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Development of Professional Ethics and Aesthetics E-Modules Based on *Problem Based Learning* to Improve Students' Critical Thinking Ability

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Abstract: Most students of the Department of Cosmetology and Beauty (TRK) Faculty of Tourism and Hospitality (FPP) Universitas Negeri Padang (UNP) are still unable to think critically in lectures, especially in analyzing problems related to the profession in the field of cosmetology and beauty. In addition, based on the explanation from the supporting lecturers, in Professional Ethics and Aesthetics lectures there are limited learning resources that can support students' critical thinking skills. The purpose of this research is to produce E-modules of Professional Ethics and Aesthetics based on Problem Based Learning that are appropriate, effective, and practical. Data collection in this study used validation questionnaires, critical thinking questions, and response questionnaires from students. The research method used is Research and Development. The data analysis technique used is descriptive quantitative and N-gain scores. The results showed that the average percentage of e-module feasibility was 94%, so it was included in the feasible category with a little revision. The effectiveness of the E-module in improving critical thinking skills is quite effective with an average percentage of 62.80 % and an N-gain score of 0.67. While the Practicality of the E-module shows a percentage of 90% with practical criteria.

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Introduction

One of the goals of the educational process is to produce human resources (HR) who have knowledge, intellectuality and technology. Qualified human resources are an asset to increase competitiveness. In higher education, lecturers are one of the determining factors in improving the quality of education. The role of the lecturer is crucial in organizing a quality learning process. The learning process is said to be of quality when in the learning process students can achieve optimal learning outcomes. The success of lecturers in carrying out learning activities will be reflected in the learning outcomes achieved by students (Astuti et al., 2018). The level of success of the education is determined by the quality of the learning carried out. In order for the desired quality to be achieved, educational goals and strategies must be directed at mastering and building the competencies needed by humans to be able to compete in the world of work. One of the factors that influence the quality of existing learning is the learning model used during the learning process in class (Dirgatama et al., 2016; Rahmadani, 2019)

The Professional Ethics and Aesthetics course is one of the faculty courses that must be followed by students of the Department of Makeup and Beauty, Faculty of Tourism and Hospitality, Padang State University. In this course, ethics is studied in every profession in the

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field of Cosmetology and Beauty. Taking part in the Professional Ethics and Aesthetics course requires students' critical thinking skills, especially those related to potential problems that arise in the professional field of cosmetology and beauty. Critical thinking is an important ability for students to be able to adapt to the conditions of a pluralistic society and as a provision to face various challenges of life in the 21st century (Saputri et al., 2019; Zubaidah et al., 2015). Critical thinking is considered a higher order thinking ability. This ability is needed to analyze and manipulate information (Şahin & Doğantay, 2018). However, the critical thinking skills of Indonesian students are still underdeveloped. The lack of development of Indonesian students' thinking skills as a whole can be seen from the results of the PISA survey (Saputri et al., 2019).

Based on the results of interviews with the team of lecturers in the Professional Ethics and Aesthetics course, most students are still unable to think critically in lectures, especially in analyzing problems related to the profession in the field of cosmetology and beauty. In addition, based on the explanation from the supporting lecturers, in Professional Ethics and Aesthetics lectures there are limited learning resources that can support students' critical thinking skills. Teaching materials have an important role in the implementation of learning activities. However, the teaching materials used so far are still in printed form, so it is necessary to develop these teaching materials in accordance with current developments. As expressed by (Joenaidy, 2019) who said that the rapid development of information and technology in the 4.0 era is unavoidable, this is also happening in the world of learning, especially the presentation of teaching materials which are still in printed form, so that a the development of interactive teaching materials that contain text, images, visuals, audio and can be used by students independently, one of which is the use of E-modules.

Application of problem-based learning (*Problem Based Learning*) is one way to train students' critical thinking skills (Ardianti et al., 2022; Ali, 2019). The problems that exist in PBL learning will stimulate students to think critically (Adawiyah et al., 2022; Esema et al., 2012). The PBL/problem solving method is a way of learning by exposing students to a problem/problem to be solved or solved conceptually as an open problem in learning. Problem solving is the use of methods in learning activities by training students to deal with various problems, be it personal or individual problems or group problems to be solved alone or together (Hotimah, 2020). Problem Based Learning (PBL) starts with meaningful real life problems where students have the opportunity to choose and carry out any investigations both inside and outside the classroom as far as it is needed to solve the problem (Syawaly & Hayun, 2020). However, PBL learning has weaknesses , namely the limited time available for students to master the desired skills to the fullest (Gündüz et al., 2016). To overcome this, learning resources are needed in the form of E-modules, which students can use anytime and anywhere (Khoirunnisa et al., 2020). So that by using the E-module students can build knowledge from their experience learning independently (Yulianti & Gunawan, 2019).

The material contained in this Project Based Learning (PBL) based E-module is material on ethics, aesthetics, and professional ethics, as well as professional ethics in the field of cosmetology and beauty. Problems related to the material that will be used as a stimulus in the E-module. Based on the results of a needs analysis carried out on students of the 2020 class of Cosmetology and Beauty Department, 83% of students are interested in using learning resources in the form of E-modules which contain various media that students can use interactively and can be accessed anytime and anywhere. There are several reasons that make students interested, which can stimulate student curiosity, increase student understanding of professional ethics and aesthetics material, and add insight in analyzing various professional-related issues in the field of cosmetology and beauty.

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This PBL-based e-module is intended to be used as a learning resource for students to understand lecture material on professional ethics and aesthetics, as well as to train critical thinking skills by stimulating students to think about issues of professional ethics in the field of cosmetology and beauty. The purpose of this study was to produce an Professional Ethics and Aesthetics E-module based on *Problem Based Learning* which is appropriate, effective, and practical.

Research Method

This research is research development or Research and Development (R&D) which focuses on teaching materials in the form of electronic E-modules (E-modules) based on problem based learning (PBL). The ASIE learning design model is used as a reference in this research and development. ASIE itself is an acronym for Analyze, Strategize, Implement, and Evaluate (Badiaraja et al., 2021). At the analysis stage, an analysis of learning profiles, student profiles and teaching material profiles is carried out. Learning profile analysis is carried out by analyzing Course Learning Outcomes (CPMK), compiling Competency Achievement Indicators (GPA) and learning objectives, compiling learning materials, as well as evaluation techniques to measure the achievement of learning objectives. Students' critical thinking skills and the need for teaching materials are two important points in the analysis of student profiles. The profile analysis of teaching materials is carried out by analyzing the characteristics of the E-module and designing specifications for the E-module to be developed, such as content, graphical and technical specifications.

At the stage of developing a strategy (strategize), integration is carried out between the aspects that have been analyzed at the analysis stage into a good E-module teaching material. At this stage, the integration of professional ethics and aesthetics material into the developed E-module is also carried out. At the implementation stage, the E-module is tested in classroom learning. The E-module implementation activity was carried out in October 2022 in class A of professional ethics and aesthetics courses, with a total of 29 people. The E-module implementation activity aims to test the effectiveness of the E-module in optimizing students' critical thinking skills. The one group pretest posttest design is used at the implementation stage. In addition to testing the effectiveness of the E-module, the practicality of the E-module will also be measured at this stage. At the evaluation stage, the process of improving the E-module teaching materials is carried out based on observations during learning, lecturer comments during the learning process and suggestions for improvement from students in the response questionnaire to the E-module.

E-module trial activities are carried out after the E-module has been declared valid. The E-module validation process is carried out by three validators, namely material experts, media experts, and field practitioners. Material expert criteria are lecturers of professional ethics and aesthetics. The aspects that the material experts evaluate are the accuracy, depth, contextuality and up-to-dateness of the material, as well as aspects of the presentation, format and characteristics of the E-module. The criterion for media experts is a lecturer at the Department of Cosmetology and Beauty who masters teaching material development techniques. The aspects that are assessed by media experts are structure (format), organization, appeal, font size and type, space, and consistency of the E-module. Field practitioners are a team of lecturers in professional ethics and aesthetics courses. E-module validity data from the three validators will be analyzed using the following calculations.

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$$V = \frac{TSe}{TSh} x100\%$$

Information:
IN : percentage of E-module eligibility
TS : total score based on the results of the validator's assessment
TSh : total highest score

The percentage validity of the E-module is then interpreted by referring to the criteria in table 1.

Table 1. Criteria for evaluating the validity level of the e-module

Criteria	Validity Level
0 - 100%	Valid, can be used with a little revision
60 - 79%	Valid enough, may be used with quite a lot of revisions
40 - 59%	Less Valid, can be used with many revisions
20 - 39%	Invalid, cannot be used

The level of effectiveness of the E-module in optimizing students' critical thinking skills can be seen by comparing the scores of critical thinking before (pretest) and after (posttest) learning activities carried out using the E-E-module. The level of effectiveness of the E-module is determined by the increase in the N-gain score. The N-gain score is obtained through the following calculations. The N-gain score is then interpreted with reference to table 2.

$$\text{N} - \text{gain} = \frac{\text{skor pretest} - \text{skor posttest}}{100 - \text{skor pretest}}$$

Table 2. E-module Effectiveness Level Based on N-gain Score

Skor N-gain	Category
$g > 0,7$	Height
$0,3 \leq g \leq 0,7$	Currently
$g < 0,3$	Low

Data on the level of practicality of the E-module were obtained from students using a student response questionnaire instrument regarding the E-module. The aspects that are assessed in the student response questionnaire are aspects of appearance, presentation of material, and the benefits of the E-module. The level of practicality of the E-module can be determined through the following calculations.

$$P = \frac{TSe}{TSh} x100\%$$

Information:
P : Practicality of E-module
TS : total score based on the results of the validator's assessment
TSh : total highest score

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The percentage of practicality of the E-module is then interpreted with reference to the practicality criteria of the E-module in table 3.

Table 3. E-module Practicality Assessment Criteria

Criteria	Practicality Level
80—100%	Practical
60—79%	Pretty Practical
40—59%	Less Practical
20—39%	Impractical

Result and Discussion

Professional Ethics and Aesthetics e-module can be accessed online via the following link:

https://emodulepepbl.000webhostapp.com/mobile/index.html

The three main parts of the E-module developed in this study are (1) introduction, (2) content, and (3) closing. Preface, glossary, learning outcomes, brief description of the material, rationalization, relevance, motivation, instructions for using the E-module are in the introduction section. The content section consists of learning activities 1 and 2. Each learning activity consists of indicators of competency achievement and learning objectives, learning activities according to the syntax of problem-based learning, material summaries, competency tests, and feedback. Final evaluation, answer key, feedback, glossary and list of references form the closing part of the E-module. The cover display of the E-module can be seen in Figure 1. The first syntax of Problem Based Learning learning can be seen in Figure 2. In the problem orientation section, cases related to professional ethics are presented. Both pictures are expected to be a stimulus for students to think.

Figure 1. Display of the E-module Cover

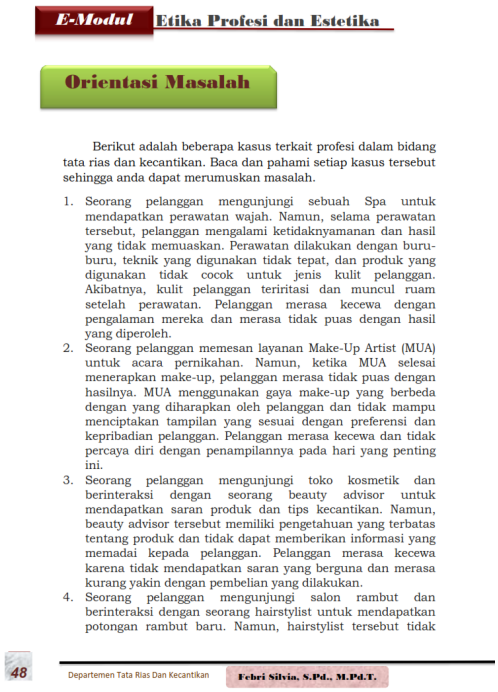

Figure 2. Problem Orientation Display

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The second and third syntax of Problem Based Learning is the organization of group learning and investigation (Figure 3). In the second syntax, students will formulate problems based on examples of cases that exist at the problem orientation stage. The formulation of the problems asked of students are those related to the structure, replication and role of viruses. Then students are asked to do research in groups. The investigation is carried out by gathering information from various sources in order to complete the problem formulation that has been made before. The fourth and fifth syntax of PBL learning can be seen in Figure 4, namely the development and presentation of the results of the investigation. At this stage students are asked to create the results of the investigation so that it is interesting and easily understood by other students. at the presentation stage, representatives of each group will come to the front of the class to communicate the results of their group's investigation. This e-module is also equipped with a material summary (Figure 5), which contains a material description of professional ethics and aesthetics. In the professional section of cosmetology and beauty, videos are also displayed which are useful for students so that they can understand the professional ethics of cosmetology and beauty well.

The fourth syntax of PBL learning is making conclusions. In this syntax students will make a conclusion from the learning activities that have been carried out. The fourth syntax display can be seen in Figure 6. The final syntax of PBL learning is the analysis and evaluation of problem solving activities. In the analysis section (Figure 6), students are given the task of further analyzing professional ethics in the field of cosmetology and beauty. In the evaluation section of the problem-solving process (Figure 7), students are asked to reflect on what valuable things are gained after learning, what obstacles were encountered during the investigation, and solutions to overcome these obstacles.

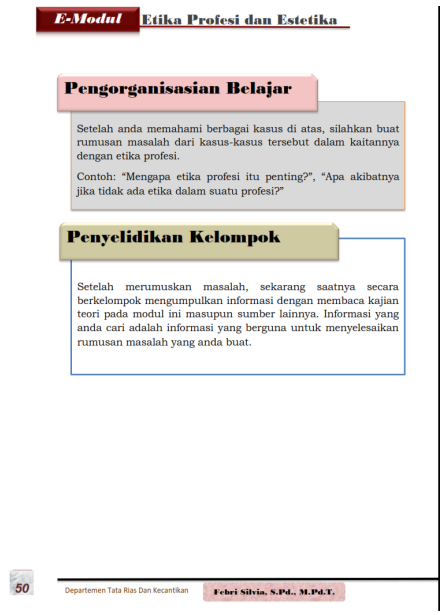

Figure 3. Display of learning organization and group investigation

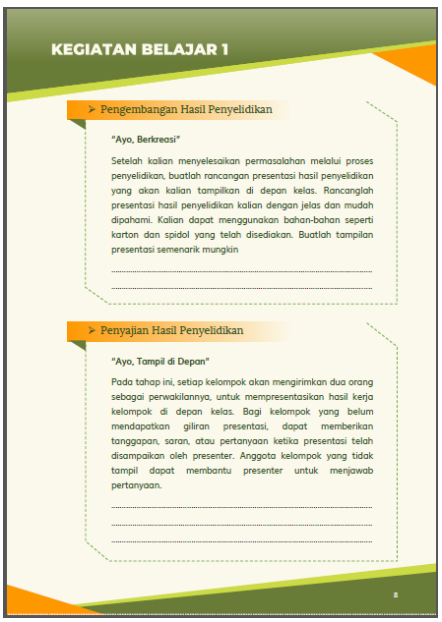

Figure 4. Display of the development and presentation of the results of the investigatio

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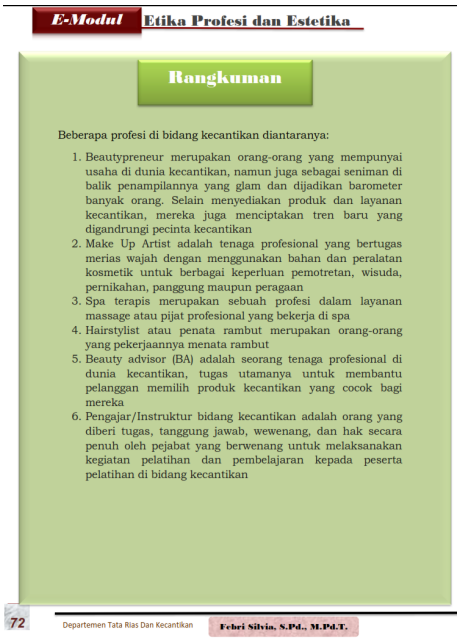

Figure 5. Display of Material Summary

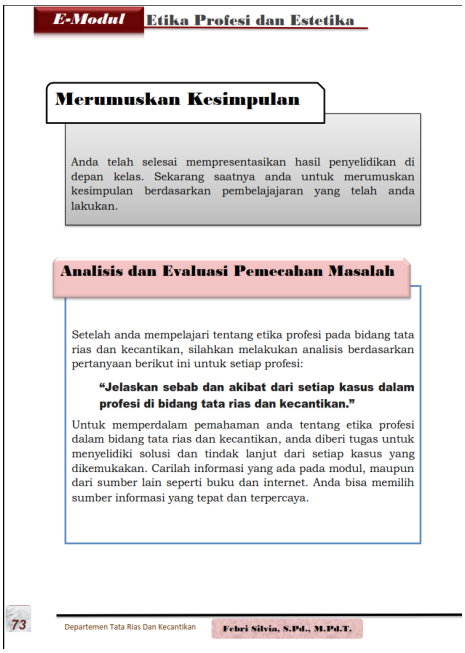

Figure 6. Display of Formulating Conclusions and Problem Solving Analysis

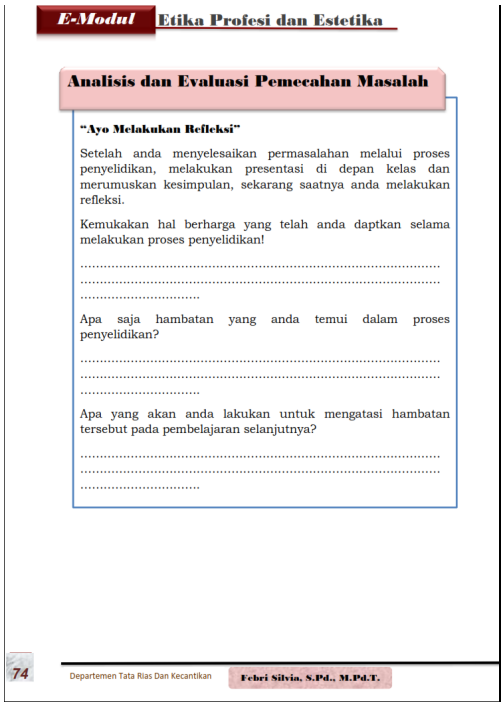

Figure 7. Reflection Display

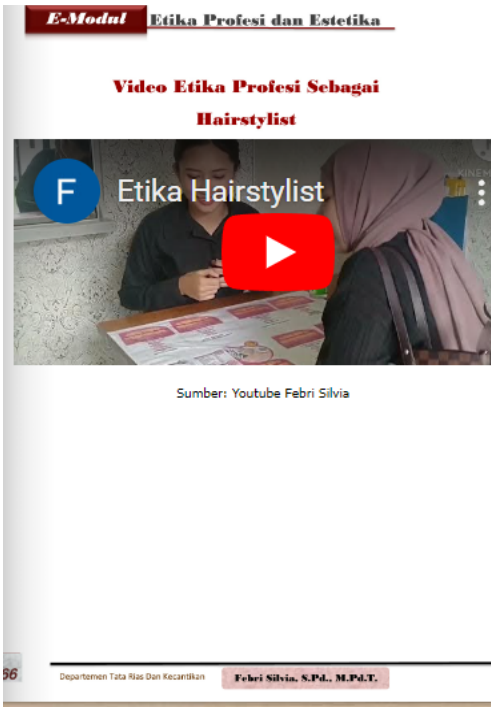

Figure 8. Video Display

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Validity of E-modul

The e-module that has been developed in this study has been tested for its validity by three validators. The results of this validity test are used as a means to revise and determine whether or not the E-module is appropriate for use in classroom learning. The validity test is carried out using a questionnaire instrument which contains seven aspects of the evaluation of the E-module. The results of the E-module validity test by material experts are presented in table 4.

Table 4. Results of the validity test of the E-module by material experts

Assessment Aspects	(%)	Information
Material accuracy	98	Valid, can be used with a little revision
Depth, material	92	Valid, can be used with a little revision
Material contextuality	90	Valid, can be used with a little revision
material update,	96	Valid, can be used with a little revision
Presentation eligibility	94	Valid, can be used with a little revision
Format	93	Valid, can be used with a little revision
Self Contained	96	Valid, can be used with a little revision
Stand Alone	92	Valid, can be used with a little revision
Adaptive	92	Valid, can be used with a little revision
User Friendly	97	Valid, can be used with a little revision
Average	**94**	**Valid, can be used with a little revision**

Testing the validity of the E-module by media experts is carried out by expert lecturers. The validity test is carried out using a questionnaire instrument, which contains 6 aspects of the evaluation of the E-module. The results of the E-module validity test by media experts are presented in table 5.

Table 5. The results of the validity test of the E-module by media experts

Assessment Aspects	(%)	Information
Format	97	Valid, can be used with a little revision
Organization	90	Valid, can be used with a little revision
Attractiveness	96	Valid, can be used with a little revision
Letter shape and size	98	Valid, can be used with a little revision
Room (*space*)	98	Valid, can be used with a little revision
Consistency	92	Valid, can be used with a little revision
Average	**95**	**Valid, can be used with a little revision**

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The validity test by field practitioners was carried out by a team of lecturers supporting professional ethics and aesthetics courses. The validity test is carried out using a questionnaire instrument, which contains seven aspects of the evaluation of the E-module. The results of testing the validity of the E-module by field practitioners are presented in table 6.

Table 6. The results of the E-module validity test by field practitioners

Assessment Aspects	(%)	Information
Material accuracy	98	Valid, can be used with a little revision
Depth, material	97	Valid, can be used with a little revision
Material contextuality	88	Valid, can be used with a little revision
material update,	96	Valid, can be used with a little revision
Presentation eligibility	92	Valid, can be used with a little revision
Format	90	Valid, can be used with a little revision
Self Contained	96	Valid, can be used with a little revision
Stand Alone	95	Valid, can be used with a little revision
Adaptive	95	Valid, can be used with a little revision
User Friendly	95	Valid, can be used with a little revision
Average	**94**	**Valid, can be used with a little revision**

E-module effectiveness

E-modules that have been declared valid are then tested in classroom learning. The E-module trial aims to determine the effectiveness of the E-module in optimizing students' critical thinking skills. The research design used to see the effectiveness of the E-module is one group pretest posttest. In this study design, the control class was not used as a comparison, but the pretest and posttest were used. The pretest and posttest questions used are in the form of essay questions and are assessed based on the rubric for assessing critical thinking skills that has been developed by Zubaidah in her research (Zubaidah et al., 2015). After knowing the score of critical thinking skills on the pretest and posttest, the level of effectiveness of the E-module is determined from the increase in the N-gain score. The results of calculating the N-gain score can be seen in table 7.

Table 7. E-module effectiveness level based on the N-gain score

Pretest mean	Posttest mean	N-gain	Category
64	88	0,67	Currently

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Practicality of E-module

E-module practicality data was obtained through a student response questionnaire instrument regarding the E-module. The distribution of questionnaires was carried out when all learning activities had been completed. Students are expected to be able to provide an assessment of the practicality of the E-module after using it in the learning process. The results of calculating the practicality level of the E-module can be seen in table 8.

Table 8. Practicality Level of E-module

Assessment Aspects	(%)	Information
E-module view	82	Practical
presentation of material,	94	Practical
Benefits of E-module	96	Practical
Average	**90**	**Practical**

The validity of the Problem Based Learning (PBL) Professional Ethics and Aesthetics module developed in this study was obtained through a validation instrument in the form of a questionnaire. The questionnaire was given to three validators to test the validity of the E-module. The three validators are two lecturers who are knowledgeable in the fields of materials and media, as well as a lecturer as a field practitioner who teaches professional ethics and aesthetics courses. The validity of the E-module assessed includes content, construct, language and graphic validity. Content validity means the suitability of the contents of the E-module to the substance of the independent curriculum that applies in Indonesia. Construct validity means the suitability of the developed E-module with the learning model used. Language validity means that the E-module uses the correct Indonesian according to the EYD so that it is easy to understand. Graphic validity means that the E-module has an attractive appearance (Lestari et al., 2019).

Based on the results of the validity test by material experts, a validity score percentage of 100% is obtained in the valid category. This means that the E-module has fulfilled all aspects of the assessment. The average percentage of validity test scores by media experts is 93% which is a valid category. However, there were suggestions given by the validator to improve the competency test scoring guidelines, while the validation results by field practitioners obtained an average validity score of 86% in the valid category. The average score of the validity of the three validators is 93%, so that the validity of the Problem Based Learning-based E-module in this study is declared valid and may be used with minor revisions. The average normalized gain or abbreviated as N-gain is a comparison of the average increase in the score obtained to the average increase in the maximum score (Hake, 1998). In this study, the N-gain test was used to determine the increase in students' critical thinking skills after carrying out learning activities using the E-module. The increase in critical thinking skills is known by comparing the scores of the pretest and posttest results. Based on the N-gain test, it is known that there is an increase in students' critical thinking skills in the moderate category, so it can be said that the PBL-based E-module is quite effective in increasing students' critical thinking skills. This shows that the problem-based

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learning activities in the E-module are quite effective in training students' critical thinking skills.

Problem-based learning or Problem Based Learning (PBL) is learning that has been proven to improve critical thinking skills (Ali, 2019; Mustafa et al., 2019). In Indonesia, PBL is the learning method most widely used as a treatment to train students' thinking skills (Susetyarini & Fauzi, 2020; Ningsih et al., 2022). The PBL-based e-module developed in this study is structured by following the PBL learning syntax, which has many scientific activities such as formulating problems, conducting investigations, analyzing the results of problem solving and drawing conclusions. Various learning activities in E-modules that lead to scientific activities are very effective in improving students' thinking skills (Susetyarini & Fauzi, 2020). Apart from having a lot of scientific activities, the E-module should also be able to present problems related to the real world of students. For this reason, E-modules were also developed as an effort to present real-world problems so that students can learn about principles and concepts (Ali, 2019). Problems taken from real experience in the professional field of cosmetology and beauty.

In addition to testing the validity and effectiveness, the practicality level of the E-module was also tested in this study. Based on the results of the practicality test, the average percentage score obtained from all students is 78% which is quite practical. This shows that the Problem Based Learning-based E-module is quite practical for students to use. Practicality refers to the extent to which users consider the E-module to be good and can be used in actual conditions, effectively and efficiently (Lestari et al., 2019). The practicality factor must be taken into account by an educator when using a teaching material or learning resource. The practicality factor is important so that learning resources can be used properly by students, so that learning becomes effective and also comfortable (Lestari et al., 2019). The practicality of the E-module was obtained by using a questionnaire instrument, which was addressed to 29 students who had learned to use the E-module. The aspects of evaluating the practicality of the E-module are the appearance, presentation, and benefits of the E-module.

Conclusion

The validity level of the Professional Ethics and Aesthetics E-module based on Problem Based Learning is valid, with the average percentage score of the three validators being 94%. The level of effectiveness of the E-module is quite effective with an N-gain score of 0.67, which means that critical thinking skills have increased in the moderate category. The practicality of the E-module is classified as quite practical with an average percentage of student response questionnaire results of 90%. Problem Based Learning based e-modules have been declared valid, quite effective and quite practical. This e-module is still being tested on a small scale; therefore, it needs to be tested on a larger scale.

Recommendation

The development of the E-Module for the PBL-based Professional Ethics and Aesthetics course is focused on ethical material in the professional field of cosmetology and beauty. Further development can be done by adding material on professional code of ethics, dress and communication ethics and other material in professional ethics and aesthetics courses so that this E-module is complete for one semester lectures.

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