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Development of E-Modules for Students' Soft Skills in Facing the World of Work in English Subjects English Subject at SMKN 1 Batam

Wirwirya Deni[1*], Fahmi Rizal[1], Ambiyar[1], Sukardi[1]

[1] Faculty of Engineering, Universitas Negeri Padang, Padang, Indonesia.

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Corresponding Author:
Wirwirya Deni
denichantix@gmail.com

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Abstract: The purpose of this research is so that students to be able to learn independently by developing teaching materials for English learning e-modules in majoring mechatronics techniques that have suitable criteria, practical and effective. This study uses research and development (R&D) methods with a 4D (four-D) development model. This research stage includes define (defining stage), design (design stage), develop (development stage), and disseminate (dissemination stage). The instrument used in this study is a questionnaire that used to measure validity and practicality. Meanwhile, to measure the effectiveness of using a test instrument in the form of multiple choice questions. The research population was students of SMKN 1 Batam in majoring Industrial Automation techniques of XII class. The research results show that the e-module the subject of English was declared valid with a validity average value of 0.89 based on the validation of four material validators and in terms of media validity it was declared valid with a average value of 0.88 from three validators. E-modules are stated to be very practical based on teacher and student responses. This shows that, E-modules are effectively used as one of the teaching materials in learning to improving student learning outcomes.

Keywords: E-Module; Research and development; Speaking and listening

Introduction

The quality of education in Indonesia is currently very low, this can be seen from the competitiveness of students in Indonesia who are still lagging behind when compared to other countries in the world (Alawyah et al., 2024; Madhakomala et al., 2022). There are many reasons why the quality of education in Indonesia is still low and less competitive with the world of work, one of which is seen from the ability or expertise of students in a particular field (Deffinika et al., 2021; Oksila et al., 2025). There are indicators to see the level of student ability, namely hard skills and soft skills. Hard skills are abilities that are identical to intelligence (IQ), hard skills are the easiest group of abilities to assess (Aditiyawarman et al., 2025; Zhou et al., 2025). Hard skills can usually be learned through teaching at school, through training, by reading books and others. Soft skills are abilities that are usually more difficult to assess (AlAfnan et al., 2024; Jaedun et al., 2024). Soft skills are usually synonymous with emotional intelligence (EQ) (Fabbricatore et al., 2023). This ability is also synonymous with empathy and interpersonal skills. Things that are included in this skill include critical thinking skills, communication skills, patience, leadership spirit, ethics at work, to the ability to make decisions (Chimakati et al., 2024; Hashi, 2024). If someone has these two abilities, it will increase the self-value of that person to be able to set aside other competitors in getting job opportunities, especially the younger generation (Chua et al., 2024; Hickey & Cui, 2024).

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The younger generation is the driver or cog in today's changing times (Milewska & Milewski, 2025; Syed et al., 2024). Those who are at this productive age dominate in various fields of life, so the competition between millennial generations is getting tighter, one among others must have the ability to compete and survive. In the world of work, soft skills will make a person develop more and soft skills will be a strong foundation for building a person's work ethic in the world of work (Robles, 2012; Semenova et al., 2021). According to data from the Batam City Statistics Agency in 2019, the Open Unemployment Rate (TPT) in Batam City in August 2020 was 11.79 percent. There was an increase in the TPT of 3.48 percentage points when compared to the August 2019 TPT of 8.31 percent. Here is the graph:

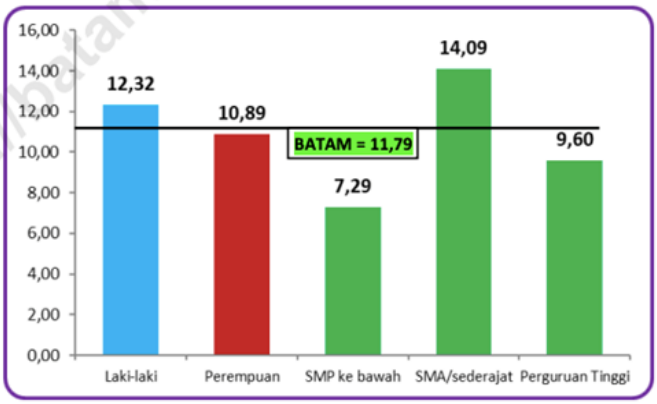

Figure 1. Open unemployment rate in Batam city by education level in 2020

The highest contribution to the unemployment rate is from the high school education level, meaning that vocational school graduates also contribute to the high unemployment rate in Batam City. Based on this, it is very important to prepare soft skills for SMK students so that graduates can have good soft skills, so that they can fill existing job opportunities or can create jobs so that they can help reduce the unemployment rate, especially in Batam City. The rapid development of technology has encouraged the replacement of printed media with computer technology in learning activities. "Modules, which were originally printed learning media, were transformed into electronic presentations, giving birth to a new term, namely electronic modules or better known as e-modules (Burhan et al., 2025; Oksila et al., 2025; Putra et al., 2025; Widyatama & Wulandari, 2025). One of the teaching materials that students can use to learn independently is e-modules (Firdaus & Pahlevi, 2022). E-modules are referred to as media for self-study because they are equipped with instructions for learning without assistance (Holisoh et al., 2023).

Module readers can carry out learning activities without the direct presence of the teacher. E-Modules are self-learning packages that are systematically designed to help learners achieve learning objectives (Kumar et al., 2021). E-Modules are arranged in a language that is easy for students to understand according to their level of knowledge and age, so that students can learn independently (Nisa et al., 2022; Sanova et al., 2022; Wijaya & Vidianti, 2020). Sanjaya (2008) states, "through modules students can learn according to their own desires and speed, students who can complete the module package quickly, on the other hand slow learning students, will also be slow to complete the lesson.

SMKN 1 Batam is one of the state vocational schools responsible for producing graduates who are able to compete in the world of work. This SMK is located at Jl. Prof. Dr. Hamka No 1, Kel. Kibing, Kec. Batu Aji, Batam City, Riau Islands Province. The majors at SMKN 1 Batam are Industrial Automation Engineering (TOI), Industrial Electronics Engineering (TEI), Computer and Network Engineering (TKJ), Mechanical Engineering, Welding Engineering and Mechatronics Engineering. In the Mechatronics Engineering department in particular, there are 2 study groups at each level. In English subjects, students are required to master speaking, reading, listening and writing tailored to the needs of the company. To support learning in this subject, laptops, projectors and sound systems are provided at SMKN 1 Batam.

Mechatronics Engineering is one of the six majors in SMKN 1 Batam. Based on the observation and interview with English teacher at SMKN 1 Batam, it is found that the school has provided the textbooks, but the materials taught are not in accordance with the students' basic competencies as well as the cognitive aspect and lack of contextualization. Furthermore, based on the results of interviews from the students themselves, the package books provided are incomplete, the efforts made by students are one of them by copying package books or taking notes, but not all students make these efforts. In addition, during the learning process, some students were busy going in and out of the classroom, talking to their friends, busy tugging on their friends' books and sometimes laughing loudly. This indicates that students' interest in learning is low (Harefa, 2023). This certainly causes obstruction to the student learning process, and can affect the average student learning outcomes in English subjects, the following data on student learning outcomes.

Table 1 shows that the percentage of students who passed English XII Meka 1 & 2 is 48% & 46% or 19 & 18 students did not pass. Certainly far from the actual learning success rate. There are still many students who

have difficulty understanding Speaking and listening. The presentation of lecture-oriented English material so far has caused students to be passive and bored because students tend to memorize concepts without knowing how these concepts are formed. Learning independence has not been developed by the teacher. The content of LKPD has not been varied so it cannot be developed by students in learning English subjects. Lack of supporting tools in English learning.

Table 1. Student Learning Outcomes

Class	Number of Learners	Number of Learners Completed	Percentage of Completion
XII Meka 1	41	18	48 %
XII Meka 2	37	17	46 %

To focus students' attention on the material being taught, one of them uses the development of learning e-modules that help students to learn independently and also reduce paper production, because e-modules do not need to be printed. According to learning e-modules contain a collection of learning materials and also practice questions to determine students' ability to learn the material in the module (Pebriantika, 2019). This learning e-module is independent which means that students can not only learn at school and accompanied by a teacher, but students can learn individually outside of school hours according to their own abilities. The purpose of making e-modules is expected to make it easier for students to master the material and learn independently (Holisoh et al., 2025; Rahmat et al., 2020). The virtue of e-modules is that the teaching material is already available without having to look for it from various other sources, so that the use of learning time is more efficient (Delita et al., 2022; Hasbollah et al., 2024; Okta Priantini & Widiastuti, 2021; Zeiler et al., 2024).

Method

This study uses the research and development (R&D) method with the development model (4D). The stages of this research include define, design, develop, and disseminate (Indaryanti et al., 2025). The instrument used in this research is a questionnaire used to measure validity and practicality(Kadir et al., 2019). Meanwhile, to measure effectiveness using test instruments in the form of multiple choice questions. The study population was students of SMKN 1 Batam majoring in Mechatronics Engineering class XII. Data obtained through observation, and questionnaire sheets, data analysis techniques using pretest and posttest. For the Practicality test using the formula 1.

Table 2. Practicality Category

Achievement Level (%)	Category
81 – 100	Very practical
61 – 80	Practical
41 – 60	Practical enough
21 – 40	Less practical
0 – 20	Not Practical

$$\text{Practicality Score} = \frac{\sum Maximum\ score}{Minimun\ score}\ x\ 100\% \quad (1)$$

Effectiveness Test Using the Gain Score Formula

Gain Score is done to determine the acquisition of student learning outcomes seen from the difference in pretest results and posttest results. First the test subjects were presented with an initial test (pretest) and at the end of the learning also presented a final test (posttest) (Hake, 1999) can be seen the formula:

$$g = (S\ post\text{-}S\ pre)/(100\text{-}S\ pre) \times 100\% \quad (2)$$

Table 3. Gain Score Categories

Gain Score	Category
$g > 0.70$	High
$0.30 \leq g \leq 0.70$	Medium
$g < 0.30$	Low

After conducting research and calculations to see the increase in student learning outcomes using the gain score formula. The e-module developed can be said to be effective if the gain score value is at least in the medium category.

Result and Discussion

This e-module was developed to improve students' ability, creativity and independence in English language learning (Saryadi & Sulisworo, 2023). The development of this e-module was carried out with the 4-D research and development model, the stages of development: Define stage, in the form of initial to final analysis, student analysis, concept analysis, task analysis, goal and outcome analysis, Design stage, in the form of module design, Develop stage in the form of validation test, practicality and effectiveness of module use, and Disseminate stage in the form of module dissemination stage that has been developed.

E-modules have gone through validity, practicality, and effectiveness trials (Suwandi et al., 2023). The validity trial was carried out by asking opinions to validators through a questionnaire, from the validity

trial conducted after several revisions, the results of the English soft skills e-module were valid for use as one of the learning media. The practicality trial was carried out by asking opinions to subject teachers and students through questionnaires. From the practicality test that has been carried out, the results show that this e-module is practical to use as one of the learning media.

The effectiveness trial was carried out by looking at the comparison between student learning outcomes using e-modules and not using e-modules, from the effectiveness trial carried out, it was found that the e-modules could improve learning outcomes and could save time, so this e-module is one of the effective learning media to be used as a learning medium. The complete and Define Stage

This defining stage is conducted to get an overview of the conditions in the field related to the learning process of English Department of Mechatronics Engineering at SMK Negeri 1 Batam. The results of observations made in the Mechatronics Engineering Department so far that the procurement of learning media is still limited so that teachers have not found the right way to present material that cannot be presented so that students are able to learn independently. The use of existing learning media has not supported teaching materials, power point media is used by teachers in the learning process as additional media in classroom learning and student self-learning. However, the media used has the disadvantage that it only contains learning material without any other supporting things such as exercises in it.

Before developing the e-module and conducting classroom learning, student analysis was conducted. The test subjects in this study were students of class XII of the Mechatronics Engineering Department at SMK Negeri 1 Batam, whose ages ranged from 16-18 years old. Generally at this operational stage, students can already think abstractly and logically. However, the abstract thinking ability of each student is not the same. Images contained in the e-module media can help students in understanding the concept of the material so that it is easier for students to understand. The characteristics of students at that age have a tendency to like contrasting colors, besides that they also like interesting characters or pictures. Combining color components and student creativity in learning with fun can foster student motivation in learning.

This curriculum analysis refers to the English syllabus, which is prepared based on the analysis of Learning Outcomes (CP), Learning Objectives (TP), so that the implementation of learning that will be produced does not deviate from the learning objectives. The indicators in this development developed are e-modules for English subjects. In this study, the concept of English lessons was analyzed. Based on the concept analysis, the learning objectives and indicators of the subjects to be presented are then developed.

Design Stage

At this stage, the design of the e-module is in accordance with the provisions of the learning module planning, paying attention to the suitability of the needs, the suitability of the material with the syllabus in accordance with the characteristics of the students. The activities carried out at this stage are: Constructing Criterion-Referenced tests, Media Selection, Format Selection and Initial Design.

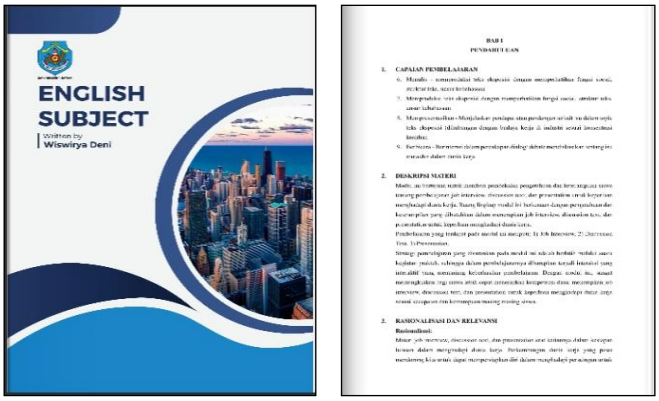

Figure 2. Cover and module description page display

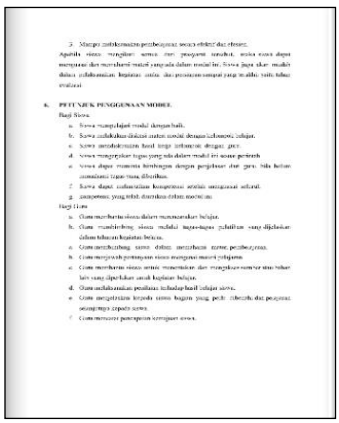

Figure 3. Instructions page display

Figure 4. Material display

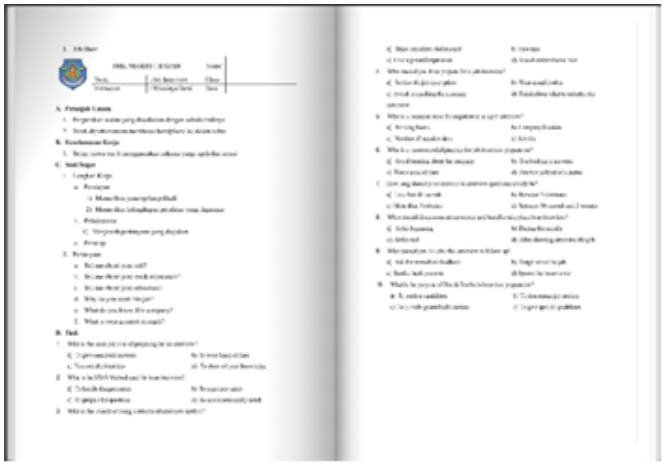

Figure 5. LKPD display

Figure 6. Evaluation view

Development Stage (Develop)

At the design stage, the next stage is the development stage. This development stage aims to produce valid, practical and effective e-modules. This development stage consists of media and material validation by validators and practicality assessment by teachers and students.

Validity

The media validation test stage is carried out so that the e-module developed can be known for its feasibility based on the assessment of material experts and media experts. Where we use 3 material experts and 3 media experts. The purpose of holding validation activities in this study is to obtain valid status from experts. The validation test data was obtained through a validation instrument filled out by several validators who were learning media experts and learning material experts.

Based on Table 4, it can be seen that the average Aiken's V value given from validators is 0.90 from the content feasibility aspect and 0.83 language feasibility quality 0.88 presentation aspect, and 0.93 self-learning aspect which is included in the valid category, so it can be concluded that the learning material in this e-mdoul is included in the valid category.

Table 4. Material Validation Assessment Results

Assessed Aspect	V	Category
Content appropriateness	0.90	Valid
Language Feasibility Aspect	0.87	Valid
Presentation Aspect	0.88	Valid
Self-Learning Aspect	0.93	Valid

Based on Table 5 and shows the average value of Aiken's V obtained from validators of 0.88 from the didactic aspect, 0.87 from the construction aspect and 0.89 from the technical aspect, which is included in the valid category, so that the e-module can be declared in the valid category. So it can be concluded that this e-module on English subjects is a "Valid" media.

Table 5. Media Validation Assessment Results

Assessed Aspect	V	Category
Aspects Assessed	0.88	Valid
Didactic Aspect	0.87	Valid
Construction Aspect	0.89	Valid

Practicality

At this stage, a field test is carried out to determine the level of practicality of the e-module that has been developed. Practicality test data was obtained from filling out the e-module practicality questionnaire. Respondents who assessed the practicality of the e-module were English teachers. In this case, teachers and students were given the e-module.

Table 6. Results of Teacher Response Assessment of E-Module Practicality

Practicality Aspect	Total Score	Percentage	Category
Product Quality	81	90.00%	very practical
Presentation of material	68	90.67%	very practical
Benefits	94	90.00%	very practical

Table 6 shows the average percentage of each indicator of the practicality of the e-module of English subject responses given by the teacher through the practicality questionnaire. Based on the assessment data in Table 6, a percentage of 90.00% was obtained for the quality aspect of the teacher's product with practical criteria, 96.67% for the presentation of material with practical practical criteria and 90.00% for the aspect of using benefits with practical criteria. These results indicate that this e-module is "practical" and can facilitate teachers in implementing the learning process and help teachers in implementing the concept of learning materials.

Practicality data is obtained after learning, through a questionnaire given to students. Practicality assessment data that has been given to students is then calculated to determine the practical value of the e-module. The research was conducted in one class, namely Class Xll in the Mechatronics Engineering department of SMKN 1 Batam with a total of 26 student respondents. This data was obtained through distributing questionnaires given to students after learning. The overall research data can be seen in table 7.

Table 7. Results of Teacher Response Assessment of E-Module Practicality

Practicality Aspect	Average Score	Percentage (%)	Category
Ease	115.83	89.10	very practical
Time	114.6	88.15	very practical
Media Attractiveness	117	90.00	very practical

Table 7 shows that the aspect of ease of use of e-modules with a percentage is 86.03% in the aspect of convenience with a practical category, 87.23% in the aspect of time required with a practical category, and 86.92% in the aspect of media attractiveness with a fairly practical category, this shows that the e-modules developed are "practical and quite practical" and can make it easier for students and teachers to understand learning materials.

Effectiveness

The effectiveness of e-modules is obtained from the completeness of student learning outcomes after using this e-module. Student learning outcomes were compared before using this e-module as learning (pretest). Learning outcome data obtained from objective tests were first tested for validity, reliability, difficulty level and differential power (Eom et al., 2006; Hardiansyah et al., 2024; Mengelkamp & Bannert, 2010). The research data are as follows: Testing the significance of differences is done by using Gain Score analysis which consists of two types, namely: Pretest (initial test) and Posttest (final test) and the average Gain Score results of all students.

Table 8. Gain Score of Knowledge Score

Value	Control				
	N	X_{min}	X_{max}	$\overline{X}$	SD
Pretest	26	8	16	60	2.37
Posttest	26	11	19	80	2.09
N-Gain	26	0.17	0.80	0.50	0.16

Comparison % Posttest and Pretestt = 20 %
Score Maximal = 20

Based on Table 8, the average pretest score is 60, the average posttest score is 80, and the average N-gain of all students is 0.50 with a moderate category. In the pretest standard deviation of 2.37, posttest standard deviation of 2.09 and standard deviation seen from N-gain of 0.16, it can be concluded that there is a difference between pretest and posttest learning outcomes.

Disseminate stage

The disseminate stage is carried out after the developed module has been declared valid, practical and effective, this is obtained from the results of the validity, practicality and effectiveness tests that have been carried out on the learning module. At this stage the developed module is ready to be used by teachers and students in English subjects, so that this valid, practical, effective media can be said to be suitable for distribution.

Conclusion

Based on the results of the e-module development research that has been carried out, the following conclusions are obtained: The development result of this research is a product in the form of e-modules on English subjects. The e-module development process refers to the 4-D development model, namely Define, Design, Develop, and Dessiminate. Based on the results of the material validity test with an average value of 0.89 and media validation with an average of 0.88, it can be concluded that the material and media validation can be declared "valid". Based on the results of the practicality test, it can be concluded that this e-module is practical from the quality of the product, the presentation of the material, and the benefits based on the assessment of the teacher. In addition to the teacher's assessment, the practicality of this e-module is also assessed based on student responses and the results are known in the student response questionnaire that this e-module is practical from the time aspect, the convenience aspect and the attractiveness of the media. Based on the assessment of student learning outcomes from the pretest and posttest, student scores after using the e-module are higher than student scores before using the e-module, so this e-module is effective for improving student learning outcomes and is used in learning.

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