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The Learning Module Uses FASTER Learning Model in C Programming Language Courses

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ABSTRAK

Rendahnya kemampuan peserta didik dalam mata kuliah Bahasa Pemrograman C, disebabkan karena kurangnya penggunaan model serta media yang sesuai dengan kebutuhan mahasiswa. Adapun tujuan penelitian ini yakni untuk menguji validitas dan praktikalitas modul pembelajaran kedua buku modul yaitu buku panduan dosen serta buku modul & panduan mahasiswa. Penelitian ini tergolong kedalam jenis penelitian pengembangan yang dikembangkan dengan menggunakan model ADDIE. Pengumpulan data menggunakan metode kuisioner dan wawancara dengan instrument penelitian berupa instrumen uji kevalidan dan instrumen uji praktikalitas. Teknik analisis data menggunakan analisis deskriptif kualitatif dan kuantitatif. Data hasil analisis penelitian menunjukkan bahwa hasil dari penilaian pakar memperoleh nilai rata-rata sebesar 0.90 dengan kategori Valid. Buku panduan dosen dan nilai rata-rata sebesar 0.87. Buku modul & panduan mahasiswa dengan kategori Valid. Praktikalitas buku panduan dosen menghasilkan nilai rata-rata sebesar 90.09 (Sangat Praktis). Praktikalitas buku modul & panduan mahasiswa menghasilkan nilai rata-rata sebesar 91.20 (Sangat Praktis). Disimpulkan bahwa model FASTER layak digunakan dalam pembelajaran Bahasa Pemrograman C serta modul yang digunakan sangat mudah dipakai dan membantu dalam proses pembelajaran.

ABSTRACT

The low ability of students in the C Programming Language course is due to the need for more use of models and media that suit student needs. This research aims to test the validity and practicality of the learning modules of the two model books: the lecturer's guidebook and the module book & student guide. This research belongs to the type of development research that was developed using the ADDIE model. Data collection used a questionnaire method and interviews with research instruments in the form of validity and practicality test instruments—data analysis techniques using qualitative and quantitative descriptive analysis. The data from the research analysis showed that the results of the expert assessment obtained an average value of 0.90 in the Valid category. Lecturer manual and the average value of 0.87. Module book & student guide with Valid category. The practicality of the lecturer's guidebook produces an average value of 90.09 (Very Practical). Practical module books & student guides produce an average value of 91.20 (Very Practical). It was concluded that the FASTER model is suitable for learning the C Programming Language, and the modules used are very easy to use and help in the learning process.

1. INTRODUCTION

Technological developments in the 21st-century era require humans to accept various changes and leave traditional abilities (manual skills) towards brain skills so that in practice, all people are directed to have skills in using technology and developing thinking skills (thinking skills) (Aldriani et al., 2021; Husain & Kaharu, 2020; Rahayu et al., 2022). Several abilities must be prepared by individuals in facing the development of the 21st century, including communication skills, creativity and innovation, technical skills, problem-solving skills, analytical skills, and being able to manage people and the environment (Rosnaeni, 2021; Salsabila et al., 2020; Widodo et al., 2020). Development of individual abilities in technology and thinking skills can be trained through the provision of Programming Language C courses. Programming Language courses are included in Computer Based Learning (Adwar & Wildian, 2020; Suyono & Muskhir, 2021). In its development, various terms emerged from Computer Based Learning, including Computer Assisted Instruction (CAI). Learning using computer aids (CAI) helps students understand the material and can repeat the material repeatedly until they master the material (Gumilar et al., 2021; Nang & Purnama, 2019). Using computers in learning can affect students' cognitive, affective, and psychomotor domains. Experts conclude that with a computer-assisted learning model,

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students can learn quickly and effectively using computers and, on the other hand, can improve learning outcomes (Ningrum & Rusimamto, 2016).

C Programming Language is one of the courses in the Information Systems Study Program curriculum, Faculty of Computer Science at Putra Indonesia University "YPTK" Padang. Based on observations made in the C Programming Language Course. In the learning process, the interaction between lecturers and students was still Teacher Center Learning with the lecture learning method collaborated with the Project Based Learning model. From the survey conducted, it was found that efforts to transfer knowledge from educators to students have yet to be maximally absorbed because the success rate of students is still below 60%. For this reason, more innovative efforts are needed to maximize the results obtained. One of them is by using media in the learning process. Learning media is a tool teachers use to support the learning process (Ningrum & Rusimamto, 2016; Yuanta, 2020). Learning media can help teachers explain various abstract concepts presented in the material so that teaching material can be easier for students to understand (Handayani & Rahayu, 2020; Rahmawati & Atmojo, 2021).

One of the suitable media to support the student learning process is learning media in the form of modules. The module is one of the concepts of teaching materials packaged completely and systematically, which contains a set of learning experiences designed and developed to help students achieve specific learning goals (Diana et al., 2018; Pramana et al., 2020; Samsu et al., 2020). It is further explained that learning modules are teaching materials arranged systematically and interestingly, including material content, methods, and evaluations that can be used independently to achieve the expected competencies (Afrianti & Qohar, 2019; Wati et al., 2019). In the learning process, learning modules are developed as an effort to organize individual teaching, which allows students to master one unit of study material before they move on to the next teaching material (Dwiyanti et al., 2021; Gazali & Ningsih, 2019). A module will be meaningful if students can easily use it (Pratiwi, 2017; Puspitasari et al., 2020). Having an interesting module will make students more interested in learning. It can also influence and improve student learning outcomes (Hakim & Windayana, 2016; Silva et al., 2019). The use of teaching module media in learning C Programming Language will be more effective if the application of a learning model accompanies it. It is because the learning model is a form of prescriptive strategy and instructions to achieve learning objectives. One of the models that can be used in learning the C Programming Language is the FASTER Learning learning model, which is a collaboration of two learning models, namely the jigsaw-type cooperative learning model and the project-based learning model (Marda, 2022). FASTER learning is a process carried out in simple and efficient ways by applying short learning steps and emphasizing opportunities to improve skills and knowledge (Suryana & Abna, 2020).

Several previous studies have revealed that the FASTER learning model can improve problem-solving skills and the ability to produce students' creativity (Suryana & Abna, 2020). The results of other studies reveal that e-module media with a contextual approach to science subjects, especially in single and mixed object material, is very interesting to use in the learning process (Widiastuti, 2021). The results of further research reveal that learning media in the form of interactive e-modules can increase learning motivation, scientific literacy, learning outcomes, independence and students' critical thinking skills (Wulandari et al., 2021). Berdasarkan beberapa hasil penelitian tersebut maka dapat dikatakan bahwa model *Faster Learning* maupun media modul pembelajaran secara signifikan dapat meningkatkan kemampuan belajar, motivasi, serta hasil belajar siswa. Hanya saja pada penelitian sebelumnya, belum terdapat kajian yang secara khusus membahas mengenai pengembangan modul pembelajaran menggunakan model *faster learning* pada mata kuliah bahasa pemrograman C. Sehingga penelitian ini difokuskan pada kajian tersebut dengan tujuan untuk menguji validitas dan praktikalitas modul pembelajaran kedua buku model yaitu buku panduan dosen serta buku modul & panduan mahasiswa.

2. METHOD

This research belongs to the type of development research which was developed using the ADDIE model. The ADDIE development model consists of 5 stages consisting of the analysis, design, development, implementation, and evaluation stages. The ADDIE model was chosen because of various considerations, such as the ADDIE model, which developers of learning and training programs, such as lecturers, teachers, and instructors, easily understand. The ADDIE model is more systematic so that designers can create learning programs. It's just that this research is limited to testing the validity and practicality of the product.

The test subjects in this study were students who took the C Programming Language Course in the Information Systems Study Program. The test subjects were involved in the research, where in this study, a limited practicality trial was carried out involving 15 students enrolled in the Information Systems Study Program at Putra Indonesia University "YPTK" Padang in the Odd Semester 2019/2020. This limited trial is part of a formative evaluation in module development using the FASTER Learning

model. In contrast, an expanded trial for practicality is carried out on students enrolled in the 2019/2020 Odd Semester. Five classes (SI-1, SI-2, SI-3, SI-4, and SI-5) take the C Programming Language course with 30 students per class. Two classes were taken randomly (random sampling) for the trial class. Each class was determined as the control class (SI-3) and experimental class (SI-5).

The type of data used in module development with the FASTER Learning model in learning the C Programming Language is primary data obtained directly from the test subjects. In this study, the data used were in the form of qualitative and quantitative data. Qualitative data contains data obtained from interviews, while quantitative data comes from instruments distributed to test subjects. Qualitative data consists of discussion results, Focus Group Discussions, observations or observations, and interviews, while quantitative data consists of validation and practicality instruments. The type of data used in this product development trial is a module that is tested using a validity test in the form of a validated questionnaire to users or research subjects to measure the level of validity of the product being developed. As well as data to test the practicality of the module using a questionnaire given to test subjects, namely students taking Programming Language C courses. In more detail, the data type used can be seen in Table 1.

Table 1. Types of Research Data

Stages	Data Type	Subject
Analysis	1. Data regarding the implementation of learning in Programming Language Courses	Subject lecturers, students, curriculum
Design	2. Data regarding Programming Language Course material	policymakers
	1. Syllabus and SAP currently used	Experts or experts in learning and related literature
Development	2. Analysis of the literature on project-based cooperative learning models	
	1. Validation of learning tools by experts in Focus Group Discussion (FGD) activities such as lecturer guides, module books, and student guides.	1. Experts or experts on material, curriculum, language, and learning media
	2. Interview with experts about the use of modules in the model	2. Students and Lecturers
Implementati on	3. Data on the practicality of the experimental class (15 students)	
	1. Data on the practicality of the experimental and control classes (30 students).	Students and Lecturers
Evaluation	2. Lecturers and students fill out a questionnaire regarding using the lecturer's guidebook and the module book & student guide.	
	1. Formative evaluation of observations and portfolios	Experts or experts, lecturers, and students
	2. Student learning outcomes	

The instruments used in this research are validity test instruments and practicality test instruments. The research instrument grids can be seen in Table 2, Table 3, and Table 4.

Table 2. Lecturer Manual Validation Instrument

Assessment Aspects	Assessment Aspects
Writing Format	
Language Use	
Introduction	A questionnaire using a Likert Scale
Content Aspect	
Evaluation System	

Table 3. Module Validation Instruments and Student Guides

Assessment Aspects	Assessment Aspects
Writing Format	
Language Use	
Introduction	A questionnaire using a Likert Scale
Content Aspect	
Evaluation System	

Table 4. Module Practical Instruments and Student Guides

Assessment Aspects	Indicator	Instrument Form
Model (Lecturer Response)	Attractiveness	
Lecturer Guide (Lecturer Response)	Development Process Ease of Use functionality	
Lecturer Guide (Lecturer Response)	Instructions for implementing the model SAP components Scoring system Writing Language and Format Presentation of the contents of the book	A questionnaire using a Likert Scale
Module and Student Guide (Lecturer Response)	Module and Student Guide Use of Student Modules and Guidebooks	

Media validity analysis was carried out using Aiken's V Approach by calculating the content-validity coefficient based on the assessment of a panel of experts of n people on an item. Furthermore, in measuring the level of validity, the number range V can be obtained between 0 to 1 so that a range of ≥ 0.6 can be interpreted as a fairly high coefficient so that it can be said that the validity category is in the "valid" category. Furthermore, it is analyzed using a percentage formula converted into a table of product criteria to measure practicality, as shown in Table 5.

Table 5. Product Practicality Criteria

No	Achievement Level	Criteria
1	86% - 100%	Very Practical
2	76% - 85%	Practical
3	60% - 75%	Practical Enough
4	55% -59%	Less Practical
5	0% - 54%	Impractical

3. RESULT AND DISCUSSION

Result

Research on the development of learning modules based on the Faster learning model was carried out using the ADDIE development model. The results of each stage of the ADDIE development model are as follows: The first development stage is the analysis stage. The Analysis phase begins with conducting curriculum, needs, and material analyses. Analysis of needs in the learning process was obtained by carrying out observations, field interviews, and filling out questionnaires by lecturers of the C Programming Language course and students. The questionnaire for lecturers contains the material composition of the C Programming Language Course on the competence of study program graduates. At the same time, the questionnaire for students contains the competence of lecturers who teach C Programming Language Courses, Teaching and Learning Processes, and Student Character.

The second development stage is the media product design stage which is carried out by making lecturer guidebooks, module book, and student guides. At this stage, the preparation of assessment instruments was also carried out in the form of validation sheets and practicality sheets. The FASTER Learning model was born from adopting two learning models: Cooperative Learning type Jigsaw and Project Based Learning: the third stage, namely the media development stage. Media development is carried out by carrying out Focus Group Discussions (FGD) of products that have been designed. FGDs are conducted by gathering experts/experts. 5 experts assessed the instrument as validators consisting of Curriculum, Programming, Language, Learning Media, and Education experts. After validation, revisions will be carried out according to input and directions from experts, which will be carried out with limited product tests.

The fourth stage is the Implementation stage, which is carried out by conducting practicality trials on products validated by experts in the control and experimental classes through extended testing. The

fifth stage is the evaluation stage which is carried out by conducting a formative evaluation by revising the product based on input from experts and distributing practicality questionnaires to lecturers and students. A validity test was carried out using the Aiken'V approach. As a whole, the contents of the module book using the FASTER Learning model in this study were declared valid with the criteria for Aiken'V scores being between $\geq 0.6 \leq 1.0$, where the validation results for Lecturer Product books scored 0.90 and Student Modules and Guides with an average score of 0.87. The summary of the assessment results can be seen in [Table 6](#).

Table 6. Product Content Validation Test Results

Product	Average (%)	Category
Lecturer Guide	0.90	Valid
Student Modules and Guides	0.87	Valid

The results of the practicality test of the assessment come from lecturers and students involved in implementing the module with the FASTER Learning model. The practicality test used in this study was obtained after implementing the model in the field, with the results shown in [Table 7](#).

Table 7. Product Practicality Test Results

Product	Respondent Number of Respondents	Average (%)	Description	
Lecturer Guide	Lecturer	5	90.09	Very Practical
Student Modules and Guides	Lecturer	5	91.20	Very Practical
Student Modules and Guides	Student	30	89.59	Very Practical

Based on the data in the table, it is known that practicality with a range of 86% -100% is included in the "Very Practical" criteria. So the FASTER Learning model can be used as an option for learning Programming Languages in Higher Education.

Discussion

The book products developed with the ADDIE stage for lecturers and students, including the Lecturer's Handbook and Module Books & Student's Guide, have been tested for validity and practicality. To test the validity, the aspects assessed include; writing format, language use, introduction, content aspect, and evaluation system. The validation test results showed that the Lecturer's Handbook and Module Book & Student's Guide were well prepared. Validated products require improvement until the developed product is considered suitable for use later ([Charlina & Septyanti, 2019](#)). The validation results significantly influence the improvement of the product being developed. Very valid products can be used as learning resources. As for the practicality test, the aspects assessed include; attractiveness, development process, ease of use, the functionality of product books, implementation instructions, material, organizational structure, the scope of study material, learning scenarios, SAP learning outcomes, assessment systems, questions and answer keys, text composition, images, tables, language arrangement easy to understand, appropriate font size and easy-to-read font. Using the right indicators in the instrument determines a module's practicality level. The use of vocabulary and language that is easy to understand determines the success of the practical test ([Handayani & Rahayu, 2020](#); [Hendriyani et al., 2020](#); [Rahmawati & Atmojo, 2021](#)).

Testing the validity and practicality of the media is carried out to see the feasibility of using the product. The excellent practical value means the book is easy to use and carry around. Good learning resources can be used easily and practically. It was further explained that using modules in learning in the C Programming Language Course could improve student learning outcomes ([Adwar & Wildian, 2020](#); [Suyono & Muskhir, 2021](#)). Determining the right indicators in the instrument can be an added value for module users. Material design uses interesting and easy-to-understand language, and the composition of the text and images makes the module even more interesting to read ([Fauzi, Hilmi, 2017](#); [Ramli & Tajudin, 2021](#)). Besides that, using pictures that are appropriate to the learning content will increase the enthusiasm and motivation of students to learn ([Aprinawati, 2017](#); [Dames et al., 2019](#)). Learning modules have a very important role in the learning process. It is because learning modules can contain complete and systematic concepts of teaching materials, which are then accompanied by a set of learning experiences that are designed and developed to help students achieve specific learning goals ([Diana et al., 2018](#); [Samsu et al., 2020](#)).

The results obtained in this study align with previous research results, which revealed that the FASTER learning model could improve problem-solving skills and generate student creativity ([Suryana &](#)

Abna, 2020). The results of other studies reveal that e-module media with a contextual approach to science subjects, especially in single and mixed object material, is very interesting to use in the learning process (Widiastuti, 2021). The results of further research reveal that learning media in the form of interactive e-modules can increase learning motivation, scientific literacy, learning outcomes, independence, and students' critical thinking skills (Wulandari et al., 2021). Based on some of the results of these studies, the Faster Learning model and learning media modules can significantly improve learning abilities, motivation, and student learning outcomes.

4. CONCLUSION

Based on the results of the data analysis that has been carried out, it can be concluded that the developed module meets valid and practical criteria. With this level of validity, the module is suitable for use in product trials. For the level of practicality with very practical level, the module using the FASTER Learning model is very helpful in learning the C Programming Language and is easy to use.

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