

## Development of Learning Module of Building Technology using Model Sidek

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**Abstract:** Building Technology 1 is a course offered to students of this program. This study aimed to develop and test the usability of learning module of Building Technology 1 in terms of design and content of the module. The research design of this study is the product development design. Based on this research form, there are three phases in module development, Phase I: Need Analysis Phase, Phase II: Design and Development Phase and Phase III: Evaluation Phase. In the need analysis phase, the preliminary analysis questionnaire was used to identify the needs of module development. The design and development phase are the process of preparing a draft module based on Model Development of Sidek Module. The questionnaire instrument was validated by three experts and a pilot test had been conducted with a reliability value of design construct was 0.966 and content construct was 0.955. In the evaluation phase, the learning module validate by expert and been tested usability consist of design and content through a quantitative method. Sample of research consist of 3 experts and 27 students. The finding shows that the usability of the module was at moderate level (M=3.67). Meanwhile, the usability of the module in terms of design (M=3.89) and content (M=3.93) was at high level. Overall, in can be conclude that the design and content of learning module of Building Technology 1 that had been developed are acceptable and usable.

**Keywords:** Building Construction Technology Program, Building Technology 1, Module Development, Model Sidek

### 1. Introduction

The world is now in a rapid pace of globalisation that impacts either positively or negatively and becomes one of the biggest challenges to be faced by all countries. According to Ahmad, Jalani and Hasnori (2015), in facing the challenges of globalization, a country nowadays must not only produce knowledgeable human capital but also highly skilled in various fields to ensure the development of the community and the nation increases along with the rapid growth of this globalization. One of the important aspects in the process of achieving community and national development is through

education. According to Kamro (2012), education system is capable to produce a knowledgeable and skilled individual through Technical and Vocational Education and Training (TVET) as its objective is to provide technical skills and knowledge to students in preparation for the employment world. This is supported by statement from Minghat, Yasin, Subari and Noordin (2013) which is TVET plays an important role in developing and producing manpower to meet the work in the industry. The objectives of the TVET itself will not be achieved without knowledgeable and skillful competent educators. According to Jamian and Ismail (2013), the role of the educator is important as an individual who is the catalyst in the process of students seeking knowledge. The use of teaching materials creates a positive impact during teaching and learning process, which is able to increase students' memory towards the lesson delivered (Ilias, Ismail & Jasmi, 2013). So, one of the teaching materials that can be used is a learning module. The learning module helps students to master and understand a particular subject more clearly as stated by Sidek and Ariffin (2011). Nugroho et. al. (2019) also stated that the learning module is a complete unit of learning designed specifically for student to use for self-learning or in class.

Nowadays, TVET can be said to be one of contributors in the county's development. Thus, Ministry of Education, Malaysia (MOE) has taken the initiative to elevate TVET as a national development engine by offering a Bachelor of Technology program. Nonetheless, students who are pursuing the program have difficulties due to lack of references, such as modules, as the programme was recently established at the Faculty of Technical and Vocational education, Universiti Tun Hussein Onn Malaysia. According to Ilias et. al., (2016), a lack of resources and references causes students to be less exposure and preparations for the examination. Typically, lecturers in higher learning institutions use notes in the form of PowerPoint slides to teach because there are no specific modules for teaching and learning session. Mohd Taib and Mustapha (2017) noted that the complete facilities are need to be filled to learn a skill. Hence, it is a need to produce modules that have complete content as a reference source that can enhance students' knowledge in terms of theory and skills. Based on the previous study, Ismail and Abdul Rahman (2012) noted that the lack of resources and reference materials became a problem to the students to master learning.

Teacher-centered teaching methods cause students easily to be bored (Azman et. al., 2014). This is because every student has a different learning style. Lecturers should be aware that each student has different learning styles and it can affect students' performance. There is no denying that there are students who can master the knowledge delivered by the lecturers, but there are also students who need a reference while listening to the knowledge delivered. This situation requires educator to use a diverse teaching and learning approach to ensure that all students can dominate the topics taught. Zhaffar (2012) states that the educator has to be creative in stimulating and promoting students' intelligence so that they can obtain experience and learning outcomes as possible. According to Fuad (2015), one learning style has not given good results to all the individuals who are called students.

If the educator does not take into account the factors of learning style, there will be some students who will have difficulty during teaching and learning session. The difficulty of learning is a nuisance in psychological problems that can cause problems thinking, spell, counting and so on (Yulinda, 2010). The pedagogy planned by the educators shall take into account the factors of students' acceptance of teaching approach applied and able to produce effective learning. If the lecturer only uses a teacher-centered approach, students will have difficulty to understand the learning content. Therefore, the use of learning modules in the classroom and during self-learning as teaching materials can be regarded as an effective learning element as the students get information directly through the module and facilitate the students to refer in class. This can help in overcoming the students' difficulty to study. According to Mularsih (2007), the use of module in learning became one of the solutions alternatives to students' learning problems.

Based on the preliminary study conducted by the researchers on 10 students who are taking the Building Technology 1 course, this course has yet to have a specific module used for teaching and

learning process in the classroom or while doing self-learning. Preliminary study found that a total of 60% had problems to dominate the course while learning in class while the percentage for students who had problems during self-learning was 80%. The preliminary study also shows the percentage of students agreed that the reference for the course is not sufficient and is not easy to obtain is 100%. Students also agree that the need to develop a learning module of Building Technology 1 is essential and necessary to perform self-learning and reference to perform tasks.

### 1.1 Problem statement

There are several problems identified through previous studies. The study found that the teaching and learning form is still focused on teacher-centred approaches, which are lecturers teach by using notes in the form of PowerPoint slides while students will listen. The teacher-centred can also led student to be bored and have difficulty in learning, especially during self-learning. This is because students will only remember what is being taught within a short period does not doing any revision. In addition, this teacher-centred teaching resulted in the students to become passive in class. Based on the issues identified, researchers choose to develop a learning module for students' usage during teaching and learning process in the classroom and anywhere while doing self-learning. The development of this learning module also can be used by lecturers. The learning module will be developed by referring to the Model Development of the Sidek module. In developing this module, cognitive learning theories and constructivism learning theories as well as teaching and learning strategies will be implemented by the researcher.

### 1.2 Research Objective

The objectives of this study are:

- a) To develop the learning module of Building Technology 1 in Malay version for Building Construction Technology Program based on Model Development of Sidek Module.
- b) To test the usability of the learning module of Building Technology 1 in terms of design of the module.
- c) To test the usability of the learning module of Building Technology 1 in terms of content of the module.

### 1.3 Model Development of Sidek Module

There are two stages in Model Development of Sidek Module (Mohd Noah & Ahmad, 2005). The first stage is to prepare a draft module while the second stage is to try and evaluate the module. In the first stage, there are 9 steps to be done sequentially to prepare a draft module, such as the development of goals, identify the theory, rationale, philosophy, concept, target and period, study requirements, setting objectives, content selection, strategy selection, logistic selection, media selection and combining the draft module.

The researcher will adapt a few steps and processes of the Model Development of Sidek Module to develop the Building Technology 1 learning module. In the first stage, the researcher determines the goals of this learning module to be developed. In addition, the researcher identifies the theories that be applied, the rational of this learning module developed, philosophy, learning concept using modules, user targets and time frames required to develop this learning module. Then, the researcher will conduct a need analysis study to get information in order to help the researcher to develop a module that will meet the needs of consumers. After that, the researcher needs to decide on the development objectives of the learning module. Objectives should be measurable and accessed by the user. In addition, the researcher must select the content and strategies used in the learning module to be developed. Stage 1 will be concluded with the validation of the draft module after all steps in this stage are implemented. After combining the draft module, the second stage is implemented by testing the validity and evaluation of

the module.

## 2. Methodology

Research design of this study is the product design and development research. In this study, the product is the Learning Module of Building Technology 1. Module development process in this study is based on Model Development of Sidek Module. Preliminary research had been conducted to analyse the needs of module development based on design and content.

### 2.1 Sample

In this study, there are 30 samples consist of 3 experts and 27 students. The experts consist of 2 lecturers from FPTV and 1 lecturer of Construction Technology program from Vocational College. 27 students are the 1<sup>st</sup> year students of Building Construction Technology Programme at FPTV, UTHM. The selection of samples research as the respondents in this study is using purposive sampling method.

### 2.2 Instrument

The study used quantitative approach by using questionnaire form. The questionnaire contained 3 parts that were levelled as part A, B and C. There are 2 items in part A and 29 items in part B and C. Part A is about demography, part B is about the usability of module in terms of design and part C is about the usability of module in terms of content. The five-points Likert scale were used to answer the questionnaire. The questionnaire had been validated by 3 experts. Based on the reviews by the experts, researcher had modified and removed a few terms used in the questionnaire items. After correcting the questionnaire, the researcher conducted a pilot test on 30 students of building construction program from FPTV. Thus, the researcher selects construction building students as they have the closest features as actual samples, which is both are students of construction program. The reliability value of design construct was 0.966 and content construct was 0.955. The Alpha Cronbach value for both constructs were high, so the instrument can be used in the actual study.

### 2.3 Data Analysis

The data will be analysed using Statistical Package for Social Science (SPSS) version 23 by using frequency, percentage (%) and mean score. In order to facilitate the researcher to analyses and process the data for part B and C. The five-points Likert scale will be classified in three levels as shown in Table 1.

**Table 1: Three-ponts Likert Scale (Best & Khan, 1998)**

Five-points Likert scale	Three-points Likert scale
1 - Strongly disagree	Disagree
2 - Disagree	
3 - Less agree	Less agree
4 - Agree	Agree
5 - Strongly agree	

For mean score value of the data, if the range is 1.00 – 2.33, it will be interpreted as low level. If the range is 2.34 – 3.67, it will be interpreted as moderate level. Lastly, if the range is 3.68 – 5.00, it will be interpreted as high level.

## 3. Results and Discussion

The finding shows that 84.46% agreed or accepted items for the design aspect of the module, while 13.32% less agreed and 2.22% disagreed or did not accept the item of the design aspect of the module. Mean score for items B6, B11, B14 and B15 are at medium level (mean score = 2.34-3.67) and other items are at high level (mean score = 3.68 – 5.00). However, all the items of the module design are at a moderate level, with the mean score value is 3.67. This shows that the module has a moderate level of design based on feedback from the expert group.

Besides that, the finding shows that that 90.11% agreed that the design aspect of the module, while 8.9% less agreed and 0.99% disagreed or did not accept the item of the design aspect of the module. All items of the module design are at a high level which is the mean score value is 3.89. This shows that majority of the respondents (90.11%) Agree that module design is at a good level. The findings in part C to examine the module content.

Finding also shows 83.35% agreed or received an item for content aspects of the module, while 9.51% less agreed and 7.14% disagreed or did not accept the item for the contents of the module content. The mean score of items C1, C9 and C10 is at a medium level (mean score 2.34-3.67) and other items are at high level (the mean score of 3.68– 5.00). However, all the items of the module design are at a moderate level, the mean score value is 3.67. This shows the usability of the content aspects of the module that has been developed at a moderate level based on feedback from experts. 91.53% agreed or received an item for content aspects of the module, while 7.93% less agreed and 0.58% disagreed or did not accept the item for the contents of the module content. The mean score for all items of the module design aspect is at a high level which is the mean score value is 3.93. Studies have shown that 91.53% of the respondents of the student group agreed that usability in terms of content of the module are at a good level.

The finding shows that majority of respondents agree that this module has size that was easy to be carried. Respondents also agree that this module has suitable color and the graphic really convey what is needed to be delivered in the module as Lindstrom (1994) states that graphic is the interesting illustration and pictures and able to convey people, place or things. Respondents also agree that this module has diagrams placed in the right place for reference. Diagrams as graphical elements that are organized neatly and sequentially with information make it easier for students to better understand and integrate descriptions of the learning content presented in the module. In the context of the layout of the module design aspect as well, the findings show that the majority of respondents agree that the sentence structure in the module is clear, the module has a well-organized text, the arrangement of subtopic is suitable, layout for all topics in the module are uniform and has a subtopic layout that is easy to refer to. Mohd Yusuf (2008) states that the use of text is an important aspect in the production of a module. Based on the findings of the study, the text produced by the researcher is well organized. Furthermore, the findings also shows that respondents agree that the font size is suitable and font type is easy-to-read. The findings of this study shows that the size and type of font used by the researcher is consistent in terms of consistency, size selection and clarity as noted in Atoma's (2004) study which states that authors should be aware of writing design such as consistency, selection font size, spacing and paragraph shapes.

Although the findings show that the majority of respondents agree on the aspects of module design, there are some items in this aspect that are moderate based on expert' feedback. The findings show that the group of experts disagrees that the sentence structure in the module is easy to understand. In this module, there are sentences that are not well organized that make it difficult to understand. The findings of this study contradict the findings of Harun and Mohd Zainul Abidin (2010) who received positive feedback from respondents who found that the sentence structure in the development of their module was easy to understand. This indicates that a well-structured sentence is important to make it easier to understand. In addition, respondents from the expert group disagreed that the module has a clear diagram and the size of the diagram used in this module is suitable. In this module there are many diagrams but there are less obvious diagrams and smaller sizes. According to Isa and Mohd Imam

Ma'rof (2018), graphic play an important role as they can illustrate the process of learning and this encourages students to think, analyze, make concepts and ideas that are difficult to translate into text. Therefore, the use of attractive and appropriate graphics in module writing is important as it helps facilitate student learning. This means that the diagrams contained in the module need to be improved because Beckmann (2004) through his study states that the production of diagrams can help students understand problems and identify the needs of the questions. This statement is also consistent with the study of Ogunleye (2009) which states that well-drawn diagrams can give meaning to students and solve problems given. This statement clearly shows that the use of proper diagrams is important to stimulate students' knowledge and thinking during the learning process.

Based on the analysis of the findings of the study, majority of respondents agree that the instructions contained in the module are easy to understand. Mohd Noah and Ahmad (2005) stated that students understand the content of the module when the instructions in the module are clear. Majority of the respondents also agreed that the examples provided in the module fit the topic. The examples provide more guidance for students to gain more insight into the topics in the module. The findings of this study are in line with the findings of Masrom's (2010) study which stated that guidance and instruction in modules play a role in facilitating learning. This means that the content of the instructions and examples in the module developed by the researcher is clear and easy to understand. In addition, the study found that majority of respondents agree that the content of the module is suitable to the student level and the syllabus. The findings of this study are based on both items in line with Suryaman's (2006) study which stated that each module developed should meet the needs and requirements of the user. The content in this module is well organized as the findings show that the majority of respondents agree that the content of the module is organized in order of learning from simple to difficult levels. The arrangement of content in this order of learning complies with the characteristics of a good module in line with Sutrisno's (2008) statement that in order to meet the features of the learning module, the learning content must be organized into specific units to facilitate student learning. This statement is also supported by Pahliwandari (2016) who states that cognitive learning theory emphasizes the preparation of learning materials using specific patterns, from simple to complex. Structured content arrangement makes it easier for students to have better understanding about the content of each topic and can make connections between topics. Furthermore, majority of respondents agreed that the use of language in the module is easy to understand and the content of each topic is clear and easy to understand. Hassan, Sha'ri and Yaakob (2019) also point out that good and effective writing should have a clear, concise, accurate, interesting and easy-to-understand element of reading. Therefore, the researchers decided to develop this learning module in the Malay language version is to help students understand the content in the module.

However, there are also some items for the usability of the module in terms of content that have received less consensus which is the objectives of the module are clearly stated. The objectives stated in the module developed by the researcher are not explicate and only stated in general. Sungkono (2009) states that ambiguous objectives are a hindrance to a learning process. This is because the unclear objectives make it difficult for students to identify what should be achieved after learning or their learning outcomes. Respondents from the expert group also disagreed with the exercise items for each topic to meet the learning objectives and also the exercise for each learning unit was appropriate. The level of exercise in the module does not meet the learning objectives. Good exercise is an exercise that can test the level of mastery of a topic as stated in Abdul Aziz and Ahmad's (2008) study that a student can reach a level or attach a connection so that the learning learned becomes more memorable through the exercises performed. Therefore, reinforcement training should be in line with the objective in order to measure the extent to which students can understand and master a given topic.

#### **4. Conclusion**

As a conclusion, based on discussion of the findings through the feedback of all respondents, this study is suitable as a material that can be used in learning process especially for self-learning. However,

improvements can be done on some of the items in the module in terms of design and contents of the module. Through the findings, this study has enabled researchers to gain an overview of the design aspects and the content of modules that need to be improved to ensure that the usability of the modules is at a high level. In terms of module design, the production of easy-to-understand sentence structure and interesting diagram should be emphasized in module development. Meanwhile, in terms of the content of the module, the setting of a more explicate objective is essential as well as the suitable exercise activity should be produced to ensure that the module user can measure the extent of their understanding of all topics based on the set objective. Therefore, the findings of this study are expected to provide an insight into future studies to focus on the important aspects in developing a module so that it can have a good quality.

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