

# Development of Economic Based Generative Learning to Facilitate Students' Concept Understanding Ability

Fiska Wahyuni Siregar<sup>1</sup>, Henny Indrawati<sup>2</sup>, Neni Hermita<sup>3</sup>

<sup>1</sup> Universitas Riau, Pekanbaru, Indonesia; Wahyunifiska690@gmail.com

<sup>2</sup> Universitas Riau, Pekanbaru, Indonesia; henny.indrawati@lecturer.unri.ac.id

<sup>2</sup> Universitas Riau, Pekanbaru, Indonesia; neni.hermita@lecturer.unri.ac.id

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## ABSTRACT

In the modern era of digitalization, teachers serve as a pivotal element in the educational process, instrumental in shaping future human resources. Students, particularly in the field of economics, are encountering increasingly competitive challenges, underscored by the rapid evolution of knowledge and technology. Independent learning emerges as a critical response to these challenges, aligning with the requisites of 21st-century education through the augmentation of technology-mediated learning environments. This study proposes the development of economic e-modules based on generative learning, aiming to furnish a valid and practical learning tool. The investigation enlisted a sample comprising 107 students and three educators across three schools. Employing the Research and Development (R&D) ADDIE Model—comprising stages of Analysis, Design, Development, Implementation, and Evaluation—the study scrutinized the efficacy and validity of the proposed e-modules. The findings reveal that the e-modules exhibit high validity, with scores of 0.975 and 0.987 for the e-modules and their content, respectively. Practicality assessments conducted across School 1, School 2, and School 3 in Pekanbaru yielded percentages of 94.29%, 91.42%, and 100%, respectively, demonstrating the modules' applicability and utility in the context of economic instruction. Economic e-modules rooted in generative learning principles not only enhance the enjoyment of the learning process but also significantly improve students' conceptual understanding and active engagement. This research underscores the potential of such e-modules to revolutionize economics education, catering to the evolving demands of both students and the educational paradigm of the 21st century.

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### Corresponding Author:

Fiska Wahyuni Siregar

Universitas Riau, Pekanbaru, Indonesia; Wahyunifiska690@gmail.com

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## 1. INTRODUCTION

The National Education System demands that education reforms in a planned, directed, and sustainable manner so as to guarantee quality improvement and educational efficiency in preparing students to face the challenges of changing lives both locally, nationally, and globally (Sibagariang et al., 2021; Syafriani, 2021). Teachers are an important element in the learning process, and they play a

role in building human resources in the future (Indrawati, 2013; Naziah et al., 2020). The teacher's ability in learning activities will affect the quality and quality of human resources in the future. The role of the teacher in learning is very important, this is supported by Hamalik's writings in Susanti (2019) which states that the teacher is a measure of the success of teaching and learning activities in the classroom, an educator must be able to control learning activities so that they can run effectively according to the demands of the times.

In the future, students will face very competitive challenges in knowledge or technology. The existence of independent learning is very relevant to the needs of students and the demands of 21st-century education (Irawati et al., 2022), because the essence of independent learning is to develop the ability of both students and teachers to provide updates to improve the quality of technology-based learning. The development of technology-based learning activities is a hallmark of the 21st century (Rahayu et al., 2022). Education in the 21st century emphasizes learning activities not just giving knowledge, but learning should be used as a place to develop students' abilities in order to obtain quality learning. These conditions require educators to be able to manage the personality of students so that students can solve various problems, be passionate, work hard, be diligent, be responsible, and foster good interactions between students (Mailani, 2019). The personality of these students will later help students to understand a concept in learning. Quality education must be arranged according to the development of science and technology (Hermita et al., 2021; Rosmandi et al., 2021).

Current learning expects students to be able to implement their understanding to solve various problems. However, in reality, the current learning problems are still focused on understanding concepts and student participation in learning, which is not optimal. This is because the correlation between learning components is still not optimal so the activity of students is still minimal. The lack of student activity will have an impact on students' understanding of concepts. The observation results show that students' mastery of concepts is still in the low category, with an average understanding of concepts obtained by students of 57.74% with an achievement level of 45.5%. The learning process is said to be successful if classically, it reaches 75% (Mulyasa, 2013). Therefore it can be concluded that the learning process is not fully effective. Mega & Eddie (2019) states that the effectiveness of learning will be realized when the teacher is able to guide and act as a facilitator in the learning process.

Furthermore, teachers still use teaching materials that are general in nature and not based on models or strategies. The teaching materials used do not explain the concept of material systematically, so that students tend to be unable to understand the concept of learning. Teaching effectiveness and student learning outcomes are equally influenced by the quality of textbooks used by teachers (Heyder et al., 2020; Indrawati, 2019). One of the teaching materials that students can use in learning is e-modules. Handyani (2018) emphasized that e-modules have advantages compared to other teaching materials. One of the advantages of e-modules is that they can be used by students independently in the learning process. In more detail, Fatika et al. (2021) state that the information contained in the e-module is clearly organized and makes it easier for students to understand the topic, so its presence can facilitate students' enthusiasm for learning. When students understand the material, they will be able to find their own concepts related to the learning material. Next up, Nufus (2020) claims that using electronic modules can help students understand the material. E-modules are used to explain material conceptually in an effort to increase students' knowledge and retention of it. Students' understanding of material concepts can be improved by using e-modules. E-module is a learning resource that can be used to improve students' conceptual understanding skills.

The importance of teaching materials requires teachers to be able to choose teaching materials that are effective, acceptable, and able to help students develop the skills needed by the current curriculum. This is due to the importance of teaching materials. Effective teaching materials according to Daryanto (2013) must meet the following criteria: 1) The topic must contain skills or sub-competencies that match the graduate's ability profile; 2) Topics must be correct, complete and actual, including facts, concepts, procedures and terms; and 3) The topic must be relevant to the graduate's

field of study; 3) The level of readability must be in accordance with the level of learning ability, both in terms of language challenges and topics; and 4) systematic layout.

In addition to the teacher's ability to guide students, another effort that can be made in order to form students' conceptual understanding is conducting group discussions. This activity is expected to be an alternative for students in expressing their understanding and stating things they really understand and don't understand. The discussion method causes interaction between students so that it will indirectly encourage students to increase their knowledge. Mizana et al. (2019) emphasize that the interaction between a person and their environment, which includes students, teachers, librarians, school principals, materials, as well as various learning resources and facilities can make learning more meaningful. The generative learning model emphasizes group learning, and there is a challenging stage where students are encouraged to express conclusions from the results of the conversations they have attended process. Generative learning is an educational process in which students are directly involved in seeking, discovering, and developing their own knowledge so that they will more easily absorb the lessons to be learned (O'Connor, 2021). Sumarli et al. (2021) in his research, he obtained the result that the use of the generative learning model was able to make learning more active so as to enable students to gain an understanding of concepts more quickly. Generative learning is a suitable method to facilitate students' understanding of concepts (Ekaputri, 2016; Maharani et al., 2013). Based on the previous explanation, it was concluded that the use of generative learning models can improve students' understanding of concepts.

The ability to understand concepts, the activeness of students and meet the challenges of 21st-century education in developing generative learning-based economic e-modules is very important to do. E-modules are technology-based teaching materials that can be used to help students form early learning concepts. The use of technology can assist teachers in conveying relatively difficult learning concepts (Tan et al., 2020). Learning with technology allows students to learn independently because learning can be accessed anytime and anywhere (Rosmandi et al., 2021; Usmeldi, 2016). E-modules also help improve students' understanding of concepts. In addition to e-modules, efforts can be made to get students directly involved in learning by using generative learning models (Nufus et al., 2020). Generative learning is an educational process in which students are directly involved in seeking, discovering and developing their knowledge so that it is easier for them to absorb lessons (O'Connor, 2021). The Generative Learning Model will later be applied to economic e-modules, which facilitate students' increased understanding of concepts. In overcoming the various problems that have been disclosed, the effort that is made is to develop generative learning-based e-modules to facilitate the ability to understand students' concepts.

Several researches have shown the beneficial effects of creating generative learning-based e-modules. The research on developing e-modules using generative learning started in 2016. In 2016, a Physics-Based Generative Learning Module was created and published in print with accompanying illustrations (Purwo, 2017). In 2017, a study developed a Biodiversity Module based on generative learning using the K-13 curriculum, utilising printed modules (Agnafia et al., 2017). In 2018, a Biology Module was developed based on the K-13 curriculum, which included images and student worksheets (Prawita et al., 2019). In 2019, a study created physical modules with images and worksheets (Doyan et al., 2020). Create an electronic-based mathematics module (e-module) for K-13 education in 2022. The e-module should be in PDF format and include visuals and videos (Melasari et al., 2022). The creation of generative learning-based e-modules is crucial for introducing technological advancements in the learning process, leading to enhanced quality, efficiency, and outcomes, as well as boosting the calibre of graduates. Produce graduates capable of competing internationally and comprehending crucial technology advancements for the nation's future.

This research introduces a novel approach to economic education through the development of an e-module that leverages generative learning principles. Distinctively, this e-module incorporates an array of multimedia elements—videos, audio, and interactive quizzes—accessible both online and offline, a feature not commonly found in existing educational tools. Additionally, it includes

functionalities such as attendance tracking, quizzes, games, audio support, and barcodes, facilitated by a trigger icon in the e-module's table of contents. The utilization of a flipbook application for e-module conversion ensures ease of access due to the reduced file size, offering a user-friendly experience for students. This innovation is particularly pertinent to Indonesia, offering significant benefits for the advancement of science and technology education, thereby enhancing national competitiveness and welfare in the era of the Industrial Revolution. The e-module aims to elevate educational quality and foster effective learning, underscoring the pivotal role of education in national development (Hermita et al., 2021; Rosmandi et al., 2021). While previous studies have explored the practicality of generative learning-based e-modules, this investigation seeks to broaden the understanding of their impact on students' conceptual grasp. The anticipated findings will offer insights into how such e-modules can promote concept discovery and support student-centred learning environments. Given this background, the research question formulated aims to evaluate the e-module development's feasibility and ascertain the practicality and efficacy of utilizing generative learning-based economic e-modules.

## 2. METHODS

The research uses R&D (Research And Development) with the ADDIE development model. The stages of developing the ADDIE model e-module are carried out as follows (Tegeh & Kirna, 2013):

- a. Analysis: Analysis is carried out to find out the performance problems experienced by teachers and students as well as solutions to overcome these problems.
- b. Design: Activities to plan and design e-modules based on generative learning according to the needs of teachers and students.
- c. Development: Develop generative learning-based e-modules using supporting applications such as Canva and flipbook.
- d. Implementation: Carry out learning programs by implementing e-modules that have been tested for feasibility and have been tested and perfected.
- e. Evaluation: E-Modules that have been developed are assessed and evaluated by experts and then researchers fix things that are needed.

Data was collected using questionnaires and interviews. The questionnaire used was a validation questionnaire by material experts and e-module experts, as well as a student response questionnaire on the use of generative learning-based economic e-modules. Validation questionnaires, e-module practicality questionnaires, and interviews were used to evaluate and validate the developed e-module teaching materials. The validation sheet instrument summarizes statements related to indicators that must be contained in an e-module so that it is feasible to use. The e-module validation instrument contains statements regarding indicators that must be contained in the e-module so that the material displayed is in accordance with the learning objectives and desired achievement indicators.

The analysis technique for e-module validity and material validity uses Aiken's formula. Basically, this technique is a method for measuring agreement among raters regarding the importance of certain items. The validator will be given an instrument in the form of a questionnaire and will decide on the results of the assessment that will be given at the end. The validator's assessment will be analyzed using the Aiken's V formula as follows:

$$V = \frac{\sum s}{n(c-1)}$$

Information:

V : Average Validation

s : r - 1

r : the number given by the validator

lo : the value of the lowest validity assessment

- c : score of the highest validity assessment  
n : number of validators

**Table 1.** E-Module Validation Decision Categories based on Aiken's V

| V criterion           | Category  |
|-----------------------|-----------|
| $\leq 0.4$            | Low       |
| $0.4 \leq V \leq 0.8$ | Currently |
| $\geq 0.8$            | Tall      |

Source: Adapted from Retnawati(2016)

The decision category based on Aikens's V is used to see the validity level of the e-module being developed. If the level of validity is already in the high category, the developed e-module is feasible to test and implement. The practicality of using e-modules based on generative learning is obtained from processing questionnaire data on the responses of students and teachers to the use of e-modules. At the same time, practicality analysis looks at the usefulness of the media for students and teachers.

**Table 2.** Generative Learning-Based E-Module Practicality Categories

| No | Information | Category  |
|----|-------------|-----------|
| 1  | 37-48       | Tall      |
| 2  | 25 - 36     | Currently |
| 3  | 12 - 24     | Low       |

Source: Adoption and modification from Sudjana (2017)

This research was conducted to see the level of feasibility and usefulness of e-modules based on generative learning in economics learning.

### 3. FINDINGS AND DISCUSSION

Referring to the ADDIE model, the research was conducted using the R&D (Research and Development) methodology. Based on generative learning, this development research will produce a product in the form of an economic e-module.

#### 3.1 The Stage of the ADDIE Model

The stages of developing the ADDIE model and the results of each stage are described as follows:

##### 3.1.1 Analyze

Study of e-module needs and preferences, especially in the field of economics learning, as well as school conditions, learning environment, student characteristics, and curriculum requirements that require teachers and students to be able to use electronic-based learning tools. The data analyzed were obtained based on the results of interviews with economics teachers, students and carrying out observations of learning activities in the classroom. Curriculum demands show the importance of equipping students with various learning tools that can help conceptual understanding and be able to solve problems according to these elements. E-modules are teaching materials that are able to hone students' abilities and are the right solution to meet the demands of an independent curriculum and the demands of today's 21st-century learning.

##### 3.1.2 Design

The implementation of the e-module design will use the data analysis that was carried out at the initial stage as a guide. Students need generative learning-based e-modules that can be used on mobile devices or school computers and consist of attractive designs, interesting learning videos accompanied by audio, images that help students understand concepts, and games that are interesting and have a variety of interesting game displays. Which helps students' understanding.

The material contained in the economic e-module based on generative learning is working paper material. The working paper material is presented briefly by presenting the working paper drafting concepts. The formula for working on working paper material and the credit debit mechanism in the preparation of working papers is structured and presented in a structured manner accompanied by examples of questions. Some examples of questions in the working paper material are also given explanations in the form of problem-solving videos. Economic e-modules are applied with generative learning syntax. When the generative learning learning model is able to link previous information with the latest knowledge possessed by students, this can help students find learning concepts for themselves.

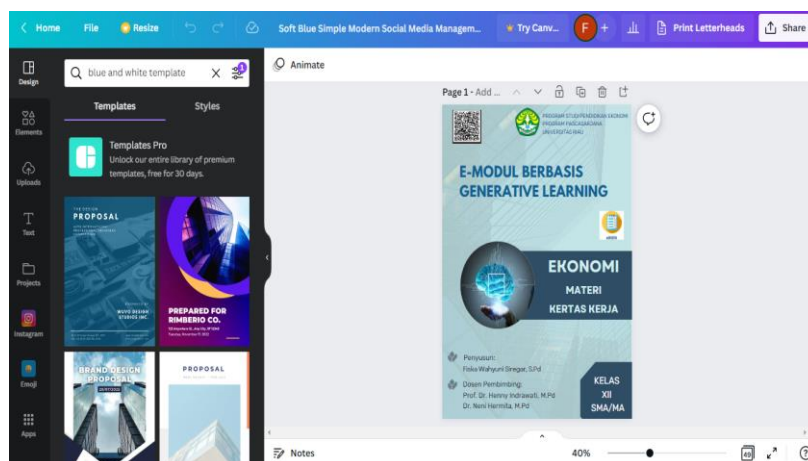


Figure 2. Application for Designing Economic E-Modules

### 3.1.3 Development

E-modules are designed with several aspects developed, and product development is also adapted to the needs of students. It is different from e-modules used in learning in general. On the generative learning syntax application page, students can immediately fill in the answers by clicking the answer button on the lower right.

| Nama Akun    | Neraca Saldo  |        | Jurnal Penyesuaian |             | Neraca Saldo D disesuaikan |        |
|--------------|---------------|--------|--------------------|-------------|----------------------------|--------|
|              | Debit         | Kredit | Debit              | Kredit      | Debit                      | Kredit |
| Perlengkapan | Rp. 2.000.000 | -      | -                  | Rp. 500.000 |                            |        |

Figure 3. Display of the Generative Learning E-module and its Development

1. Presented the concept of material that trains students' conceptual understanding skills in an interactive and interesting way

The working paper material provided in the generative learning-based economics e-module is designed interestingly and interactively, so that when using the e-module students feel excited to discover new concepts. In the e-module, students are highly demanded to be active in finding learning concepts, and later, these concepts will be collaborated with the old knowledge that students have. Some views of e-modules that hone students' conceptual abilities are as follows:

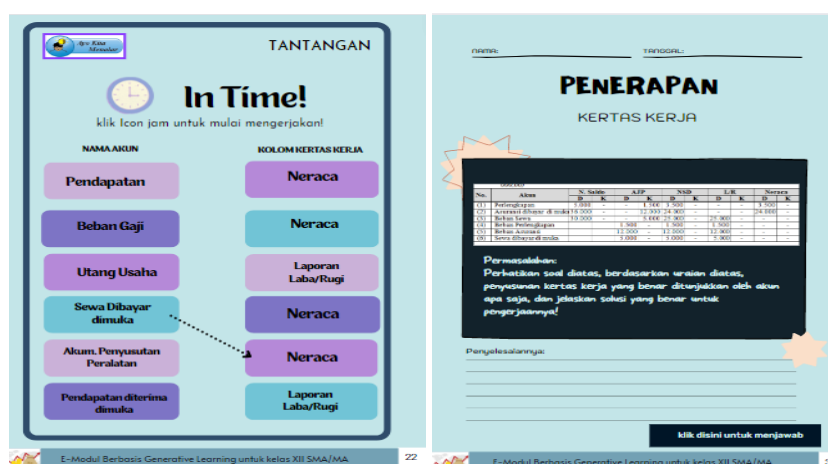


Figure 4. Stages of Sharpening Students' Concept Understanding Ability

2. An interesting and complete learning video is presented

2 PINDAHKAN DATA JURNAL PENYESUAIAN

TOKO SEMBAKO RAYA INDAH  
KERTAS KERJA  
PERIODE 31 JANUARI 2021

| NO  | NAMA AKUN                     | NERACA SALDO |            | JURNAL PENYESUAIAN |           | NSD   |        | LABA/RUGI |        | NERACA |        |
|-----|-------------------------------|--------------|------------|--------------------|-----------|-------|--------|-----------|--------|--------|--------|
|     |                               | DEBET        | KREDIT     | DEBET              | KREDIT    | DEBET | KREDIT | DEBET     | KREDIT | DEBET  | KREDIT |
| 111 | KAS                           | 20.270.000   | -          |                    |           |       |        |           |        |        |        |
| 112 | ASURANSI DIBAYAR DIMUKA       | 1.200.000    | -          |                    |           |       |        |           |        |        |        |
| 113 | PIUTANG DAGANG                | 7.300.000    | -          |                    |           |       |        |           |        |        |        |
| 114 | PERSEDIAAN BARANG DAGANG      | 5.000.000    | -          |                    | 5.000.000 |       |        |           |        |        |        |
| 115 | PERLENGKAPAN                  | 1.500.000    | -          |                    |           |       |        |           |        |        |        |
| 121 | PERALATAN                     | 6.000.000    | -          |                    |           |       |        |           |        |        |        |
| 122 | AKUMULASI PENYUSUTAN PERALATA | -            | 1.000.000  |                    |           |       |        |           |        |        |        |
| 211 | UTANG DAGANG                  | -            | 7.200.000  |                    |           |       |        |           |        |        |        |
| 221 | UTANG BANK                    | -            | 5.000.000  |                    |           |       |        |           |        |        |        |
| 311 | MODAL NONA RAYA               | -            | 24.700.000 |                    |           |       |        |           |        |        |        |
| 312 | PRIVE                         | 300.000      | -          |                    |           |       |        |           |        |        |        |
| 411 | PENJUALAN                     | -            | 10.100.000 |                    |           |       |        |           |        |        |        |
| 412 | RETUR PENJUALAN               | 200.000      | -          |                    |           |       |        |           |        |        |        |

| TANGGAL  | AKUN                 | REF | DEBET     | KREDIT    |
|----------|----------------------|-----|-----------|-----------|
| JAN 2021 | 31 (akhir Laba Rugi) |     | 5.000.000 | -         |
|          | PBD (awal)           |     | -         | 5.000.000 |
|          | PBD (akhir)          |     | 4.000.000 | -         |
|          | (akhir Laba Rugi)    |     | -         | 4.000.000 |
| 31       | Beban Gaji           |     | 2.000.000 | -         |
|          | Utang Gaji           |     | -         | 2.000.000 |
| 31       | Beban Perlemakan     |     | 500.000   | -         |

Figure 5. Video Connecting Old Knowledge and New Knowledge

3. Audio is presented to explain some concepts

The development of e-modules using audio is aimed at several characteristics of students who prefer listening to reading. Audio is provided with explanations in simple language and is easily understood by students according to their age level.

**CONTOH SOAL**

Neraca Saldo (sebagian) milik PD Selera Rasa Bensama periode 1 Desember 2021:

| No. | Nama Akun    | Debet            | Kredit           |
|-----|--------------|------------------|------------------|
| 1.  | Perlangkapan | Rp 1.500.000,00  | -                |
| 2.  | Utang        | Rp 10.000.000,00 | -                |
| 3.  | Persediaan   | -                | Rp 17.000.000,00 |
| 4.  | Dana         | Rp 500.000,00    | -                |
| 5.  | Beban Sewa   | Rp 300.000,00    | -                |
| 6.  | Beban Sewa   | Rp 3.600.000,00  | -                |

Data penyesuaian per 31 Desember 2021:

- Perlangkapan teras Rp2.000.000,00
- Sewa gedung dibayar 1 Desember untuk 1 tahun. Berdasarkan data di atas, dicatat pada kertas kerja sebagai berikut:

**PENYELESAIAN**

Untuk menjawab soal latihan diatas, siswa diminta mengingat kembali materi Jurnal penyesuaian yang telah dipelajari sebelumnya dan menyusunnya kedalam jurnal!

| Tanggal | Keterangan                | Debet        | Kredit       |
|---------|---------------------------|--------------|--------------|
| 31 Des  | Beban Perlangkapan        | Rp 1.500.000 |              |
|         | Perlangkapan              |              | Rp 1.500.000 |
| 31 Des  | Beban sewa dibayar dimuka | Rp.300.000   |              |
|         | Sewa dibayar dimuka       |              | Rp.300.000   |

Perlangkapan awal - Perlangkapan teras + Perlangkapan yang dipertahankan  
 Rp. 1.500.000 - Rp. 2.000.000 + Rp. 1.500.000  
 (Yang ditulis adalah sejumlah perlangkapan yang telah dipertahankan)

Beban Sewa untuk satu tahun dari 30 Desember 2021 November hingga 30 Desember terhitung 1 bulan. Maka:  
 $1/12 \times Rp. 3.600.000 = Rp. 300.000$   
 (Nilai yang ditulis sesuai yang telah dipertahankan)

E-Modul Berbasis Generative Learning untuk kelas XII SMA/MA

Figure 6. Use of Audio in E-Modules

#### 4. E-Module uses an independent curriculum

The designed generative learning-based economic e-module already uses an independent curriculum that is in accordance with the current curriculum. E-modules are made according to the needs of the current curriculum and according to the needs of students and schools.

##### 3.1.4 Implementation

Generative learning-based economic e-module implementation activities were carried out in three schools with the qualifications of each school having the same accreditation, facilities, and needs, namely Pekanbaru 2 Public High School, Pekanbaru 6 Public High School, and Pekanbaru 8 Public High School. The process of implementing the economics e-module takes place over two meetings, each of which lasts for two hours of lessons using generative learning syntax.

The first meeting and the second meeting have the same overall learning sequence. In the first phase, students are given an explanation regarding learning outcomes, objectives, and the learning model used. Before learning begins, the teacher forms students into small groups. Students in groups are asked to explore their knowledge by deepening the concepts, knowledge, or initial understanding of students that have been studied in the previous material, namely work paper material. Furthermore, after students have learned the new material they are given a challenge, namely students are directed to obtain data, draw conclusions and write them down. Then, students put forward the concept of understanding they have by discussing so that the activity of exchanging concepts and ideas can occur which aims to familiarize students to be able to express opinions, suggestions, criticize, and interpret the existence of conceptual discrepancies between fellow students. The final activity of students is asked to apply the new concept by asking them to solve a problem by implementing the knowledge they have just acquired. Seeing that some students are active, all students are also motivated to actively find new concepts to solve the problem of preparing working papers. The final activity of students is asked to apply the new concept by asking them to solve a problem by implementing the knowledge they have just acquired. Seeing that some students are active, all students are also motivated to actively find new concepts to solve the problem of preparing working papers. The final activity of students is asked to apply the new concept by asking them to solve a problem by implementing the knowledge they have just acquired. Seeing that some students are active, all students are also motivated to actively find new concepts to solve the problem of preparing working papers.

##### 3.1.5 Evaluation

Evaluation is at the last stage of research and development activities in the ADDIE development research model. However, evaluation is carried out in this development research at every level of the research and development process.

### 3.2 Feasibility Analysis of Generative Learning-Based Economic E-Module

Expert validation is needed to find out whether or not economic e-modules based on generative learning can be applied in learning activities before carrying out trial activities and before being used by students. Expert judgment techniques were used in the validation process of this study, where the feasibility of the resulting e-modules was assessed based on the opinions of experts in the relevant domains. The results of the expert validation are as follows:

#### 3.2.1 Validation by E-Module Experts

The e-module is validated by 3 e-module experts who are experts in their field. There are 3 sub-sections for e-module expert questions, namely display aspects, programming aspects and utilization aspects. Based on the final assessment of each expert validator, in the last stage of validation activities by e-module experts it was determined that the economic e-module was valid, suitable for use in research, and feasible for testing. Validation is carried out after the e-module design stage is carried out. The validity of the e-module was carried out twice each for repairs to three e-module validators. The results of the analysis of the e-module construct validation data are summarized in Table 3:

**Table 3.** Results of E-Module Validity Analysis

| Aspect                         | Score from Validator |    |     | S1 | S2 | S3 | $\Sigma S$ | n(C-1) | V            | Category    |
|--------------------------------|----------------------|----|-----|----|----|----|------------|--------|--------------|-------------|
|                                | I                    | II | III |    |    |    |            |        |              |             |
| Display Aspect                 | 74                   | 77 | 75  | 63 | 66 | 64 | 193        | 198    | 10.72        |             |
| Average                        |                      |    |     |    |    |    |            |        | 0.974        | High        |
| Programming Aspect             | 46                   | 49 | 49  | 39 | 42 | 42 | 123        | 126    | 6,83         |             |
| Average                        |                      |    |     |    |    |    |            |        | 0.976        | High        |
| Utilization Aspect             | 47                   | 49 | 48  | 40 | 42 | 41 | 123        | 126    | 6,83         |             |
| Average                        |                      |    |     |    |    |    |            |        | 0.976        | High        |
| <b>Aikens' V Average Score</b> |                      |    |     |    |    |    |            |        | <b>0.975</b> | <b>High</b> |

The results of the validity of the e-module show that the average value of Aiken's V e-module validity is 0.975 in the high category. These results indicate that the resulting e-module is appropriate, very well structured and suitable for use in research. The validator states that the e-module that has been designed is in accordance with the criteria of a good e-module, then the design and concept understanding questions that are designed as attractive as possible will foster activeness and make it easier for students to find learning concepts.

#### 3.2.2 Validation by Material Experts

An economics teacher validates the material in the economics e-module and the theory that forms the basis is a solid e-module standard. The aspects assessed by material experts are content components, namely the relationship between e-module content and learning materials, linguistic components, e-module presentation components and graphical components. The material expert validator consists of a validator that is carried out twice to validate the e-module material. Analysis results the material validation data is summarized in Table 4:

**Table 4.** Table of Material Expert Validity Analysis

| Aspect                         | Score from<br>Validator<br>I | S1 | $\Sigma S$ | n(C-1) | V            | Category    |
|--------------------------------|------------------------------|----|------------|--------|--------------|-------------|
| Core Components                | 84                           | 72 | 72         | 72     | 12           |             |
| Average                        |                              |    |            |        | 1            | High        |
| Language Component             | 41                           | 35 | 35         | 36     | 5.83         |             |
| Average                        |                              |    |            |        | 0.97222      | High        |
| Serving Components             | 49                           | 42 | 42         | 42     | 7            |             |
| Average                        |                              |    |            |        | 1            | High        |
| Graphic Components             | 48                           | 41 | 41         | 42     | 6,833        |             |
| Average                        |                              |    |            |        | 0.976        | High        |
| <b>Aikens' V Average Score</b> |                              |    |            |        | <b>0.987</b> | <b>High</b> |

Based on the final assessment of the material expert validator at the last stage of the validation activity by the e-module expert and material expert, it was stated that the economic e-module is valid, feasible to use for research, and worth trying. The material validator stated that the resulting e-module was in accordance with the ability level of students, the video presentation of the discussion of questions was designed in simple language and easy for students to understand.

### 3.3 Practical Level of Using Generative Learning-Based Economic E-Module to Facilitate Students' Concept Understanding Ability

#### 3.3.1 Practicality Level of E-Module Based on Student Response Questionnaire

The ability to help students understand concepts is one of the objectives of making economic e-modules based on generative learning. Educators and students' responses to the application of generative learning-based economic e-modules can be used to measure how effective and practical it is. After the entire series of learning exercises by utilizing economic e-modules based on generative learning has been completed, a questionnaire is given. The results of the student response questionnaire at the implementation stage.

**Table 5.** Questionnaire Frequency Distribution of Student Responses at SMA Negeri 2 Pekanbaru on the Level of Practicality of Generative Learning-Based Economic E-Module

| Category  | Rating Score | Frequency | Percentage (%) |
|-----------|--------------|-----------|----------------|
| High      | 37-48        | 33        | 94,29          |
| Currently | 25 - 36      | 2         | 5.71           |
| Low       | 12 - 24      | 0         | 0              |
| Total     |              | 35        | 100            |

Source: Processed Data 2023

According to Table 5, two out of 35 students rated the practicality of the e-module as moderate. Both respondents expressed a preference for straightforward explanation of the learning material by the teacher. Moreover, students' written feedback on the questionnaire indicated that utilising e-modules for learning enhanced their engagement, making the process more enjoyable and interactive. The materials were found to provide concepts in a clear and comprehensible manner, aiding in the resolution of economic issues. The generative learning-based economic e-module facilitates students' comprehension of ideas. The results of a questionnaire on the use of generative learning-based economic e-modules are presented in Table 6.

**Table 6.** Questionnaire Frequency Distribution of Student Responses at SMA Negeri 6 Pekanbaru on the Practicality Level of Generative Learning-Based Economic E-Module

| Category  | Rating Score | Frequency | Percentage (%) |
|-----------|--------------|-----------|----------------|
| High      | 37-48        | 32        | 91.42          |
| Currently | 25 - 36      | 3         | 8.57           |
| Low       | 12 - 24      | 0         | 0              |
| Total     |              | 35        | 100            |

Source: Processed Data 2023

The results of the student response questionnaire at SMA Negeri 6 Pekanbaru showed that 32 students stated that the practicality of the economic e-module was in the high category. Then, 3 other students stated that the e-module was in the moderate practicality category. The three respondents admitted that they felt difficulties with quotas, because access to several learning resources in the economics e-module had to use the internet network. The results of the student response questionnaire obtained an average of 91.42, indicating a good and positive response. Students at SMA Negeri 6 Pekanbaru also provided written comments on the questionnaire sheet. Students stated that the generative learning-based economic e-module used was very good, interesting, easy to understand, interactive, and fun. Furthermore, the results of the student response questionnaire at SMA Negeri 8 Pekanbaru after the e-module implementation stage was carried out can be seen in Table 7:

**Table 7.** Questionnaire Frequency Distribution of Student Responses at SMA Negeri 8 Pekanbaru on the Practicality Level of Generative Learning-based Economic E-Module

| Category  | Rating Score | Frequency | Percentage (%) |
|-----------|--------------|-----------|----------------|
| High      | 37-48        | 37        | 100            |
| Currently | 25 - 36      | 0         | 0              |
| Low       | 12 - 24      | 0         | 0              |
| Total     |              | 37        | 100            |

Source: Processed Data 2023

The questionnaire results clearly show that students find generative learning-based economic e-modules valuable in education. Students credit the advantages they noted to the design of the e-modules and the pedagogical components they provide. A group of students from SMA Negeri 8 were quite satisfied with the e-module due to the clear questions and explanations, which made problem-solving easier and enhanced the learning experience. Moreover, a significant portion of these students supported including this e-module into all next economics classes. Students found economic fundamentals easier to understand due to the engaging design of the e-module, which increased their enthusiasm to learn. Feedback from Pekanbaru 2 Public High School, Pekanbaru 6 Public High School, and Pekanbaru 8 Public High School was very good. This study suggests that the generative learning-based economic E-Module greatly improves the effectiveness and involvement of economic instruction, especially when using working paper materials.

### 3.4 E-Module Practicality Level Based on Teacher Response Questionnaire

After the learning series was completed, the teacher was given a response questionnaire regarding the implementation of the e-module in each of these schools after students completed a series of learning activities using economic e-modules based on generative learning. Table 8 below provides a summary of the instructor's response questionnaire regarding the use of the e-module:

**Table 8.** Frequency Distribution of Questionnaire Responses of Teachers on the Level of Practicality of Generative Learning-based Economic E-Modules

| School                 | Total score | Percentage (%) | Category |
|------------------------|-------------|----------------|----------|
| SMA Negeri 2 Pekanbaru | 48          | 100            | Tall     |
| SMA Negeri 6 Pekanbaru | 48          | 100            | Tall     |
| SMA Negeri 8 Pekanbaru | 45          | 93.75          | Tall     |

Source: Processed Data 2023

The results of the teacher's response questionnaire showed that with a combined 48 points from 12 statements, SMA Negeri 2 and SMA Negeri 6 Pekanbaru received a perfect score. In addition, SMA Negeri 8 Pekanbaru teachers gave a percentage of 93.75% with a final score of 45. SMA Negeri 8 Pekanbaru teachers stated that there were still students who were not fully able to participate in learning activities, so sometimes these students had to be given explanations several times. to be able to understand the concept of learning. But on the side the other hand, all teachers gave a positive response which was stated in the teacher's response questionnaire. The teacher stated that the e-module used by SMA Negeri 2 teachers was very good and suitable for increasing conceptual understanding and enhancing learning. Students also show greater engagement and better learning outcomes.

Furthermore, written comments were also given by the teacher of SMA Negeri 6 Pekanbaru who stated that using generative learning-based e-modules really helps teachers in conveying material in an interesting, concise and clear manner so that students do not feel bored quickly and even tend to be interested in learning. Then the SMA Negeri 8 teacher added that this e-module was very good for use in further economics lessons. The percentage of teacher responses shows the teacher's trust in the e-module so that it is concluded that the use of e-modules is practical and useful in learning, especially in economics lessons. The teacher even requested that the e-module be presented for other economics material and in other lessons so that students are more active and able to find learning concepts independently according to the demands of the curriculum.

### Discussion

Economics, a pivotal discipline integral to everyday life, necessitates a profound understanding of its concepts at the high school level. Despite its significance, students often struggle to grasp economic principles, primarily due to the inadequacy of current pedagogical materials, which fail to foster a comprehensive conceptual understanding. The predominant teaching materials do not accommodate Student-Centered Learning approaches and employ complex language, rendering students passive and demotivated in their studies. This lack of engagement results in a superficial memorization of content rather than a deep understanding of economic concepts.

To address these educational challenges, there is a pressing need for teaching materials that empower students to overcome learning obstacles through independent study, conceptual clarity, and active participation. Generative learning-based e-modules emerge as a pivotal solution, offering technology-enhanced teaching materials that foster the initial formation of learning concepts. The incorporation of technology in education, as supported by Hermita et al. (2021), Muthoharoh & Sakti (2021), and Pratiwi et al. (2021), not only facilitates the conveyance of complex concepts but also promotes learning autonomy by enabling problem-solving outside the traditional classroom setting.

The effectiveness of e-modules in education is further evidenced by their systematic content arrangement, which simplifies and encapsulates learning concepts, thereby augmenting students' understanding and engagement (Imansari & Sunaryantiningsih, 2017; Wahyugi, 2021; Handayani, 2018; Wulandari et al., 2021). By providing access to a variety of learning resources, including videos and conceptual explanations, e-modules support a more dynamic learning environment. This accessibility aids in the active participation of students in the learning process, encouraging inquiry, dialogue, and comprehension.

The adoption of generative learning principles in the design of economic e-modules is pivotal for enhancing students' conceptual understanding. This educational approach, as posited by Maharani et

al. (2013) and O'Connor (2021), enables students to actively engage in the discovery and development of knowledge, thus facilitating a deeper assimilation of learning materials. The development of generative-based economic e-modules employs the Research and Development model, specifically the ADDIE model, which encompasses the Analysis, Design, Development, Implementation, and Evaluation phases. Utilizing digital tools such as Canva for editing, Heyzine for creating flipbooks, and Word Wall for integrating interactive games, alongside multimedia resources like videos and audio, enriches the e-modules. These modules, accessible both online and offline, offer flexibility, enhancing their efficacy as a learning tool.

#### 4. CONCLUSION

Based on the research findings and discussion, it is evident that the generative learning-based economic e-module is extremely valuable, applicable, and advantageous in improving students' understanding of various topics. Examples of additional criteria for evaluating e-modules could include assessing practical application skills, critical thinking abilities, and real-world problem-solving capabilities. Researchers in the field of education can explore the potential of using e-modules as educational tools to broaden their scope and applicability. There is an expectation that e-modules will be developed using additional resources such as multimedia content, interactive elements, and instructional videos. Additional factors to consider for evaluating the effectiveness of e-modules could include student engagement levels, retention rates, and transfer of knowledge to practical settings. Additional factors can be considered to evaluate the effectiveness of e-modules in the future, going beyond just the student's understanding of the concepts. Furthermore, incorporating interactive elements such as quizzes for self-assessment and simulations for real-world application can enhance student engagement and lead to improved learning outcomes. Furthermore, conducting long-term studies to assess the lasting impact of e-modules on student performance, knowledge retention, and skill development could provide valuable insights for educators and policymakers.

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