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ANALYSIS OF THE UTILIZATION OF *COMPUTER BASE TRAINING* (*CBT*) *SIMULATORS* IN SUPPORTING THE TEACHING AND LEARNING ACTIVITIES OF LECTURERS AND STUDENTS AT MARITIME EDUCATION AND TRAINING INSTITUTIONS UNDER MINISTRY OF TRANSPORTATION

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Abstract

The Ministry of Transportation has 12 (twelve) Maritime Education and Training Institutions (Lemdiklat) at the level of Colleges and Polytechnics that have carried out maritime education and training for the community. To increase the effectiveness and support the learning activities of Lecturers and Learners in the process of teaching and learning activities, the Maritime Education and Training Institutions within the Ministry of Transportation utilize the Seagull Simulator Computer Base Training (CBT) software in accordance with the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978 amendment 1995. However, the utilization of CBT Simulator still finds many obstacles so that the implementation of its use is not optimal. This study aims to analyze the effect of CBT Simulator utilization in supporting the teaching and learning activities of Lecturers and Learners, especially in 2 (two) Maritime Training Institutions, namely the Jakarta College of Shipping (STIP) and the Polytechnic of Shipping Science (PIP) Semarang. The method used is descriptive quantitative with data collection through questionnaires distributed to 88 (eighty-eight) Lecturer and Learner respondents. The results of descriptive analysis show that 84.9% of CBT Simulator utilization variables contribute positively to the teaching and learning process. The classical assumption test shows that the data is normally distributed (Asymp. Sig. = 0.200) and there is no heteroscedasticity. The t test shows that the CBT Simulator utilization variable has a significant effect ($p < 0.000$) on learning outcomes. The coefficient of determination (R^2) showed a contribution of 84.9% to teaching and learning activities. These findings provide a strong basis for encouraging the integration of technology in the maritime education and training curriculum. Further research is recommended to explore other variables that could potentially affect learning outcomes.

Keyword: : Learning Media, Teaching and Learning Activities, Curriculum, Maritime Education and Training.

Abstract

The Ministry of Transportation has 12 (twelve) Maritime Education and Training Institutions (Lemdiklat) at the level of Colleges and Polytechnics that have carried out maritime education and training for the community. To increase the effectiveness and support the learning activities of Lecturers and Learners in the process of teaching and learning activities, the Maritime Education and Training Institutions within the Ministry of Transportation utilize the Seagull Simulator Computer Base Training (CBT) software in accordance with the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978 amendment 1995. However, the utilization of CBT Simulator still finds many obstacles so that the implementation of its use is not optimal. This study aims to analyze the effect of CBT Simulator utilization in supporting the teaching and learning activities of Lecturers and Learners, especially in 2 (two) Maritime Training Institutions, namely the Jakarta College of Shipping (STIP) and the Polytechnic of Shipping Science (PIP) Semarang. The method used is descriptive quantitative with data collection through questionnaires distributed to 88 (eighty-eight) Lecturer and Learner respondents. The results of descriptive analysis show that 84.9% of CBT Simulator utilization variables contribute positively to the teaching and learning process. The classical assumption test shows that the data is normally distributed (Asymp. Sig. = 0.200) and there is no heteroscedasticity. The t test shows that the CBT Simulator utilization variable has a significant effect ($p < 0.000$) on learning outcomes. The coefficient of determination (R^2) showed a contribution of 84.9% to teaching and learning activities. These findings provide a strong basis for encouraging the integration of technology in the maritime education and training curriculum. Further research is recommended to explore other variables that could potentially affect learning outcomes.

Kata Kunci: *Learning Media, Teaching and Learning Activities, Curriculum, Maritime Education and Training.*

A. INTRODUCTION

Computers are a type of media that can virtually provide an immediate response to learning outcomes by learners. Moreover, computers have the ability to store and manipulate information as needed. The rapid development of technology today has enabled computers to load and display various forms of media to them.

Currently, computer technology is no longer only used as a means of computing and word processing (*word processor*) but also as a multimedia learning tool that allows students to design and engineer a concept and science. Computer-based multimedia presentation can be defined as a technology that optimizes the role of computers as a means to display and engineer text, graphics and sound in an integrated display. With a display that can combine various elements of information and message delivery, computers can be designed and used as an effective technological medium for learning and teaching relevant lecture material.

Computer-based multimedia can also be utilized as a means of conducting simulations to train certain skills and competencies. For example, the use of a ship platform simulator that allows marine students to practice navigation to prevent collisions or the use of a loading monitoring room simulator that allows marine students to practice loading and unloading cargo.

The development of computer technology today has formed a *network* that can provide the possibility for students to discuss and interact with learning resources widely. Computer networks in the form of the *internet* and the *web* have opened access for everyone to obtain the latest information and knowledge in certain academic fields. The development of computer technology also brings many changes to an application program in an effort to make technology capable of manipulating the real situation. The emphasis lies on continuous efforts to maximize teaching and learning activities as cognitive interactions between learners, subject matter and lecturers. Computer systems can deliver learning directly to learners by interacting with subjects programmed into the system. Computer-assisted teaching is what aids the learning process.

The learning process is an interaction that has normative value while teaching and learning activities are a conscious and purposeful process. The goal in teaching and learning activities is used as a guide to which direction the teaching and learning process will take. The teaching and learning process will be successful if the results are able to bring changes in knowledge, understanding, skills and values in students. In organizing learning so that students can achieve learning objectives, lecturers need careful planning. One of the important things that needs to be considered to make a learning plan is to determine the learning model.

The definition of a learning model is a plan based on psychological theory which is used as a guide for lecturers in planning and implementing teaching and learning activities. Another understanding of the learning model is a conceptual framework in the form of a systematic pattern of procedures developed based on theory and used in organizing the teaching and learning process to achieve learning objectives (Ridwan Abdullah Sani, 2013: 89). So by determining the learning model means that the lecturer plans the basic pattern of learning activities in the classroom, this concerns the material presented and the methods or methods used. Although in the curriculum the learning objectives have been targeted by the Ministry of Transportation's Transportation Human Resources Development Agency (BPSDM) through the determination of syllabus and competencies, the learning material is still the territory of the lecturer to choose what to convey to students. Although the material is closely related to learning objectives, lecturers can add learning materials that are not related to the objectives, such as concerning things that are new or being discussed. As for the learning method, BPSDM Transportation only focuses on a learner-centered learning approach. The approach is expected to make students more active in the teaching and learning process so that there are many choices of methods that can be used to teach students.

The minimum competency standards for *seafarers* are regulated in the *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers*

(*STCW*), 1978. In addition to the provisions in the 1978 *STCW*, juridical considerations regarding learning for deck and engine seafarers are also regulated through the *Model Course* guidebook established by the *International Maritime Organization*. With the *IMO Model Course*, stakeholders can develop training programs in updating the knowledge and skills of learners according to the needs of maritime technology.

Computer-*assisted* learning activities or better known as *Computer Base Training* (*CBT*) is a general term for all learning activities that use computers, either partially or as a whole. Computer Based Learning is a new concept that until now has many types of designs and implementations in the world of education and learning. This condition arises as a concrete manifestation of the globalization of Information and Communication Technology in the implementation of lectures.

One of the computer-based learning models in the implementation of lectures is utilizing the *CBT Simulator*. *CBT Simulator* is a tool or system used to provide education and training through the use of computers. *CBT Simulator* allows users to learn interactively through simulations, exercises and evaluations that run on computers or other electronic devices. It can include a variety of learning methods such as multimedia tutorials, process or activity simulations, quizzes and tests designed to improve the user's understanding and skills in a particular subject or field. The definition of simulation type is one of the learning strategies that aims to provide a more concrete learning experience through imitations that are close to the real form. So it can be explained that this simulation-type *CBT* is a computer-mediated learning or using computers as learning materials with a strategy to provide a more concrete learning experience by creating imitations that are close to the real form.

Currently, the teaching and learning activities of several subjects at the maritime training institute within the Ministry of Transportation have been facilitated by the use of computer technology in the form of *CBT Simulator-based* learning. However, the availability of the *CBT Simulator* is not optimal and there are obstacles found in its utilization. Learners have not been motivated to develop their knowledge and skills constructively in order to be able to learn actively and build the concepts learned. Lecturers and Learners also use more or tend to use informative package books. Lecturers have not received special training in the use of the *CBT Simulator* to be adopted as a learning model using a computer and BPSDM Sea Transportation as a syllabus conceptor has not integrated the material in the *CBT Simulator* with the curriculum and subject learning objectives. The maritime training institution as the learning implementer has not made continuous efforts to update the content and maintain the simulator system to keep it relevant and effective in accordance with current conditions.

1. Problem Identification

   Based on the background presented, the following problems were identified:

   a. The utilization of *CBT Simulator* in teaching and learning activities has not been maximized.
   b. Lack of organizational support in setting curriculum and learning objectives.
   c. Lack of training for Lecturers and Learners on the use of *CBT Simulator*.
   d. Lack of continuous development of the *CBT Simulator* system.
   e. Lack of effort in maintaining the *CBT Simulator* system to keep it functioning and well-maintained.

2. Problem Limitations

   This research raises the main problem of CBT Simulator utilization in supporting teaching and learning activities of Lecturers and Learners with the following problem restrictions:

   a. The utilization of CBT Simulator in teaching and learning activities has not been maximized.
   b. Lack of organizational support in setting curriculum and learning objectives.

3. Problem Formulation

   Based on the background, identification and limitation of the problems described above, the following problems are formulated:

   a. The effectiveness of *CBT Simulator* utilization in teaching and learning activities.

   b. How to optimize the utilization of *CBT Simulator* in learning activities.

4. Research Objectives

   Based on the problem formulation above, this research aims to:

   a. Knowing and analyzing the effectiveness of *CBT Simulator* utilization in teaching and learning activities.

   b. Knowing and analyzing the optimization of *CBT Simulator* utilization in teaching and learning activities.

5. Research Urgency

   The urgency of this research is to provide input to policy makers to further utilize the *CBT Simulator* in teaching and learning activities optimally.

B. THEORY AND LITERATURE REVIEW

1. Theory Overview

   According to Ariesto (2012), the use of computers in the field of education, especially in learning, is actually a link in the history of learning technology. The history of learning technology is the creation of various experts in related fields, who basically want to strive to realize practical ideas in applying the principle of dichdathy, namely learning that emphasizes individual differences both in ability and in speed. The realization of these practical ideas is also in line with the development of learning theories developed by psychologists, namely with the development of learning theories from the behaviorist school (learning theory from the behaviorist school) and cognitive theories, especially those using the *information processing* model. The theories of school psychology related to complete learning with its figures such as John

media that can be used in learning are becoming increasingly diverse along with the times. Several types of computer-based learning media have now been classified by experts. There are several types of computer-based learning media proposed by one expert. According to Azhar Arsyid (2006: 3), computer-based learning media consists of:

a. PowerPoint Presentation

   Currently, technology in the field of computer engineering is replacing the role of presentation tools in the past. The use of presentation design software such as Microsoft PowerPoint developed by Microsoft Inc. which develops many types of software to support these interests. The advantage of this media is that it combines all media elements such as text, video, animation, *images*, graphics and *sound* in a PowerPoint presentation so that it can be made as interesting as possible.

b. Interactive Learning CD/DVD/Multimedia

   The nature of this media is not only interactive but also multimedia, containing complete media elements including *sound*, animation, video, text and graphics. The various learning multimedia models are:

   1) *Drill* Model

   Provides a more concrete learning experience through the creation of imitations of forms and experiences that are close to the real atmosphere.

   2) Tutorial Model

   Using software in the form of a computer program that contains subject matter.

   3) Simulation Model

   Provides a learning experience through the creation of imitations of forms that approximate the actual atmosphere.

4) Model *Games*

This game model is developed based on "fun learning", where learners will be exposed to some instructions and rules of the game.

c. Learning Video

One form of learning media is learning videos which can be:

1) Recordings of learning activity outcomes.
2) Visualization is intended to guide students in understanding the material.
3) It's almost the same principle as watching a movie.
4) Videos can be self-made or downloaded from *video sharing* sites.
5) Videos that are adapted to the material go through an *editing* process.

d. Internet

Internet-based media can be email, chat, video/teleconference, blog, e-learning or web. The objectives of using the internet as a computer-based learning media include:

1) Utilizing the internet as a learning medium conditions students to learn independently.
2) Students can access *online* from various libraries, museums, databases and get primary sources on various historical events, biographies, recordings, reports and statistical data.
3) Students can play the role of a researcher, become an analyst, not just a consumer of information.

Computer-based learning media is a learning system that generates meaning by connecting academic content with technological context. The computer is a medium that can virtually provide an immediate response to the learning outcomes of students. Basically, computers have the ability to store and manipulate information as needed.

With computer-based learning media, the learning process will be maximized. According to Wati (2016:77), computer-based learning media has several functions that need to be understood. These functions are as follows:

1. Cognitive Function

   Computers teach about various concepts. These concepts consist of rules, principles, steps, processes and calculations. Then, the concepts are explained simply through animated visual and audio combinations. Thus, computers are suitable as an independent learning medium.

2. Psychomotor Function

   Computers have a psychomotor function. This function is expressed and implied in the form of learning that is packaged in *games* and simulations. It is very well used to create conditions for the world of work.

3. Affective Function

   Computers present interesting programs. If these programs are designed appropriately, learning objectives will be achieved, including student attitudes.

Learning media has its own characteristics. Learning media has a certain function in supporting the success of student learning objectives. Learning media needs to be categorized based on its nature and function towards learning. Computer-based learning media has characteristics that need to be understood by lecturers. This understanding is so that lecturers master the use of computer media to convey material appropriately. According to Wati (2016: 68), the characteristics of computer-based learning media are as follows:

1. Effective
   Computer-based learning media used must be in accordance with learning objectives. Computer-based learning media should not only display displays that attract students, but the display must be related to the learning material presented. Thus computer-based learning media effectively supports the successful delivery of learning materials.
2. Customize
   Computer-based learning media used must be in accordance with student characteristics. Lecturers must understand the character of students as an audience.
3. Interactive
   Computer-based learning media is used because it is more interactive than other learning media. The advantage of computers lies in the ease of the interaction process when learning takes place. Complete computer capabilities in displaying images, animations, and sounds that can attract students' attention. Interaction between students and lessons can be maximally achieved using computer-based learning media
4. Attracts Interest
   It is undeniable that computers are one of the learning media that attract students. The computer presents an attractive appearance. Various applications can be used by lecturers to deliver material through computers. Learning using computers is more motivating for students. One of the reasons that makes students happy to learn with computer media is the display that is not monotonous. One material with other materials can be presented with different displays.
5. Conceptualized
   Basically, lecturers also like to deliver learning materials using computers. Besides being more effective, learning using computer media is also more conceptualized. Good learning is delivered with good concepts. Effective computer-based learning media must contain learning objectives, display commands, evaluative and feedback.

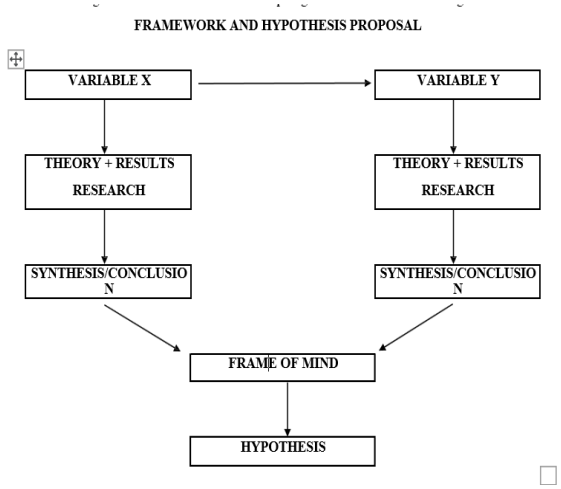
2. Literature Review
   Several studies that discuss the utilization of *CBT Simulator* in teaching and learning activities that can be used as a reference in writing have been done quite a lot. The following are relevant studies:
   a. Inesa Tri Mahardika Pratiwi and Rini Intansari Meilani in the Journal of Office Management Education Vol. 3 No. 2, July 2018, Page. 173-181 with a study entitled "*The role of learning media in increasing student learning achievement*". This research is a quantitative research using the *explanatory survey* method by distributing questionnaires to respondents using a Likert scale aimed at measuring the effectiveness of the use of learning media which is described through 5 (five) indicators, namely relevance, teacher ability, ease of use, availability and usefulness (13 statement items). According to this research, it can be concluded that learning media in the research context has a positive and significant influence on student achievement. As one of the factors that affect the quality of student achievement, the quality of learning media, especially the level of usefulness for the student learning process, must be improved so that learning objectives in vocational high schools according to the national curriculum can be achieved.
   b. Wegig Pratama and Sri Sartini (2019) in the Jogja Maritime Scientific Magazine (MIBJ) Vol. 17 No. 2 with research entitled "Maritime Universities Facing the Industrial Revolution 4.0". This research is a qualitative research using library research methods and analysis of each concept and theory examined is comparative and correlative. According to the study, it can be concluded that the demands of the maritime industry in the industrial revolution 4.0 require human resources (HR) who have competencies

that can reflect the sophistication of technology and maritime universities must be responsive in responding to the paradigm shift that occurs.

c. Agus Dwi Santoso and Azis Nugroho in the Journal of 7 Samudra Polytechnic of Surabaya Vol. 3, No.2, November 2018 Page: 83-94 with a study entitled "The Use of Simulators in the Development of Circuit Breaker Learning Scenarios at the Surabaya Shipping Polytechnic". This research is a qualitative research using an interview method with respondents. According to the study, it can be concluded that the learning steps in developing an independent learning scenario using a high voltage laboratory can be prepared a sample lesson plan along with its completeness, namely student books and student worksheets and modules that are made can support the improvement of the competence of cadets majoring in ETO who will later work on board.

C. FRAMEWORK AND HYPOTHESIS

1. Framework of Thought



2. Hypothesis

According to Sugiyono (2014: 134) the speculation is an impermanent response to the exploration issue plan, where the definition of the issue has been stated as an inquiry sentence. After the speculation is collected, the scientist tests it through examination, in this way the theory is proposed as an impermanent critical thinking, with the understanding that the exploration carried out can get results or recognition of the theory introduced. In this way, given the definition of the problem, the examination of the hypothesis and the structure of the thought, the creator gets the accompanying speculation:

Ha: the effectiveness of *CBT Simulator* utilization in supporting teaching and learning activities.

Ho: not optimal utilization of *CBT Simulator* in supporting teaching and learning activities.

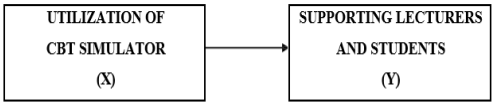


Figure.3.2 Flow Chart of the Effect of *CBT Simulator* Utilization in Supporting Teaching and Learning Activities

D. RESEARCH METHODS

1. Methods Used

This type of research is field research, namely direct observation of the object under study in order to obtain relevant data. The method that will be used in this research is to use quantitative analysis research methods, namely using in-depth data analysis in the form of numbers (Sugiyono, 2017).

2. Conceptual and Operational Definition of Variables

Conceptual definition is a limitation on the understanding given by researchers to variables or concepts to be measured, researched and extracted data (Hamidi, 2010: 141).

Variable operation is the process of decomposing research variables into sub variables, dimensions, sub variable indicators and measurements. According to Sugiyono (2009: 38), the definition of a variable is as follows "A

variable is an attribute or trait or value of people, objects or activities that have certain variations set by researchers to study and draw conclusions".

In accordance with the title in this study, namely "Analysis of the Utilization of Computer Base Training (CBT) Simulators in Supporting the Teaching and Learning Activities of Lecturers and Learners at the Maritime Education and Training Institute within the Ministry of Transportation", it is known that there are 2 (two) variables, namely Variable X (CBT Simulator Utilization) and Variable Y (Supporting Teaching and Learning Activities of Lecturers and Learners).

The two variables can be divided into:

a. Independent variable
   According to Sugiyono (2009: 39), the definition of independent variables is as follows, "Independent variables are variables that affect or cause changes or the emergence of dependent variables (bound)". The independent variable in this study is *CBT Simulator* Utilization (X).
b. Dependent/independent variable
   According to Sugiyono (2009: 39) states that the definition of the dependent variable is as follows, "The dependent variable is the variable that is influenced or that becomes the result, because of the independent variable". The dependent variable in this study is Supporting Teaching and Learning Activities of Lecturers and Learners (Y).

3. Data Collection Technique

   The data source for this research is primary data. Primary data is data obtained by researchers from first sources, either individuals or individuals, such as the results of interviews or filling out questionnaires commonly conducted by researchers (Sugiyono, 2017).

   Data collection in this study used primary sources. Primary sources are data sources that directly provide data to data collectors (Sugiyono: 137). The data collection technique in this study used questionnaires and interviews. The questionnaire was given directly to Lecturer and Learner respondents. The time specified in data collection and supporting literature is a maximum of 1 (one) month.

   Compilation of questionnaires by:

   1) Literature study.
   2) The indicators and dimensions of the questions are determined.
   3) The research team proceeded to finalize the indicators and dimensions into questionnaire questions (both closed and open-ended).

4. Sampling Technique

   The population in this study were:

   a. Lecturers and Students of STIP Jakarta.
   b. Lecturers and Students of Politeknik Ilmu Pelayaran (PIP) Semarang.

   The sample in this study used *purposive sampling* with the following details:

   a. STIP Jakarta sample: 25 respondents of STIP Jakarta Lecturers and 25 respondents of STIP Jakarta Students who are actively participating in learning in the current semester.

1. PIP Semarang sample: 13 respondents of PIP Semarang Lecturers and 25 respondents of PIP Semarang Learners who are actively participating in learning in the current semester.

Table 4.1. Questionnaire Grid

Variables	Dimensions	Indicator	Statement	Question Item	
				+	-
Utilization of *CBT Simulator* (X)	1. Availability	1. Availability of variety material In *CBT Simulator*. 2. Availability of learning resources learning resources that can be renewed according to circumstances	1. The materials in the *CBT Simulator* have variations that match the competency levels. 2. Learning resources *CBT Simulator* You can	√ √	
		real latest. 3. There is a positive and inclusive learning atmosphere in the *CBT Simulator*.	updated according to the latest developments. 3. *CBT Simulators* do not create a learning atmosphere positive and inclusive.		√
	2. Ability	1. Lecturers have an understanding of the material and experience using the *CBT Simulator*. 2. *CBT Simulator* has good speed and responsiveness.	4. Lecturer accustomed to using *CBT Simulator* in Teaching and Learning Activities. 5. Learners have a good ability to use the *CBT Simulator*. 6. *CBT Simulator* has never experienced technical issues.	√ √	 √
	3. Ease	1. Ease of access in understanding and using the *CBT Simulator*. 2. *CBT Simulator* provides easy feedback on usage performance and immediate adjustments or immediate improvement.	7. *CBT Simulator* can be used easily without there are no obstacles. 8. Features in *CBT Simulator* are easily understood by Learners. 9. Lecturer easier to provide materials and assignments through *CBT Simulator*. 10. *CBT Simulator* difficult to use as learning media in lesson activities.	√ √ √	 √
Supporting Teaching and Learning Activities for Lecturers and Learners (Y)	1. Relevance	1. Relevance of learning materials in *CBT Simulator* with the competency needs of graduates. 2. Comparison of *CBT* utilization *Simulator* with traditional learning model that tends to use informative textbooks.	1. Material *CBT* learning *Simulator* is relevant to the competency needs of graduates. 2. Simulated situations on *CBT Simulator* are relevant and resemble the real situation. 3. Relevance of learning materials in *CBT Simulator* can be maintaine in accordance with developments because easy and quickly updated. 4. Use of *CBT Simulator* is relevant to reduce costs in training physically that pose a risk of error or harm. 5. Use of *CBT Simulator* is not relevant in helping to understand the concept which taught.	√ √ √ √	 √
	2. Usability	1. Intensity of Lecturers and students in using *CBT Simulator*	6. Lecturer utilizing *CBT Simulator* for providing	√	
		for Teaching and Learning Activities. 2. The usefulness of *CBT Simulator* for graduate competency improvement.	material and tasks. 7. *CBT The simulator* helps Learners in understanding the concept of the material being taught. 8. Learners collect assignments by utilizing the *CBT Simulator*. 9. Intertwined interaction and activeness of lecturers and participants Learners in learning process using *CBT Simulator*. 10. *CBT Simulator* does not motivate and improve learning outcomes.	√ √ √	 √

Table 4.2. Statement Items from the *CBT Simulator* Utilization Aspect (Variable X)

No.	Statement	SS	S	R	TS	STS
1.	The material in the *CBT Simulator* has a variety of that correspondents to the competency level.					
2.	Source learn *CBT Simulator* You can be updated according to the latest developments.					
3.	*CBT Simulator* does not create a positive and inclusive learning atmosphere.					
4.	Lecturers are accustomed to using the *CBT Simulator* in Teaching and Learning Activities.					
5.	Learners have good abilities in using the *CBT Simulator*.					
6.	*CBT Simulator* has never experienced any technical issues.					
7.	*CBT Simulator* can be used easily without any problems.					
8.	The features in *CBT Simulator* are easy understood by Learners.					
9.	Lecturers find it easier to provide materials and assignments through the *CBT Simulator*.					
10.	*CBT Simulator* is difficult to use as learning media in Teaching and Learning Activities.					

Table 4.3. Statement Items from Aspects of Supporting Teaching and Learning Activities of Lecturers and Cadet Learners (Variable Y)

No.	Statement	SS	S	R	TS	STS
1.	Relevant *CBT Simulator* learning materials with the competency needs of graduates.					
2.	The simulated situation on the *CBT Simulator* is relevant and resemble the real thing.					
3.	The relevance of learning materials in *CBT Simulator* can be maintained in accordance with developments because it is easy and fast. Updated.					
4.	The use of *CBT Simulator* is relevant to reduce the cost of physical training which poses a risk of errors or mistakes/danger.					
5.	*The* use of *CBT Simulator* is not relevant in helps to understand the concept being taught.					
6.	Lecturers utilize the *CBT Simulator* to provide materials and assignments.					
7.	*CBT Simulator* helps Learners in understanding the concept of the material being taught.					
8.	Learners collect assignments with utilizing the *CBT Simulator*.					
9.	Interaction and activeness of Lecturers and Learners in the learning process using *CBT Simulator*.					
10.	The use of *CBT Simulator* does not motivate and improve the learning outcomes.					

5. Analysis Design and Hypothesis Testing

a. Statistical Descriptive Test

According to (Sugiyono, 2017) is a statistical technique used to analyze data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the public.

1) Mean

According to (Lasse, D.A., 2017), Mean is the average value or mean of the data and is calculated by the total data-value divided by the number of data completed with the formula:

$$x = \frac{\sum x}{n}$$

2) Median

According to Lasse (2018: 288), Median is the middle value that divides all score data that has been arranged in order from the lowest score to the highest score into two equal parts.

3) Mode

According to Lasse (2018:288), the Mode is the score value that appears the most.

b. Data Quality Test

1) Validity Test

The validity test is used to determine the validity or suitability of the questionnaire used by researchers in measuring and obtaining research data from respondents. The instrument can be declared valid, meaning that the measuring instrument used to obtain the data is valid or can be used to measure what should be measured (Sugiyono, 2013:

$$r = \frac{n\,(\sum XY) - (\sum X \,.\, \sum Y)}{\sqrt{[n(\sum X)^2 - (\sum X)^2].\sqrt{[n\,(\sum Y)^2 - (\sum Y)^2]}}}$$

2) Reliability Test

The reliability test aims to see if the questionnaire has consistency if measurements are made with the questionnaire repeatedly. According to Sugiyono (2017: 130) states that the reliability test is the extent to which the measurement results using the same object will produce the same data. The reliability test is carried out by referring to Cronbach's Alpha. According to Wiratna Sujerweni (2014) the questionnaire is said to be reliable if the Cronbach's alpha

value is> 0.6.

$$r_{AB} = \frac{(n\sum AB) - (A\sum B)}{\sqrt{[n(\sum A^2) - (\sum A)]^2 [n(\sum B)^2 - (\sum B)^2]}}$$

3) Classical Assumption Test

1) Normality Test

The Kolmogorov Smirnov normality test is part of the classic assumption test. The normality test aims to determine whether the residual value is normally distributed or not. A good regression model is to have a normally distributed residual value. The basis for decision making:

a) If the Significance value> 0.05, then the residual value is normally distributed.

b) If the Significance value <0.05, then the residual values are not normally distributed.

2) Linearity Test

The linearity test aims to determine the form of the relationship between the independent variable and the dependent variable. The basis for decision making:

a) If the Sig. deviation from linearity value> 0.05, then there is a linear relationship between the independent variable and the dependent variable.

b) If the Sig. deviation from linearity value <0.05, then there is no linear relationship between the independent variable and the dependent variable.

4) Hypothesis Test

a) Simple Linear Regression Analysis

Simple regression analysis is used to determine whether there is a linearity in the influence of the independent variable on the dependent variable. This test uses linear regression (Riduwan, 2005: 145) as follows:

$$\hat{Y} = a + bX$$

Where:

Ŷ= Subjects in the predicted dependent variable

a= Y price when X = 0 (constant price)

b = Direction number or regression coefficient, which shows the number of increases or decreases in the dependent variable based on the independent variable. If b (+) then it increases, and if b (-) then there is a decrease.

X = Subject in the independent variable that has a certain value.

In addition, the prices of a and b can be found with the following formula:

$$a = \frac{(\sum Y) -}{n} \quad \text{and} \quad b = \frac{n\sum XY - (\sum X)(\sum Y)}{n\sum X^2 - (\sum X)^2}$$

b) Correlation Coefficient Analysis

Correlation coefficient analysis is used to determine the direction and strength of the relationship between two or more variables. The direction is expressed in the form of a positive or negative relationship, while the strength

or weakness of the relationship is expressed in the magnitude of the correlation coefficient (Sugiyono, 2017: 289). By using the Pearson correlation coefficient approach with the formula:

$$r = \frac{(\sum XY) - (\sum X)(\sum Y)}{\sqrt{n\sum X^2 - (\sum X)^2}\sqrt{n\sum Y^2 - (\sum Y)^2}}$$

E. ANALYSIS AND DISCUSAION

1. Analysis

a. Statistical Descriptive Test

The descriptive statistical test provides an overview of the characteristics of the variables in this study, namely *CBT Simulator* Utilization (X) and Supporting Teaching and Learning Activities of Lecturers and Learners (Y) from 2 (two) maritime training institutions, namely STIP Jakarta and PIP Semarang. The data was obtained from a questionnaire consisting of 10 (ten) statement items with 88 (eighty-eight) respondents whose data results were processed using the SPSS 25 application.

1) *CBT Simulator* Utilization Variable

The descriptive analysis showed that the mean score of *CBT Simulator* utilization reached 39.82 which reflects the respondents' positive perception of the effectiveness and quality of the simulator in supporting learning. The median at 40.00 indicates that half of the respondents scored above this level, indicating a strong consensus on the effectiveness of *CBT Simulator* usage (Freigang, et al., 2018). The mode at 50.00 indicates that there is a group of respondents who are very satisfied with the features and benefits offered. While the standard deviation of 7.370 reflects significant variation in the data which means that there are differences in utilization experience among respondents.

Table 5.1. Frequency Distribution of *CBT Simulator* Utilization Variables

No.	Interval	f	Percentage
1.	28-30	9	10,23%
2.	31-33	6	6,82%
3.	34-36	13	14,77%
4.	37-39	15	17,05%
5.	40-42	18	20,45%
6.	43-45	4	4,55%
7.	46-48	4	4,55%
8.	49-51	19	21,59%
	Total	88	100%

Source: Primary Data Processed, 2024

on the frequency distribution of *CBT Simulator* utilization variables above, a bar chart can be drawn as follows:

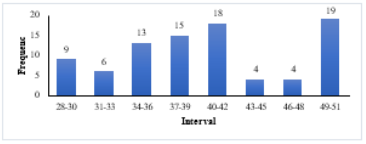
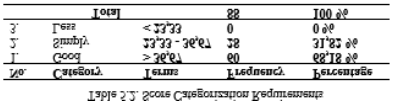


Figure 5.1 Frequency Distribution Bar Diagram of *CBT Simulator* Utilization Variables

The bar graph shows that the frequency distribution of 21.59% of respondents is in the interval 49-51 which indicates that the majority of respondents feel the maximum benefit from the *CBT Simulator*, while only 4.55% are in the lowest category (43-45) which implies that even though the majority have felt a positive impact, there are a small number of respondents who may not fully utilize the existing features. Furthermore, categorization is carried out on the *CBT*

Simulator utilization variable with an ideal mean value (Mi) of 30, the ideal standard deviation is 6.67 so that it can be categorized into 3 classes as in Table 5.2.



From the results of Table 5.2, it can be concluded that for score categorization 68.18% of respondents are in the "Good" category which indicates that the *CBT Simulator* meets user expectations. However, 31.82% of respondents who are in the "Fair" category indicate the need for improvement such as additional training for users (Freigang, S et al., 2018; Ravenscroft, B 2018). In addition, there are several strategic recommendations in improving the utilization of *CBT Simulator*, which include the development of training modules such as more realistic practice scenarios and more realistic training scenarios. structured to support users in understanding the *Simulator*'s features and functions in more depth as well as improved access to more interactive learning resources such as video tutorials and *online* discussion forums to support self-directed learning.

b. Data Quality Test

The data quality test aims to ensure that the instrument used in data collection can measure the variables under study accurately and consistently which is highly dependent on the validity and reliability of the measurement instrument. This test was conducted on questionnaires distributed to 88 (eighty-eight) respondents to evaluate 2 (two) main variables including *CBT Simulator* Utilization (X) and Supporting Teaching and Learning Activities of Lecturers and Learners (Y) from 2 (two) maritime training institutions, namely STIP Jakarta and PIP Semarang.

1) Validity Test

In this study, the validity test was carried out using a questionnaire consisting of 20 (twenty) question items distributed to 88 (eighty-eight) respondents. The results of this validity test are presented in Table 5.5, where all items show a correlation coefficient (rcount) greater than the rtable value (0.2096).

Table 5.5. Validity Test Results

Variables	Item Question	Coefficient Correlation	*r* table	Description
CBT Utilization *Simulator* (Variable X)	Question 1	0,739	0,2096	Valid
	Question 2	0,748	0,2096	Valid
	Question 3	0,642	0,2096	Valid
	Question 4	0,768	0,2096	Valid
	Question 5	0,794	0,2096	Valid
	Question 6	0,747	0,2096	Valid
	Question 7	0,764	0,2096	Valid
	Question 8	0,808	0,2096	Valid
	Question 9	0,814	0,2096	Valid
	Question 10	0,646	0,2096	Valid
Supporting Teaching and Learning Activities for Lecturers and Participants Students (Variable Y)	Question 1	0,781	0,2096	Valid
	Question 2	0,805	0,2096	Valid
	Question 3	0,831	0,2096	Valid
	Question 4	0,812	0,2096	Valid
	Question 5	0,629	0,2096	Valid
	Question 6	0,838	0,2096	Valid
	Question 7	0,764	0,2096	Valid
	Question 8	0,777	0,2096	Valid
	Question 9	0,849	0,2096	Valid
	Question 10	0,629	0,2096	Valid

The validity test results in Table 5.5. shows that all items in the questionnaire, both for the *CBT Simulator* Utilization variable (X) and Supporting Teaching and Learning Activities of Lecturers and Learners (Y) have met the validity criteria. The correlation coefficient ranges from 0.629 to 0.849 which indicates that the items can significantly describe the construct being measured. This is in line with the principle of construct validity which emphasizes that the instrument must be able to capture the dimensions of the variable under study (Türkistanli, T 2024).

The use of the *Pearson Product-Moment Coefficient of Correlation* method is an appropriate approach in this context, given the interval nature of the data and the assumption of normality usually expected in social research. Research.

Previous studies have also underscored the importance of validity testing to improve the reliability of research results in educational and technological contexts (Freigang, S et al., 2018; Kara, G et al 2020). Consistent results across items indicate that the research instrument was well designed and relevant for the context under study. This high validity also provides a strong foundation for further analysis and ensures that the results obtained from the measurement can be interpreted appropriately. As such, all question items can be used in subsequent analyses and provide confidence that the data generated is representative of the actual conditions.

2) Reliability Test

Reliability testing is a critical step in research to assess the consistency and stability of the measurement instruments used. High reliability indicates that the instrument can provide consistent results in repeated measurements, so that the data obtained can be trusted and used for further analysis.

Table 5.6. Reliability Test Results

Variables	*Cronbach's Alpha*	Total Question	Description
CBT Simulator Utilization (Variable X)	0,884	10 items	Reliable
Supporting Teaching and Learning Activities for Lecturers and Learners (Variable Y)	0,892	10 items	Reliable

The reliability test results shown in Table 5.6. shows that both variables, namely *CBT Simulator* Utilization (X) and Supporting Teaching and Learning Activities of Lecturers and Learners (Y), have very good *Cronbach's Alpha* values, which are 0.884 and 0.892 respectively. This value far exceeds the general threshold set, which is 0.60 which indicates that the instrument used in this study is reliable. As for the *Cronbach's Alpha* value above 0.80, it indicates a very high level of reliability, which is in accordance with the standards expected in social and

educational research (Kara, G et al 2020; Türkistanli, T 2024). The reliability of the instrument adds strength and validity to the data collected and increases confidence in the research results.

c. Classical Assumption Test

The classical assumption test aims to ensure that the data used meets the conditions required for statistical testing. In this study, we test for normality, linearity, and absence of heteroscedasticity. If these assumptions are met, then further analysis can be done validly.

1) Normality Test

The normality test was carried out using the *One Sample Kolmogorov-Smirnov Test* which is considered more appropriate than graphical analysis, especially for larger samples. The criterion used is that the data is said to be normally distributed if the significance value (Asymp.Sig. (2-tailed)) is greater than 0.05.

Table 5.7. *One Sample Kolmogorov-Smirnov Test* Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residuals
N		88
Normal Parameters[a,b]	Mean	0,0000000
	Std. Deviation	0,22819097
Most Extreme Differences	Absolute	0,173
	Positive	0,173
	Negative	-0,053
Test Statistic		0,173
Asymp. Sig. (2-tailed)		0,200[c,d]
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		

Source: Results of SPSS version 25

From the table, the Asymp. Sig. (2-tailed) of 0.200 indicates that this value is greater than 0.05 so it can be concluded that the variable residuals are normally distributed. Success in meeting the normality assumption is a prerequisite for performing more complex regression analysis, which requires a normal distribution of the residuals to produce efficient and unbiased estimates (Kara, G et al 2020; Türkistanli, T 2024).

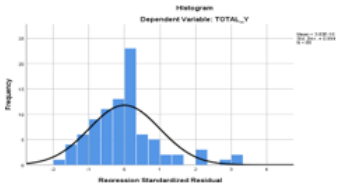


Figure 5.3 Data Normality Test Results

(Source: Primary Data Processing Results 2024)

Figure 5.3 above displays a histogram graph that clearly illustrates the distribution of data with a symmetrical bell curve shape with the data pattern centered around the average value and there is no visible *skewness* to the left or right which indicates that the data has a normal distribution with the resulting parameters are reliable and unbiased.

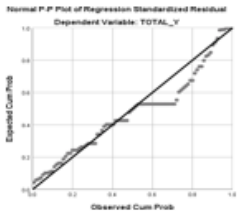


Figure 5.4 Data Normality Test Results

(Source: Primary Data Processing Results 2024)

While Figure 5.4 above shows a *normal probability plot* graph, where the data points are spread around the diagonal line. This indicates that the data is close to normal distribution. The alignment between the *Kolmogorov-Smirnov* test results and the visualization of

the histogram and *normal probability plot* increases confidence in the validity of the data. So it can be concluded that the data in this study is normally distributed and the next steps in the analysis can be carried out including testing other classical assumptions.

2. Discussion

   a. Based on multiple linear regression analysis at STIP Jakarta and PIP Semarang, the significance value (p-value) for the TOTAL_X variable is 0.000 which is much smaller than the 0.05 significance level. This indicates that there is a very significant effect of *CBT Simulator* utilization on teaching and learning activities, so that the research hypothesis which states that there is a positive effect of *CBT Simulator* utilization can be accepted.

   b. And based on the results of the *Pearson* correlation coefficient analysis, it shows that the *Pearson* correlation coefficient value is obtained at 0.921. This value indicates a very strong and positive relationship between *CBT Simulator* utilization (X) and teaching and learning activities (Y). A coefficient value close to 1 indicates that as *CBT Simulator* utilization increases, teaching and learning activities also experience a significant increase. As for the interpretation of significance (p-value) of 0.000 which is far below the alpha level of 0.01, it can be concluded that this relationship is not only strong but also statistically significant in which the utilization of educational technology such as *CBT Simulator* plays an important role in improving learning effectiveness.

   c. And based on the results of the coefficient of determination analysis, it shows that about 84.9% of variations in teaching and learning activities of Lecturers and Learners (Y) can be explained by the utilization of *CBT Simulator* (X). This means that the utilization of *CBT Simulator* has a significant contribution in supporting the effectiveness of the teaching and learning process. Furthermore, the remaining 15.1% value can be attributed to other factors that are not included in this study. These factors could include teaching methods, student motivation, and the quality of teaching resources, all of which can affect learning outcomes.

C. TROUBLESHOOTING

Based on the testing that has been carried out above, the results of the hypothesis testing are as follows:

a. Inefficiency in Inventory Management and Procurement of Goods

To overcome the problem of inefficiency in inventory management and procurement of goods, PT. PCS Internasional can implement the Just-in-Time (JIT) method as an effective solution. The JIT method is designed to ensure that the required goods are only available on time and in the required quantities, avoiding waste that often occurs in the process of storing or procuring excessive goods. By reducing excess stock, PT. PCS Internasional can save storage costs and ensure more optimal use of space on ships and in warehouses. The implementation of JIT will minimize the risk of excess or shortage of stock, which can disrupt the smooth operation of the ship. In addition, this method encourages more integrated planning and better coordination between logistics and operational departments, ensuring that procurement of goods can be carried out more efficiently and on time. With JIT, procurement of goods will be more responsive to real needs in the field, so that ship operations can take place without disruption due to delays or shortages of goods supply. As a result, the implementation of JIT will improve cost and operational efficiency, optimize the use of resources, and support the smooth operation of the ship as a whole.

b. Lack of Utilization of Digital Technology for Purchase Request ProcurementUntuk mengatasi masalah lack of utilization of digital technology in procurement of Purchase Request, PT. PCS Internasional can implement a digital Purchase Request system based on an application. With this system, the process of submitting a request for procurement of goods will be faster, more efficient, and more organized. The use of the application allows staff to submit a request for goods with just a few clicks, eliminating the need for filling out physical forms or time-consuming manual communication. It also reduces the potential for administrative errors, such as errors in filling out or losing documents. This digital system allows for more accurate and transparent data management, because all information related to the request for goods will be automatically recorded in the system, which can be accessed by authorized parties throughout the supply chain. In addition, with an application-based system, submission and approval of requests for goods can be done in a more coordinated and faster manner, without having to wait for manual confirmation. Thus, the implementation of this system not only increases the efficiency of procurement of goods but also speeds up the response time to operational needs, thereby increasing the smoothness of ship operations and reducing the potential for delays in the procurement process.

D. CONCLUSIONS AND SUGGESTIONS

CONCLUSIONS

Based on the results of the analysis that has been done, this study shows that the utilization of *CBT Simulator* at the Ministry of Transportation's Maritime Education and Training Institution (Lemdiklat), especially from 2 (two) maritime training institutions, namely STIP Jakarta and PIP Semarang, has significant effectiveness in supporting teaching and learning activities. The descriptive statistical test shows that the contribution of *CBT Simulator* to the learning process reaches 84.9%, with the regression coefficient showing that every

1% increase in *Simulator* utilization will increase learning outcomes by 0.909 (90.9%). Meanwhile, the results of normality (Asymp. Sig. = 0.200) and heteroscedasticity (significance > 0.05) tests showed that the data used met the classical assumptions. In addition, the t-test showed that the effect of *CBT Simulator* utilization was significant ($p < 0.000$), confirming that this technology plays an important role in improving teaching quality..

ADVICE

1. Lemdiklat managers are advised to integrate the *CBT Simulator* more deeply in curriculum development with relevant and interesting materials.
2. It is necessary to conduct intensive training for lecturers to optimize the use of *CBT Simulator* in the teaching process.
3. It is necessary to implement a regular monitoring and evaluation system to assess the effectiveness of using the *CBT Simulator*.
4. Further research is needed to explore other variables that may affect learning outcomes, so that the understanding of teaching dynamics becomes more comprehensive.

BIBLIOGRAPHY

Ariesto, H Sutopo. 2012. Information and Communication Technology in Education. Yogyakarta: Graha Ilmu.

Arsayd, Azhari. 2006. Learning Media. Jakarta: PT Raja Grafindo Persada.

Awidi, I. T., & Paynter, M. (2024). An evaluation of the impact of digital technology innovations on students' learning: Participatory research using a student-centred approach. *Technology, Knowledge and Learning*, *29*(1), 65-89.

Freigang, S., Schlenker, L., & Köhler, T. (2018). A conceptual framework for designing smart learning environments. *Smart Learning Environments*, *5*, 1-17.

Ghozali, Imam, 2013. Application of Multivariate Analysis with the SPSS Program. Semarang: Diponegoro University.

Kamarudin, M. Z., Mat Noor, M. S. A., & Omar, R. (2024). A scoping review of the effects of a technology-integrated, inquiry-based approach on primary pupils' learning in science. *Research in Science & Technological Education*, *42*(3), 828-847.

Kara, G., Arıcan, O. H., & Okşaş, O. (2020). Analysis of the effect of electronic chart display and information system simulation technologies in maritime education. *Marine Technology Society Journal*, *54*(3), 43-57.

Li, X., Chen, Y., & Ju, P. (2024). The Construction of ACM Practice Bases for the Cultivation of University Students' Technological. *Journal of Artificial Intelligence Practice*, *7*(1), 101- 108.

Pratama, W., Pardjono, W. W., Astriawati, N., Iryanti, H. D., & Arroyo, E. T. (2023). Developing Cadets' Soft Skills through Project-Based Learning in Moodle LMS. *Journal of Engineering Education Transformations*, *36*(4).

Rachman, A. (2024). Analyze of Education and Training Using Ship Engine Simulators at STIP Jakarta Indonesia. *Journal of Electrical*

Systems, *20*(5s), 1368-1383.
Ravenscroft, B., & Luhanga, U. (2018). Enhancing student engagement through an institutional blended learning initiative: A case study. *Teaching and Learning Inquiry*, *6*(2), 97-114.
Rabelo, A., Rodrigues, M. W., Nobre, C., Isotani, S., & Zárate, L. (2024). Educational data mining and learning analytics: A review of educational management in e-learning. *Information Discovery and Delivery*, *52*(2), 149-163.
21. Bandung: ALFABETA.
Sugiyono. (2013). Quantitative Qualitative and R&D Research Methods. Bandung: Alfabeta. Sugiyono. (2015). Combination Research Methods (Mix Methods). Bandung: Alfabeta.
Sugiyono, P. D. (2010). Business Research Methods. Bandung: CV. Alfabeta.
Türkistanli, T. T. (2024). Advanced learning methods in maritime education and training: A bibliometric analysis on the digitalization of education and modern trends. Computer Applications in Engineering Education, 32(1), e22690.
Wati, Ega Rima. 2016. Variety of Learning Media. Yogyakarta: Kata Pena.
Wiig, A. C., Sellberg, C., & Solberg, M. (2023). Reviewing simulator-based training and assessment in maritime education: a topic modeling approach for tracing conceptual developments. WMU Journal of Maritime affairs, 22(2), 143-164.