

## Using The ADDIE Model to Develop Green Skills Teaching Module

Amarumi Alwi<sup>a</sup>, Arasinah Kamis<sup>b</sup>

<sup>a,b</sup>Faculty Of Technical And Vocational Education, Universiti Pendidikan Sultan Idris, 35900 Tanjung Malim, Malaysia

Corresponding Author: Amarumi Alwi

### ABSTRACT

This article discusses the development process of a module based on ADDIE Development Model. Teaching module is one of the elements that can help in the teaching and facilitating process for a subject. Therefore, in designing a module, a development model that contains thorough and systematic phases and processes is crucial. The aim of this article is to discuss the use of ADDIE development model in the development phase of Green Skills (Gs) teaching module for the Design and Technology (D&T) subject at primary schools. This is because ADDIE model is among the design models that are systematic and effective, comprising five phases which are analysis, design, development, implementation and evaluation. The use of ADDIE model is suitable in developing the Green Skills teaching module because it is systematic and complete as it has five sufficient steps so that the results meet the desired objectives and makes the teaching and facilitating process more effective.

**Keywords**-ADDIE Model, Green Skills, Teaching Module,

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### I. INTRODUCTION

Many development models can be used in the development of a module such as Sidek and Jamaludin Module, Hannafein and Peck Model, Dick and Carey Model, Kemp Model, ADDIE Model and ASSURE Model. All these development models are different in terms of approach and procedure, however, the final aim is to produce a good module. Each module needs to have a detailed explanation based on what a student should do, how the student should continue their work and what are the sources or materials that the student needs to use, in fact, the source for the teaching materials is usually provided along with the module or in a checklist (Jamaludin, 2016; Branch, 2014; Allen, 2012).

Each model has its own different advantages and limitations which can be tailored to the chosen teaching design. Various rules and procedures should be considered for a module which is being built so that the produced module will bring a beneficial effect (Jamaludin, 2016; Sidek & Jamaludin, 2005). A beneficial effect means that after someone follows a module, in the end, the student will have mastered the objectives stated in the module. Russell (1974) asserted that the important matter in module development is the stage where the module is tested on students, which determines if the module objectives have been reached or not. Module development should also contain various media that can strengthen the

student's understanding such as pictures, using ICT and so on (Allen, 2012).

Green Skill is knowledge, abilities, values and attitudes needed in life for growth, and they support the formation of a community that has an efficient and sustainable management in utilization available resources (Thienemann, 2014; UNESCO, 2014; Pavlova & Huang, 2013). Elements of green skills should be included in technical and vocational education as an added value, so no harm would be done to the environment by people who are science and technology-sensitive, hardworking, law-abiding and with integrity, in the conducts of their everyday life (Alwi, Kamis, Mohd Affandi, Faizal Amin, & Che Rus, 2017; Kamis, Alwi, Hj Ismail, Zakaria, & Nur Yunus, 2017; Kamis, Mustapha, Abdul Wahab, & Hj. Ismail, 2016; Mustapha, 2015;). Therefore, the Gs Module has been developed to provide knowledge on green skills in primary schools

To develop a green skills module, ADDIE development model was chosen. ADDIE Model is suitable for the development of instructional or teaching modules because it is a systematic approach for design, development, implementation, and teaching evaluation (Morrison, Ross, Kalman, & Kemp, 2011; Dick & Carey, 1996). ADDIE Model is also suitable with learning goals that are student-centered, innovative, genuine and reliable (Branch, 2014). Therefore, the researcher chose ADDIE model because the activities in the Gs module used 21st Century Learning which is student-centered and

combined with the use of information technology such as *Frog-VLE* and power point slides.

## II. ADDIE DEVELOPMENT MODEL

ADDIE development model is a model that is based on behaviorism, a spark of idea which was developed by Dick and Carry (1996) to plan a more effective learning system. ADDIE is an acronym for Analysis, Design, Development, Implementation and Evaluation. ADDIE module has similarities with other module development models such as identifying student needs, implementation and evaluation for the learning process. Figure 1 depicts the directional process in the ADDIE Model which shows that each evaluation can be conducted for every stage in the development phase of the ADDIE module because evaluation is important before proceeding to the next stage (Yolanda Reyes & Oreste Jenina, 2017; Gagne, Wager, Golas, & Keller, 2005).

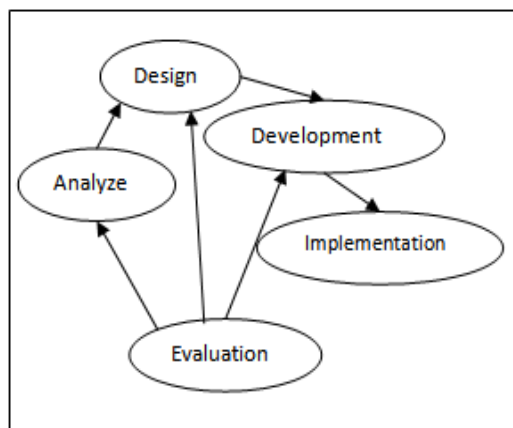


Figure 1: ADDIE Instructional Model. (Source: Gagne et al. 2005)

ADDIE model also has a planned and complete phase of module development which has systematic procedures in producing a module (Branch, 2014; Allen, 2012) which are analysis, design, development, implementation and evaluation. The five stages in the construct of ADDIE model is suitable for the development of a module, starting with a needs analysis and ending with the evaluation of the module. The five stages in ADDIE development model are also relevant as they ease the design process, in which the output for every stage becomes the input for the subsequent stage (Mohd Afifi, 2017; Ummu Nasibah Nasohah et al., 2015).

### 2.1 FIRST STAGE: ANALYSIS

The first stage in ADDIE Development Model is analysis. The aim of the analysis stage is to determine the objective for the teaching and learning process (Branch, 2014; Allen, 2012). The analysis

phase is the foundation for subsequent phases in the design of teaching. In this research, the objective of the module is to spread knowledge and skills regarding green skills in nurturing positive attitudes towards green skills in students at primary schools. The green skills that are being integrated in Design and Technology (D&T) subject is a new element in the education system of Malaysia. Therefore, an analysis in terms of the needs and content of the module was conducted by using Modified Delphi Technique. The Delphi Technique is not a new research method (Saedah, 2008), instead, it has been scientifically used to obtain expert agreement/consensus from experts who are able to give opinion freely based on their expertise (Mohd Ridhuan, Saedah, Zaharah, Nurulrabihah & Ahmad Arifin, 2014; Linstone & Turoff, 1975).

In this study, participants consist of nine experts from the various fields. The criteria for selection are based on (i) knowledge of the concept of green skills in line with green technology and environment, (ii) technical and vocational technical and technical expertise, (iii) expertise and knowledge in D&T subjects and (iv) Design and Technology field. Hence the list of expertise in this research involved a Technical and vocational specialist, two lecturers in the field of Environmental and Sustainable Education, three officers at the Ministry of Energy, Green Technology and Water, an officer in the Curriculum Development Division and two expert teachers for D&T subjects in primary schools.

### 2.2 SECOND STAGE: DESIGN

The second stage is design. Design means to determine and design the instructional method that will be used. The design process should be systematic and specific. This is the stage where information is transferred from the analysis phase to a physical sketch which is used in the development process (Branch, 2014; Allen, 2012; Morrison et al., 2011). In this research the Gs module was constructed using a teaching method which is based on contextual learning approach and 21st century learning education. Standard Performance Document (DKSP), Design and Technology for Year 5 was also used as a reference and guide in making the teaching and learning process to be more recent. Through this stage, the researcher states the learning objectives in a specific way, construction of item and the choice of teaching and learning strategy.

In the contextual learning in the Gs module, several steps need to be conformed to, so that the learning objectives fulfil the criteria that need to be achieved in the learning objectives (Gagne et al., 2005). In the implementation of the contextual approach, four strategies are used which are

motivation, understanding, skills and evaluation as explained based on Figure 2.

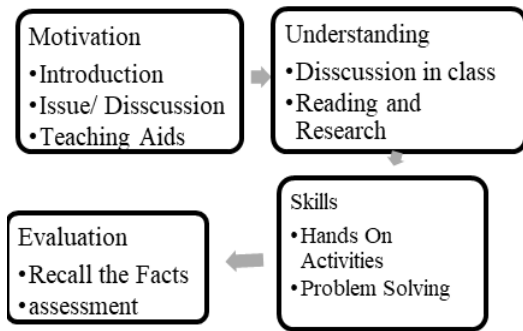


Fig 2: Four Strategies in Contextual Approach

**2.2 THIRD STAGE: DEVELOP**

Next, the third stage is the development stage. Development is the process to produce or develop software or products by using existing applications. This phase is also the composing process and production of materials needed to achieve the implemented objective based on the *Process Performance Objectives*. In this phase the developed product is a Gs module which was developed based on the skill elements that were obtained in the analysis stage. The resulting module uses teaching and facilitating technique based on the current teaching strategy of the 21<sup>st</sup> century learning education.

The teaching module for green skills is a module which was specially developed by the researcher to introduce the element of green skills knowledge and to encourage green skill-related practices. This module is used by teachers in integration for the D&T subject. The Gs module contains teaching strategies, activities, works, quizzes and teaching aids which can be used by teachers in a systematic way to plan, develop, implement and evaluate the identified activities. The Gs module was developed starting from introduction, green skills knowledge, green skills practices and evaluation. Table 1 shows some units in the Gs Module.

Knowle dge	Practices	21 <sup>st</sup> Century Learning Activities	Formative Assessment
Solid Waste Management	Separating the solid waste materials	- Getting Information : <i>CHATT</i> - Collaborative learning	Rubric: Waste Separated Practices
Foot Print	Adopt activities that can reduce the release of carbon gases into the air	- <i>Think-Pare Share</i> Activity - Pairs	Foot Print Quiz

3R (Reduce, Reuse and Recycle)	Using wasted materials to produce a project	- <i>Hot Seat</i> Activity	Rubric: 3R Practices
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Table 1: Example of Units in Green Skills Module

The Gh module is a module that was developed in writing and also using *power point* slides which were loaded into a CD software to make it easier for teachers to use them in classrooms, because the approach used is 21<sup>st</sup> century learning that applies the elements of technology and ICT in teaching. Therefore, the Gs Module not only can be used directly, it also uses a different approach, such as teachers can show *ppt.* slides to students or upload the module in the form of *power point* slides to the teachers' *frog-VLE* software means to determine and design the instructional method that will be used.

**2.2 FOURTH STAGE: IMPLEMENTATION**

The fourth stage in the development of the Gs module is implementation. The implementation stage functions to test the efficacy as well as possible problems that may arise in the design and development phases. In this research, the implementation stage involved the process of obtaining validation and credibility of the module, making improvement to the module and training the teachers who have implemented the Gs module. After the module draft was completed, the researcher started the validation process by distributing the draft to seven experts. This process took quite some time because the expert panels need to inspect the draft for the green skills module and give feedback to the researcher for improvement process.

After getting the feedback from the identified module experts, improvement process on the module draft was performed. This was based on the comments given by the module experts. There were also experts who commented and wanted to see the improvement that was made and checked the Gs module twice before making the evaluation in the module validity form. However, there were several comments and feedback for module improvement from all experts.

Every comment from experts were considered by the researcher and revised in the development of the Gs module. The researcher also returned the module along with the module questionnaire for the second time to the module experts who gave low scores in the module validation evaluation. This was to ensure that the developed Gs module has good validity. For example, suggestions such as to attach *ppt.* in the form of *power point* slides was implemented by the researcher by preparing the power point slides for

each related topic and uploading all the materials into *CD Writer* to make it easy for the teachers to use the materials in the Gs module.

Among other suggestions that were given attention to are the comments regarding the terms used in the modules related to D&T or to Environmental Education. For example, the term “*liberation*” of greenhouse gas was changed to the “*release*” of greenhouse gases, based on the comments given by the Experts. Other than that, D&T terminologies were amended by referring to the correct terminologies and indices in the Year 5 D&T textbook such as those in the *Compost Fertiliser* title which include terminologies such as red soil, fertiliser soil and so on.

### 2.5 FIFTH STAGE: EVALUATION

Evaluation is a systematic process that determines the quality and effectiveness of the teaching design in the final product. This is a crucial phase. The researcher needs to constantly evaluate the advantages and disadvantages of each previous phase which are analysis, design, development and implementation. The final process in the development phase of the Gs module in this research is the evaluation stage of the module in terms of module validity based on feedback from the seven chosen experts.

To determine the validity level of the module content, the total score given by the experts (x) is divided by the actual score (y) and multiplied by one hundred. The formula is as follows:

### III. CONCLUSION

The Gs module is a skill-based module that was developed based on ADDIE Development Model which is analysis, design, development, implementation and evaluation of the module. ADDIE Development Model was chosen because it has five complete stages and is easy to be tailored to the researcher’s needs. The contents for the Gs module was developed based on Modified Delphi Technique to obtain a high consensus value or agreement level by all identified Delphi experts apart from the analyses of literature review which are related to environmental sustainability. The Gs module was designed using a contextual approach and 21st century learning. The Gs module was developed in writing and uploaded in a CD to make it easy for teachers to use. The completed draft of the Gs module was sent to chosen experts for validation. This showed that the Gs module has undergone a complete and systematic development phase.

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