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E-Learning Development As a Technology Acceptance Model Base on Service Oriented Architecture Approach

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Abstract:

In e-learning development many methods for application architecture are used,one of which is Service Oriented Architecture (SOA). Service Oriented Architecture (SOA) is an approach that makes application functions as services, which are packaged as components that can be reused and are independent. The development of e-learning requires an appropriate design so that the connected parts can communicate with each other. Information systems can be said to fail if the user turns out to be unable to accept or is not willing to use the information system. SMK 4 Pandeglang implements an e-learning system to support the teaching and learning process. Mandatory users of this e-learning are teachers and students. This research was conducted to test the acceptance of users (students) of e-learning by using the Technology Acceptance Model (TAM). The level (if statistic significance) = 0,000 smaller than 0.05 in the table above shows that there is a significant effect of usefulness variable (X1) and convenience variable (X2) on the acceptance variable (Y). Thus, the hypothesis which states that usefulness factor (X1) and convenience factor (X2) together influence acceptance (Y) can be accepted. This result certainly strengthens the theory of TAM which states that there are two key factors that determine the acceptance of information technology / information systems, namely perceived usefulness and ease (perceived ease of use).

Keywords — ***E-learning, Service Oreinted Architecture, User Acceptance Analysis, Technology Acceptance Model.***

I. INTRODUCTION

The development of information technology in supporting daily life is growing rapidly and the benefits are increasingly felt. Every company, government and education agency currently cannot be separated from an information system in order to carry out its work activities, so that more organizedand directed with a more efficient time. Information system and Computer technology is growing very rapidly in line with the need to information. The development of information technology has made it easier for the world education in carrying out the teaching and learning process. E-learning as learning media in education that gives a very important role and a great function for the world of education. Educational development leads E-Learning is a must so that education quality standards can improved.

To improve the quality of human resources many ways or the methods carried out include increasing human resources through formal education such as schools or informal education such as courses, seminars and other activities related to improvement quality of human resources. But the learning method between institutions formal and informal education have different achievement targets.

Usually formal education institutions use activity methods teaching and learning by leading to related knowledge in the field study or majors taken by students, even though they are included in each

field of study in formal e ducation tends to be many study material that is theoretical or general with reference to applicable curriculum. The difference is the informal education, the method of activity teaching and learning leads to a focused and inclined method prioritizing practicum by referring to the learning guidelines applied to the informal education institution, in other words informal education tends to study a particular field so that produce skilled human resources.

But from differences in methods and achievements in running educational activities, formal and informal education institutions are mostly still doing learning and teaching activities with "face to face" or meet directly at the same place and time according to the schedule has been determined. As time goes by, things begin to discover some shortcomings, for example: the very limited duration of learning time teaching face-to-face, constrained by the distance from the residence to teaching and learning, traffic congestion, and shortcomings others that might inhibit effective teaching and learning activities efficient. To achieve effective and efficient teaching and learning activities, as well as address the problem of face-to-face learning activities, the progress of the systeminformation can be used as a support for teaching and learning activities within this is a school as a formal education institution, namely by using elearning or learning electronic.

SMK Negeri 4 Pandeglang is one of the secondary schools Vocational country that has used the E-Learning application. WithE-Learning students can access the school material taken, hold discussions on forums, online exams and also send files for activities learning. For this reason the researcher intends to develop system using the Service Oriented Architecture (SOA) approach,namely the design of pre-existing applications to marry results the new one matches its purpose. And using the Techonolgi method Acceptance Model (TAM) for testing acceptance users of the e-learning.

II. RELATED WORK

In order to make it easier to understand the material related to the writing of scientific articles, the writer presents it simply as follows.

A. E-Learning

E-learning is distance learning that utilizes computer technology or computer networks or the internet. E-Learning can allow learners to learn through computersin their place without having to physically go to class. Electronic learning systems are a new way of teaching and learning.

E-learning is the basis and logical consequence of the development of information and communication technology. With e-learning, teaching participants (learners or users) do not need to sit in the classroom to listen to each teacher's words directly. E-learning can also shorten the target schedule of learning time, and of course save costs that must be spent by a study program or education..

Rosenberg (2001) emphasizes that e-learning refers to the use of internet technology to send a series of solutions that can improve knowledge and skills. Kamarga (2002) which essentially emphasizes internet use in education as the essence of e-learning. EvenOnno W. Purbo (2002) explains that the term "e" or an abbreviation of electronics in an e-learning is used as a term for all technologies used to support teaching efforts through internet electronic technology. Khoe Yao Tung (2000) said that after the presence of lecturers / teachers in the true sense, the internet will become more a supplement and complement in making the teacher's representative represent the most important learning resource in the world.

Cisco (2001) describes the philosophical e-learning as follows. First, elearning is the delivery of information and communication and education and training online. Second, e-learning is to provide a sufficient set of tools that can enrich conventional learning values (conventional learning models and studies of textbooks and CD-ROMs, and computer-based training) so that they can answer the challenges of development that are globalization. Third, e-learning will not mean replacing conventional learning models in the classroom, but which strengthen the learning model through content enrichment and educational technology development. Fourth, the existing capacity of students varies greatly depending on the form of content and the way it is delivered. The better the harmony in the content and the delivery tools with

learning styles, the better the capacity of students which in turn will give better results.

Then this service will be supported by speed, very fast response to complaints and other students' needs. Thus in the improvement of learning can be done as quickly as possible by the teacher or manager.

The term e-learning contains a very broad understanding so that many experts describe the definition of e-learning from various points of view, including:

1. E-learning is a type of teaching and learning that allows the delivery of teaching materials to learners by using internet media or other computer network media.
2. E-learning is an education system that uses electronic applications to support teaching and learning with internet media, computer networks, and standalone computers.
3. E-learning allows learners to learn through computers in their respective places without having to physically go to class / lectures.
4. E-learning is often also understood as a form of web-based learning that is commonly accessed from the internet on a local network.
5. E-learning is distance learning that utilizes computer technology and computer networks or the internet.

There are 3 learning functions in electronics towards activities learning in the classroom (classroom instruction), which is as a supplement Optional, complementary, or substitute.

1. Supplements, It is said to function as a supplement (additional), if students have the freedom to choose whether to use electronic learning material or not. In this case, there is no obligation oranother requirement for students to access electronic learning material. And even though it's optional, students who use it will certainly have additional knowledge and insight.

2. Complement, It is said to function as a complement if the electronic learning material is programmed to supplement the learning material received by students in the class of. As complements means electronic learning material is programmed to become reinforcement or remedial material for students in conventional learning activities.

3. Substitute, There are 3 alternative models of learning activities that students can choose, namely: (1) fully able to be face-to-face (conventional), (2) partially face-to-face and partly via the internet, (3) fully through the internet.

E-learning Components:

1. The e-learning infrastructure can be in the form of personal computers (PCs), computer networks, internet and multimedia equipment.
2. E-learning systems and applications are software systems that virtualize the conventional teaching and learning process. How to manage classes and create material or content, discussion forums, assessment systems (report cards), online exam system and all the features related to the management of the teaching and learning process.
3. E-learning content is the content and teaching materials that exist in e-learning (learning management system). This content and teaching materials can be in the form of multimedia-based content (content in the form of interactive multimedia) or text-based (text-shaped content as in ordinary textbooks).

B. Learning Management System (LMS)

Learning Management System (LMS) is a system that helps administration and functions as an e-learning content platform (Empy Effendy and Hartono Zhuang, 2005). LMS functions as a system that regulates elearning content or learning subjects. LMS plays a lot in helping the administration of learning activities or managing all learning activities and managing all e-learning.

The basic functions of LMS include:

1. Catalog, LMS shows the material that is owned, both in the form of e-learning lessons, thesis, discussion results and description. LMS must classify the material based on the type of material, as well as the curriculum.
2. Registration and approval, a prospective student can all register himself online, both for learning online and in class the information available in the catalog must be displayed when prospective students will register himself.
3. Running and monitoring e-learning, LMS must be able to display the subject matter well. In addition, the LMS records activities carried out

by students such as how long students access, how many times, hours, dates and other information.

4. Evaluation, LMS must be able to evaluate so that it can measure how far the participants before and after participating in the lesson, and based on the results of the evaluation, a suggestion will automatically appear for the student whether he should repeat or can continue to the next material.

C. *Service Oriented Architecture (SOA)*

Service Oriented Architecture (SOA) is a system development approach that can move dynamically when developing an information system, providing a design framework with a view to rapid realization with little cost of system development to improve system quality in total. Service Oriented Architecture (SOA) is also defined as a software architecture that is based on the main concept that software can be prepared on the foreground of applications, services, repositories, services and service lines. A service consists of a contract, one or more interfaces and an implementation.

D. *Concept of Technology Acceptance Model*

The Technology Acceptance Model (TAM) was introduced by Davis in 1989. This is an information system theory that makes a model of how users want to accept and usetechnology. This concept includes the clarity of the purpose of using e-learning and the ease of users of the system for purposes in accordance with the wishes of users Davis (1989) and Oktavianti (2007). The TAM model that will be used by researchers in examining the factors that influence the acceptance of use of e-learning.

Furneaux (2006) in Oktavianti states that several studies have replicated the davis study (TAM) to provide empirical evidence of the relationship between the usefulness, ease and use of the system.

Butaccording toOktavianti(2007) stated that the intensity of the use and use of the system can be replaced by variables on IT (Acceptance of IT).

III. METHODOLOGY

Here is the explanation the method for this research:

A. *Teknik Analisis Sistem Berjalan*

The current system analysis technique used in this study uses an Object Oriented Analysis (OOA) approach or object oriented analysis with UML. The analysis process is carried out on the results of data collection stages with interviews, observations and literature studies forget the system requirements specification to be developed.

In the analysis process, the techniques are as follows:

1. Data analysis and system information running. Analysis is carried out on procedures, documents, files, and printouts of the system that is already running.
2. Analysis of functional, non-functional, and user needs. Modeling functional requirements to describe the functions of the system and the users involved and what functions can be obtained by each user are modeled with the Use Case Diagram.
3. Analysis of system behavior. At this stage, a system behavior analysis is developed and modeled by an activity diagram. Activity diagram to model the use case process that runs in the system to model the sending of messages (massage) between objects and their chronology.

B. *Development E-learning Prototype with SOA Approach*

Research on the development of e-learning with a Service Oriented Architecture (SOA) approach, namely research that aims to get a whole, holistic picture or phenomenon of an organization or company. Therefore the use of a qualitative approach in this study is to match the empirical reality with the prevailing theory using descriptive methods (Lexy J Moloeng, 2004).

The development of e-learning applications, designed using the concept of Service Oriented Architecture (SOA), which is a representation of the model for building distributed applications. This SOA concept is very suitable to be used in developing e-learning applications, SOA itself is a concept of architectural style that modulates information systems into services.

Analysis of the application of the SOA concept on e-learning is done by doing the SOA Lifecycle process. SOA Lifecycle enables the placement of service capabilities through three stages, namely:

requirements and analysis, design and development, and IT Operations (Davarsula, 2006)

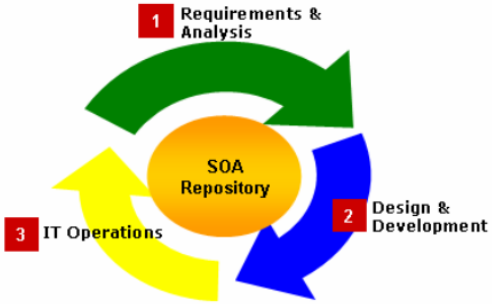

Fig 1. SOA Lifecycle

1. Requirements and Analysis
   a. Map High-Level Business Processes, at this stage mapping is done to the processes that will run in the e-learning application, namely teachers who can provide assignments and materials, and students who can see and then do the tasks, download the material.
   b. Prioritize Business Service, this stage maps the business processes in the system that have been done in the Map High-Level Business Processes stage, namely teachers who can be called application users with teacher access rights, fill in the information from the material, and the tasks to be uploaded based on the subjects they teach then students can download it.
   c. Capture Business Services Requirements, this process is to obtain a list of needs to be used, including the name of the subject, material and assignment, the name of the teaching teacher, and the date of upload.
   d. Architecture Review, at this stage a review of the architecture will be used to develop applications that will be used in its development.
   e. Prioritize and add to solutions Portfolio, at this stage is to analyze the problems contained in the previous stage which will then be continued in the process of designing the e-learning application architecture.
2. Design and Develoment
   a. Assign Resources To Solutions Develoment Team, Here is determined the determination of the users involved, namely the admin as the application manager, the teacher as the user of teacher access rights, and the student as the user of the student access rights application.
   b. Design Solutions - Identify Reuse Opportunity, This stage is the design phase of the solution that will be built, namely how students can download the material and work on the exam questions, namely by wearing a material link, and the teacher will register a list of students working on the given exam questions.
   c. Develop, QA, and Conduct UAT For Business Solutions, namely the stage of maintaining the quality of e-learning applications that have been created, here is the admin as the manager to maintain quality so that no errors occur. In this stage, problem identification and solution design can be implemented into e-learning applications.
3. IT Operations
   a. Assign Resources to Service Operatios Team, That is determining the users involved in e-learning applications.
   b. Identify Infrastructure Needs and Estabilish System Environment, At this stage the user needs are identified, the admin as the manager can manage the teacher, organize students, arrange subjects, arrange for the taking of subjects taught by the teacher. The teacher can upload material, post assignments and exam questions. Students can download material and do the exam questions by logging in first.
   c. Deploy Business Solutions, That is the implementation into technology that is in accordance with the life cycle of the SOA that was identified in the previous stage.
   d. Maintain Solutions to Business Requirements, That is the end of the IT operations stage, is the task of the admin to manage and maintain e-learning applications, adding if there are changes or additions in the new system in e-learning development.

C. Acceptance Model Technology (TAM)

This testing phase is carried out using the Technology Acceptance Model (TAM) method. With this method it is expected to be able to obtain good and accurate results from the respondents. The data obtained isdeterminants of software received or not by the user. Testing is an examination

process or system evaluation or system component to verify whether the system is in accordance with the needs of the user, where the differences between the expected results and the results will be identified. The test objective is to find out as much as possible the error so that the prototype of e-learning development can be accepted and in accordance with the needs of the user.

The Technology Acceptance Model (TAM) was introduced by Davis in 1989. This is an information system theory that makes a model of how users want to accept and usetechnology. This TAM is one of the evaluation models of information system success seen from the use of the system. This model will illustrate that there are a number of factors that influence the user's decision to use a new information system, namely convenience.

Usefulness shows user confidence in the contribution of e-learning to the performance of information user systems. While convenience shows the level at which users believe that the use of e-learning is easy and does not require hard effort. This concept includes the clarity of the purpose of using elearning and the ease of users of the system for the purpose in accordance with the user's desires (Davis, 1989 and Oktavianti, 2007). So that if e-learning is easy to use, then users will tend to use the e-learning. So that in developing e-learning needs to be considered the factors of usefulness and perceived easy of use of e-learning.

The TAM model that will be used by researchers in examining the factors that influence the acceptance of use of e-learning. Furneaux (2006) in Oktavianti states that several studies have replicated the study davis (TAM) to provide empirical evidence of the relationship that exists between the usefulness, ease and use of the system.

In the TAM scheme, it can be seen that the usefulness and ease of influencing the use of the system (actual system use) through an intervening variable is the behavioral intention to use. But according to oktavianti(2007) stated that the intensity of the use and use of the system can be replaced by variables on IT (Acceptance of IT). So that the model that will be used in this study can be seen in the following figure:

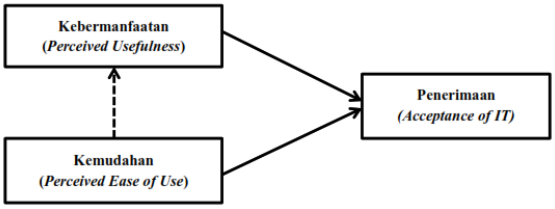

Fig 2. Research Models and Schemes

Modified results Model Davis (1989) and Oktavianti (2007) the scheme shows that 2 main factors that influence acceptance of technology are usefulness factors and convenience factors. This study aims to examine the model schema research mentioned above, which was adopted from the TAM Davis (1989) and Oktavianti (2007) models.

D. Method of Sample Selection

Population sampling using simple random sampling technique. According to, simple random sampling is a technique to get samples that are directly carried out by the sampling unit. Determination of the amount sample based on population is done by using the solvin formula with an error limit of 10% with a confidence level of 90% (Sugiyono, 2015).

The sample is part of the number and characteristics possessed by the population. The sample data that will be used in this study are 978 students, the data is obtained from the State Vocational School 4 Pandeglang.

Table I.
Number of student Active SMK 4 Pandeglang

Kelas	Jumlah Siswa		Jumlah
	Laki-laki	Penerimaan	
Kelas X	211	147	358
Kelas XI	171	128	299
Kelas XII	183	138	321
Total Semua Siswa Aktif			978

Then it can be represented using graphs to make it easier in terms of static assessment.

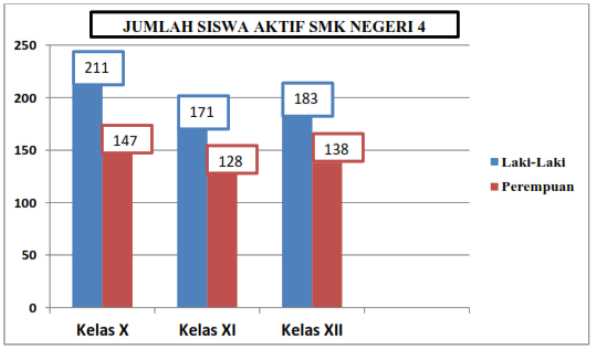

Fig 3. Number of student Active SMK 4 Pandeglang

The sample data that will be used in this study uses the Slovin formula (Sevilla. Et.al., 1960) namely:

$$n = \frac{N}{1 + N(e)^2}$$

Information:
n = sample size.
N = population size.
e = percent of the concession allowance that can still be tolerated.

So if the total population of students / students of e-learning is 978 students, with an error rate of 10%, the number of samples to be used are:

$$n = \frac{978}{1 + 978(0{,}1)^2} = 90{,}72 = 90$$

Based on the Slovin formula obtained the number of samples in this study were 99 respondents with a research confidence level of 90%.

E. Questionnaire Validity and Reliability

Testing the validity of the questionnaire is done to measure validity or nota question in the uestionnaire used. A questionnaireit is valid if the question in the questionnaire is able to disclose something that will be measured by the questionnaire

Thus a questionnairecan be used as an accurate data collection tool and cantrusted. A questionnaire statement is stated as valib if the correlation value is morelarge of r-table values. If there is an invalid statement, thenthe statement must be revised or replaced or omitted. TestingReliability is done to find out whether the statement items are in the questionnaire is truly reable and consistent to measure the same symptomsrespondent. Reliability testing is done using the methodCronbach Alpa. A statement declared reliable if the value of Cronbach Alpagreater than 0.60. Reliability testing is carried out using the methodCronbach Alpha to respondents.

With the formula, namely:

$$r_{11} = \frac{k}{k-1}\left[1 - \frac{\sum \sigma_2 b}{\sigma^2_t}\right]$$

Information:
r_{11} = Instrument reliability
K = Number of questions
$\sum \sigma^2 b$ = Number of Variant items
$\sigma^2 t$ = Total Variant

The greater the cronbach α value obtained, the higher the levelreliability of research carried out.

F. Hypothesis testing

Simultaneous Significant Test (Test F) is used to examine the effect of independent variables together on the dependent variable.

$$F_{hitung} = \frac{R^2(k-1)}{(1-R^2)/(N-k)}$$

Information:
F= fischer probability distribution approach
R= multiple correlation coefficient
K= number of independent variables
N= lots of samples

The F test steps or simultaneous tests are:

a. Hypothesis Formulation,
   Ho: Allegedly usefulness variables (X1), ease (X2),together does not affect the Acceptance of Technology.
   H1: Allegedly usefulness variable (X1), usefulness (X2),together influence the acceptance of technology.
b. Criteria for rejection or acceptanceHo is accepted if:
   i.F counts ≤ F table so Ho is accepted and Ha is rejected this means nothere is a simultaneous influence by variables X and Y.
   j.F count ≥ F table then Ho is rejected and Ha accepted this means there is simultaneous effect on variables X and Y.

G. System Implementation Technique

The definition of system implementation in this research is implementationbased on the results of analysis and system design. The implementation technique is dividedinto three, namely:

1. Implementation environment, including hardware, software and networks used.
2. Database Implementation, using database software.
3. System Implementation, consisting of the required system implementation, and report.

IV. RESULT AND DISCUSSION

A. *Overview of Developed Systems*

The development of e-learning systems can mean developing a systemnew ones to replace the old system or repair the systemrunning at this time that already exists in SMK Negeri 4 Pandeglang. E-learning systemwhich has been developed is an e-learning system that handles severalaspects starting from the process of giving learning material, the tasks of students,scoring systems, report cards, to school administration. Based on the interview and observation, obtained information that SMK 4 Pandeglang hashave an information system in the form of a school web, online exam application. Aim System development in this research is building a system basedthe web with a Service Oriented Architecture (SOA) approach that canimprove the quality of teaching and learning activities in schools. As for the modelthe proposed system is as follows:

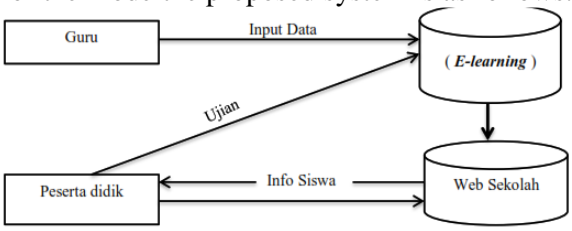

Fig 4. Proposed System Model

B. *System analys*

The system analysis process aims to describe what must becarried out by the system to meet user information needs. Analysisthe system will answer the question of what the system will do, who who will use the system, and where and when the system willused. System analysis activities that are carried out are carried out with an approach Object-oriented analysis for systems designed, intended forfocus on running functionality. Next from the results

The analysis will be visualized and documented with Unified ModelingLanguage (UML) through Use Case Diagram, Activity Diagram, with consider the diagram is considered to represent the wholea system that will run that can be understood by users.

1. Use case system

Use Case explains what the system will do, and to actually build a system, a more specific design is needed.The use of this e-learning application can be divided into 3 types of actors involved, namely students, teachers, and administrators as managers of e-learning. Designactor and use case can be seen in the diagram below:

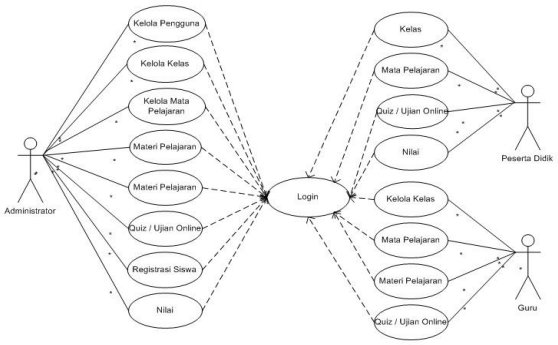

Fig 5. Use case system

Based on the specifications of the functional needs of the actors involvedin the system, it can be modeled with Use Case Diagram. Use CaseThe diagram illustrates the functionality expected from a system. UseCase also describes the interactions that occur in the system, which gives an overview of the user or actor associated with the system and things that areconnect with users in the system.

2. Activity diagram admin

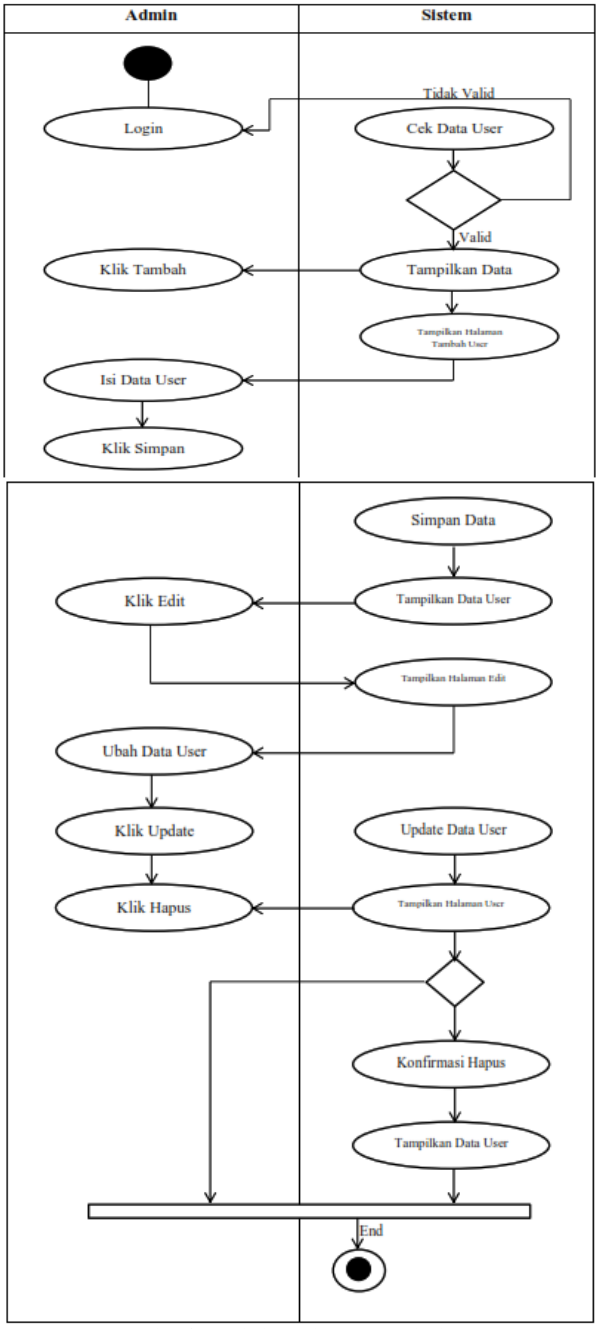

Fig 6. Activity Diagram Admin

C. *User Interface Design*

In this test first test the login menu because the user can choose the login level. Here 3 levels are provided, namely admin level, teacher level and the level of students who have different access. Testing whether all functions, buttons and links run well and can respondfrom each type of user. Below are menus from e-learning SMK Negeri 4 Pandeglang.

The following is a menu for processing administrator level user data.

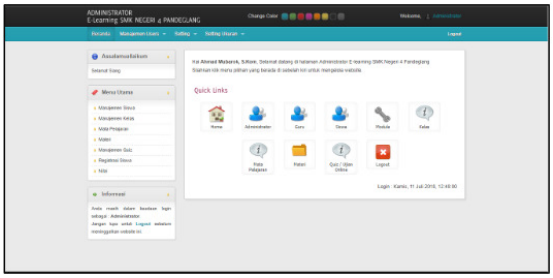

Fig7. Admin Menu page

The following is a menu for processing exam data on teacher rights, and for rights student access is to work on exam questions. The management of this exam is availabledeadline for working on questions.

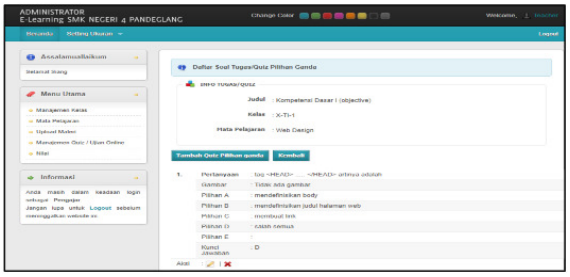

Fig 8. Teacher's Page Manage Exam Questions.

The following is the right of student access to download subject matter according to the eye lessons in his class.

Fig 9. Learning Material Download Pages

The following is the right of students' access to work on exam questions in accordance with subjects in the class, there is a time limit for the questions and cansee the value of the test results when you have finished working on the questions.

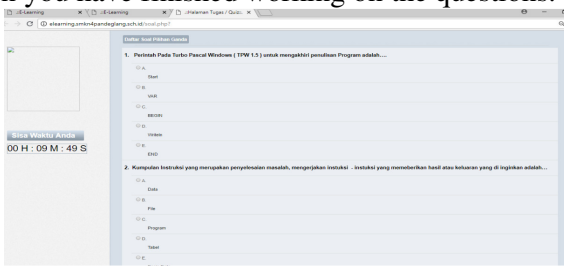

Fig 10. Online Exam page

D. *Hypothesis Testing with the TAM Method*

The stage of testing this validation is done to ensure the devicesoftware that has been made whether it complies with the specifications of functional requirementswhich are expected. Hypothesis testing using the TAM Model that will researchers used it to test the factors that influence acceptance.

1. Variabel Kebermanfaatan

Benefit variables are measured by considering indicatorson usefulness variables, respondents' answers to sixmeasurement indicators based on cumulative proportions indicate answersrespondents tend to agree. This is explained by how many appearanswer score 4. Of the 6 statement items about usefulness variables at 99respondent.

Table II.
Table Descriptions of Respondents' Answers on Benefit Variables

No	Indikator Pernyataan	STS	TS	CS	S	SS	Skor	Rata-rata
		1	2	3	4	5		
1	Kemudahan dipelajari	0	3	29	42	25	386	3.90
2	Mudah dipahami atau dimengert	0	4	25	52	18	381	3.85
3	Mudah sehingga mahir	0	1	21	37	40	413	4.17
4	Mudah digunakan	0	1	52	36	10	352	3.56
5	Mudah dikendalikan	0	1	21	70	7	380	3.84
6	Mudah diingat	0	2	48	38	11	355	3.59
		Total Skor Rata-rata						3.82

Based on Table II above, shows that the average respondentstates agree with statements on usefulness variablesespecially on easy indicators so proficient, it can be seen from the totalthe average score is (3.82).

2. Item Validity Test Results about usefulness questionnaire

Table III.
Table of Benefit Variable Validation Test Results
Correlations

Kebermanfaatan		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 1	Pearson Correlation	1	.831**	.783**	.593**	.672**	.611**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	99	99	99	99	99	99
Item 2	Pearson Correlation	.831**	1	.701**	.630**	.700**	.634**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	99	99	99	99	99	99
Item 3	Pearson Correlation	.783**	.701**	1	.513**	.673**	.629**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	99	99	99	99	99	99
Item 4	Pearson Correlation	.593**	.630**	.513**	1	.511**	.659**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	99	99	99	99	99	99
Item 5	Pearson Correlation	.672**	.700**	.673**	.511**	1	.557**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	99	99	99	99	99	99
Item 6	Pearson Correlation	.611**	.634**	.629**	.659**	.557**	.437**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	99	99	99	99	99	99

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the above output, it is known that the calculated r for item 1 is 0.611,item 2 is 0.634, item number 3 is 0.629, item number 4 is 0.659, item number 5amounting to 0.557 and item No. 6 of 0.437 the results indicate the questionnumber 1 through number 6 is valid because r count is greater than 0.300.

3. Reliability Test Results items usefulness questionnaire

To assess whether the item value of thequestionnaire is reliable or reliablenot done by comparing the calculated r value with r table on df= n-2 (99-2 = 97 at a value of 0.200). If the alpha value is greatercompared to r table (0.200), the usefulness questionnaire itemscan be said to be reliable or reliable as an internal data collection tool

research. Data processing results of usefulness questionnaire items are presentedin the table below:

Table IV.
Table of Results of Reliability Variability Reliability Test
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.915	.916	6

From the output picture above, it is known that the alpha value is 0.916>rtable (0.200) means that items of usefulness questionnaire can be said to be reliableor trusted as a data collection tool in research.

E. *Summary of Results of Proof of Hypothesis*

In the first hypothesis (H1) it is known that there is an effect of perceptions of usefulness on perceptions of acceptance. The results showed that e-learning users felt that the information system was usedimprove the effectiveness and efficiency of the completion of academic affairs such as obtaining subject matter, collecting assignments, subject exams, and subject value information. This is because the benefits gained in using e-learning affect the acceptance of information systems, many students feel comfortable and enjoy using e-learning because it provides benefits as desired, and provides features needed by students. Conversely if students' perceptions of the benefits of e-learning These tend to be negative or do not have benefits, so users tend to dislike or get bored using the information system because the information system does not provide the desired benefits.

In the second hypothesis (H2) it is proven that there is an effect of perceived ease of perception on acceptance. This is because the ease in operating an information system also affects the results obtained from that user. The ease of operating e-learning influences student work so that the teaching and learning process using elearning becomes more effective, faster, and minimizes error rates in the use of e-learning.

In the third hypothesis (H3) states that perceptions of usefulness and perceived ease of jointly influence acceptance. The results show that the usefulness and ease of the information system will improve effectiveness and efficiency in completing academic affairs, this is because the benefits gained in using elearning affect the acceptance of ease of information systems. Operating an information system also affects the results obtained from these users. The ease of operating e-learning affects the work of students so that the learning process can runwell.

Table V.
Summary of Results of Proof of Hypothesis

Hubungan Variabel	Keterangan
H1 – Persevsi Kebermanfaatan *(perceived usefulness)* berpengaruh terhadap Persepsi Penerimaan *(Acceptance of IT)*	Diterima
H2 – Persevsi Kemudahan *(perceived ease of use)* berpengaruh terhadap Persepsi Penerimaan *(Acceptance of IT)*	Diterima
H3 – Persevsi Kebermanfaatan *(perceived usefulness)* dan Persepsi Kemudahan *(perceived ease of use)* berpengaruh terhadap Persepsi Penerimaan *(Acceptance of IT)*	Diterima

V. CONCLUSIONS

Tofind out the development of e-learnig with Service Oriented Architecture (SOA) approach and Utilization and Ease are some of the factors that influence Eearning Acceptance at State Vocational. Therefore, based on the results of the study, the following conclusions can be drawn:

1. Service Oriented Architecture (SOA) can develop systems that can move dynamically when developing an information system, providing a design framework with a view to rapid realization with little system development costs to improve system quality in total
2. Benefit variables (X1) and convenience variables (X2) there is a significant influence on the acceptance variable (Y). Thus, the hypothesis which states that usefulness factor (X1) and convenience factor (X2) together influence acceptance (Y) can be accepted. It is evident that in this study, certainly strengthens the theory of TAM which states that there are 2 key factors that determine the acceptance of information technology / information systems or e-learning in SMK 4 Pandeglang, namely perceived usefulness and ease (perceived ease of use).

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REFERENCES

1. *Rosenberg, E-Learning: A Guidebook of Principles, Procedures, and Practices (2nd), 2016. retrieved 30 Desember 2015 by http://cemca.org.in/ckfinder/userfiles/files/e-learning_ guidebook.pdf*
2. *Cisco, Instructional Technology: The definition and domains of the field. Washington: AECT, 2001.*
3. *Allen, L.V, The Art, Science and Technology of Pharmaceutical Compoun,Second Editions. Wasington DC: Pharmaceutical Association, 2002.*
4. *Davis, Fred D, Perceived Usefulness, Perceived Ease Of Use, Dan User Acceptance of Information Technology, MIS Quarterly, September, Vol. 13 Issue 3 p.318-340, 1989.*
5. *Durvasula, Surekha, etc, SOA Practitioner's Guide Part 3, Introcutions to Service Lifecycle, 2006.*
6. *Hubona, W, Information Technology (IT) in Saudi Arabia: Culture and Acceptance and Use of IT. Information and Management, 2007.*
7. *Jhon F. Nash, Database for Advances in Informations System, Spring, Volume 40. No.4, 2005.*
8. *Vekantesh, Vishvanath and Fred D. Davis, A Theorical Extention of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science Vol. VI No. 42, February.p.186-204, 2005.*
9. *Robert A. Leitch, Fondations of Informations System, Boston: Irwin McGraw, 2002.*
10. *Oktavianti, Bramantika, Evaluasi Penerimaan Sistem Teknologi Informasi dengan menggunakan variabel Perceived Usefulness, Perceived Easy of Use, dan Perceived enjoyment: studi kasus di PT. Sanggar Sarana Baja pada Departemen Accounting dan Marketing" (Tesis). Program Studi Magister Ilmu Sains Akuntansi, Fakultas Ekonomi Universitas Gadjah Mada, Yograkarta, 2007.*
11. *Lexy J Moloeng, Metode Penelitian Kualitatif, Bandung: Remaja Rosda Karya, 2004.*
12. *Sugiyono, Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R&D), Bandung : Alfabeta, 2015.*
13. *Kamarga, Belajar dan Pembelajaran Berbasis Komputer: Mengembangakan Profesionalisme Guru Abad 21. Bandung: Alfabeta, 2002.*
14. *Onno W. Purbo, Belajar dan Pembelajaran Berbasis Komputer: Mengembangakan Profesionalisme Guru Abad 21. Bandung: Alfabeta, 2002.*