

DEVELOPMENT OF PROBLEM BASED LEARNING-BASED E-MODULES TO IMPROVE CRITICAL THINKING ABILITIES OF STUDENTS OF CLASS X SMAN 1 KOTA TANGERANG

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Abstract

This study aims to determine: (1) the feasibility of economic problem based learning (PBL) e-modules; (2) find out of differences critical thinking skills of students who use e-modules and students who don't use e-modules. This research used research and development (R&D) using a development design from ADDIE. The subjects of this study were students of class X IIS 2 with 38 students as the experimental class and X IIS 1 with 39 students as the control class. Product testing uses a posttest only control design. The analysis technique used the Mann Whitney test because the data were not normally distributed. The results of the study show: (1) the developing of economic problem based learning e-module is categorized as very feasible. (3) there are differences in critical thinking skills of student between the experimental class and the control class based on the Asymp Sig score. (2-tailed) of $0.000 < 0.05$. So it can be concluded that problem based learning e-modules can improve critical thinking skills of student.

Abstrak

Penelitian ini bertujuan mengetahui: (1) kelayakan e-modul ekonomi berbasis *problem based learning* (PBL); (2) perbedaan kemampuan berpikir kritis siswa antara kelompok siswa yang menggunakan e-modul dengan kelompok siswa yang tidak menggunakan e-modul. Jenis penelitian ini *research and development* (R&D) dengan menggunakan desain pengembangan dari ADDIE. Subjek penelitian ini adalah siswa kelas X IIS 2 dengan jumlah siswa 38 orang sebagai kelas eksperimen dan X IIS 1 dengan jumlah siswa 39 orang sebagai kelas kontrol. Pengujian produk menggunakan desain *posttest only control design*. Teknik analisis menggunakan uji Mann Whitney karena data tidak berdistribusi normal. Hasil penelitian menunjukkan: (1) e-modul ekonomi berbasis *problem based learning* yang dikembangkan dikategorikan sangat layak. (3) terdapat perbedaan kemampuan berpikir kritis siswa antara kelas eksperimen dan kelas kontrol berdasarkan nilai Asymp Sig. (2-tailed) sebesar $0.000 < 0.05$. Sehingga dapat disimpulkan bahwa e-modul berbasis *problem based learning* dapat meningkatkan kemampuan berpikir kritis siswa.

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INTRODUCTION

The 21st century is a century where the development of science and technology (IPTEK) is growing very rapidly. This becomes an opportunity if it can be utilized as well as possible or causes problems because human resources have not been able to deal with the changes that occur. Therefore, it is important to create quality human resources to answer the challenges of the times.

Preparing quality human resources cannot be separated from the important role of education. Based on Law no. 20 of 2003 concerning the national education system that education is a means of developing the potential of students to become useful human beings for the nation and responsive to the demands of the times (Indonesia, 2003). In this case, education is not only limited to gaining knowledge but also as a place to develop hard skills and soft skills. Quoting from the Ministry of Education and Culture news page, the skills that students must have in the 21st century are called the 4Cs, namely creativity, critical thinking and problem solving, communication, collaboration (Kemendikbud, 2017).

The ability to think critically is one of the abilities that must be possessed by students, according to Liberna, the ability to think critically makes students able to solve life problems they face by thinking deeply and analyzing the information received and having rational reasons so that the action to be taken is correct (Liberna). , 2012). However, Indonesia is classified as a country that has low critical thinking skills. This is evidenced from the Program for International Student Assessment (PISA) report that in 2018 students' ability in mathematics achieved an average score of 379 with an average OECD score of 489, while for science the average score reached 396 with an average score of 396. the average OECD score is 489 (Schleicher, 2019). Based on the results of these data can be used as a reference that the importance of developing critical thinking skills.

Developing critical thinking skills is currently difficult to implement because the learning process is carried out online. Based on the results of interviews by economics teachers at SMAN 1 Tangerang City that online learning makes it difficult for teachers to improve students' critical thinking skills because the available time is very limited, making learning tends to be passive using the lecture method and the teacher also cannot explain the material freely, besides that the teacher also needs modules equipped with pictures, videos, case studies and practice questions to overcome these problems.

Modules are independent teaching materials that are made in a systematic and directed manner accompanied by learning instructions that can be used by students (Wardhani & Sunarno, 2012). This means that the module can be used by students without being guided by the teacher directly because the module is equipped with learning instructions. Along with the development of technology, many modules have been developed into electronic modules (e-modules). The difference between e-modules and print modules is that they can be accessed using a mobile phone/computer and are more interactive because they can display images, audio, and video (Suarsana & Mahayukti, 2013).

The Ministry of Education and Culture as the organizer of affairs in the field of education makes it easy for teachers to obtain e-modules for all subjects and levels of education through the website www.emodul.kemendikbud.go.id. However, the e-module

made by the Ministry of Education and Culture still has shortcomings, namely the questions contained in the e-module do not develop students' critical thinking skills. Based on these shortcomings, researchers want to develop e-modules as an alternative to self-teaching materials that are easily understood by students and equipped with questions that can assist in developing students' critical thinking skills.

An important component in the learning process is not only the use of appropriate teaching materials but also learning models. The learning model has an influence in the learning process to direct students to achieve learning goals (Sembiring & Situmorang, 2015). Therefore, the e-module that will be developed in this research is an e-module that is packaged with problem based learning. Problem based learning is student-centered learning, where students learn about a problem and try to find a solution (Phungsuk, Viriyavejakul, & Ratanaolarn, 2017). With the presentation of a problem, students will be encouraged to solve the problem so that they can develop their critical thinking skills. This was conveyed by Madroji et al., (2019) that problem-based learning-based e-modules can improve critical thinking skills.

This study is in accordance with research conducted by Ike Selviani entitled Development of Problem Based Learning Biology Modules to Improve Critical Thinking Ability of High School Students that the developed module can improve students' critical thinking skills as seen from the significant difference between the experimental class and the control class (Selviani, 2019). However, in this study there are still shortcomings where the module developed is only for biology subjects and has not been in the form of an e-module. Therefore, researchers want to develop e-modules based on problem based learning that can help students improve their critical thinking skills in economics subjects.

The aims of research on the development of problem-based learning-based e-modules to improve critical thinking skills are (1) to develop and determine the feasibility of problem-based learning-based e-modules, (2) to determine differences in students' critical thinking skills between groups of students using e-modules. module-based problem-based learning with groups of students who do not use e-modules

METHOD

This research uses research and development (R&D) research. This research was conducted to develop teaching materials in the form of problem-based learning (PBL)-based economic e-modules that can be used to assist students in improving critical thinking skills. The development procedure used in this study refers to the development model developed by Dick and Carry, namely the ADDIE model. The ADDIE model stands for Analyze (analysis stage), Design (planning stage), Development (development stage), Implementation (implementation stage), Evaluation (evaluation stage) (Mulyatiningsih, 2011).

The subjects of this research trial were students of class X from SMAN 1 Tangerang City which consisted of two classes, namely class X IIS 2 with 38 students as the experimental class using e-modules based on problem based learning, and class X IIS 1 with the number of students 39 people as the control class did not use e-modules and only used conventional methods with the help of power points. Subjects were selected using a simple random sampling technique, ie the subject was taken randomly.

The trial was carried out using a posttest only control design, namely a research design in which the experimental and control groups were selected randomly and each group would be given a test to determine the effect after being given treatment (Sugiyono, 2016). Tabel 1.

Posttest Only Control Design

Kelas	Perlakuan	Posttest
Ekperimen	X	0 ₂
Kontrol		0 ₄

Analysis of the data used to test the hypothesis using a parametric test in the form of a t-test if the prerequisite test is met, if the parametric prerequisite test is not met, the data analysis uses a non-parametric test, namely the Mann Whitney test. This was done to determine the differences in students' critical thinking skills between the experimental class that used the e-module and the control class that did not use the e-module.

RESULTS AND DISCUSSION

The research data are the results of validation tests by experts, the results of small-scale trials, the results of the research sample trials, prerequisite tests, and hypothesis testing.

Validation Test Results by Experts

The validation test was carried out by a team of lecturers who assessed it in terms of material and media. Validation test was conducted to determine the feasibility level of the developed e-module. The overall validation test results are presented in the **following table**. Tabel 2.

Hasil Uji Validasi dari Beberapa Ahli

No	Validator	Rata-Rata Skor	Interpretasi
1	Ahli materi	88.2%	Sangat Layak
2	Ahli Media	93.1%	Sangat Layak

Based on the results of the validation test by material experts and media experts, it shows that the average value of several validators is greater than 81%. This indicates that the developed e-module is included in the very feasible category for use.

Small-Scale Trial Results

Small-scale trials were carried out by students other than the test subjects, namely class X MIPA 2 SMAN 1 Tangerang City with a total of 34 students. This aims to determine whether the e-module developed is in accordance with the needs of students. The results of small-scale trials can be seen in the following table

Tabel 3.
Hasil Uji Coba Skala Kecil

No	Kelas	Rata-Rata Skor	Interpretasi
1	X MIPA 2	83.6%	Sangat Layak

Based on the results of small-scale trials, it shows that the average score is 83.6% which is greater than 81%. This indicates that the e-module developed is in accordance with the needs of students and is very feasible to use.

Research Sample Test Results

The research sample test was conducted by giving a posttest to the experimental and control classes. The test questions provided are 19 multiple choice questions

Tabel 4.

Hasil Posttest Pada Kelas Eksperimen dan Kelas Kontrol				
Kelas	Posttest			
	Minimum	Maksimum	Mean	Standar Deviasi
Eksperimen	47	100	81.18	13.602
Kontrol	26	100	68.26	16.176

Based on the posttest results, the average posttest score for the experimental class was 81.18, while for the control class it was 68.26. This indicates that the critical thinking ability of the experimental class students is better than the control class.

Prerequisite Test

Normality test

Based on the normality test using the Shapiro-Wilk test, it shows that the value of Sig. experimental class of $0.001 < 0.05$ which means the experimental class data is not normally distributed, while the value of Sig. control class of $0.092 > 0.05$ which means the control class data is normally distributed. Therefore, parametric testing cannot be carried out because the parametric prerequisites are not met where the data must be normally distributed (Ismail, 2018)

Homogeneity Test

Based on the homogeneity test using Levene's test, it shows that the value of Sig. of $0.318 > 0.05$, which means that the experimental class and control class students have the same or homogeneous variance.

Hypothesis testing

Hypothesis testing using non-parametric statistical test, namely the Mann Whitney test. Based on the results of the Mann Whitney test, the Asymp value. Sig. (2-tailed) of $0.000 < 0.05$. It can be concluded that there are differences in students' critical thinking skills between the experimental class that uses the e-module and the control class that does not use the e-module.

DISCUSSION

Problem Based Learning-Based E-module in Improving Critical Thinking Ability

The results showed that the group of students who were treated using e-modules based on problem based learning was better than the group of students who did not use e-modules and only used conventional methods with the help of power points. Based on the results of the posttest conducted in the experimental class and control class, the average posttest score in the experimental class was 81.18, while for the control class it was 68.26.

The difference in students' critical thinking skills between the experimental class and the control class can be seen using the Mann Whitney test. The test results show that the Asymp Sig. (2-tailed) of $0.000 < 0.05$. This shows that there are differences in critical thinking skills between groups of students who use e-modules and groups of students who do not use e-modules.

Based on the description above, it can be seen that learning using e-modules has an impact on students because e-modules are designed to facilitate and assist students in learning and achieve learning goals. In addition, the use of e-modules makes learning

interesting and interactive, this was conveyed by Suarsana that e-modules can be accessed using computers/mobile phones and are more interactive because they can display images, videos and audio (Suarsana & Mahayukti, 2013). In line with the statement above, Abidin and Walida explained that e-modules are teaching materials that can make it easier for students to learn independently, because e-modules are prepared in a complete, clear and attractive manner (Abidin & Walida, 2017). This proves that the use of e-modules can provide good learning for students because e-modules are more interesting, interactive and allow students to learn independently because they are equipped with learning instructions so that students can learn without the help of the teacher.

The role of e-modules in improving critical thinking skills cannot be separated from the learning model packaged in the e-module, namely problem based learning. According to Savery, problem based learning can encourage students to conduct research and solve a problem, by integrating the theory and practice that has been obtained to be applied in developing solutions to these problems (Savery, 2006). In line with the above statement, Nafiyah and Syuyanto explain that problem based learning is a learning model that makes real-world problems a context in student learning, where from these problems students learn to develop problem-solving skills and critical thinking (Nafiah & Suyanto, 2014). Based on this description, it can be concluded that problem-based learning-based e-modules can improve students' critical thinking skills.

CONCLUSION

Based on the results of the discussion regarding the research and development of problem-based learning-based e-modules, the following conclusions can be drawn: (1) Based on the results of validation tests conducted by material experts and media experts as well as small-scale trials by students, it can be seen that e-modules -The developed module is very suitable for use in the learning process and is in accordance with the needs of students. (2) There are differences in students' critical thinking skills between the experimental class that uses e-modules based on problem based learning and the control class that does not use e-modules..

REFERENCE

- Abidin, Z., & Walida, S. El. (2017). Pengembangan E-modul Interaktif Berbasis Case (Creative, Active, Systematic, Effevtive) Sebagai Media Pembelajaran Geometri Transformasi Untuk Mendukung Kemandirian Belajar dan Kompetensi Mahasiswa. In *Prosiding Seminar Nasional Matematika dan Aplikasinya* (pp. 197–202). Surabaya: Universitas Airlangga. Retrieved from http://repository.unair.ac.id/73928/1/29-Zainal-Abidin_Pendidikan_.pdf
- Indonesia, R. Undang-Undang No. 20 Tahun 2003 tentang Sistem Pendidikan Indonesia (2003). Jakarta, Indonesia: Sekretariat Negara.
- Ismail, F. (2018). *Statistika Untuk Penelitian Pendidikan dan Ilmu-Ilmu Sosial*. Jakarta: Kencana.
- Kemendikbud. (2017). Pendidikan Karakter Dorong Tumbuhnya Kompetensi Siswa Abad 21. Retrieved from <https://www.kemdikbud.go.id/main/blog/2017/06/pendidikan-karakter-dorong-tumbuhnya-kompetensi-siswa-abad-21>
- Liberna, H. (2012). Peningkatan Kemampuan Berpikir Kritis Matematis Siswa Melalui Penggunaan Metode Improve Pada Materi Sistem Persamaan Linier Dua Variabel.

Jurnal Formatif, 2(23), 190–197. <https://doi.org/10.30998/formatif.v2i3.101>

- Madroji, Zulaiha, F., & Faizah. (2019). Pengembangan Modul Fisika Berbasis Problem Based Learning Pada Materi Fluida Dinamis Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Kelas XI SMAN 1 Astanajapura. *Jurnal Pendidikan Fisika Dan Sains*, 2(1), 17–23. Retrieved from <http://journal.unucirebon.ac.id/index.php/jpfs/article/view/15>
- Mulyatiningsih, E. (2011). *Riset Terapan Bidang Pendidikan & Teknik*. Yogyakarta: UNY Press.
- Nafiah, Y. N., & Suyanto, W. (2014). Penerapan Model Problem-Based Learning Untuk Meningkatkan Keterampilan Berpikir Kritis dan Hasil Belajar Siswa. *Jurnal Pendidikan Vokasi*, 4(1), 125–143. <https://doi.org/10.21831/jpv.v4i1.2540>
- Phungsuk, R., Viriyavejakul, C., & Ratanaolarn, T. (2017). Kasetsart Journal of Social Sciences Development of a problem-based learning model via a virtual learning environment. *Kasetsart Journal of Social Sciences*. <https://doi.org/10.1016/j.kjss.2017.01.001>
- Savery, J. R. (2006). Overview of Problem-based Learning : Definitions and Distinctions. *Interdisciplinary Journal of Problem Based Learning*, 1(1). <https://doi.org/10.7771/1541-5015.1002>
- Schleicher, A. (2019). *PISA 2018 Insights and Interpretations*. Retrieved from [https://www.oecd.org/pisa/PISA 2018 Insights and Interpretations FINAL PDF.pdf](https://www.oecd.org/pisa/PISA%2018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf)
- Selviani, I. (2019). Pengembangan Modul Biologi Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik SMA. *Indonesian Journal of Integrated Science Education*, 1(2), 147–154. <https://doi.org/10.29300/ijisedu.v1i2.2032>
- Sembiring, R., & Situmorang, J. (2015). Pengaruh Model Pembelajaran dan Gaya Belajar Terhadap Hasil Belajar Matematika. *Jurnal Teknologi Pendidikan*, 8(1), 127–140. <https://doi.org/10.24114/jtp.v8i1.3316>
- Suarsana, I. M., & Mahayukti, G. A. (2013). Pengembangan e-modul berorientasi pemecahan masalah untuk meningkatkan keterampilan berpikir kritis mahasiswa. *Jurnal Pendidikan Indonesia*, 2(3), 193–200. <https://doi.org/10.23887/jpi-undiksha.v2i2.2171>
- Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.
- Wardhani, K., & Sunarno, W. (2012). Pembelejaran Fisika Dengan Model Problem Based Learning Menggunakan Multimedia dan Modul Ditinjau Dari Kemampuan Berpikir Abstrak dan Kemampuan Verbal Siswa. *Jurnal Inkuiri*, 1(2), 163–168. Retrieved from <https://eprints.uns.ac.id/id/eprint/1582>