International Journal of Research and Review
[Indexed, Peer Reviewed Journal]
Volume 12; Issue: 1; January 2025
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Development of Problem Solving-Based E-Module to Improve the Effectiveness of Learning in School

Bayu Surindra[1], Elis Irmayanti[2]

[1,2]Economics Education Study Program, Faculty of Economics and Business, Nusantara PGRI University of Kediri, Indonesia

Corresponding Author: Bayu Surindra

DOI: https://doi.org/10.52403/ijrr.20250148

ABSTRACT

Appropriate utilisation of learning media will help teachers and students in achieving learning objectives. One example of learning media that is suitable for use in online learning today is using e-Modules. In this case, the e-module is compiled using the PDF flip application to simplify and provide an attractive appearance. With the use of e-modules in the form of flip PDF, besides being cost-effective, the available displays are similar to the printed version of the book, so students will find it easier to use the e-module. The objectives of this research include: 1) To determine the development of problem solving-based e-modules; 2) To determine the feasibility of e-modules based on problem solving; and 3) To determine the students' response to e-modules based on problem solving. The object of research is students of class X IPS 1, X IPS 2, and X IPS 4 at MAN 1 Kediri Regency. This research is a research and development (R&D), with the following research stages: 1) Preliminary research; 2) Identifying problems; 3) Collecting data and designing e-modules; 4) Validation of e-module design by experts; 5) Revision of e-module; 6) Small-scale trial; 7) Further e-module revision; 8) E-module usage trial; 9) Final e-module revision; and 10) finished product of problem solving-based economic learning module.

Keywords: E-Module, *Problem Solving*

INTRODUCTION

The utilisation of learning media in this day and age must be more selective, considering that learning activities carried out online and offline can be done easily. Learning media is very important in learning activities, where learning media will support the smooth running of learning activities. Appropriate utilisation of learning media will help teachers and students in achieving learning objectives. One example of learning media that is suitable for use in online learning today is using e-Modules. E-Module is an electronic version of the module where its use can be accessed through electronic devices such as laptops, computers, even through smartphones. In terms of cost, it is also more efficient than using modules that need to be printed and duplicated so that they can be used by students.

In response to this, currently there are many uses of technology-based learning media that are interesting and can help the online learning process. One form or type of learning media that can be used by teachers on the material taught is by using e-Modules. With e-Modules students can learn independently, this is suitable to be applied at this time, because teachers who cannot accompany students in learning activities directly, besides that they can learn at their own level of understanding, and e-Modules can be accessed on each student's gadget.

Modules are learning tools in written or printed form that are arranged systematically,

contain learning materials, methods, learning objectives based on basic competencies or indicators of competency achievement, instructions for self-learning activities (self-instructional), and provide opportunities for students to test themselves through exercises presented in the module (Hamdani, 2011). In addition, the e-module developed is expected to be able to increase the effectiveness of online learning in schools. To support this, a problem-solving-based learning model is also used, which is one of the learning models that is considered in accordance with the characteristics of economics subjects in schools.

With the e-module based on problem solving can direct students to be more active in learning so that they are able to do problem solving. So that with the development of e-modules based on problem solving, it is expected to be able to increase the effectiveness of economic learning in schools, especially in online learning like today. This is in line with the results of research conducted by (Nugroho et al., 2017), where based on the results of statistical tests that have been carried out, it is known that student learning outcomes using problem solving-based e-modules are better than conventional learning. Furthermore, from research conducted by (Aflaha, 2017), It is known that the achievement of learning outcomes after following the learning process using problem solving-based e-modules has increased. As well as research conducted by (Santosa et al., 2017), It is known that student responses to the application of e-modules in learning display suitability, ease of use of e-modules, student motivation and e-module content are included in the good category.

LITERATURE REVIEW

1. E-Module

E-Module is a learning module that uses electronic media in its presentation. So that the characteristics of E-Module are the same as the characteristics of the module, namely self-instruction, self-contained, stand alone, adaptive and user friendly (Wulansari et al., 2018). E-modules are a systematically arranged set of digital or non-printed teaching media used for self-study purposes, which requires students to learn to solve problems in their own way (Santosa et al., 2017). Electronic modules (e-modules) are the development of printed modules in digital form that adapt many of the printed modules (Sugihartini & Jayanta, 2017).

2. Problem Solving

Problem solving is a process that directs or trains students to be able to solve problems in the field of science they learn (Listiani et al., 2017). The problem solving method is to perform procedural operations in a sequence of actions, step by step in a systematic manner (Suhendri, 2015). Problem Solving, according to the term is the process of solving a problem or event, an effort to choose one of several alternatives or options that are close to the truth of a particular goal (Maulidya, 2018). The Problem Solving learning model is used to stimulate thinking in complex problem situations (Jauhar, 2017). The problem solving method is a learning method that focuses on understanding, solutions, identifying errors, finding alternatives, and formulating questions (Ritonga et al., 2021). From several definitions, it can be seen that problem solving is a procedural problem-solving process based on systematic stages in accordance with the field of science studied.

Advantages of Problem-Solving Learning Model: (a). Can make students live more in everyday life, (b). Can train and accustom students to face and solve problems skilfully, (c). Develop the ability to think creatively, (d). Learners have begun to be trained to solve their problems, (e). Train students to design a discovery, (f). Solve problems faced realistically (Jauhar, 2017). Steps in the problem solving learning model (Majid, 2015), among others: a) Prepare a clear issue/problem to be solved; b) Write down the objectives/competencies to be achieved; c) Search for data or information that can be used to solve the problem; d) Determine

temporary answers; e) Present the answers of each group; and e) Draw conclusions.

MATERIALS & METHODS

This research is a research and development (R&D) study. Research and development is a research method that uses and produces certain products. (Sugiyono, 2017), The data analysis techniques used in the research include:

a. Descriptive Analysis
b. Descriptive analysis is used to describe the results of research based on the data obtained to determine the application and feasibility of problem-based financial management textbooks (problem solving). Descriptive analysis is data analysis by describing or describing the data that has been collected as it is without intending to generalise it (Sugiyono, 2017).
c. Data analysis of the validity of teaching materials

Analysis of textbook validation by experts is carried out with the formula (Riduwan, 2010):

$$P = \frac{\Sigma xi}{\Sigma x} \; x \; 100\%$$

Where: P = percentage
Σxi = number of subject answers
Σx = highest number of answers
Furthermore, the guidelines for decision making in expert validation, namely:

Table 1. Development decision-making (Riduwan, 2010)

Score	Qualification	Description
81 – 100%	Very good	No Revision
61 – 80%	Good	No Revision
41 – 60%	Enough	Revision
21 – 40%	Less	Revision
0 – 20%	Very Less	Revision

d. Problem-solving ability

To analyse problem-solving ability, the following categories were used:

Table 2. Problem-solving ability (Ariani et al., 2017)

Score	Qualification
81 – 100	Very good
61 – 80	Good
41 – 60	Enough
21 – 40	Less
0 – 20	Very Less

e. Collaboration skills

Table 3. Student Collaboration Skills (Arifin, 2020)

Score	Qualification
81 – 100	Very good
61 – 80	Good
41 – 60	Enough
21 – 40	Less
0 – 20	Very Less

RESULT

Expert Validation Results

The following data shows the results of the validation that has been carried out by experts:

Table 4. Module Validation Results

Validated product	Validator	Validation Results	Qualification
Problem solving-based economics e-modules	Presentation Expert	95,5%	Very good
	Content Expert	94,25%	Very good
	Language Expert	98%	Very good

Problem Solving Ability Results

From the following data, it can be seen the results of the ability to solve problems in students during learning:

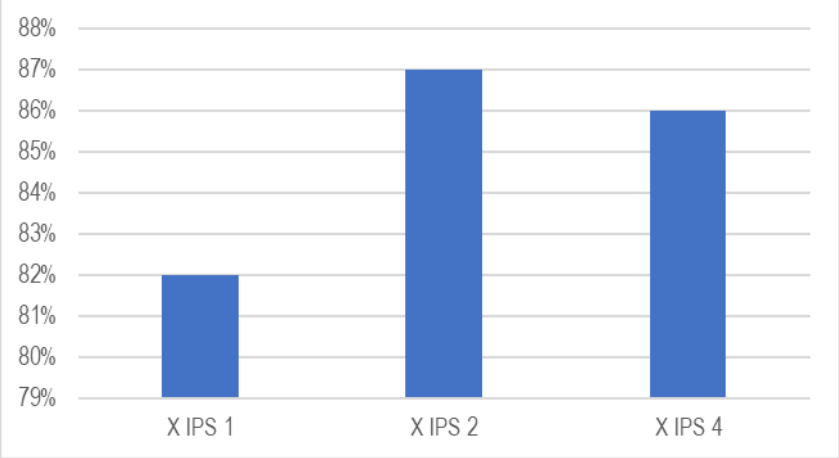

Figure 1. Problem Solving Ability

Student Collaboration Ability Results

From the following data, it can be seen that the results of collaboration skills in students during learning take place:

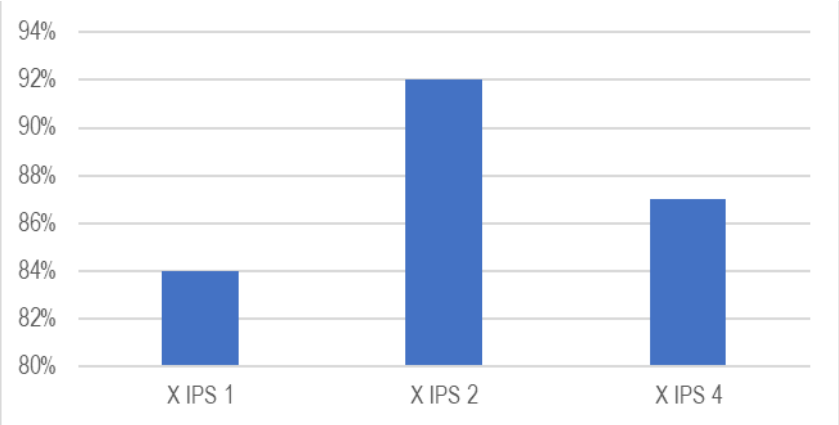

Figure 2: Students' Collaboration Ability

Student Learning Outcomes

The learning outcomes of students in classes X IPS 1, X IPS 2, and X IPS 4 classically can be known from the written test data at the end of the cycle, the data is as follows:

Table 4. Student Learning Outcomes

Value Range	X IPS 1	X IPS 2	X IPS 3
91 – 100	10	7	7
81 – 90	12	4	2
71 – 80	7	18	22
61 – 70	0	0	0
56 – 60	0	0	0
40 – 55	0	0	0
0 – 39	0	0	0
	29	34	34

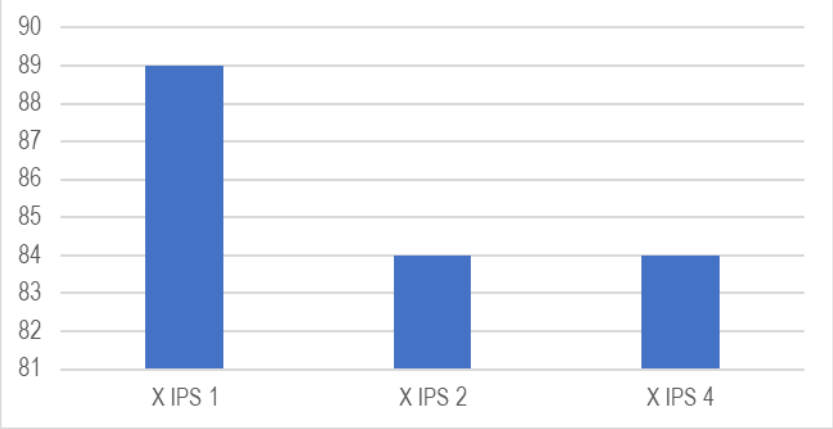

Figure 3. Classical Student Learning Outcomes

DISCUSSION

Expert Validation Results

From the results of the validation test by experts, it can be seen that the problem solving-based economic e-module is categorised as valid, so that it can be applied to all respondents. With the validity test from experts, it will further strengthen the feasibility level of e-modules can be used to improve students' problem-solving skills, students' collaboration skills, and improve student learning outcomes.

Problem Solving Ability Results

Based on observations in the aspect of problem-solving ability of the three classes used as the object of research, where the three classes have different problem-solving abilities. In class X IPS 1 known that the ability to solve problems by 82%, then in class X IPS 2 known that the ability to solve problems by 87%, and in class X IPS 4 known that the ability to solve problems by 86%. Of the three classes that became the object of research, it is known that class X IPS 2 has the highest problem-solving ability when compared to the other two classes.

This is in line with research conducted by (Permana* et al., 2021), where the results of the study are the use of problem solving-based E-modules on digestive system material is effective for improving students' problem solving skills. This is indicated by an increase in students' problem solving skills with an average n-gain of 0.57 in the moderate category.

The level of student experience in solving problems is one of the keys to success, because the more often students are required to be able to solve existing problems, especially in learning, the easier the learning process will be.

Student Collaboration Ability Results

Based on observations in the aspect of student collaboration ability of the three classes used as research objects, where from the three classes have different student collaboration abilities. In class X IPS 1 it is known that the ability of student collaboration is 84%, then in class X IPS 2 it is known that the ability of student collaboration is 92%, and in class X IPS 4 it is known that the ability of student collaboration is 87%. Of the three classes that became the object of research, it is known that class X IPS 2 has the highest student collaboration skills when compared to the other two classes.

This is in line with research (Ningrum et al., 2016) where the results of his research are that learning chemistry through collaborative problem-based learning on solubility and solubility product can increase student activeness.

From the results of in-depth searches, sometimes students are reluctant to cooperate with their groups, students prefer to divide the tasks given by the teacher and then work

individually and then collect the results together. This is done by students with the reason that to save time and to quickly complete the tasks given by the teacher. Whereas in essence student collaboration really requires cooperation between group members not done individually.

Student Learning Outcomes

From the recapitulation of student learning outcomes, it can be seen that class X IPS 1 students who scored 91-110 were 10 students, students who scored 81-90 were 12 students, and students who scored 71-80 were 7 students. Furthermore, class X IPS 2 students who scored 91-110 were 7 students, students who scored 81-90 were 4 students, and students who scored 71-80 were 18 students. As well as class X IPS 4 students who scored 91-110 as many as 7 students, students who scored 81-90 as many as 2 students, and students who scored 71-80 as many as 22 students. So class X IPS 1 is a class that has an average of students who get the highest score more than the other two classes.

From the learning results obtained by students, it is known to have quite good learning outcomes, where the results of classical completeness of social studies class 1 are 89%, classical completeness of social studies class 2 is 84%, and classical completeness of social studies class 4 is 84%. From the results of classical completeness of all classes, it can be seen that all classes have met the classical completeness that has been determined by the school which is 80%. Where the class with the highest learning outcomes is class X IPS. So that the development of e-modules based on problem solving to improve the effectiveness of learning in schools.

This is in line with research conducted by (Aflaha, 2017), It is known that the achievement of student learning outcomes after following the learning process using problem solving-based modules has improved well.

CONCLUSION

From the research that has been done, several conclusions can be drawn, including: 1) From the results of the expert validation test, it is known that the problem solving-based e-module prepared is included in the very good category so that it is valid for use in research; 2) The ability to solve student problems is different from each class, where in class X IPS 1 is 82%, X IPS 2 is 87%, and X IPS 4 is 86%, so it is included in the very good category in problem solving; 3) the ability to collaborate with students also experiences differences in each class, where in class X IPS 1 is 84%, X IPS 2 is 92%, and X IPS 4 is 87%, so it is included in the very good category in collaboration; and 4) Classical student learning outcomes were in class X IPS 1 by 89%, X IPS 2 by 84%, and X IPS 4 by 84%, so that overall from the three classes met the level of classical completeness determined by the school which is 80%.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: No conflicts of interest declared.

REFERENCES

1. Aflaha, D. S. I. (2017). Pengembangan Modul Berbasis Problem Solving Pada Mata Kuliah Elektronika. *Tecnoscienza*, *2*(1), 01–17. https://ejournal.kahuripan.ac.id/index.php/TECNOSCIENZA/article/download/81/67
2. Ariani, S., Hartono, Y., & Hiltrimartin, C. (2017). Kemampuan Pemecahan Masalah Matematika Siswa pada Pembelajaran Matematika Menggunakan Strategi Abduktif-Deduktif di SMA Negeri 1 Indralaya Utara. *Jurnal Elemen*, *3*(1), 25–34. https://doi.org/10.29408/jel.v3i1.304
3. Arifin, S. Z. (2020). Penerapan Model Pembelajaran Think , Pair , Share untuk Meningkatkan Kemampuan Kolaboratif dan Representasi Siswa The Learning Model Use ; Think , Pair , Share in Improving Collaborative Ability and Student Representation. *Report of Biological Education*, *1*(2), 63–78.

https://jurnal.ummi.ac.id/index.php/rebion/article/download/1003/569
4. Hamdani. (2011). *Strategi Belajar Mengajar*. Pustaka Setia.
5. Jauhar, S. (2017). Penerapan Model Pembelajaran Problem Solving Dalam Meningkatkan Hasil Belajar IPS Siswa SD. *JIKAP PGSD: Jurnal Ilmiah Ilmu Kependidikan*, *2*(1), 141. https://doi.org/10.26858/jkp.v1i2.5285
6. Listiani, R., Hidayat, A., & Maspupah, M. (2017). Perbandingan Model Pembelajaran Problem Solving Dan Problem Based Learning Terhadap Hasil Belajar Siswa Pada Materi Sistem Reproduksi Manusia (Penelitian pada Siswa Kelas XI IPA SMAN 1 Ciparay Kab. Bandung). *BioedUIN*, *7*(1). https://journal.uinsgd.ac.id/index.php/bioeduin/article/view/2445/1631
7. Majid, A. (2015). *Strategi Pembelajaran*. Remaja Rosdakarya.
8. Maulidya, A. (2018). Berpikir dan Problem Solving. *Ihya Al-Arabiyah*, *4*(1), 11–29. http://jurnal.uinsu.ac.id/index.php/ihya/article/view/1381/1122
9. Ningrum, P., Sains, J. P., & Semarang, U. M. (2016). Kata Kunci : Keaktifan, Berpikir Kreatif, Kolaboratif, Pembelajaran Berbasis Masalah. *Jurnal Pendidikan Sains*, *4*(1), 17–28. https://media.neliti.com/media/publications/121128-ID-meningkatkan-keaktifan-dan-kemampuan-ber.pdf
10. Nugroho, K. M., Raharjo, S. B., & Masykuri, M. (2017). Pengembangan E-Modul Kimia Berbasis Problem Solving Dengan Menggunakan Moodle Pada Materi Hidrolisis Garam Untuk Kelas XI SMA/MA SEMESTER II. *Http://Jurnal.Uns.Ac.Id/Inkuiri*, *6*(1), 175–180. https://jurnal.uns.ac.id/inkuiri/article/view/17284/13836
11. Permana*, I., Zulhijatiningsih, Z., & Kurniasih, S. (2021). Efektivitas E-Modul Sistem Pencernaan Berbasis Problem Solving Terhadap Kemampuan Pemecahan Masalah. *Jurnal IPA & Pembelajaran IPA*, *5*(1), 36–47. https://doi.org/10.24815/jipi.v5i1.18372
12. Riduwan. (2010). *Skala Pengukuran Variabel-variabel Penelitian*. Alfabeta.
13. Ritonga, N., Mone, J. L. T., Yunip, M., & Zega, Y. K. (2021). Implementasi Metode Problem Solvingdalam Meningkatkan Pembelajaranpendidikan Agama Kristen Di Sekolah. *Jurnal Shanan*, *5*(1), 29–42. http://ejournal.uki.ac.id/index.php/shan/article/view/2622/1771
14. Santosa, A. S. E., Santyadiputra, G. S., & Divayana, D. G. H. (2017). Pengembangan E-Modul Berbasis Model Pembelajaran Problem Based Learning Pada Mata Pelajaran Administrasi Jaringan Kelas Xii Teknik Komputer Dan Jaringan Di Smk Ti Bali Global Singaraja. *Kumpulan Artikel Mahasiswa Pendidikan Teknik Informatika (KARMAPATI)*, *6*(1), 62. https://doi.org/10.23887/karmapati.v6i1.9269
15. Sugihartini, N., & Jayanta, N. L. (2017). Pengembangan E-Modul Mata Kuliah Strategi Pembelajaran. *Jurnal Pendidikan Teknologi Dan Kejuruan*, *14*(2). https://doi.org/10.23887/jptk-undiksha.v14i2.11830
16. Sugiyono. (2017). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D)*. Alfabeta.
17. Suhendri, H. (2015). Pengaruh Metode Pembelajaran Problem Solving terhadap Hasil Belajar Matematika Ditinjau dari Kemandirian Belajar. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *3*(2), 105–114. https://doi.org/10.30998/formatif.v3i2.117
18. Wulansari, E. W., Kantun, S., & Suharso, P. (2018). Pengembangan E-Modul Pembelajaran Ekonomi Materi Pasar Modal Untuk Siswa Kelas Xi Ips Man 1 Jember Tahun Ajaran 2016/2017. *JURNAL PENDIDIKAN EKONOMI: Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi Dan Ilmu Sosial*, *12*(1), 1. https://doi.org/10.19184/jpe.v12i1.6463

How to cite this article: Bayu Surindra, Elis Irmayanti. Development of problem solving-based E-Module to improve the effectiveness of learning in school. *International Journal of Research and Review*. 2025; 12(1): 389-395. DOI: *https://doi.org/10.52403/ijrr.20250148*

******