Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

# Development of E-Modules to Improve Higher-Order Thinking Skills in Basic Accounting Subjects at Vocational Schools

**Fitria Jayanti, Suarman, Almasdi Syhaza**

**Universitas Riau, Pekanbaru, Indonesia**
*fitria.jayanti2057@grad.unri.ac.id*, *suarman@lecturer.unri.ac.id*, *almasdi.syahza@lecturer.unri.ac.id*
***corresponding author:*** *fitria.jayanti2057@grad.unri.ac.id*

## ABSTRACT

This paper documents learning resources in electronic modules created to improve or explore students' Higher-Order Thinking Skills (HOTS) that are valid, practical, and effective. The research method used is Research and Development (R&D) with the ADDIE model (Analyze, Design, Development, Implementation and Evaluation). The feasibility of the E-Module which was developed based on the results of module expert validation obtained 97.7% with very valid product criteria or suitable for use. Based on material expert validation, 94.5% was obtained with the valid or convenient product criteria. Based on the results of implementation in the field by basic accounting subject educators and students, the practicality of the E-Module developed received an assessment of the teacher's response with an average percentage score of 88.28% with convenient criteria and student responses with an average percentage score of 87.25% with efficient criteria. Furthermore, the E-Module developed was proven effective based on the results of the T-test and N-test gain analysis score is 0.842, which is in the high category. Therefore, this E-Module is effective in improving students' high-level thinking abilities.

***Keywords*: *basic accounting, e-module, higher-order thinking skill***

| Submitted | Accepted | Published |
|---|---|---|
| 29 August 2024 | 25 November 2024 | 22 January 2025 |

| | | |
|---|---|---|
| **Citation** | : | Jayanti, F., Suarman., & Syhaza, A. (2025). Development of E-Modules to Improve Higher-Order Thinking Skills in Basic Accounting Subjects at Vocational Schools. *Jurnal PAJAR (Pendidikan dan Pengajaran), 9*(1), 39-48. DOI: http://dx.doi.org/10.33578/pjr.v9i1.10040. |

## INTRODUCTION

The Indonesian education system has implemented the 2013 curriculum. The 2013 curriculum requires students to have high-level thinking skills or (Higher Order Thinking Skill). Gradini et al., (2018) stated that the National Education Standards Agency (BSNP) has formulated the Indonesian National Assessment which focuses on the competitiveness of Indonesian children in future competencies. This Indonesian National Assessment focuses on assessment poles that strive for thinking skills that are not only remembering (recall), restating (restate) and referring without processing (recite). The policy of the Ministry of Education and Culture of the Republic of Indonesia is estimated to be accurate in applying questions that stimulate students to carry out reasoning, not just understanding and applying.

Muthoharoh's research results(2020)High-level thinking abilities are students' way of thinking at a higher cognitive level, developed from various concepts, learning taxonomies and cognitive methods. According to Kristanto & Setiawan(2020) Higher Order Thinking Skill is the skill to connect ideas and facts, analyze, choose a hypothesis to the stage of concluding. High-level thinking skills will be formed when someone can connect new information with information that has been embedded in their memory, and/or reorganize and describe the information in order to achieve goals, or create a solution to a difficult situation.(Dinni, 2018).

During the learning process, in order for learning to run effectively and efficiently, educators must be skilled at determining learning resources according to current developments and demands. Moreover, during the current pandemic, all human activities are limited, as a result, book reading activities by students in the library are limited. According to Suarman et al.(2018), to solve problems in learning by paying attention to targets and adjusting to the competencies that must be achieved, educators must develop teaching

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

materials. During the current pandemic, the availability of the simplest learning resources is required to be used and accessed, as a result, students can easily understand and learn their learning materials. This statement is in line with the opinion put forward by Sari et al.(2021)that the application of E-Modules during the learning process will make it easier for educators to deliver lessons to their students. Moreover, nowadays almost all students already have electronic media, namely smartphones. Apart from that, Syamsurizal & Novi(2015)E-Modules can answer the availability of learning resources that can be easily accessed and can be used anywhere by students.

The use of E-Modules can improve students' high-level thinking skills, this is because E-Modules have advantages, namely they are more interactive. In line with what Nufus et al said(2020)which states that the module has the advantage of being interactive so that it encourages students to carry out personal evaluations of a problem or issue they are facing. The advantages of the E-Module are in accordance with high-level thinking skills as a transfer process, namely the skills of students in implementing what has been learned into new situations, without any instructions or guidelines from educators or others. This is supported by the results of research by Rahmatulloh et al., (2015) which states that this interactive can train students' abilities, so that when working on questions that require assessment, students no longer find difficulties. In addition, E-Modules also have advantages, namely multimedia equipped with interesting videos and illustrations, which can improve students' understanding of the material. This is in accordance with the results of previous research conducted by Sumarni, et al (2013) multimedia-based learning can improve students' mastery of concepts and thinking skills. Supported by research conducted by Simanjuntak et al (2010) that multimedia teaching materials can help students find alternative teaching materials other than textbooks which are often considered difficult to understand or confusing.

The results of interviews with Basic Accounting subject educators at SMK Negeri 6 Pekanbaru, the problems found include the lack of varied teaching materials because teachers at the school only use printed books. The available printed books are based on the 2013 Curriculum, but the results of the researcher's analysis of the printed books, the questions and exercises contained in the books have not encouraged students to have high-level thinking skills and the use of printed books is less easy for students to understand. This statement is supported by research by Yennita et al.(2018)which states that textbooks contain facts that require students to remember only, so that most student ability evaluation tests are limited to memorizing facts. Furthermore, Suarman and Almasdi Syahza (2013) stated that educators have so far focused on textbooks/textbooks and the lack of efforts to improve skills and the lack of educators' ability to develop knowledge so that they are limited to test books only. In addition, Miranda et al. (2021) stated that educators have not fully optimized the use of school facilities such as LCD and the internet. The results of research by Irianti et al. (2019) showed that the role of educators is very dominant in improving teaching skills in the classroom. Educators are professionals in carrying out their duties as teachers in the classroom in an effort to improve student skills.

Furthermore, based on the results of the analysis of KD (Basic Competencies) of Class X SMK in the Basic Accounting subject, information was obtained that KD 3.10 is located in the cognitive domain which is classified as the analysis level. So that the level of cognitive dimension that must be mastered by students is analysis. Furthermore, from the results of interviews with Basic Accounting subject educators at SMK Negeri 6 Pekanbaru, information was obtained that in the basic accounting subject based on the teacher's teaching experience and the results of written interviews with students, students have difficulty with the material on adjusting journals for service companies. Therefore, development of adjustment journal material is needed during learning at school, with the aim of improving students' high-level thinking skills. Based on the explanation stated above, the researcher aims to develop learning materials in the form of Electronic Modules which are created to improve or explore students' higher order thinking skills (HOTS). The E-Module developed by researchers is equipped with practice questions based on high-level thinking skills which are available in the E-Module to improve students' high-level thinking skills.

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

## METHOD

This research was carried out through the Research and Development (R&D) method. This research was conducted on Jl. Seroja, Kulim, Kec. Tenayan Raya, Pekanbaru City, Riau 28266. With the research subject being SMK Negeri 6 Pekanbaru. The time of this research started from December 7, 2021 to May 31, 2022.For the validation test of the E-Module, it was conducted by module experts and material experts. The effectiveness test of the E-Module was conducted by the T-test and the N-gain test. Then the practicality test of the E-Module was conducted by educators and students.

The R&D method is a research method used to produce certain products and test the effectiveness of these products (Situmorang et al, 2020). Syahza, A (2021) says the goal of development research is to investigate patterns and sequences of growth and/or change as a function of time. The Research and Development (R&D) method for this research uses the ADDIE (Analysis-Design-Development-Implement-Evaluate) model. The stages of the ADDIE model can be seen in Figure 1.

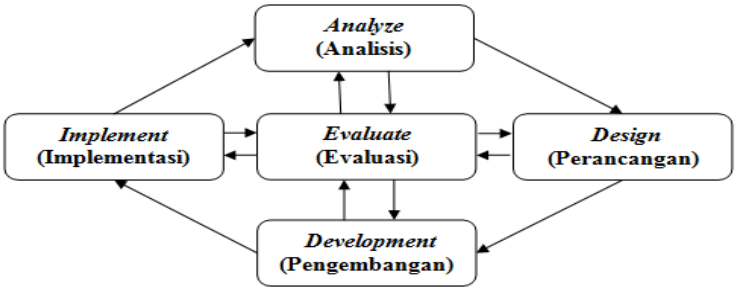


**Figure 1. Stages of the ADDIE Model**

## RESULTS AND DISCUSSION

### E-Module Development Process

The process of developing E-Modules to Improve High-Level Thinking Skills in Basic Accounting Subjects refers to the ADDIE development model, which includes the stages of analysis, design, development, implementation and evaluation. The evaluation stage can be carried out at each of the four stages above. Evaluations that occur at each of the four stages above are called formative evaluations, because their purpose is for revision needs.

Analysis activities carried out in the research include needs analysis, curriculum analysis and student analysis. Then an evaluation was carried out on the analysis of the three activities and it was found thatin Basic Accounting subjects there is KD 3.10 which is in the cognitive domain which is classified as an analysis level. KD 3.10 contains Basic Competence, namely Analyzing Adjustment Journals. Thus, the level of cognitive dimension that must be mastered by students is analyzing. Therefore, the development of teaching materials to improve HOTS on adjustment journal material is needed in learning at school, with the hope of being able to improve students' high-level thinking skills.

After conducting the analysis, it was continued to the design stage. At this stage, the researcher designed the contents of the E-Module, namely teaching materials in the form of E-Modules to improve high-level thinking skills, prototype design and instrument design used in the study. Then an evaluation was carried out and it was found that in order for the E-Module to be developed to be able to improve students' high-level thinking skills, the E-Module was equipped with practice questions.with transaction evidence, which will encourage students to analyze the transaction evidence to solve problems. This is because in accounting learning it is always based on practice and accounting practice is based on evidence of financial transactions. Next, at the development stage, researchers carry out validation test activities for the product being developed. From the validation results, revisions or improvements are then made according to suggestions/input from

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

module expert validators and material expert validators.

The validation process is carried out until the two expert validators state that the E-Module is suitable for testing. Below are some pictures of the improvements made to the E-Module.

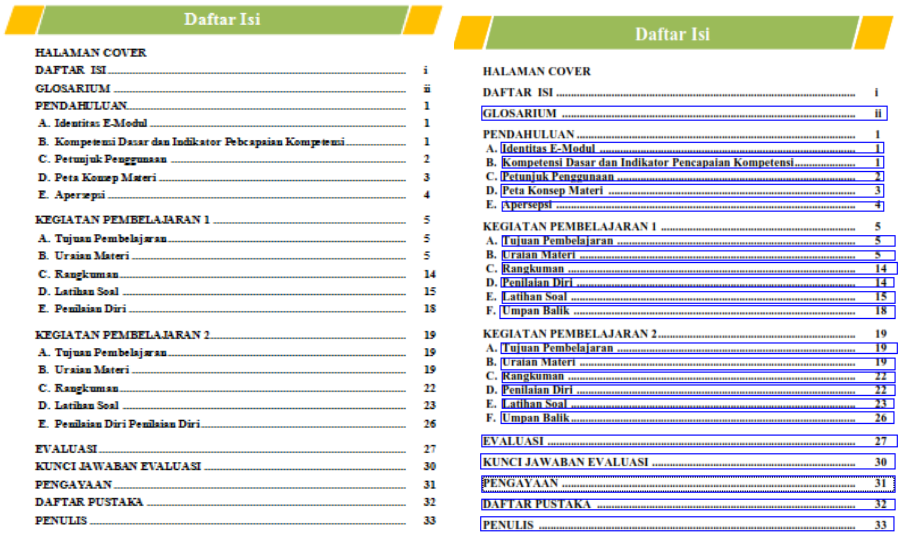


**Figure 2. Display of E-Module Table of Contents Before Revision (Left) and After Revision (Right)**

In the image above, revisions were made by creating gaps between sections in the table of contents and making the table of contents interactive. Furthermore, the revision of the video display in the E-Module can be seen in Figure 3.

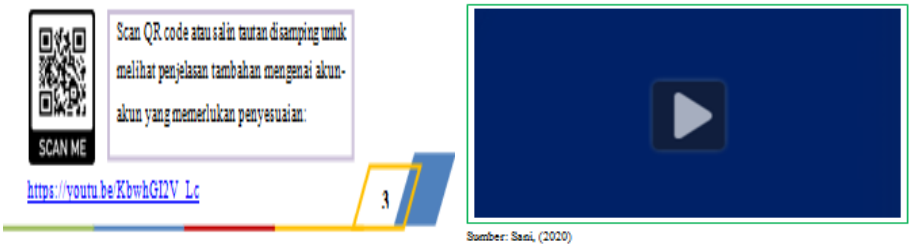


**Figure 3. Video Display in E-Module Before Revision (Left) and After Revision (Right)**

In the image above, a revision was made by adding a video to the Module. After the E-Module that has been developed is declared suitable for use. At this implementation stage, the results of the E-Module that was developed are applied in learning to determine its effect on improving students' high-level thinking skills. This stage consists of two activities. First, the practicality test of the E-Module and Second, the effectiveness test of the E-Module.

**E-Module Eligibility**

Validation or assessment of the e-Module's feasibility was carried out by 3 expert module validators and 2 expert material validators.The summary of validation by module experts and material experts as a whole can be seen in Figure 2.

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

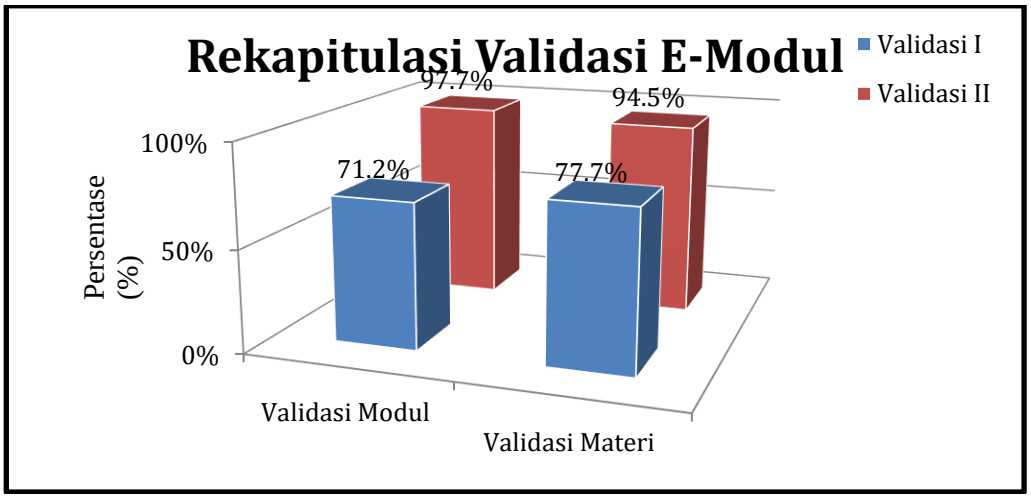


**Figure 4. Recapitulation of E-Module Validation**

Figure 4. is a recapitulation of the validation of the E-Module by module experts and material experts, where in validation I the highest percentage was in material validation, which was 77.5% and the lowest percentage was in module validation, which was 71.2%. The lowest percentage in module validation was obtained because all aspects of the assessment obtained values in the category of quite valid. Meanwhile, for material validation in validation I, the highest percentage was obtained because of the 4 aspects of the assessment, there was 1 aspect categorized as valid, namely the aspect of language assessment, and 3 aspects categorized as quite valid, namely the aspect of content feasibility, the aspect of presentation feasibility and the aspect of high-level thinking skills. In validation II, the highest percentage was in module validation, which was 97.7% and the lowest percentage was in material validation, which was 94.5% with the criteria of a very valid product or worthy of use.

**Effectiveness of E-Modules**

The E-Module Product Effectiveness Test aims to determine the level of effectiveness of the E-Module by looking at the increase in students' high-level thinking skills after using the E-Module developed through high-level thinking ability test questions. In this study, the E-Module effectiveness test was carried out in 2 ways, which are described as follows:

**High-Order Thinking Ability Test Data Analysis**

Analysis of high-level thinking ability test data was carried out using the paired samples T-test. The T-Test aims to determine whether there is a significant difference in students' high-level thinking abilities before learning activity 1 (KP 0), after learning activity 1 (KP 1) and after learning activity 2 (KP 2) on the E-Module. The Paired Samples T-Test test goes through the following 2 stages:

**Stage 1,** To see the differences in students' abilities between the test results carried out in learning activity 0 (KP0) and the test results carried out in learning activity 1 (KP1), a Paired Samples T-Test was carried out which can be observed in Table 1.

**Table 1. Paired Sample T-Test Results on KP0 and KP1**

| | T | Df | Sig. (2-tailed) |
|---|---|---|---|
| Pair 1 KP0 -KP1 | -24,102 | 69 | ,000 |

Based on Table 1, it is known that there is a difference in the average high-level thinking abilities of students in learning activity 0 (KP0) and learning activity 1 (KP1) in the E-Module which has been developed with a significance value of 0.000<0.05.

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

**Stage 2**, to see the difference in students' abilities between the test results carried out in learning activity 1 (KP1) and the test results carried out in learning activity 2 (KP2), a Paired Samples T-Test was carried out which can be observed in Table 2.

**Table 2. Paired Sample T-Test Results on KP1 and KP2**

| | T | Df | Sig. (2-tailed) |
|---|---|---|---|
| Pair 1 KP1 –KP2 | -67,185 | 69 | ,000 |

Based on Table 2, it is known that there is a difference in the average high-level thinking skills of students in learning activity 1 (KP1) and learning activity 2 (KP2) in the E-Module that has been developed with a significance value of 0.000<0.05.

**Category Enhancement of Higher Level Thinking Abilities**

Data analysis of high-level thinking skills was conducted through the N-gain score test which aims to determine the category of improvement in students' high-level thinking skills in learning activities 0 (KP0), learning activities 1 (KP1) and learning activities 2 (KP2) in the E-Module that has been developed. The data on the improvement in students' high-level thinking skills for the 2 stages are described as follows:

**Stage 1**, increasing students' high-level thinking skills between the test results carried out in learning activity 0 (KP0) and the test results carried out in learning activity 1 (KP1) can be observed in Table 3.

**Table 3. N-gain results of high-level thinking ability tests in KP0 and KP1**

| No. | High level thinking indicators | Score N-gain | Criteria |
|---|---|---|---|
| 1. | C4 Indicator | 0.181 | Low |
| 2. | C5 Indicator | 0.201 | Low |
| | **Overall average** | 0.20 | Low |

Table 3 shows the increase in students' high-level thinking abilities between learning activity 0 (KP0) and learning activity 1 (KP1) in the E-Module that has been developed for each indicator. Based on Table 5 above, it is known that in stage 1 there was an increase in students' high-level thinking abilities with an average of 0.20 with low criteria.

**Stage 2,**The increase in students' high-level thinking skills between the test results carried out in learning activity 1 (KP1) and the test results carried out in learning activity 2 (KP2) can be observed in Table 4.

**Table 4. N-gain results of high-level thinking ability tests in KP1 and KP2**

| **No.** | **High level thinking indicators** | **Score N-gain** | **Criteria** |
|---|---|---|---|
| 1. | C4 Indicator | 0.829 | Tall |
| 2. | C5 Indicator | 0.873 | Tall |
| | **Overall average** | 0.842 | Tall |

Table 4. shows the increase in students' high-level thinking skills in learning activity 1 (KP1) with learning activity 2 (KP2) in the E-Module that has been developed for each indicator. Based on Table 6 above, it is known that in stage 2 there was an increase in students' high-level thinking skills with an average of 0.842 with high criteria.

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

**Practicality of E-Modules**

The educator practicality questionnaire consists of 16 questions, meanwhile, the student practicality questionnaire consists of 17 questions. The data from the educator and student questionnaire results can be seen in Table 5.

**Table 5. Recapitulation of the results of the analysis of the questionnaire data on the practicality of practitioners and students.**

| No | Respondent | Percentage Score (%) | Practicality Category |
|---|---|---|---|
| 1 | Practitioners | 88.28% | Very Practical |
| 2 | Students | 87.25% | Very Practical |

Based on the Table 5, the percentage of scores for practitioner I and practitioner II with an average score of 88.28% is obtained with a very practical category, meaning that the developed E-Module is very easy to use, the presentation of the material is coherent and systematic, and the presentation of the material is in accordance with the indicators and learning objectives to be achieved in accordance with the 2013 Curriculum revised in 2017 for the vocational high school level. Overall, the results of the analysis of the assessment data for the two practitioners of the developed E-Module are stated to be very practical to use in learning.

Based on the results of the analysis of the practicality questionnaire data of students consisting of 70 people at SMK Negeri 6 Pekanbaru, it is known that the E-Module is categorized as very practical with an average percentage score of 87.25% with a very practical category. Overall, students stated that they strongly agree with the E-Module that was developed, including being interesting, using easy-to-read text, using easy-to-understand sentences, fostering motivation to learn, concepts and examples of questions presented are easy to understand and easy to understand the concept of material through video animation.

**DISCUSSION**

The Feasibility Assessment of the developed E-Module is carried out by the E-Module Validation Test. Validation or assessment of the feasibility of the E-Module is carried out by 3 expert module validators and 2 expert material validators. The assessments from the expert module validators and expert material validators are then analyzed so that the level of feasibility of the developed E-Module can be determined. Based on the results of the E-Module validation test phase II by the module experts and material experts above, it can be concluded that the E-Module to improve high-level thinking skills in basic accounting subjects is declared valid or suitable for use in the learning process. Because the E-Module has the advantage of being equipped with multimedia and is designed so that students can learn independently. The results of this study are in line with research conducted by Simanjuntak et al (2010) that multimedia teaching materials can help students find alternative teaching materials other than textbooks which are often considered difficult to understand/confusing. In addition, it is supported by the results of research by Suarman and Sumarno (2019) which states that the independent learning process can improve students' high-level thinking skills (HOTS).

The E-Module Product Effectiveness Test aims to determine the level of effectiveness of the E-Module by looking at the increase in students' high-level thinking skills after using the E-Module developed through a high-level thinking skills test. Based on the results of the T-test conducted in stages 1 and 2 above, it can be concluded that there is a significant difference in students' high-level thinking skills between learning activity 0 (KP0), learning activity 1 (KP1) and learning activity 2 (KP2) in the developed E-Module. The difference in students' high-level thinking skills indicates that the use of E-Module in the learning process has a positive influence which is indicated by an increase in the results of students' high-level thinking skills tests (Appendix 17). The use of E-Module can improve students' high-level thinking skills, because E-Module has the advantage of being more interactive. In line with what was said byNufus et al(2020)that stateThe module has the advantage of being interactive.thus encouraging students to carry out personal evaluations of an issue or problem they are facing. The advantages of the E-Module are in accordance with high-level thinking skills

Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 1 January 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i1.10040

as a transfer process, namely students' skills in implementing what they have learned into new situations, without any instructions or guidelines from educators or other people. This is supported by the results of research by Rahmatulloh et al, (2015) which states that this interactive activity can train students' abilities, so that when working on questions that require assessment, students no longer encounter difficulties.

To determine the category of improvement in students' high-level thinking skills in learning activities, high-level thinking skills data analysis was carried out through the N-gain score test. Based on the results of the N-gain test carried out in stages 1 and 2 above, it can be concluded that the use of the E-Module that has been developed can influence the increase in students' high-level thinking abilities. Which is characterized by an increase in students' high-level thinking abilities from a low scale/criteria with a score of 0.20 to a high scale/criteria with a score of 0.842. Increasing students' high-level thinking skills in basic accounting subjects, especially in adjusting journal material for service companies because the E-Module is equipped with HOTS practice questions to encourage the improvement of students' high-level thinking skills. This statement is supported by the results of research conducted by Qoridatullah, et al. (2021) who foundthat the use of HOTS-oriented E-Modules can improve students' abilities in solving HOTS type questions, which is indicated by an increase in student learning outcomes scores, which is indicated by an increase in the pre-test average score of 65.00 to the post-average score test was 76.33.

In addition, the use of E-Modules can improve high-level thinking skills because E-Modules are designed with examples of questions and exercises that stimulate students to be able to analyze the effects caused by evidence of adjustment transactions. E-Modules like this can provide students with an understanding of the material using a practical approach.This is because accounting learning is always practice-based and accounting practice is based on evidence of financial transactions. This is in line with the opinion of Rubenfeld and Scheffer (2014) who say that in evidence-oriented practice, a person must be able to determine when to look for evidence (describe questions), what is contained in the evidence, where and how the evidence can be found, the quality of the evidence how to best translate evidence into practice, and how to determine whether evidence-based practice is the “best” course of action. Furthermore, Eggen and Kauchak (2012) stated that there is a connection between critical thinking and evidence-based practice.

The practicality assessment of the developed E-Module was carried out by the E-Module Practicality Test. The E-Module Practicality Test aims to determine the practicality of the developed E-Module based on user responses. This test was carried out on a limited basis (small scale) to 2 basic accounting educators and 70 class X Accounting students at SMK Negeri 6 Pekanbaru. Based on the results of practicality tests by educators and students, it was concluded that the E-Module for improving high-level thinking skills in basic accounting subjects was stated to be very practical for use in learning, as evidenced by the level of practicality obtained from educators of 88.28% in the very practical category. This means that the E-module developed is very easy to use, the presentation of the material is coherent and systematic and the presentation of the material is in accordance with the indicators and learning objectives to be achieved in accordance with the 2013 Curriculum revised 2017 for the vocational school unit level. And the level of practicality obtained from students was 87.25% in the very practical category. Overall, students stated that they strongly agreed with the E-Module being developed, including being interesting, using text that is easy to read, using sentences that are easy to understand, fostering motivation to learn. , the concepts and example questions presented are easy to understand and easy to understand the concept of the material through video animations. This is in line with the research results Sari et al(2021), that the implementation of E-Modules during the learning process will make it easier for educators to deliver lessons to their students. Next, Syamsurizal & Novi (2015) stated that E-Modules can answer the availability of learning resources that can be easily accessed and can be used anywhere by students.

## CONCLUSIONS AND RECOMMENDATION

The E-Module was designed using the research and development (R&D) model with the ADDIE model. Then the results of research by module experts and material experts obtained results with very valid

criteria, thus the E-Module was suitable for use in learning in basic accounting subjects. Furthermore, the E-Module was proven to be effective based on the results of the T-test and N-gain test with high criteria, and obtained a very practical assessment based on the results of implementation in the field by basic accounting subject educators and students.

The results of this research also add empirical evidence that E-Modules are really needed by students in the learning process to improve high-level thinking abilities. For researchers who are interested in E-Module development research using an R&D model, especially those related to basic accounting subjects, it is best that trials are not only carried out on a limited basis but are carried out fully and repeatedly.

**REFERENCES**

Dinni, H. N. (2018). HOTS (High Order Thinking Skills) dan Kaitannya dengan Kemampuan Literasi Matematika. *PRISMA: Prosiding Seminar Nasional Matematika* , 1: 170-176.

Eggen, P & Kauchak, D. (2012). *Strategi dan Model Pembelajaran. Mengajarkan Konten dan Keterampilan Berpikir, Edisi 6*. Jakarta: Indeks.

Gradini, E., Firmansyah, B., & Julia, N. (2018). Menakar Kemampuan Berpikir Tingkat Tinggi Calon Guru Matematika melalui Level HOTS Marzano. *Mathematics Education Learning and Teaching*, 7(2): 41-48. DOI: 10.24235/eduma.v7i2.3357.

Irianti, M ., Syahza, A ., Suarman., (2021). Is it true that educator certification guarantees professional teachers? Elementary Education Online. 20(1), 1479-1489. DOI: https://doi.org/10.17051/ilkonline.2021.01.145

Kristanto, P. D., & Setiawan, P. G. (2020). Pengembangan Soal HOTS (Higher Order Thinking Skills)Terkait dengan Konteks Pedesaan. *PRISMA: Prosiding Seminar Nasional Matematika*, 2: 370-376. Doi: https://doi.org/10.31258/jes.5.3.p.464-478

Miranda, M., Almasdi Syahza dan Sumarno. (2021). Analysis of Factors Affecting Teacher Performance in State Junior High School Learning in Bengkalis Regency. *Journal of Educational Sciences*, 5(3): 464-478

Muthoharoh, M. (2020). Inovasi Pelajaran Pendidikan Agama Islam Berbasis HOTS (Higher Order Thinking Skills). *Journal of Islamic Education* , 5(2): 131-143.

Qoridatullah, A., Sholeh, H., & Ajat, S. (2021). Pengembangan E-Modul Berorientasi Higher Order Thinking Skills (HOTS) pada Pelajaran Ilmu Pengetahuan Alam (IPA) Kelas VI Sekolah Dasar. *Jurnal Muara Pendidikan, 6(1)* , 33-40.

*Rahmatulloh, B., Nengah, M dan Agus, S. (2015).* Kuis Interaktif untuk Melatih Kemampuan Pengamatan Siswa Pada Materi Kinematika dan Dinamika. *Jurnal Pembelajaran Fisika*, 3(5):37-46.

Rubenfeld, M. Gaie dan Scheffer, Barbara K. (2014). *Critical Thinking Tactics for Nurses*. Jones and barlett Publishers, Inc

Sari, S. E., Susilawati, & Lenny, A. (2021). E-Module Development on Hydrocarbon Compounds Material for Class X Agricultural Vocational High School. *Journal of Educational Sciences*, 5(1): 36-52. DOI: https://doi.org/10.31258/jes.5.1.p.36-52

Simanjuntak, SF., Suarman dan Henny Indrawati. (2019). Development of Interactive Multimedia Towards Economic Problems on Economic Subjects For Social Science Class X Students at Darma Yudha High School. *International Journal of Educational Best Practices (IJEBP)*, 3(2):64-74. DOI:10.31258/ijebp.v3n2.p64-74

Situmorang, M., Yustina, & Wan, S. (2020). E-Module Development using Kvisoft Flipbook Maker through the Problem Based Learning Model to Increase Learning Motivation. *Journal of Educational Sciences* , 4(4): 834-848. DOI: https://doi.org/10.31258/jes.4.4.p.834-848

Suarman dan Alamsdi Syahza. (2013). Dampak Kebijakan Sertifikasi Terhadap Kinerja Guru di Daerah Riau. *Jurnal Pendidikan*, 4(2):72-83. doi: http://dx.doi.org/10.31258/jp.4.2.72-8

Suarman, Hendripides, & Nurul, H. (2018). Development of Innovative Teaching Materials through Scientific Approach. *Journal of Educational Sciences*, 2(2): 14-22. DOI: http://dx.doi.org/10.31258/jes.2.2.p.14-22

Suarman dan Sumarno. (2019). Improving the Quality of Learning through the Self-Directed Learning Model. *International Journal of Innovation, Creativity and Change*, 10(2): 253-264.

Sumarni, W., Sudarmi dan Sri, K. (2013). Pembelajaran Berbasis Multimedia untuk Meningkatkan Penguasaan Konsep Kimia dan Keterampilan Berpikir Mahasiswa. *Jurnal Ilmu Pendidikan*, 19(1): 69-77. doi: http://dx.doi.org/10.17977/jip.v19i1.3757

Syahza, A. (2021). *Metodologi Penelitian (Edisi Revisi)*. Pekanbaru: UR Press.

Syamsurizal, H., & Novi, C. (2015). Pengembangan E-Modul berbasis keterampilan proses sains pada materi kesetimbangan kimia untuk tingkat SMA. *Prosiding SEMIRATA*