both in terms of places or time, requiring primarily students' gadgets [19]. Something that is also more economical and flexible [20]. Finds certain implementations of e-modules to be unique and thus less boring. The present study, meanwhile, focuses on creating an interactive e-module in the history class with materials from a local wisdom in South Sumatra called *Biye* tradition.

An interview with Zainudi, a local figure, on May 28th, 2022 reveals that *Biye* is another term for mutual cooperation activity. Further he explained that *Biye* is a mutual cooperation tradition local to Padang Bindu village, Kisam Tinggi, Ogan Komering Ulu Selatan district of South Sumatra. An interesting aspect of this traditional activity is that the people involved do it voluntarily to help others in need. In addition, the tradition is usually seen on two general categories of events called *aguk'an ringkeh* (for good or grateful things such as marriage, opening a land, or building a house) and *aguk'an karut* (for bad or sorrowful things such as caring for the ill, during an accident or disaster, and funeral). For these reasons this study argues that school students need to have more exposure on these character-building values, in addition to these activities being a cultural heritage, most prominently by integrating it into the students' lessons.

Development studies on e-modules as learning resources have been previously carried out several times, such as that of Ma'rifatullah et al. [21] aptly given the title of

"Development of e-modules based on science technology society integrated life based learning in history learning" [21]. Secondly, there was a study on similar matter from Oktaviani [22] under the title "Development of AnyFlip-Based Digital Teaching Materials on the Eating Habits of Palembang People to Support Online Learning for Local Wisdom Courses in the South Sumatra Region" [22]. Lastly, a similar study can be found from Oktari [23] entitled "Development of an Electronic Module Based on 3D Pageflip in Grade X History Subject at SMA Negeri 1 Tanjung Raja" [23].

Being development research in nature, concerning about the use of e-module containing materials on local wisdoms, the present study has the same approach as those mentioned earlier, namely making and developing an interactive e-module as a learning resource in classroom learning activities using the ADDIE model. What sets this study apart, however, is its use of easier-to-access application in the product development stage by using Microsoft PowerPoint. Furthermore, this study focuses on the *Biye* tradition of Padang Bindu village in Kisam Tinggi, South Ogan Komering Ulu regency of South Sumatera. Aside from these, the target user of the e-module developed herein is considerably specific, namely grade X (ten) students of SMA Negeri 1 Kisam Tinggi, a place where *Biye* tradition originates and is practiced.

2 Research Method

This study is conducted as a research and development (RnD) activity, designed using the ADDIE development model [24]. The ADDIE model consists of five development stages, namely analysis, design, development, implementation and evaluation—hence the name. Each of these five stages has their own specific, systematic approaches and steps to carry out, often depending on what is being made and developed [25].

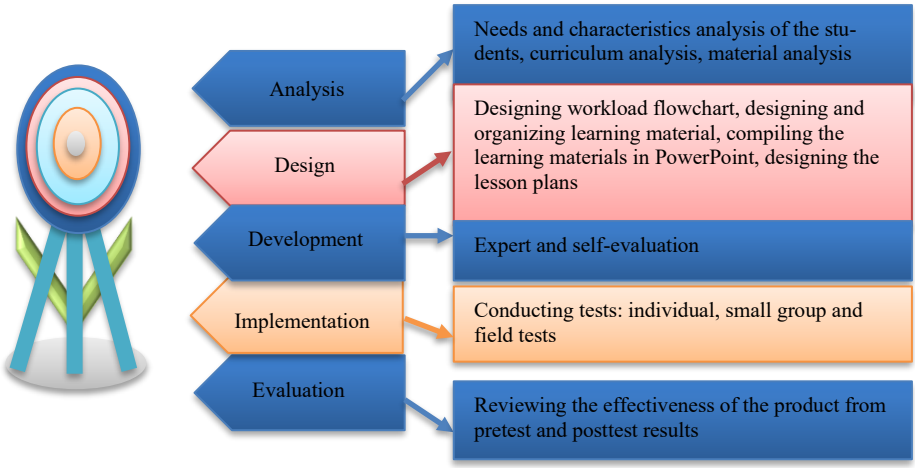


Fig. 1. Stages of the ADDIE Development Model [26]

Firstly, the analysis stage in this study is subdivided into analysing the students' needs and characteristics, followed by analysing the applied curriculum and materials in their respective school. Secondly, the design stage further consists of designing a workflow for the whole research process, designing and compiling the learning materials, putting the materials into PowerPoint, and designing lesson plans. Thirdly, the development stage consists of independent or self-validation and expert validation processes.

The fourth stage in the ADDIE model in implementation, where the product is put on real-use tests, consisting of individual or one-on-one testing, small group testing, and whole population or field testing. Fifth and last stage is evaluation. The evaluation stage consists of comparing the results of the students' pretest and posttest scores to see the effectiveness of the digital learning media developed using PowerPoint 2019 based on Kisam Tinggi local wisdom in the form of the *Biye* tradition which prioritises the spirit of mutual cooperation that is applied. The target of this research is grade X (ten) students of SMA 1 Kisam Tinggi.

3 Result and Discussion

The term "learning material" often refers to a collection of related materials that is used in the teaching and learning activity to facilitate students in achieving their learning goals [27] The success in students achieving their learning goals is highly proportional to the teacher's creativity in carrying out the teaching and learning process.

In trying to make things more interesting to the students, the teacher might want to use an interactive e-module in their class. However, there are certain aspects to pay attention to when developing such novel learning material or medium, the most important one being the suitability of the material with the students' learning needs [28]. that would in the end greatly affect their learning outcomes [29].

In addition, developing any form of technology-based learning resources must be done in accordance with what sort of technology is available at hands—be it on the students' sides, the school sides, or even the teachers' themselves—such as computers, laptops, mobile phones, classroom projectors, internet access, even electricity itself [30]. To get the most insight into what kind of technological devices (or gadgets) the students specifically can get access to, the teachers might want to use questionnaires to them before carrying on with the learning material development processes. After that, the main stages in the ADDIE development model can be carried out.

The first stage begins with analysis, in this case concerning the students' needs and their characteristics, the implemented educational curriculum, as well as the material(s) to be used. Analysing these points are is necessary to get suitable materials with what the students need and how they are doing in their study, and at the same time follow the operational curriculum.

After everything was thoroughly analysed, the next stage is designing the target product itself, in this case the interactive e-module using PowerPoint on the *Biye*

tradition from Padang Bindu village. The design process needs to cover everything from the cover pages, usage instruction, introductory words, list of contents, concept map, standard competence, learning goals, the main materials themselves (including illustration works), exercises (including the keys at the end), glossary, list of further readings, as well as information about the makers.

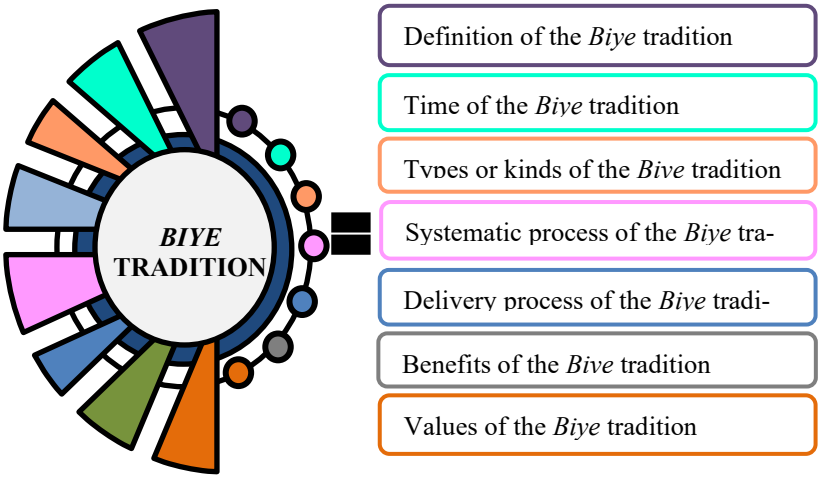


Fig. 2. Material Chart of the *Biye* tradition

Once all has been designed, they need to be developed into a finished product, beginning by compiling everything up and see how things went together, after which required changes and revisions are made accordingly. Afterwards, the finished prototype needs to be presented to related experts to further correct mistakes and improve it more that consist of media validation, material validation, instructional design validation, and language validation. Said validators and their roles can be seen in table 1 below.

The media validation process is required in this study to determine whether or not the media used in the e-module is feasible to use in the classroom learning process. The media expert in this case is expected to provide feedbacks as comments, corrections, or suggestions to the media being presented. The results from media validation process can be found in the following table.

Table 1. Changes in the Product's Media Design Following the Validation Process

Before revisions	After revisions
	

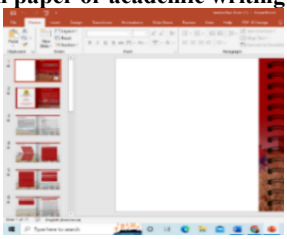
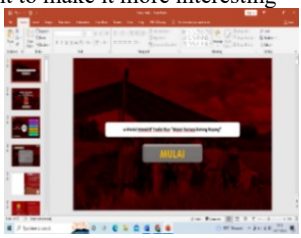
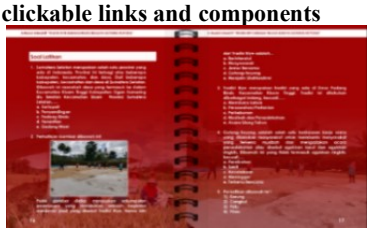
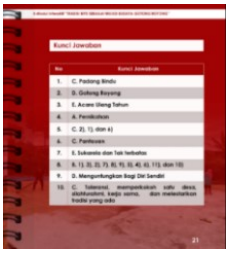
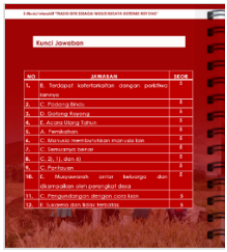
Make the cover more colorful and less like a research paper or academic writing cover	The cover look has been redesigned in PowerPoint to make it more interesting
	
Make the e-module more interactive by using clickable links and components	Links and buttons have been added to make it more interactive
	
Add I*spring* to the evaluation questions	Ispring has been added into the evaluation questions
	
Move the answer keys from page 21 to the last page	The answer keys have been moved from page 21 to the last page

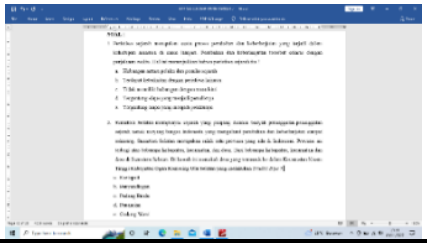
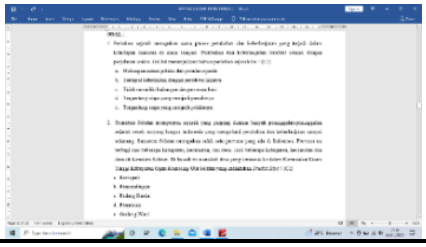
Table 2. Changes in the Product's Materials Draft Following the Validation Process

Before revisions	After revisions
	
Revise the structure of the materials in the introduction so that it begins with the most general aspect and ends with the most specific ones (i.e. funnelling)	The structures of the materials in the introduction have been revised following the advice.

Provide additional supporting theories in the sub-definition of the *Biye* tradition

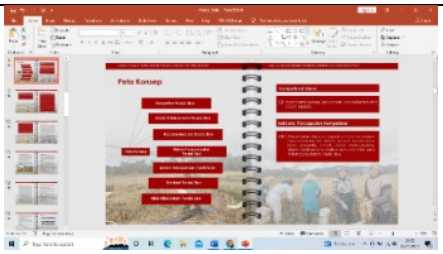
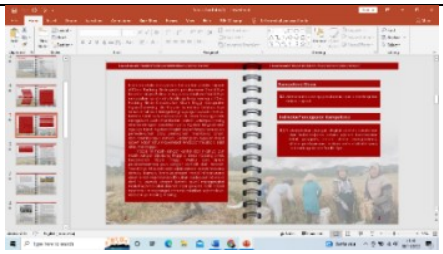
Additional supporting theory has been added in the sub-definition of *Biye* tradition.

Table 3. Changes in the Product's Learning Instruments Following the Validation Process

Before revisions	After revisions
	
Revise the instruments' structure where appendix titles are still mixed in, and that there is still the mentioning of "Lampiran RPP"	Arrangements of the evaluation instruments have been changed into separating the titles of the appendices to their own page, and changing "Lampiran RPP" with numbers (1,2,3,4,5) from the lesson material, evaluation instruments, answer keys
	
The materials' writing structure needs to be reconsidered	Run-on sentences have been corrected
	

More contextual information is needed in some questions	Cognitive nuances have been added in the questions

Table 4. Changes in the Product's Language Aspect Following the Validation Process

Before revisions	After revisions
	
Some uses of punctuations need to be corrected	Punctuation errors have been corrected

The overall validation process can be summed up as follows. First, the material used in the e-module received a 3.8 score which is considered good in the 3.4-4.20 range of *valid* category. Second, the media used in the e-module received a 4.6 score which falls into *very valid* category in 4.21-5.00 score range. Third, the instructional design aspect of the e-module received a score of 4.6 which is the same as the media aspect of it (i.e. *very valid*). Fourth, the language used in the e-module received a score of 4.0 from the expert validator which is considered *valid* in the range of 3.41-4.20.

When every aspect of the e-module has been compiled and validated, they need to be tested in their actual implementation in classroom learning. This is where the implementation stage of the ADDIE development model takes place, which includes testing the e-module to some individual students, a small group of them, as well as the whole class (field test). We received help from Mr. Asnawan as the head of administration office, SMA Negeri 1 Kisam Tinggi in organizing the students as the research participants. Afterwards, the testing processes were carried out with returning results as follows.

Table 5. Average Implementation Test Scores

No.	Kind of implementation	Score	Average
1.	Individual/one-to-one test	147	4,9 (very effective)
2.	Small group test	362	4,52 (very effective)
3.	Whole-class/field test	1075	4,60 (very effective)

The table above shows some promising results from the three testing groups of students. A score of 4.9 was received from the individual implementation test (considered *very effective*), an average of 3.52 from the small group implementation test (considered *effective*), and an average of 4.6 from the field test (considered *very effective*). The next step to take after the developed e-module has been scored by the students is to conduct

pretest and posttest sessions to them to see how much (if any) improvements can be provided by implementing it in their learning process, the results of which can be seen in table 7 below.

Table 6. Students' Average Pretest and Posttest Scores

No.	Score range	Category		Number of students	
		Pretest	Posttest	Pretest	Posttest
1.	0-70	Below minimum required score	Below minimum required score	20	2
2.	70-100	Above minimum required score	Above minimum required score	1	19
		Total		**21**	**21**

A total of 21 students were involved in both pre- and posttest sessions. The pretest scores show 20 of them not reaching the minimum score requirement (that is, below 70) and only one of them did. The posttest scores, meanwhile, show quite the opposite with 19 of the total 21 students passed the minimum score requirement, while only 2 of them failed to do so. Even though not 100% of them managed to get to that degree of improvement, this was still considered a success in the implementation of the developed e-module.

The last stage in the ADDIE development model is evaluation whose purpose is to make further improvements and refinements to the developed product according to how it performs in the field which is reflected from the previously carried out implementation testing processes. The main driving factor in this stage is students' performance in both the pretest and posttest sessions and what they had to say about the developed e-module. Their average pretest and posttest scores can be seen in the following table.

Table 7. Comparison between Students' Pretest and Posttest Scores

Score category	Pretest score	Posttest score
Highest	70	85
Lowest	20	55
Total	865	1620
Average	41,19	77,14

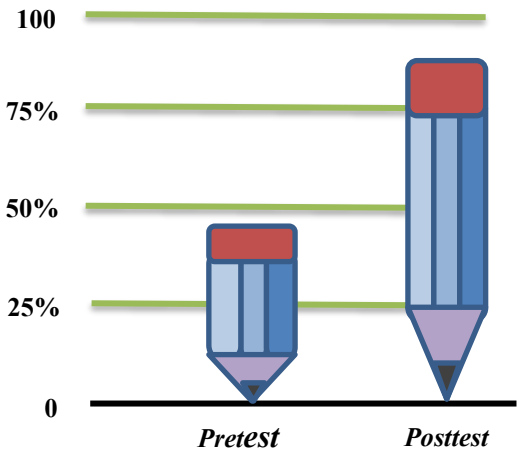


Fig. 3. Students' Pretest and Posttest Score Percentage

Looking at the table above, the students managed to get an average pretest score of 41.19 and posttest score of 77.14. This means there was an increase of 35.95% in their learning outcome, indicating an effectiveness in the implemented e-module. Their average score increase percentage was then used to calculate the N-gain using the following formula:

$$N - gain = \frac{Skor\ Posttest - Skor\ Pretest}{Skor\ Maksimum - Skor\ Pretest} = \frac{77{,}14 - 41{,}19}{100 - 41{,}19} = \frac{35{,}95}{58{,}81} = 0{,}61$$

The calculation above shows an N-gain of 0.61 under the *average* criteria, which also means that the developed e-module on the *Biye* tradition from Padang Bindu village was effective in the students' learning process. They were able to understand the given material quite well as indicated from their increased posttest scores compared to their pretest ones prior to using the e-module.

Table 8. Recapitulation Results of Students' Pretest and Posttest Scores

No.	Score range	Number of students		%		Category	
		Pretest	*Posttest*	*Pretest*	*Posttest*	*Pretest*	*Posttest*
1.	0-20	1	-	4,76%	-	Fail	Fail
2.	21-40	12	-	57,14%	-	Inadequate	Inadequate
3.	41-60	6	3	28,57%	14,28%	Adequate	Adequate
4.	61-80	2	13	9,52%	61,90%	Good	Good
5.	81-100	-	5	-	23,38%	Very Good	Very Good

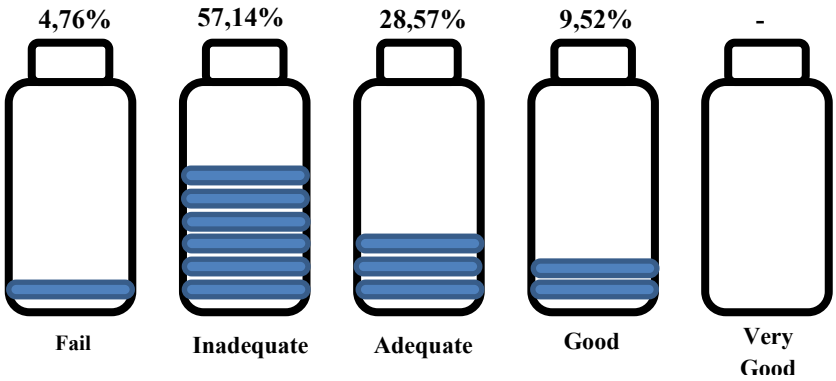


Fig. 4. Recapitulation Results of Students' Pretest Scores

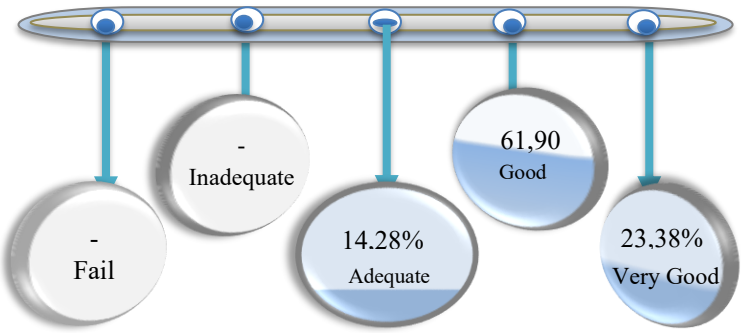


Fig. 5. Recapitulation Results of Students' Posttest Scores

From the table above, we can see the recapitulated pretest scores the test students were able to achieve. Of the five categories the could achieve (i.e. fail, inadequate, adequate, good, and very good), 14.28% of them fell into *adequate* category, 61.90% of them fell into *good* category, and the rest 23.38% of them fell into *very good* category, while none of them failed the test or fell into *inadequate* category. During the posttest session, meanwhile, 18 of the 21 test students succeeded in passing the minimum required score, and 5 of them were able to achieve the highest score of 85.

4 Conclusion

The interactive e-modules developed herein using PowerPoint 2019 had successfully passed the expert validity step, from which the product received an average score of 4.25 or considered very valid. In further detail, the media expert validation returned a score of 3.8, which falls into the validation level range of 3.41-4.20; the material expert validation returned a score of 4.6, which falls into the validation level range of 4.20-

5.00; the instructional design expert validation returned a score of 4.6, which falls into the validation level range of 4.21-5.00; lastly, the language validation step returned a score of 4, which falls into the validation level range of 3.41-4.20. If we look at the validity score ranges received by the product, the final results show that the four expert validators considered the product as very valid. The results of field testing steps show the product's effectiveness and the improvement in students' learning outcome. This can be seen from the significant difference between their average pretest score of 41.19 and posttest score of 77.14. These two test scores show that there was an increase in the students' knowledge by 35.95%. The N-gain score calculation using the students' pretest and posttest scores resulted in an N-gain of 0.61 in the medium category, which means that the results show that the use of such interactive e-module using PowerPoint 2019 on *Biye* tradition material as a form of mutual cooperation culture is effectively used in history learning activities in grade X (ten) students of SMA Negeri 1 Kisam Tinggi.

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