

Developing English Project Based Learning Supplementary Materials for Computer and Network Engineering Vocational High School

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ABSTRACT: This research has been conducted with the aims to develop an English supplementary material in the form of e-module for reading skill difficulty in Computer and Network Engineering VHS students. The difficulty in reading made the students cannot understand the matter given easily. Moreover, in *Kurikulum Merdeka*, reading skill becomes one of focused skill to improve the literacy aspect. This study was Research and Development (R&D) which used ADDIE model. Questionnaires were used for collecting data in preliminary study, expert validations after the product developed, and students' perception after trial product. While the researcher used the field note to gather document analysis result and interview guidelines as structured interview instrument to English teacher. All expert validation result showed >74,99%. The media expert had been on 95%, the matter expert was on 75%, and the final score from linguistic expert was on 95%. The student's perception questionnaire had been on 84% with positive responses which reached "Good" category. Whereas the validation and reliability final counting are >0.457 and 0.815 which defined as valid and reliable. The e-module can be used as supplementary material for English teaching especially in Vocational High School.

Keywords: development, project based learning, supplementary materials, vocational high school.

ABSTRACT: Penelitian ini bertujuan untuk mengembangkan materi tambahan bahasa Inggris berupa e-module untuk kesulitan membaca pada siswa SMK Teknik Komputer dan Jaringan. Kesulitan dalam membaca membuat siswa tidak memahami materi yang diberikan dengan mudah. Apalagi, dalam Kurikulum Merdeka, keterampilan membaca menjadi salah satu keterampilan yang difokuskan untuk meningkatkan aspek literasi. Penelitian ini merupakan penelitian dan pengembangan (RnD) yang menggunakan model ADDIE. Kuesioner digunakan untuk mengumpulkan data pada studi pendahuluan, validasi ahli setelah produk dikembangkan, dan persepsi siswa setelah uji coba produk. Sementara itu, peneliti menggunakan catatan lapangan untuk mengumpulkan hasil analisis dokumen dan pedoman wawancara sebagai instrumen wawancara terstruktur untuk guru bahasa Inggris. Semua hasil validasi ahli menunjukkan >74,99%. Ahli media sebesar 95%, ahli materi sebesar 75%, dan skor akhir ahli bahasa sebesar 95%. Angket persepsi siswa telah mencapai 84% dengan respon positif yang mencapai kategori "Baik". Sedangkan validasi dan reliabilitas penghitungan akhir >0,457 dan 0,815 yang ditetapkan valid dan reliabel. E-modul dapat digunakan sebagai bahan tambahan untuk pengajaran Bahasa Inggris khususnya di Sekolah Menengah Kejuruan.

Kata kunci: bahan tambahan, sekolah menengah kejuruan, pengembangan, pembelajaran berbasis proyek

INTRODUCTION

According to the Indonesia Number 20 of 2003 law of the Republic Article 18 which concerns in the National Education System considered Vocational High School (SMK) as secondary education that sets up the students to work in certain fields. One of those skills is English competency. However, to reach good English capability, the students must to learn English related to their study program with appropriate materials. The basic thing for understanding the materials can be started by reading. Reading is defined as the most necessary skill to acquire knowledge of the students discipline (Safdarian et al., 2014). Thus, reading skill is one of English learners needed skill for helping them more understand about English especially based on their own field. In line with this, there are two reading important roles for the learning process of the students especially in vocational high school. First, reading is necessary for supporting their academic success (Leahy & Fitzpatrick, 2017). It will not be achieved, if the students still have find some difficulties on understanding the English material given in their classroom. The second one, understanding the work steps through manual books on their practical steps such as installing or assembling is always be done. Thus, they will commonly have understanding difficulty, if they still have a lack of knowledge about English (Pahamzah, 2022).

Unfortunately, based on the result of questioners given to all students at the tenth grade of computer and network engineering program, the result are 9 out of 15 students total have chosen "KURANG" questionnaire answer for the difficulty English learning part in vocabulary. It means 60% admitted that they still find difficulty in understanding the material given. Moreover, the structured interview result that the teacher still find difficulty to make all students more understand about English materials especially in the form of texts. Additionally, it can also be seen from document analysis result that the students learning source from the current government mostly contained about tasks and minimum material as the students reference to do all tasks given. Whereas, English learning material is one of the practicing skills that is greatly needed by VHS students' future career (Mahbub, 2022). Based on the problem found, the researcher decided to give a solution by developing English supplementary given especially for helping students understand the English materials given easily.

Materials have a crucial role in the teaching and learning of languages. Unfortunately, not all reading material is simple to comprehend. As a result, there must be supplementary materials in order to encourage learners to actively participate in learning the target language (Thakur, 2015). Using supplementary materials also make the classroom activities become more interactive and dynamic (Dodd et al., 2015). In connection with students major and needs, this research developed a supplementary material in the form of e-module because it can help the students in comprehending the learning materials (Fahmi et al., 2021). Additionally, the e-module is also based on PjBL model which is suitable with the current curriculum concept applied (Kurikulum Merdeka). The developing reading materials developed also considered the current curriculum concept which focuses on literacy and numeration. Reading is one way to support the literacy movement to replace the National

Examination in the form of reasoning competence about texts (Kemendikbud, 2022). In addition, as minister of education and culture revealed that "literacy" is not only about reading ability, but also analyzing ability of some texts (Supini, 2020). As a result, it can help to support the students' literacy skill.

Nevertheless, in this research, supplementary material is developed based on project based learning (PjBL) model. Project-based learning is able to make VHS students actively and creatively develop specific competences and help them improving English language skills actively (Makrifah & Widiarini, 2019). Additionally, PjBL, which involves learning by "doing something," is appropriate for engineering students (Firmanda et al., 2021). For supporting the PjBL model, the e-module is completed by graphic organizer and vocabulary box. From the explanation above, the researcher aimed to develop supplementary materials with PjBL model in the form of e-module which focuses on reading skill for Computer and Network Engineering students at Islamic Kanigoro Vocational High School.

RESEARCH METHOD

This research used development research or usually called by Research and Development (R&D). It is one of research method kinds which was commonly used to conduce a certain product or test product effectiveness (Sugiyono, 2014). In this study, the researcher used the ADDIE model for developing the e-module product. ADDIE is consists of five research steps which stands for Analysis, Design, Development, Implementation, and Evaluation (Allen, 2006). There were qualitative and quantitative data which would be collected for the research. The qualitative data was gained from the structured interview result and document analysis in preliminary study which used interview guidelines and field note as the instrument. Whereas the quantitative data was collected by using survey technique which used the need analysis, e-module after the validation from all experts and students' perception questionnaire results after product testing. All questionnaire forms were used a likert scale with a scale of 1-4. Moreover, the quantitative data was calculated using the formula below:

$$\text{Score (\%)} = \frac{\text{total score of validation component}}{\text{maximal score}} \times 100\%$$

Table 1. Scoring Guide (Subari & Lisdawati, 2022)

Score Range	Qualitative Category
75% - 100%	Strongly feasible
50% - 74,99%	Feasible
25% - 49,99%	Unfeasible
0% - 24,99%	Strongly Unfeasible

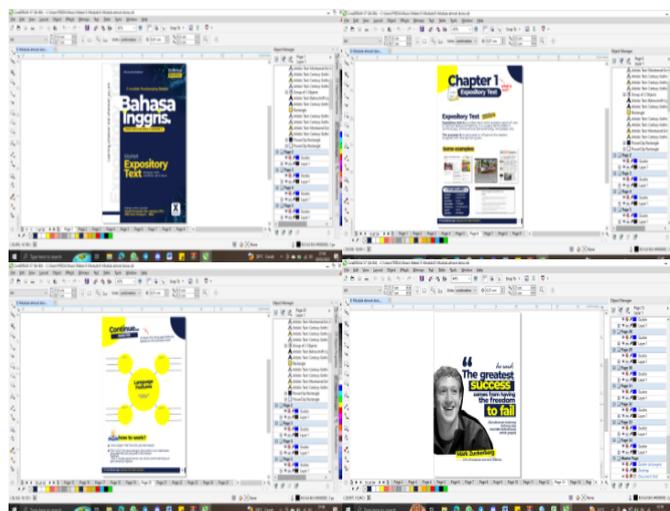
Next, the validity and reliability of instrument distributed to all respondents would be calculated by Pearson Product Moment and Cronbach's Alpha formula by using SPSS 26.0 version. Testing the measurement quality became the main purpose of this process.

RESULT AND DISCUSSION

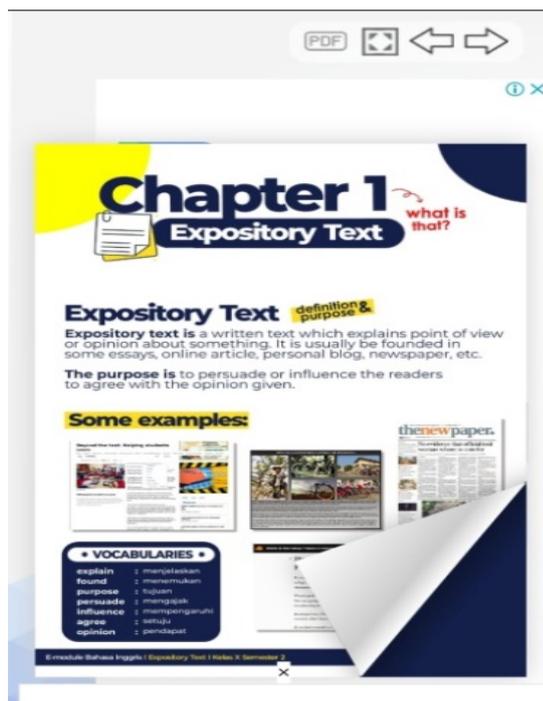
Result

According to the need analysis before, the e-module product was chosen which expository text as the matter because it is new matter for the students and should be learned on the second semester. The e-module product draft was based on *Kurikulum Merdeka*. Vocational High School includes in Phase E which has learning objectives for Reading and Viewing skill in *Kurikulum Merdeka*: "By the end of Phase E, Variety of texts such as narratives, descriptions, procedures, expositions, recount and report should be read and responded by the students." So, the focused skill of the product is reading and viewing skill. In this phase, all validation needs, and product testing preparation has been organized and ensured for the trial process after the development phase.

After all needs and preparation have done, the development phase could be begun. First, the materials and exercises organized into modules are drawn from various references. The material presented in the module is typed in *Montserrat* format with various font sizes. Preparation of materials and exercises using a graphic design application, namely CorelDraw. Then, background, cover, layout, and finishing the images and backgrounds that will be used in making the cover are compiled into one with a pre-made layout using the CorelDraw X7 application with CDR file format. The module size is selected using A4 paper (21 cm x 29.7 cm). The images and backgrounds used come from various sources taken from the internet. After the producing process is completed, the product will be inserted to Flipbook website, so the students can access it either online through website or offline through PDF format by downloading the file to their phone if they have Internet limitation.



Picture 1. Producing E-module using CorelDraw X7 Application



Picture 2. E-module on the Flipbook website display

For knowing the product feasibility, three expert validation such as media, matter, and linguistic have validated the e-module product which have been produced. The media and linguistic expert are the English lecturer in Nahdlatul Ulama University who are expert on media and linguistic field. Whereas, the matter expert is the English teacher in the tenth grade class. The result of validation can be viewed in the tables below:

Table 2. The results of the product validation

No.	Expert Validation	Indicator	Total Score	Percentage	Category
1.	Linguistic expert	Accurate sentence structure, sentence effectiveness, and the suitability with the students development	38 of 40	95%	Strongly Feasible
2.	Matter expert	Clarity of learning objectives, material suitability with the department/field, and availability of examples and practice questions	30 of 40	75%	

3.	Media expert	The attractiveness of teaching materials, practical use of the product, and the design quality	38 of 40	95%	
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After the product is validated by all expert validation, the product was revised based on the validation result above. There was any revision from the linguistic expert which is in the word selection of “Based on the text before,”, it will be better changed into “Based in the previous text..”. However, there was any conclusion from the linguistic expert that the product is already feasible to use with any revision. Whereas the validation results from media and matter expert, the product can be used without any revision. As a result, the product can be declared as feasible and ready for product testing.

After all students allowed to use the e-module, the students perception questionnaire is distributed to know their perception about the e-module. The questionnaires are closed questionnaire with liker scale 1-4 and completed by suggestion box as open questionnaire. The questionnaire of student’s perception result was counted by the following formula:

$$\text{Score (\%)} = \frac{\text{total score of validation component}}{\text{maximal score}} \times 100\%$$

$$\text{Score (\%)} = \frac{470}{560} \times 100\%$$

$$\text{Score (\%)} = 84\%$$

Based on the counting result, the final score of all student’s questionnaire result is 470 with percentage 84% which has reached “Good” category. The scores category for student perception questionnaire can be seen in the table 5 below:

Table 3. Scoring Category (Yanti, 2019)

Score Range	Qualitative Category
86% - 100%	Excellent
76% - 85%	Good
60% - 75%	Fair
55% - 59%	Less
≥54%	Worst

According to the score category above, this research will be declared that the product is valid when the students’ perception questionnaire result reaches on “Good” or “Excellent” category. Whereas, if the result shows “Fair”, “Less”, or “Worst” category, it will be revised by the researcher according to students’

perception as evaluation. After the product testing, all the student's perception questionnaires have been collected, the next phase is to test validity and reliability of the product testing result. The test was done to reinforce that the product is feasible to be adjusted in the English learning classroom. The Pearson Product Moment, as the validity formula test, was used to check the suitability of questionnaires which have been used to measure and collect the data research from the respondent. The rule in Pearson's formula is comparing the r count with the r table:

1. When the r count value > r table, so the result is declared as valid
2. When the r count value < r table, so the result is declared as invalid

The r table value with $df=N-2$, the total respondents are 14, so the r table value will be decided based on $N=12$ at 0.05 significance, the r table will be 0,457. The reference for determining the validity test by checking Significance (Sig.):

1. When the Significance value is >0.05, so the result is declared as valid
2. When the Significance value is <0.05, so the result is declared as invalid

Table 4. Validity test results

No.	Pearson Correlation R count	R table (N12)	Significance	Declaration
1.	0.571	0.457	0.016	Valid
2.	0.813	0.457	0.000	Valid
3.	0.552	0.457	0.006	Valid
4.	0.622	0.457	0.009	Valid
5.	0.510	0.457	0.031	Valid
6.	0.504	0.457	0.033	Valid
7.	0.729	0.457	0.002	Valid
8.	0.478	0.457	0.042	Valid
9.	0.536	0.457	0.024	Valid
10.	0.796	0.457	0.000	Valid

Viewed on the data in table 6 above, all r count values are more than the r table decided which is also suitable with the Sig. rules. As a result, the product can be defined as feasible to be adjusted in the classroom.

According to (Sujarweni, 2014), the test of questionnaire reliability can be checked by using Cronbach's Alpha Formula. The rule from this formula is, if the Cronbach's Alpha test result is higher than 0,60, then it will be determined as reliable. Though, the reliability test is for testing the questionnaire consistency when repeated measurements are made using the questionnaire.

Table 7. Reliability test results

Case Processing Summary			
		N	%
Cases	Valid	14	100.0
	Excluded^a	0	.0
	Total	14	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.815	10

According to the data result in the table 7 above, the final score of reliability test can be seen on 0,815 which is more than 0.60. As a result, the instrument can be determined as reliable.

Discussion

The objectives of this research are to describe then analyze the development process and result. In line with the problem findings from the preliminary study showed that the students still find difficulty on understanding the English material given. In line with this, the structured interview result, the English teacher revealed that the teacher also still find difficulty how to make the material can be understood by the students especially in the text form. The document analysis has been conducted which has a result that the English handbook mostly contains of many exercises, so that the students a lack of reference to explore the material for supporting their activities related to the handbook used. So, the student feels bored and less active in the classroom which builds mindset "English is so difficult and boring". Nowadays, English becomes one of common skills which must be mastered by the students.

With the current curriculum applies, English skill especially reading can help the literacy movement succeed in its goal of replacing the National Examination with a test of students' ability to analyze texts (Kemendikbud, 2022). It means how to understand and interpret the material exactly affects how the students can train their critical thinking. To conquer this problem, the students need supplementary material with the digital form which related to the major. The supplementary material in the form of e-module can help the students in comprehending the learning materials (Fahmi et al., 2021). Additionally, the high mobility and flexibility of digital-based learning materials, especially e-module, can engage students to be more active and make learning activities more efficient (Alenezi, 2020). This development supplementary material was completed by Project Based Learning which used graphic organizers

as learning media. Project-based learning is possible to motivate VHS students to actively and creatively build certain competencies and support their active language improvement (Makrifah & Widiarini, 2019). The study was conducted by (Kurniaman & Zufriady, 2019), graphic organizer was proven to help students develop their critical thinking and their ability to understand and find meaning from text. So, this research focused on developing English e-module supplementary materials based on PjBL which completed by graphic organizers as supporting media. The result on Table 2, the linguistic validation of e-module has been validated with 95% which a little revision. Additionally, same with the Table 3 result, it showed 95% final score from media expert, the e-module is defined "strongly feasible" to apply in the classroom. Next, the result of matter validation gained 75% with no revision.

According to all validation results, the e-module is qualified to be used for English teaching in implementation stage. It can be seen from the student perception questionnaire counting result, it showed a positive response from the students by 84% which reached "Good" category. Through the suggestions given in the box, the students said that the e-module is good enough. They can feel a new way of English learning and want to continue learning English by using e-module because it can be understood easily. For testing the measurement of the instrument used to collect this data research, it can be seen from Table 6, it showed all items in questioners are defined as valid. While the reliability indicated by 0.815 (>0.60) which is reliable.

In connection with the previous study results which conducted by (Prayoga et al., 2021) in the same field at peripheral Indonesia that developing English material is highly needed for the VHS students if we can provide it in the different from and simplifying the matter based on the students capability. This research and development have been conducted for accomplishing it. The simplifying learning materials and the addition of difficult vocabularies information which was support by interesting visuals in digital form could make the students more understand about the matter. The validation's overall calculation and media's suitability indicated as valid which means the e-module may can be as supplementary material in the classroom.

CONCLUSION

The preliminary study of this research showed that both the students and the teacher still have any difficulty in English learning. The students were difficult to understand the matter given while the teacher also found difficulty how to make the students more understand and interested in English learning. So, this research provides e-module supplementary material based on PjBL to help them. According to the validation result from all experts, the e-module was defined as feasible to be implemented. After testing, e-module has received positive response from the students. It can help and engage them to use e-module in the next learning because of its convenience. Moreover, the e-module can be used as English supplementary material in *Kurikulum Merdeka* related to the VHS students in Computer and Network Engineering field.

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