

Development of Heutagogy Learning Module for Mastering Thinking Skills in Industrialized Building System Course

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Abstract: This study is a Development of Heutagogy Learning Module for Mastery of Thinking Skills for Industrial Building Systems (IBS) Course. The main objective of this study was to develop a heutagogy learning module for the mastery of thinking skills for IBS courses for students and teachers of Construction Technology in Vocational Colleges. This module is developed based on the ADDIE Model. The instrument used in this study was to collect data through feedback forms given to teachers and students of Vocational Colleges. This study uses the dichotomy scale method to obtain information from respondents. The results of the analysis performed show a positive result that the Heutagogy Learning Module for the mastery of Thinking Skills for the Industrial Building Systems (IBS) course developed is suitable and adapted for the use of teachers and students. However, some weaknesses exist in the development of this module due to the researcher himself who is the first experience in the module developed. Nevertheless, this study can be further developed despite its shortcomings. Among the researcher's suggestions for the future is to develop more complete modules for all topics in the Industrial Building Systems (IBS) course by applying heutagogy learning methods.

Keywords: Heutagogy, Thinking Skill, Industrial Building System, Module

1. Introduction

The IBS course is one of the courses studied at the Vocational College to provide students with the skills and understanding to identify the types of components that are found in IBS, calculation, planning, and implementation of IBS. Therefore, students must obtain good scores in IBS courses to meet the requirements of the industry. Therefore, to obtain a good score in an IBS course, students need thinking skills so that the learning process becomes more effective (Mohamad Shukri Ismail, 2016). Sternberg's thinking skills consist of analytical, creative, and practical thinking (Nursafra Mohd Zhaffar et al., 2017). Analytical thinking is trying to understand something as a whole by understanding all its

components, and creative thinking is the ability to generate and produce new, original, unusual, and various ideas through inspiration or a combination of existing ideas (Mathan Cool, 2013).

Practical thinking in turn is a person's ability to act with knowledge and skills accumulated to perform another task (Sharifah Amnah et al, (2009). With the presence of analytical thinking, students are expected to be able to learn the types of components found in IBS, calculate and implement IBS effectively. Students can use creative thinking to generate a new idea in problem-solving or product production. As for practical thinking, students can use it during training and practice. Through the heutagogy learning approach in IBS courses, students can gain knowledge, learn from each other and help students to determine for themselves what they want to learn in an effective way (Rohmat Sulistya, 2019). Thus, through the mastery of thinking skills in the learning process of IBS courses that use the heutagogy learning approach, students are expected to be able to obtain good scores in IBS courses. This is because the heutagogy learning approach seeks to improve students'.

Therefore, the mastery of Sternberg thinking skills must be inculcated in students to be able to improve a good score in the IBS course. To master good thinking skills among students while studying IBS courses, an effective and appropriate learning approach must be identified. Among the learning approaches that can be applied is the heutagogy learning approach. Through the heutagogy learning approach in IBS courses, students can gain knowledge, learn from each other and help students to determine for themselves what they want to learn effectively (Rohma Sulistya, 2019).

Thus, through the mastery of thinking skills in the process IBS course learning that uses a heutagogy learning approach is intended for students to be able to obtain good scores in IBS courses. This is because, the heutagogy learning approach seeks to improve students' ability in thinking skills, researching and providing existing ideas as well as applying that knowledge in situations to put them into practice (Khoiruddin Boshori, 2020).

1.1 Background Problems

According to kamarudin (2013), the factor of students finding it difficult to get a good score does not depend solely on the teaching factor in the classroom but is also related to the learning process itself. Early achievements, interests, attitude, motivation, and problem-solving skills are also among the factors that cause problems getting a good score in a course. Among other factors also found to contribute to the cause of not being able to get a good score is due to the inconsistency of teacher teaching strategies and approaches with current needs and student learning methods (Ridzuan Ismail, 2012). Students themselves also do not know effective and efficient learning techniques and methods. According to Peidi and Youngjin (2019), learning that involves computation requires the use of appropriate and effective learning approaches, and teachers need to maintain active communication between students and teachers as well as between students and other students.

The results of the initial survey also found the need to develop additional materials, reference sources such as learning modules that are more complete and effective in implementing the teaching and learning process for IBS courses. According to Mohd Adnan (2016), the use of learning materials incomplete will cause students to often complain and feel bored to study and this causes students to have trouble getting good scores.

1.2 Research Objectives

This module will be developed to fulfill a few objectives of the study that were already set by the researcher at the beginning. There are two main objectives for the Development of heutagogy learning module for the mastery of thinking skills for the Industrial Building System (IBS) course:

- 1) Develop a learning module on the application of the heutagogy learning approach for mastery of Sternberg thinking skills for the IBS course.

- 2) Identify the suitability of the format, content, and usability of the heutagogy learning module design for the mastery of Sternberg thinking skills for the IBS course.

1.3 Importance of Study

This module is developed to provide importance and benefits to students to better understand the content of the lesson on their own and be able to perform the tasks given by the teacher. The heutagogy learning module for the mastery of thinking skills is one of the reference sources or guidance materials for students to solve problems to obtain good scores in IBS courses. This module is also expected to be a guideline for teachers to apply a heutagogy learning approach for the mastery of Sternberg thinking skills to students.

2. Methodology

Research methodology is a process to carry out a study and is a process to obtain information related to the study (Azizi, 2007). Research methodology is also a method used to process and analyze data to obtain the results of the study and achieve the objectives of the study. In this chapter, aspects are discussed about study design, study population and sample, study instruments, study operational framework, data analysis methods, and expectations of study findings.

2.1 Research Design

The design of this study can help researchers to obtain information on the study conducted more systematically. The study design is an action strategy plan that describes in detail the process of a study by stating the pattern of the study to be implemented, the type of information collected, methods to obtain information, and methods to analyze information (Konting, 2014).

The study design used in the development of this module is to use the ADDIE Model by involving only three phases, namely the analysis phase, design phase, and also the development phase. Next, among the features that need to be taken into account in the development of a module are the suitability of the format design, content and usability of the module are accurate, using descriptions that meet current needs, meet the objectives of the study, use simple language easy to understand, include examples, etc. to facilitate teachers or students to use it during the teaching and learning process.

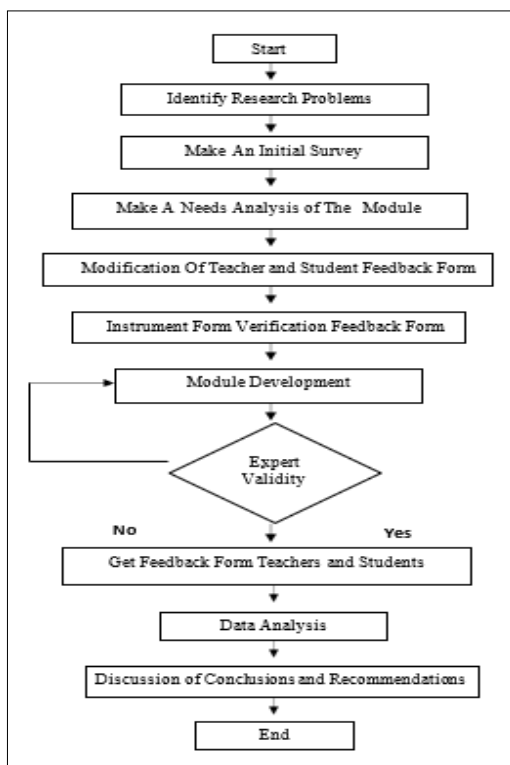


Figure 1: Research Design

2.2 Research Instruments

In this study, the instrument used to collect data is a feedback form provided to teachers and students of Vocational Colleges to obtain information on the suitability of the format design, content, and usability of the modules to be developed. The data analysis method used in this study is referring to the data obtained based on the responses from the feedback form to be analyzed and inferred. Researchers measured the data using a dichotomous scale in the formation feedback form items.

2.3 Data Analysis Methods

The data analysis method used in this study refers to the data obtained based on the answers from the feedback form to be analyzed and inferred. Data analysts are done to help researchers measure, validate, analyze and organize information more systematically so that the data obtained from the study is done more easily and accurately. Researchers measure data by using dichotomous scales in the formation of feedback form items because of this type of scale it is easier and according to Ismail (2003).

3. Results and Discussion

The researcher will discuss the results of the study findings obtained overall according to the aspects that have been assessed ie. the design suitability aspect, content suitability aspects, and usability aspects.

3.1 Analysis of Module Design Aspects

Based on table 1 of the percentage analysis of product development design aspects involving twelve (12) items to be evaluated. On average, all the items provided showed a high percentage of agreement which is 97% of the views of the teachers who evaluated. All teachers agreed that the front page of the developed module can describe the content of the lesson to be studied, the size of the module is appropriate and easy to use, the layout of all topics in the module is uniform, the arrangement of subtopics is appropriate, the typeface in the module is easy to read, the module has pictures clear

diagrams, the appropriate writing size in the module and the size of the diagrams used in the module are appropriate, the use of color in this learning module is appropriate and the sentence structure in the module is easy to understand as well as the use of graphics in the module is interesting. However, some teachers disagreed that the continuity of teaching identified by the presence of linkers on each section was with a percentage of 40% indicating that teachers disagreed.

Table 1: Analysis of Design Aspects Based on Teacher Opinion

Item	Optional Answer	
	Yes (percent %)	No (percent%)
1. The front cover of the learning module is appropriate with the title of Industrial building Systems heutagogy.	100	0
2. This module has the appropriate size and is easy to use.	100	0
3. The use of color in learning modules is appropriate.	100	0
4. Layout for all topics in the module uniform.	100	0
5. The order of the subtopics is appropriate.	100	0
6. The sentence structure in the module is easy to understand.	100	0
7. Easy-to-read type of writing.	100	0
8. This module has a clear diagram.	100	0
9. The use of graphics in interesting modules.	100	0
10. The font size used in the module is appropriate.	100	0
11. The size of the diagram used in the module is appropriate.	100	0
12. Continuity of teaching is identified with the presence of connectors on each part.	60	40
Total	97	3

Based on Table 2, the percentage of design aspects of product development involving ten (10) items is to be evaluated. On average, all items provided showed a high agreement of 100% of students' opinions. All students agreed that in terms of module size, attractive page design, easy-to-read writing, diagrams in the module are placed in a suitable place for reference, photos in the module are placed in a suitable place for reference, tables in the module are easy to refer to, the arrangement of the text in the module is easy to follow, the instructions in the module are clear. the page layout is attractive and the font size used is easy to read. All students agreed that all of the items already stated were suitable for their use.

Table 2: Analysis of Design Aspects Based on Students' Opinions

Item	Optional Answer	
	Yes (percent %)	No percent%)
1. Suitable module size and easy to use.	100	0
2. The design of the module page is attractive.	100	0
3. The type of writing in the module is easy to read.	100	0
4. The diagram in the module is placed in a suitable place for reference.	100	0
5. The photos in the module are placed in a place suitable for reference.	100	0
6. The tables in the module are easy to refer to.	100	0
7. The arrangement of the text in the module is easy to follow.	100	0

8. The page layout is interesting.	100	0
9. The page layout is interesting.	100	0
10. The font size used is easy to read.	100	0
Total	100	0

3.2 Analysis of Module Content Aspects

Based on table 3, the percentage of content aspects of product development involving nine (9) items is to be evaluated. On average, all the items provided showed a high percentage of agreement which is 100% of the views of the teachers who evaluated. All teachers agreed that the learning outcomes in the module are in line with the syllabus, the content in the module is in line with the learning outcomes., The instructions in the module are clear, the module content is arranged in order of learning from easy to difficult, description on each topic is clear, the content description on each topic is easy to understand, reinforcement exercises for learning are appropriate to the target level and the use of language in the module is easy to understand.

Table 3: Analysis of Content Aspects Based on Teacher Opinion

Item	Optional Answer	
	Yes (percent %)	No (percent %)
1. Learning outcomes contained in modules parallel to the subject syllabus.	100	0
2. The contents of the module are in line with the learning outcomes.	100	0
3. The instructions contained in the module are clear.	100	0
4. The contents of the modules are arranged to learn from easy level to difficult level.	100	0
5. The description of the content on each topic is clear.	100	0
6. Content descriptions on each topic are simply understood.	100	0
7. Reinforcement training meets objectives of learning.	100	0
8. Reinforcement exercises for learning are by the target level	100	0
9. The use of language in the module is easy to understand.	100	0
Total	100	0

Based on Table 4, the percentage of product development content aspects involving eleven (11) items to evaluate from aspects in understanding the objectives of the module clearly, understand what to do in the module, learn the content of the module without any problems, understanding the ideas in the module, can do all the things instructed in the module, the words used in the module are easy to understand, understand all the text in the module, this module makes it easy to learn this topic, have fun learning using the module and the module content is arranged in order of learning from easy to difficult as well as exercises reinforcement of learning is appropriate and very helpful. On average, all items provided showed a high percentage of agreement which is 100% of students' opinions. All students agreed that all of the items already stated were suitable for their use.

Table 4: Analysis of Content Aspects Based on Students' Opinion

Item	Optional Answer	
	Yes (percent %)	No percent%)
1. I understand the objectives of the module clearly.	100	0
2. I easily understand what I need to do in the module.	100	0
3. I can study the contents of the module without much trouble.	100	0
4. I understand the ideas in the module.	100	0
5. I can do all those things directed in the module.	100	0
6. Words used in simple modules understood.	100	0
7. I understand all the text in the module.	100	0
8. This module makes it easier for me to study the topic.	100	0
9. I enjoy learning using modules.	100	0
10. The contents of the modules are arranged in order learning from easy level to difficult level.	100	0
11. Learning reinforcement exercises are appropriate and very helpful	100	0
Total	100	0

3.3 Analysis of Module Usability Aspects

Based on Table 5, the percentage of usability aspects of product development involves seven (7) items to evaluate. On average, all the items provided showed a high percentage of agreement which is 97% of the views of the teachers who evaluated. All teachers agreed that all teaching activities encourage active involvement and feedback, each teaching activity is divided into several small steps, diagrams, tables, flow charts, and other graphics are used to provide clear explanations, the information contained in the module helps in mastering the course Industrial Building System (IBS) and all aspects in the module can be used as a reference for teachers and this module can be used as the main reference to solve the problem of thinking skills of students. While there are also some items of usability of the module that does not get approval from teachers with a percentage of 40% do not agree on the item of continuity of teaching has been identified with the presence of linkers in each section.

Table 5: Analysis of Usability Aspects Based on Teacher Opinion

Item	Optional Answer	
	Yes (percent %)	No percent%)
1. All teaching activities are encouraging active engagement and feedback.	100	0
2. Each teaching activity is divided into a few small steps.	100	0
3. Continuity of teaching has been identified with the presence of connectors on each part.	100	0
4. Diagrams, tables, flow charts, and other graphics are used to give a clear description.	100	0
5. Information contained in the module helped me in mastering the Industrial building System course	100	0
6. All aspects in the module can be made as a reference to the teacher.	100	0
7. This module can be used as the main reference for solving thinking skills problems for students.	100	0
Total	100	0

Based on Table 6, the percentage of usability aspects of product development involves six (6) items to evaluate. On average, all the items provided showed a high percentage of agreement which is 100% of the views of the students who evaluated. All students agreed that this module can be used as the main reference for problem-solving for scores in the Industrial Building System (IBS) course and this module is suitable for self-learning. Furthermore, the students also agreed that this module improves the mastery of the Industrial Building System (IBS) course, and the information contained in the module helps the mastery of the Industrial Building System (IBS) course as well as understand the overall information presented in this module and this module improves thinking skills. Students.

Table 6: Analysis of Usability Aspects Based on Students' Opinion

Item	Optional Answer	
	Yes (percent %)	No (percent%)
1. This module can be used as the main reference for solving problems for deep scores Industrial Building System course.	100	0
2. This module is suitable for learning self.	100	0
3. This module improves my mastery of the Industrial Building System course.	100	0
4. The information contained in the module helped my mastery of the Industrial course Building System.	100	0
5. I understand the whole information presented in this module.	100	0
6. This module improves my thinking skills.	100	0
Total	100	0

3.4 Suggestion and Improvement

In the future recommendations section, the researcher puts forward some suggestions to improve the quality of the module. The construction of quality modules can help students in improving the level of learning and strengthen students' mastery of IBS, Heutagogy, and Thinking Skills courses. The results of the analysis performed show positive results. However, some weaknesses exist in the development of this module due to the researcher himself who is the first experience in developing the module and still lacks knowledge in the study conducted. Nevertheless, this study can be further developed despite its shortcomings.

4. Conclusion

The researcher has developed a Heutagogy Learning Module for Mastery of Thinking Skills for Industrial Building System (IBS) course for the use of Construction Technology students in Vocational Colleges and has obtained expert validation to evaluate the suitability of the module for use during teaching and learning sessions (PDP). The researcher has set the objective to be achieved which is to evaluate the suitability of the heutagogy learning module for the mastery of thinking skills for industrial building system (IBS) course based on the design, content, and usability of the module. This module is developed using the ADDIE Model by involving 3 phases, namely the analysis phase, the design phase, and also the development phase. Therefore, the first objective of the researcher was successfully achieved, yet there are still some things that need to be improved.

Overall, the findings show that all experts, teachers, and students agreed to give positive feedback on the suitability of the Heutagogy Learning Module for Mastery of Thinking Skills for Industrial Building System (IBS) course developed suitable and acceptable for teachers and students. As well as being used as an additional reference. However, the modules developed need to be further improved in some aspects in the future to get more effective modules for the use of teachers and students.

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