

## **Development of An Environmental Education Learning Model for Vocational High Schools**

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### **Abstract**

This study, is a Research and Development (R & D) Model which generates four product components, namely: a book of models, devices, instrument learning and web-based program. The purpose of this study is to design a Learning Model for Environmental Education used on Vocational Education, tested at Vocational high School Palopo to 110 students as the sample to represent 1100 students. Indicators research is validity, practicality, and effectiveness of the model of environmental education. Based on the results of the research found that the learning model improve knowledge, and improvements in the affective aspect. This is due to the students' responses are in a category will be positive but do not meet the criteria of effectiveness. Furthermore, based on the results of the second experiment found better results, more effective where the activities of the students showed a positive value and according to criteria of effectiveness

**Keywords:** Learning, Environmental Education.

### **INTRODUCTION**

Several previous studies in the field of vocational technology education focused on the development of student competence, participation, and ethical students, that there are many things that influence each other in the educational process as the quality of teachers that make the learning process, and the completeness of the infrastructure used. Widyastono, (2014: 119) argues that the curriculum in 2013 on the competence of vocational skills Technology and Engineering emphasizes the competence development of knowledge, skills, attitudes that learners are balanced. Similarly

Norizan (2010: 41) argues: "Identify the knowledge, attitudes and practices on the environment is required to assess the level of preparedness to integrate Education Sustainable Development (ESD) in their teaching."

The failure of environmental education in vocational schools, based on preliminary observations, due to: First lesson needs to be designed based on the model of environmental management in the form of explanations and giving practical understanding to the teacher in the classroom. Both the design of the learning model can serve as a reference for teachers, especially to apply learning to use computer technology in the form of a website, so that the preparation of the model is expected: First, teachers and students are accustomed to using technology-based learning model. Second, teachers and students used to interact listening to the material and worksheets of students with computers using website. The third, student learning outcomes are evaluated by a computer using the website, making it easier with an integrative approach.

The learning model is appropriate for it named Plan, Observation, Revision, Evaluation, and value environmental Education (POREV-EE) Model-based website, designed in the form of learning materials, student worksheets, and evaluation of learning outcomes are presented online. Results were related to the results of previous studies conducted by Riyana, (2010: 52) with the title "Increasing pedagogical Master Through Implementation Education Model (Interactive Virtual educational)" where such research qualification improvement of teachers through the development of learning models designed specifically through the system distance learning by using information technology. The utilization of information technology-based, interactive and virtual (e-learning) to increase the competence of teachers.

Learning environment in vocational high schools, is still lacking. This is due to the teachers who are still using conventional learning models by using the media what they teach and previous study results can not increase the ability of teachers in providing an understanding. This is why the design POREV-EE Model-based website with programming languages (Hypertext Processor), and based database management system becomes important to be spliced. Armitage et al. (2012: 135) argues that "the use of computers in teaching equipment have seen an exponential growth in the last decade and from the perspective of students, the use of technology as a learning resource helps to impart skills and knowledge". One approach is the model used Nieveen Model (1999), and Joyce, Weil, and Calhoun (2004: 48-51).

## RESEARCH METHODS

This type of research study Research & Development method where development is done through several stages or phases to produce Environmental Education Learning Model (POREV-EE Model). The model can be asses by the quality criteria based on the theory Nieveen (1997) issue of validity, practicality, and effectiveness. The development of this model was followed by the learning device is packaged in an application program using computer media website.

Instruments used in FOREV-EE model, is a learning device that is packaged in the form of an application program website includes: (1) Model sheet assessment, (2)

Sheet Observation, (3) Questionnaire responses of students, (4) Gazette the results of evaluation studies, and (5) Form validation for each instrument. Then test POREV-EE model, the learning device is packaged in a media program using a computer, and instruments that already meet the validity tested at Vocational high School Palopo in Class XI of the school year in 2014 to 110 students as the sample to represent 1100 students.

Formula reliability of devices and instruments based on a percentage of the deal has been modified as follows:

$$\text{Percentage of agreement (R)} = \frac{\text{Agreements}}{\text{Disagreements} + \text{Agreement}} \times 100\%$$

Information:

R = Coefficient Reliability

Agreements = average rate of Assessor Agreement

Disagreements = The average level of disagreement of assessors

Criteria for the implementation of otherwise reliable models, if the value of reliability (R)  $\geq 0.75$  (Borich, 1994: 385)

## RESULTS AND DISCUSSION

### 1. Results

Step Model Development activities of POREV-EE Model

Development learning model that is designed to be named Model POREV-EE Model following the order of modification of common development model as follows:

#### *Phase 1: Preliminary Investigation*

Based on evidence in the field, the teacher teaches environmental management in the classroom using model interface customary teachers teach (the conventional model, the result is less effective and its impact has not been felt in students and the community. This phase is the phase observations to make a plan for development.

#### *Phase 2 : Designing*

##### *a. Designing Learning Model*

Phase 2 is to redesign or design a Learning Model for Environmental Education (POREV-EE Model) after planning and observation. Activities undertaken in the design study model, referring to the components of learning by Joyce, Weil, & Calhoun, (2004).

##### *b. Designing a Learning Tool*

Designing POREV-EE Model, requires teachers to first determine the learning objectives. In the learning objectives can be used as guidelines for selecting learning with the help of computer models tutorial using a computer program (software), namely: the programming language PHP (Hypertext processor) and MySQL database (management system).

**Phase 3: Realization**

**a. Realization of Learning Model**

After conducting Phase-2 on the design of the above, the next entry in the phase of realization or implementation phase. Activities undertaken are implementation model that has been designed as the phase 2, namely: (1) conducting the preparation syntax of the model with attention to serve as a computer-based learning instructional purposes; (2) establishes a system of social or learning environment prevailing at POREV-EE Model; (3) formulate principles reactions; (4) determine the support system; (5) develop the instructional goals of the learning process. POREV-EE Implementation Model in Phase-2 will be named Prototype I

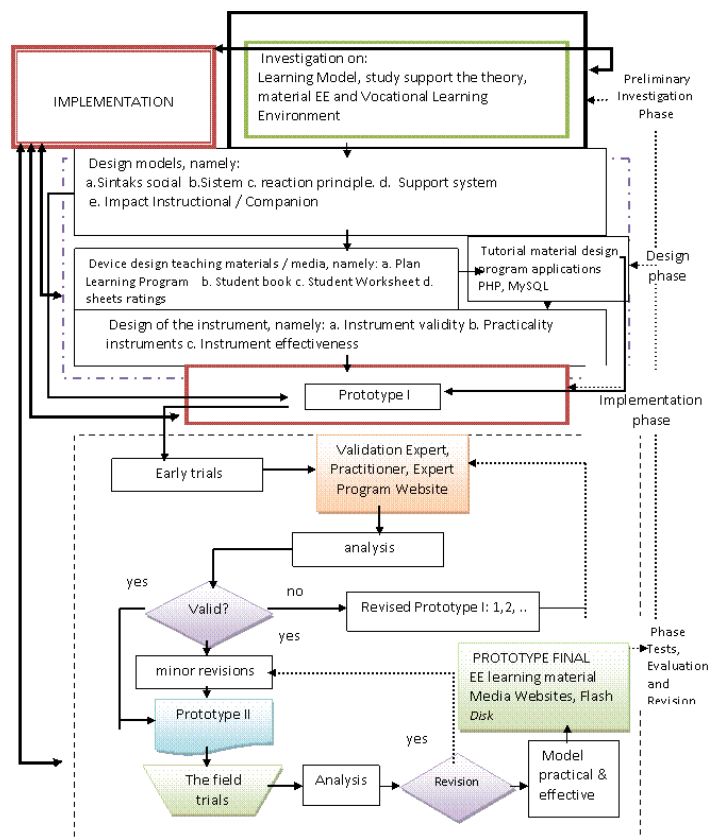
**b. Implementation of Learning Tool**

The implementation phase learning device refers to a direct instructional model utilizing information technology based on phase 2, phase 3 and phase-4.

**Phase 4 revision, evaluation, and testing Values**

In this Phase 4 activities undertaken is validation, and test piloted in the field POREV-EE Model development. Stages are validated prototype phase I consists of the Model POREV-EE, learning tools, and research instrument.

To show the flow of activities in this study, can be seen in Figure 1 below.



**Figure 1 . Event Flow Model POREV-EE**

**PROV-EE Application Assessment Model**

Research PROV-EE Model asses by four (4) experts and practitioners refer to the book POREV-EE Model. Based on the results of expert assessment and confirmed the valid criteria obtained the test results as follows:

**Table 1.** Test results POREV-EE Application Model

NUMBER	ASPECT ASSESSMENT	AVERAGE VALUE	CATEGORY
1	Support theory	3,5	Very high
2	Syntax	3,4	High
3	Social system	3,5	Very high
4	Principle reactions	3,5	High
5	System support	3,4	High
6	Instructional impact accompaniment	3,5	Very high
7	Online learning	3,5	Very high
8	Online student assignment sheet	3,3	High
9	Evaluation of learning outcomes	3,5	Very high

*Source: Results of data processing*

Based on the results of the assessment of the experts presented in Table 1 above, it can be concluded that the overall POREV-EE model is valid and can be used as a model of learning in secondary vocational schools.

**Rate of use Website**

Use of the Web site is part of the POREV-EE model used by teachers and students in the classroom, can be seen in Table 2.

**Table 2.** Rate of Use Website PORE LEE Model

NUMBER.	ASPECT ASSESSMENT	AVERAGE VALUE	CATEGORY
1	The initial view	3,5	Very high
2	Selecting aspect of the study	3,68	Very high
3	Choosing the material aspect	3,62	Very high
4	Working Worksheet students	3,5	Very high
5	Evaluation	3,6	Very high

*Source: Results of data processing*

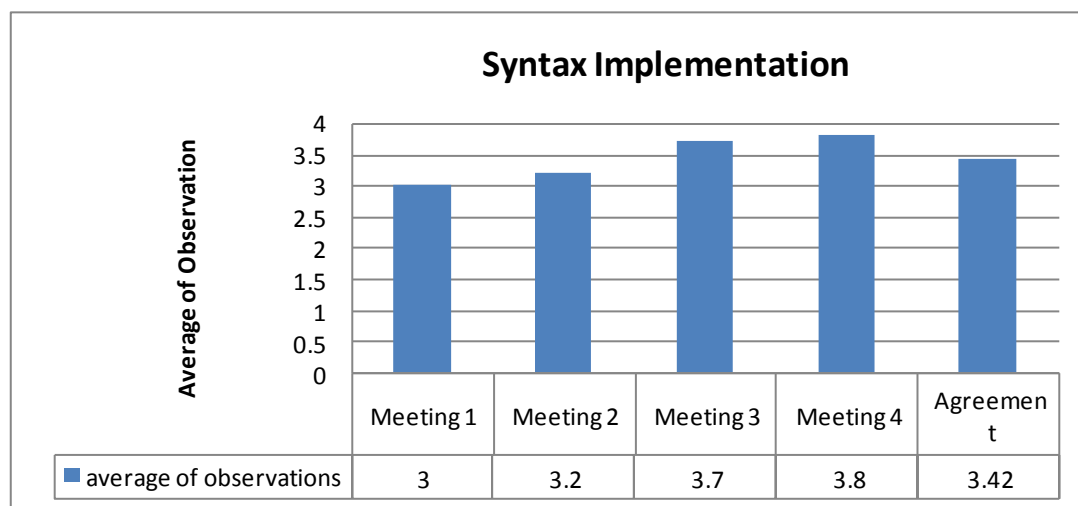
There are five aspects judged on the use of the website in the implementation POREV-EE model used by teachers and students in the classroom, namely: (1) aspect of the initial view is used by teachers and students to create a user ID and password as participants learn, (2 ) choose the aspect of the study by the student, (3) select aspects

of the subject matter, (4) aspects of student worksheets, and (5) aspects of the evaluation of the students' worksheets. Based on the average results obtained are presented in Table 2 above, then confirmed with valid criteria, it can be concluded that all aspects of the assessment are at very high category.

### ***Trial POREV-EE Model***

#### ***a. Component syntax***

Implementation of the testing of components syntax, obtained 15 agreements of two expert observers, and the only one that is not agreed upon. observations of two observers agree that POREV Syntax-EE Component Model reliability is achieved by a percentage R (PA) = 93.75%, or an average observation disagreement (M = 3.42) of four meetings in the classroom. Component syntax shown in Figure 2.



**Figure 2.** Implementation of Syntax Components

#### ***b. Social System Components***

Implementation of the Social Component System test, obtained 19 agreements from two expert observers and the only one that was not agreed upon. This means that from observations of two observers agree that POREV-EE Model Social System reliability is achieved by a percentage R (PA) = 95%, or an average observation disagreement (M = 3.65) of four meetings in the classroom. Aspects of the implementation of the social system components shown in Figure 3.

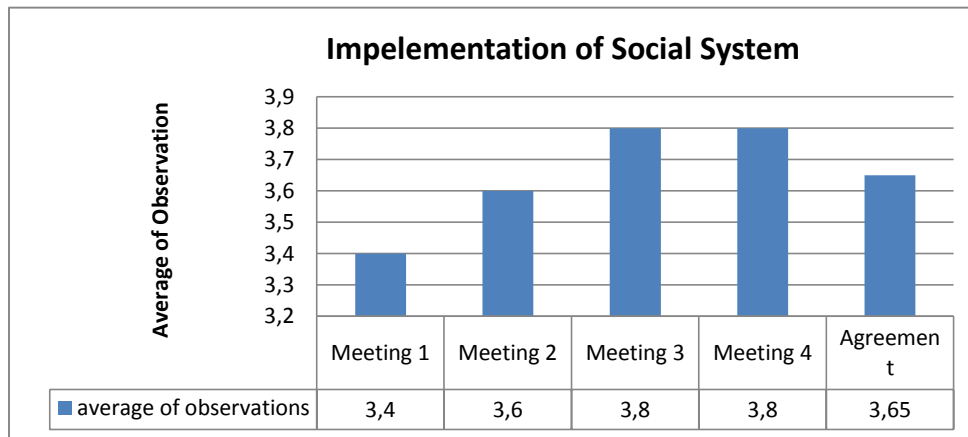


Figure 3. Implementation of the Social System Components

**c. Principle Component Reaction**

Implementation of the test component of reaction principle obtained 20 agreements from two expert observers and 0 are not agreed upon. This means that from observations of two observers agree that the principle component reaction-POREV-EE Model achieved by the percentage of reliability R (PA) = 100%. or the average value of disagreement (M = 3.75) than 4 learning in the classroom. Aspects of the implementation of the principle components of the reaction are shown in Figure 4.

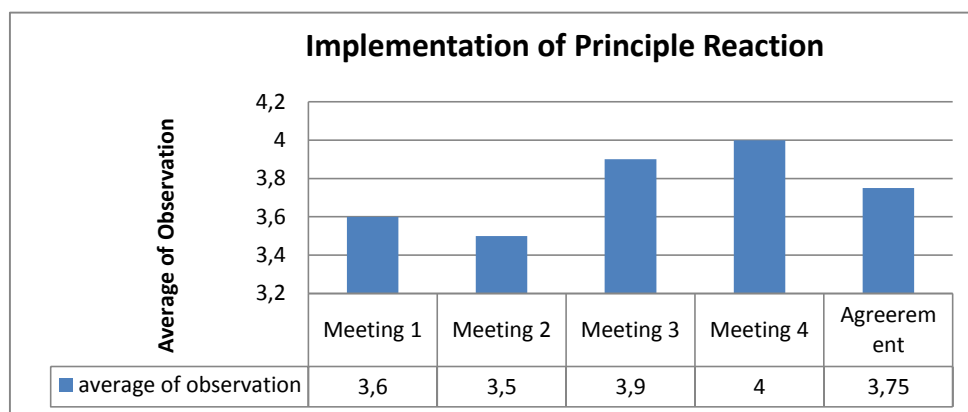
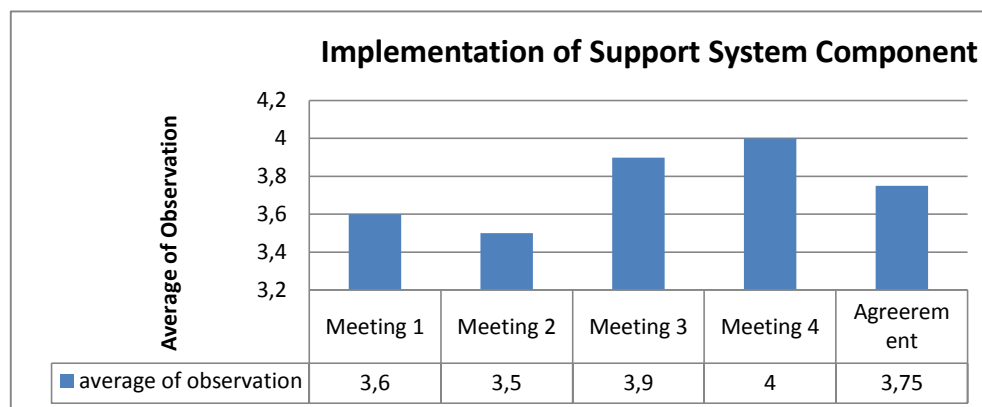


Figure 4. Implementation of the principle components of the reaction

**d. Component Support System**

Implementation Support System Components trial, obtained the agreement from the two observers 24 experts and 0 are not agreed upon. Observations of two observers

agree that Component Support System Model POREV-EE is achieved with the reliability R (PA) = 100%. or the average value of disagreement (M = 3.90) than 4 learning in the classroom. Implementation of Component Support System are shown in Figure 5.



**Figure 5.** Implementation Support System Components

## 2. Discussion

During this time the teacher teaches is still using the old model is system oriented teaching at the teacher, or the conventional learning system so that the learning is very limited so created a new model of learning by using POREV-EE model in which the online computer-based learning system that is oriented to students activities This learning system, provide many benefits, namely: First, students learn more effectively individually, teaching materials easy to remember because of the material in the form of images of environmental problems, so that students do not get bored; Second, students are stimulated to learn to interact with computers so that students have the challenge to be more creative; Third, students in learning activities, can be directly evaluated by the computer therefore mastery learning can be measured directly, for example by determining the minimum standard of completeness criteria (KKM) score  $\geq 70$  were determined by school.

R & D research was conducted to develop a learning device through several stages or phases that resulted in Environmental Education Learning Model (POREV-EE Model). Initially, only the hosting local produce used in the classroom and then developed in the form online and can be accessed through the website [www.Asri-uncp.com](http://www.Asri-uncp.com). Learning materials are prepared in such a way that allows students to know the real situation in society, and is expected to change the way of thinking and behavior of students. This learning material removed from the real situation through the phenomenon observed images, analyzed, and given the conclusions so as to attract the attention of students to learn. Through learning tools, students utilize computer media furthermore it can analyze the character of students, performance, selecting



methods, evaluate, revise, and others in accordance with learning theory proposed by Smaldino, Lowthher, and JD Russell, (2011, 334)

Practicality Learning Model Environmental Education (PROV-EE Model). measured by two approaches, namely a theoretical and empirical approach and based on the results of an expert assessment, POREV-EE Model online already feasible in the classroom, in the computer lab, and outside the classroom. In Trial I declared that meets the criteria elements of practicality, but still needs to be improved. Followed by Trial II to fix a few things that are found in the trials I so that this model can really executed well, although still no shortage, caused by: First teachers and students not yet accustomed to accessing learning materials using the website, second teachers did not master classroom management is good, so in the process of learning some aspects are often forgotten, The third students are not used to doing exercises online, where students are evaluated by a computer, the fourth student habit often open other websites outside of the material presented, thereby disrupting the smooth process learning.

The effectiveness of the learning model POREV-EE online are: ability of teachers manage learning activities, student activities, success in learning or learning outcomes, student response to POREV-EE Model online. The effectiveness of the results achieved during the implementation phase of Trial are: (1) based on the results obtained using POREV-EE Model online has been declared effective, because the results of the assessment refers to the ability of teachers manage teaching and learning activities, but in it experienced improvements; (2) the activities of students who rated load 9 elements declared effective activity component in the learning process; (3) the success of learning or mastery learning outcomes is done online students work in a timely matter using a computer program; (4) The student's response to POREV-EE model is very high.

## **CONCLUSION**

Based on these results, it can be concluded that POREV-EE Model: First, because the instrument has been validated Valid four experts and practitioners with the reliability coefficient  $R = 0.96$ , on the whole instrument has qualified validity and reliability. Second, effective for learning model POREV-EE online can enhance teachers' ability to manage the learning activities, student activities, and the success of learning or student learning outcomes. Third, practically as measured from the two approaches, namely a theoretical and empirical approach, based on the results of expert assessment, POREV-EE Model online already feasible in the classroom, in the computer lab, and outside the classroom.

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