Development of an Automated Short Essay Scoring (ASES) Assessment Model as an Assessment Solution for the Digital Era

Evi Susilawati[1], Hasrita Lubis[2], Sapta Kesuma[3], Hadiani Fitri[4], Pulung Sumantri[5]

{evisusilawati@fkip.uisu.ac.id[1], hasrita.usm@fkip.uisu.ac.id[2], saptakesuma@fkip.uisu.ac.id[3], hadianifitri@fkip.uisu.ac.id[4], pulungsumantri@fkip.uisu.ac.id[5]}

Faculty of Educational Teaching Training, Universitas Islam Sumatera Utara, Indonesia[1,2,3,4,5]

Abstract. This research aims to develop an Automated Short Essay Scoring (ASES) assessment model as an assessment solution in the digital era. This research was developed using the ADDIE Model (Analysis, Design, Development, Implementation and Evaluation). The subjects of this research used 2 validators, namely 20 students and 1 lecturer. Data collection uses questionnaires while data analysis techniques use qualitative and quantitative statistics. The results of the research show that identification of the level of student needs is within the required qualifications, identification of material needs for those who answered yes to the qualifications is very necessary while for those who answered no to the qualifications it is very lacking. The conclusion from the results of this research is that the level of development of the Automated Short Essay Scoring assessment model is within the qualifications required as a valid and practical assessment product in the era of digital technology.

Keywords: Mobile Application, Nine Mandatory Malay Dances, Blended Learning Model.

1 Introduction

The digital age has growing rapidly as well requires learning to be integrated with the internet and digital- based . With the digital era, the learning process in Indonesia must change according to the development of the digital era. Changes in the learning process in question of course, it is adjusted to the goals of Indonesian National Education , namely to make it happen system education become more quality, with a better use curriculum produce better graduates.

In the learning process in this digital era, lecturers act as demanding facilitators educator to be facilitator. The continued sophistication of digital technology develop give contribute to improvement effectiveness in the implementation of the learning process, improve learning outcomes , motivation , interest in learning, and student achievement. The application of digital- based learning has given opportunity for students to awaken interest and improve competence of students to communicate, learn news latest, and get Lots information pushing area development perspective knowledge [1]. The use of technology in the digital era has Lots advantage in upgrading efficiency learning assessment and diversification chance learn [2].

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The application of digital-based learning requires the ability of lecturers to develop various assessment models. Ability develop assessment model is ability basic must mastered by the lecturer as one competence the professional. Ability develop the valuation model is one lecturer professional competence is developed in learning with one the goal namely to facilitate learning activities [3]. In line with this, in the learning process assessment activities it should be able to use digital technology that facilitates learning activities. Various models of teaching materials, learning methods to learning assessment activities, can be facilitated using digital technology. Various research results show that assessment using digital technology is capable measure the success of learning carried out by the lecturer at the same time measure student success in assignments material that has determined. Thus , lecturers need a digital technology- based assessment model . The use of digital technology in assessment activities can assist in earning product quality , improvement accuracy time , reduce error , and improve efficiency costs , and productivity [4]. The digital technology-based assessment model has been used by lecturers help produce product quality, improve accuracy time, reduce error, and improve efficiency cost , and the most tools adopted tend helps in quantitative data analysis , management project , and caution [5]. Assessment model digital technology- based can be applied in making questions and assessments. With an assessment model based on digital technology, it will be very helpful become faster and easier to find out result [6]. Therefore it is very important developing digital technology- based assessment models in the learning assessment process, one of which is by using the Automated Short Essay Scoring (ASES) assessment model.

The ASES assessment model is an assessment model that uses tools soft . Automated Short Essay Scoring (ASES) is device capable software evaluate in a manner automatically using a computer [7]. Device This software helps lecturers to carry out assessments regularly automatic. The ASES digital assessment model uses virtual elements by using similarities answer between participant exam [8]. The ASES scoring model is based on enabling technology interaction multisensory with virtual environment, digital objects and people. The efficiency of the ASES assessment model has Power strong pull to reduce weakness inspection essay assessment manually [9]. ASES assessment model that serves as a tool usable computer software capable independent evaluate and assess answer exam participant educate. The advantages of the ASES assessment model as a digital assessment model are able to overcome problems of time , cost, if compared to using a manual assessment model. The reliability and validity of the ASES assessment model is better than using the manual assessment model. Although lots own excellence in many respects, the ASES assessment model is not intended to be exhaustive replace evaluator human but to be used as part of the scoring model for participant diduik of course will easy to help assessment routine for participant educate. The ASES assessment model is capable works well and can function in a manner flexible and used anytime and anywhere so more flexible , efficient and accurate in assessing answer participant educate. Security the use of the ASES assessment model as a digital assessment model is unquestionable . With the involvement of technology in the use of the ASES assessment model will capable build the future of the future more digital assessment model accurate, reliable, practical and economical.

See lots advantages of the ASES assessment model, researchers carried out the development of the ASES assessment model in the Education Research Methodology course in the Pancasila and Citizenship Education study program at the Faculty Lecturership and Education

Sciences, Universitas Islam Sumatera Utara. The Education Research Methodology course discusses about procedure general delivery material to complete learning outcomes is based on assumption certain about the nature of educational research [10]. Aims: (1) to provide description in a manner detailed problems, facts, and related data in the field of education, (2) explains condition the initial background of existing problems related to the field of education, (3) compiling theory base from a number of aspects of the problem and theory settlement as well as theory among the problems that occur in the field of education [11]. See characteristics this Educational Research Methods course, is still in the assessment process found deficiencies in the use of the test based paper even though the learning process is digital based. Meanwhile, facilities and infrastructure owned Faculty Lecturer and Science Education already available, like laboratory computer, projector, until the connection WiFi, however the facilities and infrastructure have not optimized its use as a learning support. Therefore, it is necessary to optimize these facilities and infrastructure by using digital- based learning. If the learning process is digital- based, then the assessment process is also based on digital technology, so developing the ASES assessment model is an appropriate solution. Offered which is one of the assessment models in digital learning in the Pancasila and Citizenship Education study program Faculty Lecturership and Education Sciences, Universitas Islam Sumatera Utara.

2 Methods

This research uses a Research and Development (R&D) approach that produces results a the product of the AutomatedShort Essay Scoring (ASES) assessment model with the ADDIE model (Analysis-Design-Development Implementation-Evaluate). The development of this ASES assessment model only reached the implementation stage. The selection of this model was based on consideration that this model was developed in a manner systematic and grounded theoretical development learning design [12]. This research was conducted in the Pancasila and Citizenship Education study program Faculty Lecturership and Education Sciences at the Universitas Islam Sumatera Utara, precisely in the subject of Educational Research Methods. The subjects in this study were two validators consisting of from 1 expert validator learning design and 1 expert validator device software for validity test. Meanwhile, the practicality test was carried out on 20 students who were participating in the Education Research Methodology course and 1 lecturer in Educational Research Methodology course. The types of data in this study are qualitative data and quantitative data with techniques data collection using interviews and questionnaire. Collected data Then analyzed using descriptive data analysis qualitative and quantitative. Data analysis to process the result data questionnaire obtained from trial results validity and practicality into descriptive form percentage. The formula used to calculate percentage subject are as follows :

$$\boldsymbol{ercentage} = \frac{(\boldsymbol{Answer\ X\ Weight\ of\ Each\ Choice})}{\boldsymbol{N\ X\ Highest\ Weight}} \boldsymbol{X}\ \mathbf{100}\ \%$$

Description :

N: Total number of questionnaire items

Based on the results of the assessment obtained , the conversion is used level achievement as follows :

Table 1. Conversion of Achievement Levels with a Scale of 5

Achievement Level	Qualification	Information
90% - 100%	Very Good	No Need Revision
75%- 89%	Good	No Need Revision
65% - 74%	Enough	Revised
55% - 64%	Not enough	Revised
0% - 54%	Very less	Revised

3 Results And Discussion

3. 1 Results

This research and development results a product in the form of an Automated Short Essay Scoring (ASES) assessment model in the Education Research Methodology course, the Pancasila and Citizenship Education study program Faculty Lecturership and Education at the Universitas Islam Sumatera Utara which was developed using the ADDIE model steps outlined following :

3.1.1. Analysis

Stage in this research is Analysis by conducting analysis need . Analysis need This was done on 20 students to find out description use of digital technology -based assessment models In this study researchers identify needs of class students with a questionnaire identification needs filled by students by voting answers that are in accordance with the conditions experienced and related needs use of a digital technology- based assessment model that can be seen in the table below :

Table 1. Student Perceptions About Using Digital- Based Assessment Models in Educational Research Methodology Courses

No	Question	Amount student who answered		
		Yes	Sometimes	No
1	Is lecturer using a fun assessment model	10	3	7
2	Is lecturer using an assessment model besides than on paper at the moment do activity Course assessment Methodology Educational Research	10	9	1
3	Is lecturer using an appropriate valuation model with need Study You	9	4	7
4	Is the assessment model given lecturer Already in accordance with objective learning eye studying Method Educational Research	8	10	2
5	Is lecturer give test spoken / written at the end learning	8	9	3
	Amount	**35.00 %**	**70.00 %**	**20.00%**

Based on results questionnaire identification student needs in table 1 given to 20 students indicates that in the learning assessment process for the Education Research Methodology not yet maximal and necessary learning resources that suit the needs of students. Therefore an innovation to develop assessment models that suit student needs. As for the results analysis from student perceptions of the learning assessment model needed by students can be seen in Table 2 below :

Table 2. Perceptions Students Against Learning Assessment Models Needed by Students in Educational Research Methodology Courses

No	Question	Amount student who answered		
		Yes	Sometimes	No
1	Is You need a valuation model digital based	18	2	0
2	Is lecturer Once using assessment media especially on the eyes studying Methodology Educational Research	19	1	0
3	Is You interested using an assessment model digital based on learning Methodology Educational Research	14	5	1
4	Is You agree using the ASES assessment model in learning eye studying Method Educational Research	16	3	1
5	According to you, what is the model ASES assessment is interesting for you Spirit do question evaluation learning eye studying Method Educational Research	14	4	2
6	Is You agree if evaluation more digital based ASES pleasant compared to with ongoing assessment this applied	12	4	4
7	Is You Like use evaluation digital- based ASES	12	5	3
	Amount	**96.00 %**	**29.00 %**	**11.00%**

Based on results questionnaire identification student needs in table 2 above regarding students ' perceptions of learning assessment media needed by answering questionnaire "Yes" obtained the average yield percentage is 96.00% which is in qualification interested. From the results obtained indicates that the participant educate interested in using the ASES digital- based assessment model in the learning process of the Educational Research Methods course .

3.1.2. Design

Stage design on this ADDIE Model is designing product of the ASES digital-based assessment model will be developed. At stage the second focus is on the steps for creating an ASES digital-based assessment model as seen in the following figure:

Fig. 1. Main Page of ASES Digital Based Assessment Model

In part page In Figure 1, there are several menus such as "Home", "About the ASES Digital Assessment Model ", "Input Answers", "Check Results", "Update" and "Contact" function of the menu described as follows : (1) Home: Main Page of the ASES Digital-Based Assessment Model, (2) Input Answers: input answers from the lecturer concerned , (3) Check Results: see results from scoring answers and student scores , (4) Update : update the algorithm to provide

grade updates from students who have input answers , (5) Contact: information related to the Educational Research Methodology course . Making The ASES digital- based assessment model product is then carried out on the input of the answers to the lecturer's questions as seen in Figure 2 below:

Fig. 2. Lecturer Page Inputs Answers from Questions

Next step is to input student answers on the assessment model based d igital ASES where Student must fill in Student Name, NIM, Course Code, Course Name and Lecturer Name. Next, students will fill in the number of questions. The next step is to check the results of student answers. The results of student answers on the assessment model digital based ASES can be seen in the Check Results menu as follows this:

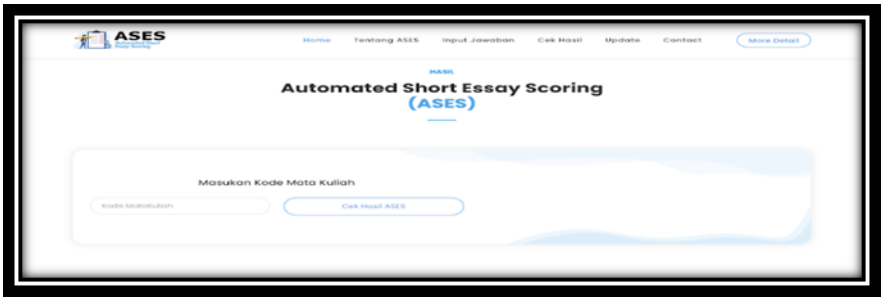

Fig. 3. Results Check Page

3.1.3. Development

ASES digital- based assessment model is necessary validated by experts learning design and experts device soft.

Table 3. Results of Learning Design Expert Validation of the ASES Digital- Based Assessment Model in the Education Research Methodology Course

No	Aspects Assessed	Score
1	Clarity of Content of Eye Assessment Studying Methodology Educational Research	5
2	suitability with achievements learning eye studying Methodology Educational Research	5
3	Relevance material with achievements learning eye studying Methodology Educational Research	5

4	Clarity of question items eye studying Method Educational Research	4
5	Presentation question eye studying Method Educational Research is simple and concrete	4
6	Using standard and easy language understood	5
7	Compatibility material assessment with need student	5
	Amount	**33**

Based on the results of expert judgment the learning design in table 3 can be calculated percentage level achievements as follows :

$$\boldsymbol{Percentage} = \frac{(\boldsymbol{Answer\ X\ Weight\ of\ Each\ Choice})}{\boldsymbol{N\ X\ Highest\ Weight}} \boldsymbol{X}\ \mathbf{100}\ \%$$

Because of the weight choice is 1, then the percentage is as follows:

$$\boldsymbol{Percentage} = \frac{\mathbf{33}}{\mathbf{7}\boldsymbol{X}\ \mathbf{5}} \boldsymbol{X}\ \mathbf{100}\ \% = \mathbf{94,28}\ \%$$

After converted by table conversion , result the percentage of 94.28% is in very good qualification so it can be concluded that the results validation expert learning design worth trying out field without revision due are in very good qualifications . The ASES digital- based assessment model development activity was validated by experts device soft. Validation results expert device software can be seen in Table following :

Table 4. Device Expert Validation Results Software for the ASES Digital- Based Assessment Model in the Educational Research Methodology Course

No	Aspects Assessed	Score
1	Quality valuation model display digital- based ASES	4
2	Quality model color valuation digital- based ASES	4
3	Appropriateness of the font model assessment digital- based ASES	4
4	The quality of the assessment model layout digital- based ASES	4
5	Conformity of items about the assessment model digital- based ASES	4
6	Quality pictures and questions of valuation models digital- based ASES	5
7	suitability use model color valuation digital- based ASES	5
8	Size and font used easy to read	5
9	Accuracy use Language	5
	Amount	**40**

Based on the results of expert judgment device software in table 4 can be calculated percentage level achievements as follows :

$$\boldsymbol{Persentase} = \frac{(\boldsymbol{Jawaban\ X\ Bobot\ Tiap\ Pilihan})}{\boldsymbol{N\ X\ Bobot\ Tertinggi}} \boldsymbol{X}\ \mathbf{100}\ \%$$

Because of the weight choice is 1, then the percentage is as follows :

$$\boldsymbol{Persentase} = \frac{\mathbf{40}}{\mathbf{9}\boldsymbol{X}\ \mathbf{5}} \boldsymbol{X}\ \mathbf{100}\ \% = \mathbf{88,88}\ \%$$

After converted by table conversion, result the percentage of 88.88% is in good qualification so it can be concluded that the results validation expert device soft worth a try field without revision due are in good qualification.

3.1.4. Implementation

ASES digital-based assessment model is necessary implemented by lecturers and students. Stage this implementation to know the practicality of the valuation model digital- based ASES is carried out for students. Questionnaire Results Response Students Against the ASES Digital- Based Assessment Model in the Educational Research Methodology Course can be seen in the table following :

Table 5. Questionnaire Results Student Responses to the ASES Digital- Based Assessment Model in the Educational Research Methodology Course

No	Aspects Assessed	Average	Category
1	Clarity delivery achievements learning on the assessment model digital- based ASES	90%	Very Good
2	Suitability of the test items contained in the valuation model digital-based ASES	88%	Good
3	convenience understand the test items in the assessment model digital-based ASES	91%	Very Good
4	Quality valuation model display digital- based ASES	87%	Good
5	Quality size and letter on the scoring model digital- based ASES	90%	Very Good
	Average	**89%**	**Good**

Based on the results of the questionnaire assessment student responses to the assessment model digital-based ASES which has been developed, it can be known the average percentage by 89% and are in good qualification, so the assessment model digital-based ASES is not necessary revised. To know the practicality of the valuation model digital- based ASES is also carried out for supporting lecturers Educational Research Methods cours. Questionnaire results lecturer responses to the ASES digital- based assessment model in the Education Research Methodology course

Table 6. Questionnaire Results Lecturer Responses to the ASES Digital- Based Assessment Model in the Educational Research Methodology Course

No	Aspects Assessed	Average	Category
1	Attractiveness assessment model design digital- based ASES	89%	Good
2	The practicality of the valuation model digital- based ASES	86%	Good
3	Test items on the valuation model according to ASES digital based with eye studying Methodology Educational Research	90%	Very Good
4	Assessment model digital- based ASES in its use easy understood student	87%	Good
	Average	88%	Good

Based on the results of the questionnaire assessment lecturer's response to the assessment model digital-based ASES which has been developed, it can be known the average percentage by 88% and are in good qualification, so the assessment model digital- based ASES is not necessary revised. Based on the results of the trial assessment expert learning design, expert device software , trials on students and lecturers of the assessment model digital- based ASES which has been developed , it can be stated that the assessment model digital- based ASES is suitable for use as an assessment model in the Educational Research Methods course in the Pancasila and Citizenship Education study program Faculty Teacher Training and Education at the Universitas Islam Sumatera Utara.

4 Dicussion

The model developed in this study uses the ADDIE model with stages which include: analysis, design, development, implementation, and evaluation. At stage analysis , the research process begins with analysis need where students answered questionnaire given by researchers to students. Analysis results need percentage of 96.00% which indicates students are interested in using the ASES digital -based assessment model . The findings of this study are in line with the results of research which states that the development of ASES as a digital assessment model contributes to student effectiveness and interest in learning [13].

The design for the development of the ASES digital -based assessment model uses other software performance such as Computer , Microsoft word, Google Chrome and the Web where the assessment model is based from learning achievement of the Education Research Methodology course . The ASES digital- based assessment model consists of: from student essay answers, key answer from the lecturer, time when finished working test, and input student answers , as well score student answers that can be obtained by students after they carry out tests given by lecturers in Educational Research Methodology courses. The design of the ASES digital- based assessment model has excellence in assessment activities and completed at cost more low and able to make judgments in many forms of writing essay using correlation while maintaining high precision [14].

The ASES digital- based assessment model product is necessary tested its feasibility so that it can be used in the learning process of Educational Research Methodology courses. The development of the ASES digital- based assessment model has been validated by experts learning design and expert's device soft. Validation results expert learning design . based on results validation expert learning design of the ASES digital- based assessment model in the Education Research Methodology course. After converted by table conversion, result validation by experts acquiring learning design the percentage of 94.28% is in very good qualification so it can be concluded that the results validation expert learning design is suitable for use in Educational Research Methodology courses without revisions because are in very good qualifications. The ASES digital- based assessment model development activity was validated by experts device soft. Validation results expert device soft obtain the percentage of 88.88% is in good qualification so it can be concluded that the results validation expert device soft worth a try field without revision due are in good qualification .

After the due diligence has been carried out, the ASES digital-based assessment model product can be implemented in the Educational Research Methodology course. The development of the ASES digital-based assessment model has been implemented by lecturers and students to know the practicality of the valuation model digital-based ASES. Questionnaire results student responses to the ASES digital- based assessment model obtain an average percentage by 89% and are in good qualification, so the assessment model digital-based ASES is not necessary revised. Implementation of the assessment model digital-based ASES is also carried out for supporting lecturers the Educational Research Methods course obtained an average percentage by 88% and are in good qualification, so the assessment model digital- based ASES is not necessary revised. Based on the results of the trial assessment expert learning design , expert device software , trials on students and lecturers of the assessment model digital- based ASES which has been developed, it can be stated that the assessment model digital- based ASES is suitable for use as an assessment model in the

Educational Research Methods course in the Pancasila and Citizenship Education study program Faculty Teacher Training and Education at the Universitas Islam Sumatera Utara.

Based on the research that has been carried out the development of an assessment model digital- based ASES as an assessment model in the Educational Research Methods course in the Pancasila and Citizenship Education study program Faculty Teaching and Education at the Universitas Islam Sumatera Utara give contribution for valuation problems in the digital era at this time. Indeed, in the digital era as it is today. An integrating assessment model element mastery of digital technology must animate the learning process in the present where the learning system in the present is already based on a digital network so every student can carry out assessment activities anytime and anywhere. Now along progress in the digital era, development of assessment models digital- based ASES can support idea independent learning which is currently being implemented by the government .

5 Conclusions

Based on the results of the research and discussion , it can be concluded that this research is as follows :

1. Analysis results need shows that students of the Education Research Methods course in the Pancasila and Citizenship Education study program Faculty Teaching and Education Sciences at the Universitas Islam Sumatera Utara requires a new assessment model that yields results identification the need for a new digital- based assessment model that addresses yes are in the required qualifications so that become base for researchers in developing assessment models digital- based ASES.
2. This ASES digital-based assessment model was developed with reference Education Research Methods course in the Pancasila and Citizenship Education study program Faculty Teacher Training and Education at the Universitas Islam Sumatera Utara using the application namely Microsoft Word, Web, and Google Formulas and have been validated by expert validators learning design and design device soft and earn results very good and good qualification.
3. The implementation of the ASES digital- based assessment model was tested by 20 (twenty) students taking the Education Research Methods course and 1 (one) supporting lecturer Educational Research Methods course. Furthermore results of student and lecturer responses to the ASES supporting digital- based assessment model are well qualified and unnecessary revised.

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