

# THE DEVELOPMENT OF ICT-BASED ASSESSMENT DATABASE WITH REINFORCEMENT ON ACCOUNTING SUBJECT AT SENIOR HIGH SCHOOL

*Puji Handayati*

*Anggun Ritme*

State University of Malang

---

## Abstract

This study aims to develop ICT-based assessment database by using Dokeos software. The development model in the study refers to Borg and Gall method. The procedure starts from the needs analysis, database development assessment, assessment database feasibility test, first database revision, limited field test, the second revision of the database and the final product. The research results is the development of assessment with the specifications database containing personal data of students, have a variety of questions (multiple choice, true/false, and essay length), provide reinforcement and display the report in the form of scores obtained by the students, the entire student scores, average result and needed time diagrams by the students. This ICT -based assessment database with reinforcement has website address at [www.belajarasik.asia](http://www.belajarasik.asia). The database has a valid assessment of 91.67 % from the material validator, in terms of ICT is valid for 91 % and according to the limited field test is valid for 87.48 %. The suggestions for further research is that the assessment database for the existing hosting capacity should be upgraded in order to accommodate more materials, protect on other websites when students are accessing the website for this ICT-based assessment database with reinforcement ([www.belajarasik.asia](http://www.belajarasik.asia)), and if this database is used simultaneously, then each laptop and connection used have the same specifications.

---

**Keywords:** Assessment, Assessment Database, ICT, Reinforcement, Dokeos

## INTRODUCTION

At each learning activity, learning outcomes assessment is needed. Learning outcomes assessment is needed to determine how good students master the learning material that has been given. According to Hayat (2004:110), the purpose of assessment learning outcomes by teachers should be directed to the following four points. Keeping track which is to discover that the students learning process is in accordance with the plan, checking – up in order to check if there is any disadvantages experienced by students in the learning process, finding – out in which to search and find things that cause weakness and errors in the learning process, and a summing - up to infer whether students have achieved competency set or not.

In order to achieve the purpose of the assessment, teachers must use a variety of assessment methods and techniques varied according to the characteristics of the learning objectives and learning experiences which have been done. Regulation of the Minister of National Education No. 20 of 2007, the assessment of learning outcomes by educators should use a variety of assessment techniques such as tests, observations, individual or group assignments, and other forms of competence in accordance with the characteristics and level of development of the students. . Assessment techniques was done in the form of tests, observations, individual or group assignments, and other forms used by the teacher is not going to take the given matterial. The given question by the teachers has a variety of types. It

can be in the form of multiple choices, true / false, and essay (Lester, et al. 2011:3). Yet, these types of problems have various advantages and disadvantages. Multiple choice is the type of material that is widely used because it has a wide range of advantages. The advantages of multiple-choice is all the chapters can be represented in material arranged, the correction can be done correctly, quickly and accurately. Type of multiple choice questions also can reduce the element of subjectivity and answer sheets needed a bit so practical and economical as well as the type of question true / false . In contrast, essay is chosen because students can express their thoughts in writing with their own minds. However, the essay has limitations that not all chapters / sub - chapters can be represented. This is because in answering essay takes a long time, especially to correct answer so that teachers have the obligation to make an assessment should take special time to correct it. Besides, sloppy writing and require a lot of answer sheet can be the limitation on the type of essay. One of the various types of questions that an assessment instrument can be observed that all types of matter which has a strong character.

Along with the development of information communication technology (ICT) that is characterized by the development of the internet supports computerized assessment process carried out by the teacher. ICT supports the overall assessment process even in the input and process assessment instruments such as the type of questions including multiple choice, true false and essay. The advantage offered by ICT is time efficiency, practicality, and ease in a matter of correction and assessment process. In addition, the benefits of ICT is shown in term of making and flipping the questions, randomize questions and provide assessment services only with the help of a server from one place. The existence of randomization matter of making students does the problems more honestly. Assessment with reinforcement is very useful for students. A teacher can provide an assessment of the reinforcement by using ICT. ICT is used so that the assessment is more practical and efficient reinforcement. ICT is combined with the use of the software. Nowadays, there are many computer software packages that can help a person to make an application program. This study uses a package of programs called Dokeos. *Dokeos is an open source corporate learning suite with four components; author to build elearning content LMS to handle interaction with learners, shop to sell a course catalog, evaluate for assessment and certification* (Kumar, 2012: 45). Dokeos is the right software to support ICT -based assessment database with reinforcement. Based on the background described above, the title chosen for this thesis is "the development of ICT-based assessment database with reinforcement on accounting subject at senior high school".

## **THEORY OF THE STUDY**

Student progress is reflected in the form of assessments by the teacher. Rating is given by teachers on students' learning outcomes continuously that are maintained to monitor the process, progress, and improvement of the results. In particular, the assessment is done by teachers used to assess student competency achievement, compiling a progress report learning outcomes, and improve the evaluation process essentially for the learning process. Basically, assessment has many functions such as: (1) intensive to enhance learning; (2) as feedback for students; (3) as a feedback to teachers; (4) to provide information to parents and students (5) for information on selection requirements (Mahmud, 1989:252). In order that assessment can work well, in doing evaluation should be fit with the basic principles. Basic principles have been elaborated in the appendix of the Minister of National Education No. 20 Year 2007 (June 11, 2007) on the standard education assessment. When a teacher has applied the existing principles of assessment, teachers should be able to decide what kind of assessment techniques will be used. Classification technique can be in the form of test, observation, individual and group assignments, and other forms used by the teacher. From the classification of assessment techniques available, the teacher must determine the appropriate

assessment technique for a particular subject. Assessment technique is capable of producing an output of assessment from a variety of assessment instruments.

### ***Information Communication of Technology (ICT)***

*Information Communication of Technology (ICT) is any hardware or software, or even any activity that is related to the use of computers for the generation, storage, transmission and retrieval of information in an electronic format* (Mason, R. & Rennie, Frank. 2006: 60). ICT is a technology used to manipulate the data, including processing, obtaining, compiling, storing, manipulating the data in different ways to produce quality information, the information that is relevant, accurate and timely. ICT -based assessment Database should be adjusted to the characteristics of ICT. Characteristic that is expected by UNESCO (2002), as compiled by Ariwijanarko (2011:17-21) the main purpose of integrating ICT in learning are: (a) developing knowledge-based society habits, such as the ability to solve problems, the ability to communicate, ability to find out, acquire and process information and communicate it to others; (b) develop the skills to use ICT (ICT literacy); and (c) improve the effectiveness and efficiency of the learning process. ICT will be more efficient and effective in the students assessment.

### ***Reinforcement***

In general, a reward has a positive influence in their daily lives which is to induce a person in improving behavior and increasing effort. Mulyasa (2009:77) states that reinforcement is a response to behaviors that can increase the likelihood of recurrence of the previous behavior. Reinforcement is also interpreted as a positive response to a specific behavior from students that allow such behavior from happening in the future, (Alma, 2009:30). Winkle (2005:63) explains that the reinforcement or reinforcement holds a key role such as a result or consequence of a form of behavior that increases the frequency of behavior in the future. In above understanding, it can be seen that the role of the teacher is very great in motivating students to perform behaviors that have positive response by teachers to be repeated. Reinforcement provided by the teacher is the feedback in the form of reward, attention, and the chance to have further achievement.

As said by Skinner (in Mahmud and Mudjiono, 1994:48), reinforcement is the most important element in the learning process. Possible actions appear to reinforce to the child's behavior. In some sense, it can be concluded that reinforcement is any response as a result of the modification of behavior committed by teachers on their students intended to provide feedback or feedback to students on their conduct. Reinforcement in this study is intended to stimulate the students to do the positive return. In addition, the reinforcement in question in this study is providing direct feedback to the students in the fulfillment of duties, training and final examination. The presence of reinforcement in each of the answers students can make students motivated to respond confidently in every question given by the teacher.

### ***Dokeos***

According Kastelic and Loncaric (2007:180) Dokeos is an open source for e -learning and course management web application translated in 34 languages. The multilingual support is very useful. It enables user to adapt interface regarding the course subject. Dokeos can be found on the official website at <http://www.dokeos.com/>. Dokeos is an application that uses PHP and MySQL. This software is released under the GNU GPL and OSI certified, so it can be used as a management system for education. Dokeos is written in PHP language and uses a MySQL database. Dokeos is a learning management system which has the best LMS among other types. In Dokeos, the length and type of long essay and the student progress graphic evaluation results is available, unlike the case with other LMS. Stenal, MH & Godsk,

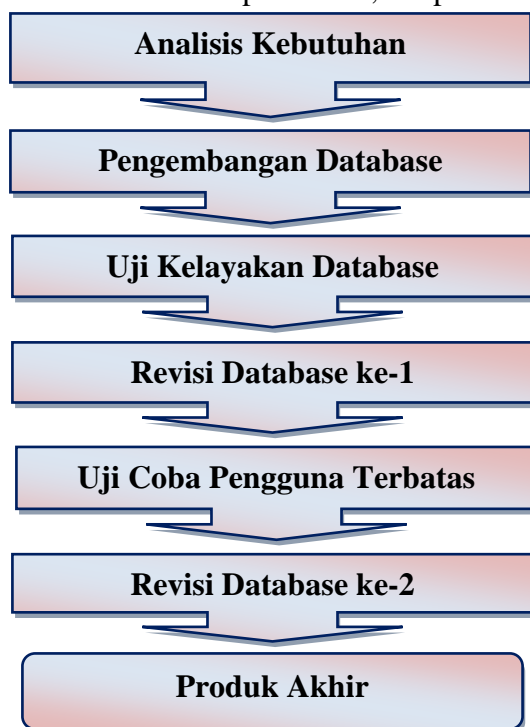
Mikkel (2012:210) states that our survey shows 82% of the course administrators feel that's Dokeos is a useful teaching supplement, indicating the existence of Qualities described as user experience goals which could be considered as aesthetical qualities.

Dokeos is used because the feature can support the process to make multiple-choice, true / false and long essay questions. The reporting feature provides the results of evaluation of the students' questionnaire with graphics and reinforcement that had been made previously. Not only that, Dokeos is easier to understand and able to be used in Bahasa Indonesia.

## RESEARCH METHODS

This study is a research and development model Borg and Gall. According to Borg and Gall ( 1983) in Research Methods Development compiled by the Center for Educational Research and Innovation Policy Research and Development Ministry of National Education (2008:10), the development model has ten-step which are: 1) conduct preliminary study that consists of collecting advance information (literature survey, observation), identification of the problem, and summarizes the problems, 2) make arrangements to cover the skills needed in the implementation of the study, 3) formulate the objectives to be achieved, and the R&D steps type/initial product, 4) try out I, 5) revisions based on try out I, 6) field trial of the learners/users, 7) appropriate revisions user feedback, 8) field operational test, 8) final product and 10) iseminasi and implementation.

Therefore, if it is concluded and picturized, the procedures can be seen below:



**Figure 1** the development of ict-based assessment database with reinforcement (adapted: Borg dan Gall)

### Product Try Out

According to the Department of Education (2008:12) product try out was conducted to determine whether the product has been made fit to be use or not. Product try out also to see the extent to which the products are made to achieve the goals and objectives. In the Guidelines for Scientific Writing (2010:47) explained that the test product is intended to collect data that can be used as a basis to determine the level of effectiveness, efficiency, and

the product appeal. In testing the product, it consists of test design, test subjects, data type, data collection instruments, and data analysis technique. The details of product trials are:

### Data types

The obtained data was from the test results in the form of assessment products tested. It was taken through questionnaire about the evaluation and validation of practicality database, and the database test questionnaires to the students. The type of data captured in the form of qualitative and quantitative data. Qualitative data is in the form of criticism, suggestions and opinions in general about ICT-based assessment database with reinforcement provided by the validators and unlimited users. Quantitative data is in the form of assessment given by the validator and the limited user to the assessment database.

### Data Collection Instrument

The instrument used in the data collection form was enclosed questionnaire. The questionnaire according Arikunto (2002:151) is a number of written questions used to obtain information from respondents about the things they want to know. Questionnaire used in order to obtain data on the feasibility of the product quality as a basis for revising the product. Closed questionnaire respondents selected for ease in understanding the content of the questionnaire. Enclosed questionnaire is used in collecting assessment data experts with a Likert scale. Sugiyono (2009:134) Likert scale to measure attitudes, opinions, and one's perception of social phenomena. Measurement scale questionnaire items are as follows:

**Table 1 : Answer Measurement Scale**

NUMBER	SCORE	NOTE
4	4	Very appropriate/strongly agree /very suitable
3	3	appropriate / agree / suitable
2	2	appropriate / agree / suitable
1	1	less appropriate /less agree /less suitable

The aspect that is attached on the question validity consist of material presentation that is appropriate to the learning material, while the aspect attached to the ICT validity of the research and development product consist of website layout quality. Based on the explanation, it can be picturized more detail in this questionnaire table below:

**Table 2 Questionnaire detail**

No	Measured Aspect	Number of the Question
1.	the quality of the presentation covers the suitability of the material, communicative and formal language, limited questions and answers accordingly, do not cause a double interpretation, an obvious material, do not give clues about the answer key, the problem does not depend on the answer to the previous question, homogeneous answer and options, logical and systematic as well as the same length of answer choices.	1-15 (Material Expert) 1-2 (Limited User)
2.	The display quality of the website, including the website address, accessing the website, use of the logo, the presentation of the text is readable and easy to understand, the use of type and font size, text color contrasting with the background, the clarity of the links in the website, the composition of colors, fonts and graphics attractive (not no broken links), the program presents the results / scores achievement of learning outcomes, the feedback is given immediately after clicking the reply, if answered incorrectly told the correct answer, can log in and log out the program at any time, and the feedback to motivate learning.	1-22 (ICT expert) 1, 2, 3, 9, 11, 12, and 21 (Limited User)

### Data Analysis Technique

Data obtained in the form of quantitative and qualitative data. Analysis technique for the qualitative data is in the form of criticism and suggestions by using inference technique, while the quantitative data were analyzed by using descriptive technique percentage.

Descriptive is the percentage change in the quantitative data to be interpreted as percentages for qualitative data. Based on Sudjana (1990:45), it is obtained that the formula for calculating the percentages are as follows:

$$P = \frac{X}{x_i} \times 100\%$$

Description:

P = Percentage of the try out subject

X = Score number for the try out subject

X<sub>i</sub> = Maximum score number for the assessment aspect by the try out subject

100% = Constanta

## RESULTS

### Database Development with ICT-Based Assessment Reinforcement

Based on the results of the needs analysis which has been conducted, the researchers developed a database of lesson assessment of accounting starting from the second half of the trial balance, adjusting entries, working papers, financial statements, closing entries, and reversing entries. Database assessment developed in accordance with the syllabus of XI grade students of Accountant in the second semester at SMAN 4 Malang. Researcher took limited questions in the second semester due to several considerations. First, the implementation of development activities started in the second semester so that the database is adapted to the material assessment of two semesters. Second, the material accounting is more complicated than the second semester so that more takes practice. With the need to do a lot of exercise then the database is an important assessment.

### Designing Problem

Assessment with reinforcement database contains questions from two semesters. The questions used two semesters covering topics about the balance, adjusting entries, working papers, financial statements, closing entries, and reversing entries. Activities designed the matter refers to Bloom's Taxonomy. Bloom taxonomy consists of three domains: psychomotor and affective. In this study, a matter which is developed is only in the cognitive domain of Bloom's Taxonomy. Problem is limited to the cognitive domain was developed for accounting subjects which have cognitive and affective specifications. Problems supplied database consisting of C1 to C6 levels matter. The following table describes the discussion which adjusted to Bloom's Taxonomy.

**Table 3: The Composition of Database sssessment Question based on ICT with Reinforcement**

Topic	Number of Question Composition		
	Multiple Choice	True/ False	Essay
Balance Sheet	10 Problems	2 Problems	5 Problems
Adjusting entries	10 Problems	2 Problems	5 Problems
Working papers	10 Problems	2 Problems	5 Problems
Financial statements	10 Problems	2 Problems	5 Problems
Closing and reversing entries	10 Problems	2 Problems	5 Problems

**Table 4: Bloom Taxonomy about Assessment Database based on ICT with Reinforcement**

Topic	C1	C2	C3	C4	C5	C6
Balance Sheet	3	7	7	-	-	-
Adjusting entries	3	4	7	1	1	1
Working papers	7	7	3	-	-	-
Financial statements	2	3	9	1	1	1
Closing and reversing entries	-	2	10	3	1	1

## Designing Database

In designing assessment database, it is divided into several activities. As events in the planning database evaluation of ICT-based reinforcement as follows:

### a. Domains Registration

After searching through google, the authors decided to use the services of www.jagoanhosting.com service. Once you are logged on the page, then it will look like in Figure 2



Figure 2 List of Domains for Database-Based Assessment of ICT with Reinforcement

### b. Choosing a Domain (Website Address) Database

Domain Database assessment are selected based name that is easy to remember and understand. The selection is also based on the name of the name of the website is still available. In the assessment database, the name of the selected site is belajarasik.asia. Figure 3 is an image database domain election.



Figure 3 : Domain Selection (Website Address) for Database

### a. Dokeos Installation

Dokeos installation is done on hosting and domains that have been ordered. Version of Dokeos installed on the hosting and domain-Dokeos is version 2.1.1. Dokeos installation view reflected in Figure 4.



Figure 4 : Dokeos Instalation Process through Browser “Click to install dokeos”

b. Making Front Page Website

Making the front page website uses adobe photoshop. The Front Page is looked like in figure 5.



Figure 5. Home page www.beljarasik.asia

c. Making Subject

The database assessment, the subject should be made in advance in order to be registered on the database assessment. To make subjects click "course" then select the site for the course. After that, fill in the data about the subject that will be made. Figure 6 is a display manufacturing subject.

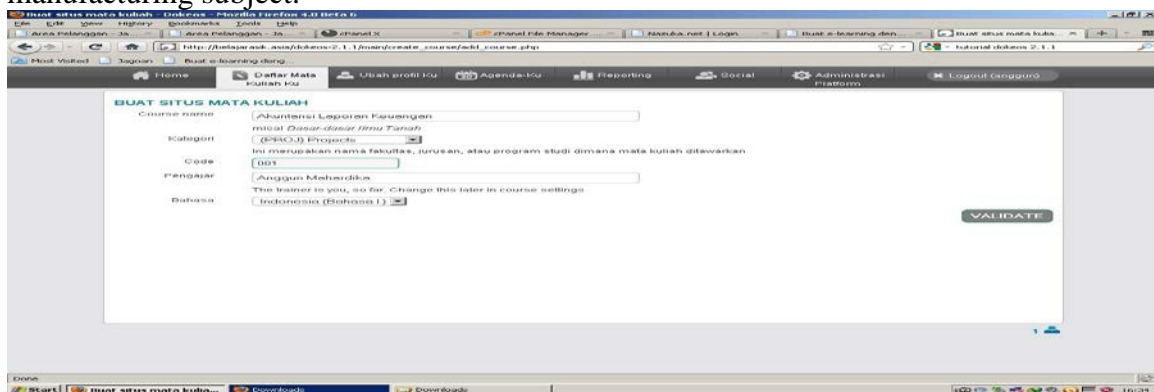


Figure 6 : Making Accounting Financial Report

d. Questions and Reinforcement input on Main Page

When new subject has been made, then the main page will contain a feature of training / quiz. Select the feature training / quiz to input a question that will be based on the type of question. Then fill with the reinforcement feedback to the students. After completing questionnaires and reinforcement input, then the scenario training / quiz mandatory to be



filled. Current view input question, reinforcement and scenario in the main page as pictured in 6, 7, 8, 9 and 10.

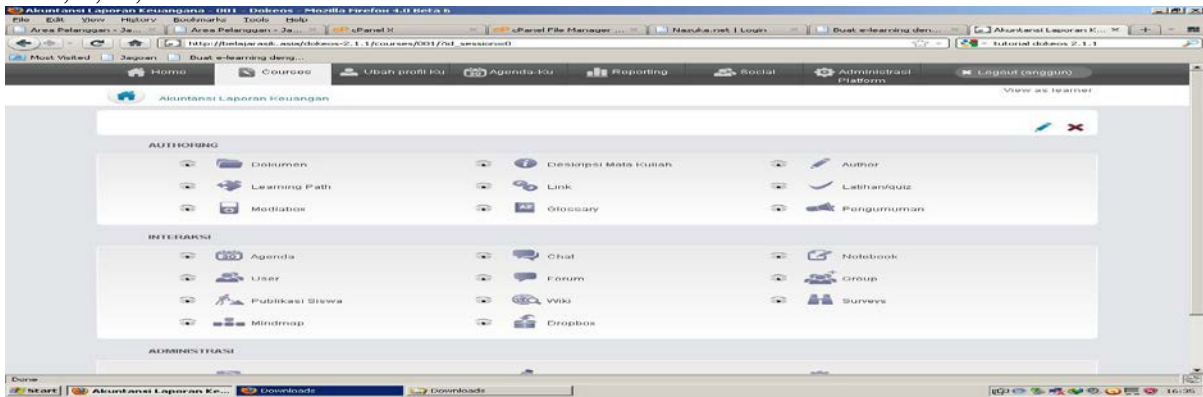


Figure 7 : Menu/ Fitur Shown on Dokeos

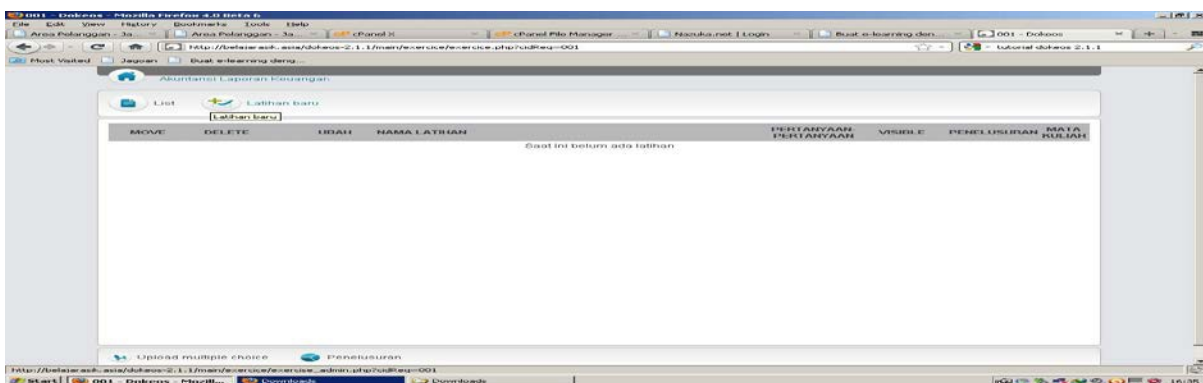


Figure 8: Choose New Exercise to Create a Problem



Figure 9 The Problem which Has Been Made on Assessment Database

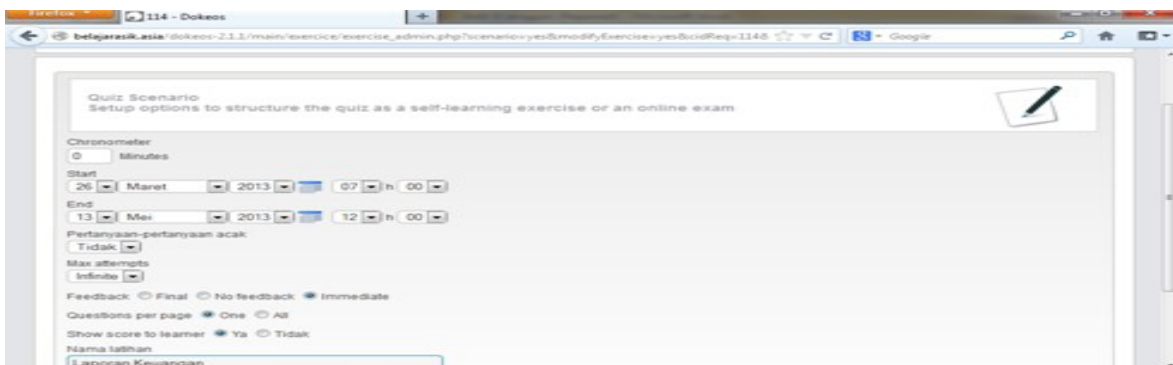


Figure 10 : Scenario which has to be Filled on Assessment Database

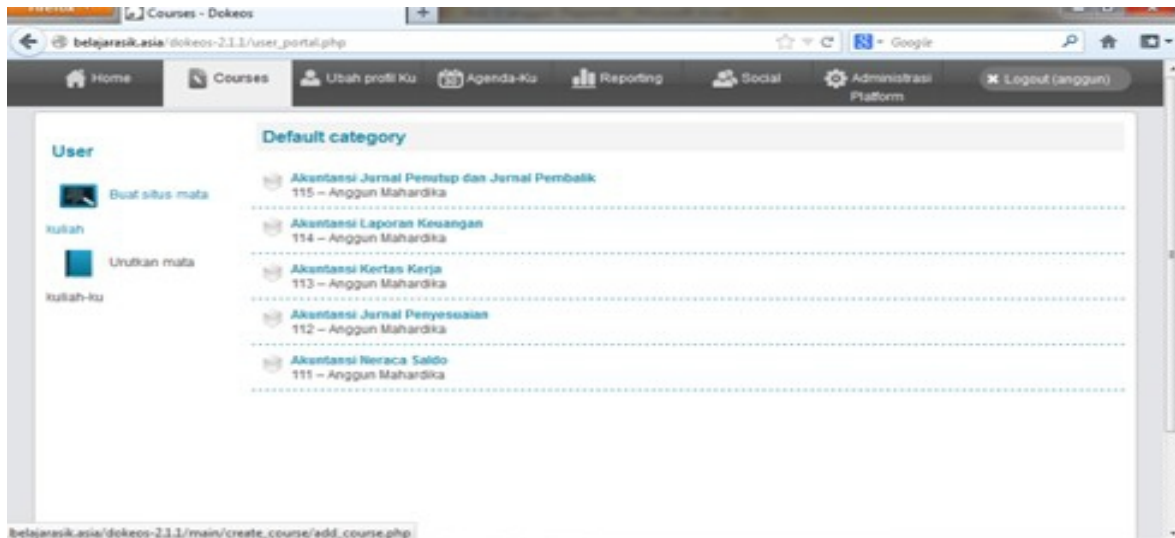


Figure 10 Problem Menus on Assessment Database

**e. Showing Report**

In the assessment of ICT-based database with reinforcement, there are various accounting for the XI grade student on semester 2. When a user (student) working on a chapter accounting database then display the report on the assessment consists of: Report option the user answers with the expected answer (correct answer), feedback in the form of reinforcement, in the form of a diagram average report, a report in the form and report in the form of a percentage of the processing time of each student The following images are ICT-based assessment report database with reinforcement.



Figure 11 User Answer Report with the Expected Result on True/False Problem



Figure 12 User Answer Report with the Expected Result on Multiple Choice



Figure 13 User Answer Report with the Expected Result on Essay

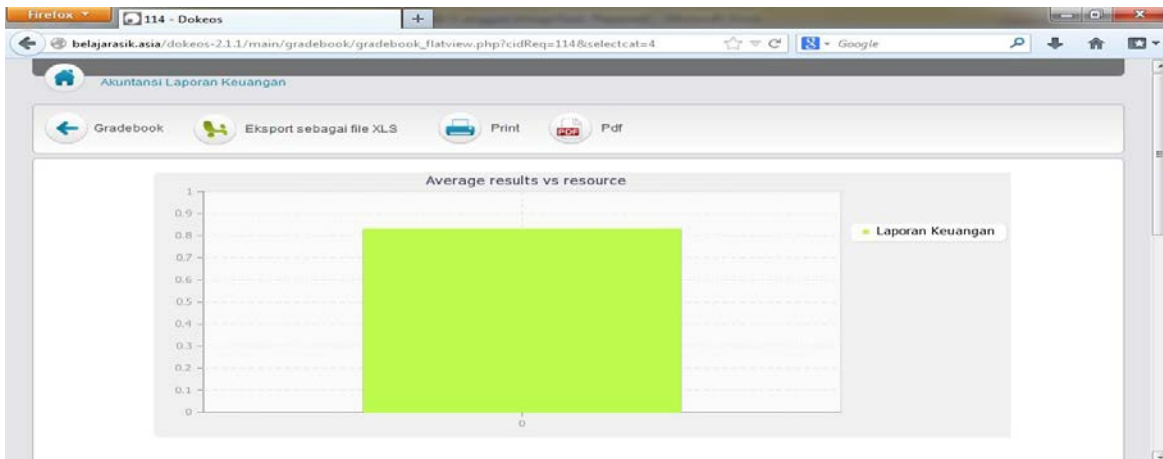


Figure 14 Report in form of Students Average Assessment on Financial Statement Unit

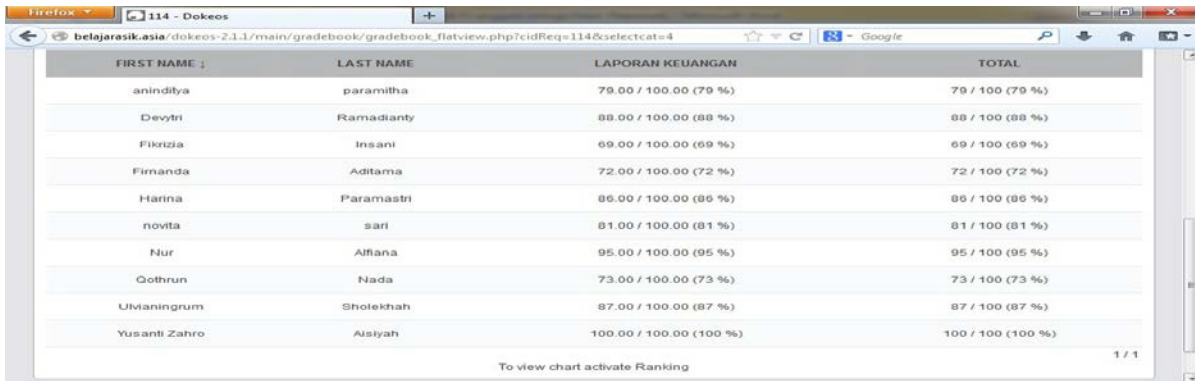
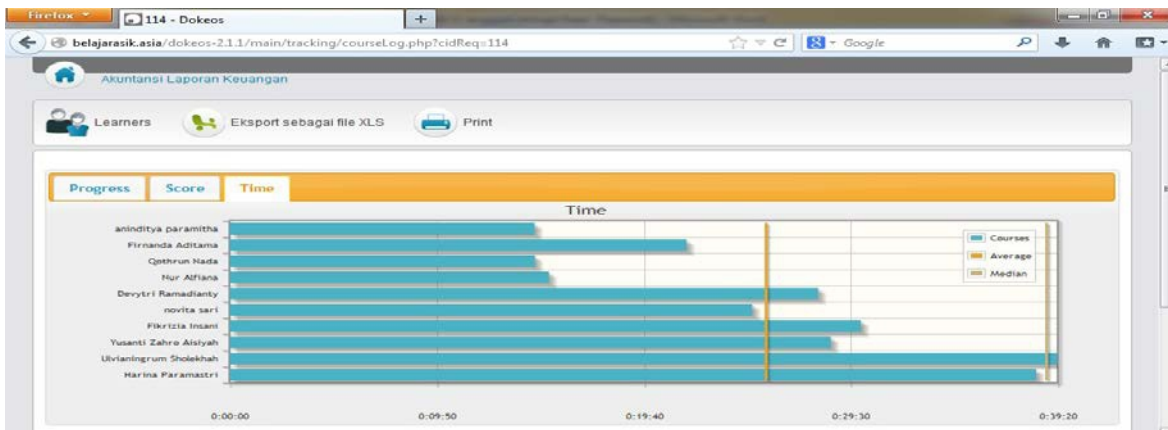


Figure 15 Report in Form of Students' Final Assessment Form



### Feasibility Test Database Based Assessment of ICT with Reinforcement

Feasibility tests involving two validators. Validator is a material expert of accounting teacher in the XI grade students. ICT Validator is the ICT coordinator of SMAN 4 Malang. Validator is a material expert on accounting teacher who has 28 years teaching experience. He is teaching accounting at the XI grade students of at SMAN 4 Malang. Drs. Tony Suhartono M.M. did his validating assessment database on March 23, 2013.

Validator ICT is the ICT coordinator at SMAN 4 Malang, Mrs. Amalia Sufa, S.ST, MT. He has been teaching ICT for 4 years and has been the coordinator of ICT for 4 years as well. Mrs. Sufa is an ICT coordinator who has implemented a Learning Management System (LMS) at SMAN 4 Malang. LMS has been implemented by Mrs. Sufa include Moodle and Claroline. Mrs. Sufa is an ICT coordinator who is an expert in various types including Dokeos LMS used in the development of database researchers. Validation by ICT experts was held on March 26, 2013. Results of a questionnaire based on validation data collection consisted of quantitative and qualitative data.

#### 1. The Quantitative Data

Quantitative data obtained from the scores given by the score of each validator. Table 17 shows the scores given by expert on the assessment database.

**Table 17 The Conclusion of Material Expert Validation Result**

No .	Assessment Item	Percentage	Description
1	Material asked is suitable with the education level	75	Valid
2	Communicative Problem Language fits with education level of the students	75	Valid
3	The Problem has used formal Indonesian Language	100	Valid
4	Question and Answer are Limited appropriately	100	Valid
5	Do not use words / proverb which cause ambiguity or misunderstanding	75	Valid
6	Problem is Formulated Simply, Clearly and Stricly	75	Valid
7	Problem Formulation and Answer Choice is the needed questions	100	Valid
8	Problems do not give a leading answer key	100	Valid
9	Problem is safe from multiple negative statement	100	Valid
10	The problem does not depend on the previous answers	100	Valid
11	The choices do not repeat the word / group of words which is the same, except a sense of unity	100	Valid
12	The length of the answer choices are relatively equal	100	Valid
13	Homogeneous and logical answer choices in terms of materials	100	Valid
14	Using question words or commands that require answers overview	100	Valid
15	Systematic and coherent problem	75	Valid
	<b>Mean</b>	<b>91,67</b>	<b>Valid</b>

Based on table 17 it is known that the question which is stated to be valid to be used with percentages as large as 91.67%. Quantitative data is also obtained from the scores given by the ICT validator. Table 4.2 shows the ICT evaluation validator on evaluation of the developed database.

**Table 18 the Conclusion Result of the ICT Expert**

No .	Assessment Item	Percentase	Description
1	The website address is memorable	50	Not Valid
2	Website easily accessible	75	Valid
4	The use of the logo on the website	75	Valid
5	The presentation of the text is readable and easy to understand	100	Valid
6	The use of type and font size	100	Valid
7	Text with a background color contrast	100	Valid
8	This web page can be displayed by either using the Internet Explorer	75	Valid

	browser		
9	This web page can be displayed by either using the open source browser / Mozilla Firefox	100	Valid
10	Clarity links within this website (no broken links)	100	Valid
11	Presentation of information on the website	100	Valid
12	The registration process is easy	100	Valid
13	The composition of colors , fonts and graphics draw	100	Valid
14	The program presents the results / scores achievement of learning outcomes	100	Valid
15	Feedback is given as soon as you respond to answers	100	Valid
16	If you answer incorrectly told the correct answer	100	Valid
17	You can login and logout at any time	100	Valid
18	Database of ICT -based assessment program can be run without having to help others	75	Valid
19	Clarity feedback / response	50	Valid
20	The use of the application helps the process of assessment	100	Valid
21	Display order can be forward or backwardFeedback motivating Learning	100	Valid
22	Feedback give learning motivation	100	Valid
23	Ease of use assessment database	100	Valid
	<b>Mean</b>	91	Valid

No.	Critics and Suggestion
1.	There is still mistake in problem typing
2.	On the question about the statement of cash flows is replaced by the use of foreign terminology appropriate to learning in SMA Negeri 4 Malang.

Validation results from the matterial experts and ICT experts will serve as the basis for the revision of the ICT-based assessment database with reinforcement to- 1. Overall, the validation result demonstrate the validity of that revision is done in accordance with the criticisms and suggestions validator and the points that have not been declared invalid appropriate level of ability and understanding of researchers.

### ICT-Based Assessment Database revision with reinforcement – 1

#### 1. Revision of Validator Problem

According matterial validator, matterial has a valid and fit to be used, but researchers still have to revise the matterial in accordance with the criticisms and suggestions of the validator matter. Here is the revion made by the researcher: 1)material typing errors (problem is typed on a card given to the validator still have a typing error that investigators confirmed the fault location by editing the typing material in the assessment database to make it more perfect), 2) use of Foreign Terms (in accordance with the learning activities in SMAN 4 Malang, in material cash flow statement, students mention and know the cash flow, not the cash flow statement, cash flow statement editing researchers become cash flow valuation database).

#### 2.Revision of ICT Validator

According validator ICT, ICT -based assessment database with reinforcement have a valid and fit for use , but researchers still have to revise the database in accordance with the criticisms and suggestions of the validator . The following revisions researchers do to improve the assessment of ICT-based database with reinforcement.Set the scenario reassessment database for answers and feedback comes after the quiz is completed to minimize the risk of cheating and memorizing answers.Examining the reinforcement feedback form that will appear on each student answer.

LMS content is focused on the evaluation of learning, therefore, full package LMS feature is not used all of them. By not using the LMS features, a full package affective appraisal can not be realized. Affective assessment in LMS Dokeos still can be used by activating all the features of the chat feature to the document. Www.belajarasik.asia website address is the domain that has been booked for database development assessment. Before booking this domain, researchers have surveyed some of the other domain names. The result of the research survey which is a more interesting domain name has been ordered by various parties so that the researchers could only get a suitable domain name that is www.belajarasik.asia. Researchers can not change the domain name for some considerations; www.belajarasik.asia first domain name is the most appropriate domain when another domain name has been ordered. Second, if researchers forced to change the name of another domain, the researcher created a database assessment starts from the beginning again when in the field there is not necessarily a better domain name. Feedback has been clarified in order to ease for the limited user test.

### **The Try Out for Database Assessment by Using ICT -Based with Limited Reinforcement to Users**

The trial of ICT-based assessment database to the user with limited reinforcement carried out to determine the feasibility and practicality of the assessment database was developed based on the perspective of the user (learner). Implementation trials conducted on the XI grade students of Social Program at SMA Negeri 4 Malang which consist of 10 people. The try out for ICT-based assessment database with limited reinforcement to users held on Thursday, March 28, 2013.

Based on the ICT-based assessment database with the reinforcement to a limited user, the data is obtained by quantitative and qualitative data. Quantitative data were summarized in the form of assessment scores can be seen in Table 19

**Table 19 : Summary of Users Assessment Result**

No.	Student's Name	%	Description
1	1 <sup>st</sup> Students	85,714	Valid
2	2 <sup>nd</sup> Students	87,5	Valid
3	3 <sup>rd</sup> Students	91,071	Valid
4	4 <sup>th</sup> Students	96,428	Valid
5	5 <sup>th</sup> Students	78,57	Valid
6	6 <sup>th</sup> Students	89,285	Valid
7	7 <sup>th</sup> Students	92,875	Valid
8	8 <sup>th</sup> Students	92,857	Valid
9	9 <sup>th</sup> Students	66,071	Valid
10	10 <sup>th</sup> Students	94,643	Valid
<b>Rata-rata</b>		<b>87,48</b>	<b>Valid</b>

Based on Table 19, it is known that the ICT -based assessment database with overall reinforcement is declared as invalid by the percentage of 87.48 %. Thus, in general, according to the user's perspective, the ICT -based assessment database with reinforcement is interesting, easy to understand, motivate and effectively used. There are 14 elements assessed by the user: website address is easy to remember, easy accessing the website, the clarity of the links in this website (no broken links), easier registration process, the composition of colors, types, fonts and appealing graphics, text colors with contrasting background, easy to understand language, answering questions more easily by using the program, the exercise is in accordance with the composition of existing material in the 2nd semester, giving feedback

learning motivation, knowing where the wrong and correct answer, it is easier to see assessment results, the program presents the results/scores achievement of learning outcomes and if answered incorrectly, we are told the right answer.

### ICT -Based Assessment Database revision with reinforcement-2

ICT-based assessment database revision with 2nd reinforcement was done by the user if there are invalidity database of ICT -based assessment developed by reinforcement. In limited user testing revealed that the product had been valid for the 2nd revision, criticisms, and suggestions from limited users. Based on user comments and suggestions, the researchers revised the front page of the website which will be shown in table 4.7. Researchers will protect the future of other websites that only www.belajarasik.asia website which can be accessed at the time of use. Additionally reinforcement feedback form has been improved to better motivate students to continue doing positive and minimize the negative activities in working.

Based on limited user trial questionnaire, all users stated that the website address is easy to be remembered (valid). This is contradictory to answer a questionnaire on ICT validator which states that the address of the website is less easy to be remembered (not valid). A statement of limited user that is easy to remember website address makes researchers maintain the existing website address.

Table 20 Revised Home www.belajarasik.asia

<p><b>Front Page Layout before Revision</b></p> 	<p><b>Front Page Layout after Revision</b></p> 
<p><b>Header Database Assesment before Revision</b></p> 	<p><b>Header Database Assesment after Revision</b></p> 

### CONCLUSION AND RECOMMENDATIONS

Database development of ICT -based assessment with reinforcement is based on the fact of the unavailability of the database in the evaluation of learning. The database mentioned here is the one which can host different types of problems, correct automatically; provide feedback in the form of reinforcement, post answers and the right answers, shows the overall results of the assessment and student assessment diagram. This assessment is in accordance with the specifications database does not already exist on the subject of accounting at SMAN 4 Malang.

Database development of ICT -based assessment with reinforcement is in accordance with the method of Borg and Gall (1983) which includes: 1) analysis of requirements; 2) the development of ICT -based assessment database with reinforcement; 3) feasibility test of database development of ICT -based assessment with reinforcement; 4 ) revision 1; 5) the try

out of database development of ICT -based assessment with reinforcement; 6 ) revision 2; and 3) the final product. Here is a study of the products that have been revised and a final product in development research conducted by the researcher.

### 1. Product characteristics

Assessment is an important matter for teachers and students. So far, the assessment is done by hand. assessment by hand starting to create questions, presenting it to the students to answer using paper and pencil, correcting students' answers, and report the result. The assessment activities are carried out manually is not practical and effective. Furthermore assessment activities manually can lead to an error correction or error reporting. With the reality on the ground that the assessment has not been integrated with practical and effective, the researcher developed a product database of ICT -based assessment with reinforcement. Database of ICT -based assessment with reinforcement products have characteristics such as: 1) the database contains personal data of the students, 2) database has a variety of assessment questions are multiple choice, true false and essay length for each student, 3) databases assessment provides reinforcement for students) databases provide an assessment report for the students.

Characteristics of the development product has function as:(1) intensive to improve learning; (2) as feedback for students; (3) as a feedback to teachers; (4) as information for parents, and (5) as the information for the purposes of selection (Mahmud, 1989: 252). This fundamental assessment of ICT-based database with this reinforcement is in accordance with the assessment principle that has been outlined in appendix from the Minister of National Education No. 20 of 2007 (June 11, 2007) on the standard of education assessment including:

1. Sahih means that the assessment is based on data that reflects the ability measured. Database is in compliance with the principle of assessment which is valid because it has been reflected in the ability of each student to answer a variety of questions.
2. Objective is a meaningful assessment which is based on procedures and criteria are clear, not influenced rater subjectivity. In the database assessment, objectivity is certainly due to this database so that ICT-based assessment is conducted by a program (software) automatically.
3. Fair means that there is no beneficial or adverse assessment of learners with special needs as well as differences in religious background, ethnicity, culture, customs, socioeconomic status, and gender. In the assessment using the database does not distinguish assessment of each learner for assessment performed by a program (software) so it does not look any difference. Assessment is based on the answers worked out by the students.
4. Integrated means that the assessment by educators is one the components of the learning activities. Assessment is carried out with a database including a component of assessment of learning activities in the second semester of the topics include trial balance, adjusting entries, working papers, financial statements and closing entries, and reversing entries.
5. Open means that the assessment procedures, assessment criteria, and the basis of decision-making can be seen by interested parties. Assessment contained in the database is open assessment with assessment procedures that weighs 100 % in working and assessment criteria are presented automatically.
6. Wholistically and continuously means that the assessment covers all aspects of competency by using appropriate assessment technique, the ability to monitor the progress of learners. Assessment technique used is in accordance with the purpose of assessment. Assessment technique that exist in the database that is exercise/quiz. Exercise/quiz consists of a variety of multiple choice, true/false, and essay length.
7. Systematis means that the assessment is done in a planned and phased by following basic steps. Assessment is carried out which has been planned in accordance with the standard



measures. Planning assessment in the database is to provide a weight training/quizzes at 100 %.

8. Based on Criteria means that the assessment is based on the size of the achievement of specified competencies. Database assessment is based on a set of learning competencies. Each student is assessed based on their ability to answer questions in the assessment database. Problem in database based on competency assessment of students able to understand the preparation of the accounting cycle services company.
9. Accountable means that the assessment can be accounted for both in terms of technique, procedure, and results.
10. Technique procedures and results of ICT-based assessment database can be accounted for by the reinforcement.

In addition to the Database assessment using ICT -based is in accordance with the reinforcement of UNESCO (2002), as compiled by Ariwijanarko (2011: 17-21). The main purpose integrating ICT into learning is to: (a) build a knowledge based society habits such as problem-solving skills, communication skills, ability to find, acquire and process information and communicate it to others; (b) develop the skills to use ICT (ICT literacy); and (c) improve the effectiveness and efficiency of the learning process . The use of ICT can be efficient and effective in the learning process, especially for students in making judgments. The communication of the assessment will be easier with the use of ICT.

Besides, a database of ICT-based assessment with reinforcement gives feedback in the form of reinforcement. Reinforcement is a response to a behavior that can increase the likelihood of reoccurrence of such behavior (Mulyasa, 2009:77). The response to answers each student is assigned automatically using a database of ICT-based assessment with reinforcement. On multiple choice questions and true/false each student will receive the same reinforcement in each case, while the long essay, reinforcement on each student is different because every student answers doing different from other students.

## **Advice Utilization and Development of Advanced Products**

### **1. Utilization Suggestion**

The following suggestions can be given to the use of database researchers, ICT-based assessment with reinforcement. Uses a fast and stable connection, computer compatible devices when used simultaneously (synchronously), preferably every connection and used laptop has the same specs and hosting capacity can be upgraded to larger and more questions that could be loaded.

### **2. Further Product Development**

Suggestions which can be given for further product development are: 1) other researchers can test the effectiveness of the use of ICT-based assessment database with reinforcement in accounting learning; and 2) increase the quality of ICT validator and 3) make protection on other websites when students are accessing the website database of ICT-based assessment with reinforcement.

## **References:**

- Alma, B. 2009. *Professional Teacher*. Bandung: Alfabeta.
- Arifin, Zainal. 2012. *Teaching Evaluation Book*. Bandung: PT. Remaja Rosdakarya.
- Arikunto, S. 2002. *Research Procedure of Practice Approach: Revision Edition Revisi*. Jakarta: PT Rineka Cipta.
- Aunurrahman. 2009. *Study and Learning*. Bandung: CV. Alfabeta.
- Grondlund, E. N. Linn, L. & Miller, D. 2009. *Measurement and Assessment in Teaching*. United States of America: Pearson.

- Hayat, Bahrul. 2004. *Classroom Assessment in the Implementation of Standard Competence. Education Journal Penabur.* (Online), 3 (3): (108-112), (<http://www.bpkpenabur.or.id/.../hal%20108->), Retrieved on Februari 10, 2013.
- Kastelic, M. & Loncaric, Tea. 2007. A Model of Introducing E-Learning System at Vocational College for Business Secretaries. *Journal Science and Information Technology*, (Online), 4: (175-184), ([http://www. Information Technology, 2007 - docs.huihoo.com](http://www.Information Technology, 2007 - docs.huihoo.com)), diakses tanggal 21 Februari 2013.
- Kumar, A. 2012. Detail Study Evaluation of Educational ERP Tools. *Journal of Multidisciplinary Research*, (Online), 1 (8): (44-53), ([http://www. pinnaclejournals.com](http://www.pinnaclejournals.com)), diakses tanggal 21 Februari 2013.
- Lestari, D. Handayani, A. N. Aripriharta & Asmara. 2011. Development of Multiple Choice Test Application Based on Web for Information Technology in Education World. 2011. *Educational Journal*, 27.
- Mahmud, D. & Medjiono. 1994. *Study and Learning*. Jakarta: Departement of Education and Culture.
- Mulyasa, E. 2009. *Being a Professional Teacher*. Bandung: PT. Remaja Rosdakarya.
- Rusman. Kurniawan, D & Riyana. 2011. *Learning Book Based on Information Technology and Communication*. Jakarta: PT. Rajagrafindo Persada.
- Setemen, Komang. 2010. Development of Online Learning Evaluation. *Educational and Learning Journal*, (Online), 43 (3): (207-214), ([http://www.undiksha.ac.id/images/img\\_item/1174.pdf](http://www.undiksha.ac.id/images/img_item/1174.pdf)), diakses 29 Desember 2012.
- Sudjana, N. dan Rivai, A. 1990. *Media Pengajaran*. Bandung: Penerbit CV Sinar Baru.
- Sugiyono. 2010. *Educational Research Method by Using Qualitative, Quantitative and R&D*. Bandung: Alfabeta.
- Sukmadinata, N.S. 2007. *Educational Research Method*. Bandung: PT Remaja Rosdakarya
- Suwono, Hadi. 2009. Training Model based on Tachers' Conference to Enhance the Ability to Assessment Tools based on Class. *Educational Journal*, (Online), 16 (1): (28-39), (<http://journal.um.ac.id/index.php/jip/article/viewArticle/2543>), diakses 19 Desember 2012.
- Stenalt, M. H. & Godsk, Mikkel. 2012. The Pleasure of E-Leraning Towards Aesthetic E-Learning Platforms.
- Tim Penyusun PPKI. 2010. *Guidelines for Scientific Writing: Sarjana's Thesis, Thesis, Dissertation, Article, Journal, Final Paper, Research Report*. Malang: State University of Malang.
- Usman, U. 2010. *Being a Professional Teacher Guru*. Bandung: PT. Remaja Rosdakarya.
- Wahid, Fathul. 2002. *Information Technology Dictionary*. Yogyakarta: Andi
- Winkel, W. S. 2005. *Learning Pcyhology*. Yogyakarta: Media Abadi.
- Yamin, M. 2007. *Teacher's Profesionalism and the Implementation of Education Unit Curriculum*. Jakarta: Gaung Persada Press.
- [www. dokeos.com](http://www.dokeos.com), retrieved on February 28, 2013.