Received : 16 October 2019
Revised : 29 December 2019
Accepted : 25 March 2020
Online : 26 April 2020
Published: 30 June 2020

DOI: doi.org/10.21009/1.06101

Assessment Virtual Test (ASVITE): Assessment Virtual Based on Interactive Lecture Demonstration (ILD) to Support Employability Skills

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Abstract

The development of information and communication technology (ICT) based on computer technology offers another alternative to an assessment form. In supporting employability skills, the assessment format can be presented in an assessment combined with animation. This study aims to develop a virtual test assessment (ASVITE) based on Interactive Lecture Demonstration (IL D) to support 21st-century competence of employability skills. This study uses an R&D method with a modification of the 4D development model, consisting of define, design, develop, and disseminate. Product developed in the form of tests ASVITE the objective test with four possible answers animation associated with the optical material. The results of the judgment by experts in physics material obtained 18 valid questions, and based on ICT experts, an average value of 84,17% was collected with the category "Very Eligible" in supporting employability skills. The instrument trial results obtained an average value of 83.4% with the grade "Very Good" based on student responses. ILD-based ASVITE can support employability skills.

Keywords: virtual test assessment, interactive lecture-demonstration, employability skills

INTRODUCTION

The higher education should consider several aspects in preparing graduates to face the challenge internal and external to the internal problems of the 21st century the era of the form education must still refer to the National Education Standards. External challenges in the form of global issues with the birth of MEA, CAFTA, APEC, WTO; environmental issues; advancement in information technology; the revival of the creative industry; and transformation in education (Christine 2020). However, in the face of internal and external challenges, required competencies include problem-solving skills, life skills, creative thinking, collaboration skills, communication, and E-learning are collectively known as 21st-century skills of Employability Skills. Employability skills can be defined as skills developed in one situation and can transfer to others' conditions on the condition in the classroom to real-life situations (Suleman 2017; Griffiths et al. 2018). Generally, things such as qualifications, skills, knowledge, personal attributes, as well as other tangible-intangible factors, that

have an important role in individuals' employability. From several studies on employability skills, the majority of studies focus on these skills as skills related to personal characteristics (El Mansour & Dean 2016; Pheko & Molefhe 2016).

Today's reality, the primary indicators used to assess the quality of learning and graduation of students from an educational institution, are often based on the results of student learning listed on the test scores. So it becomes essential to know how the quality and character of assessment tools given to students. Traditionally the test items were packaged in paper and pencil tests. The developments of Information and Communication Technology (ICT) based on computer technology offer another alternative of an assessment format. One of the advantages of computer technology is the ability to animate objects. With this capability, it enables plastic images in the paper test and pencil test format to be converted into dynamic images in the animated question format, so the test items will be very beneficial if packaged in the form of motion animation as will be designed in the Assessment Animation Format (Wibowo et al. 2017). Besides, when learning with audio-visual assistance, it will contribute to the mastery of the material by 30%.

Assessment documenting the educational process disable in the meaning how students achieve the learning objectives with correlated professional judgment based as measurement data while measuring the only load on the final result of students or the achievement of learning goals in the form of scores, degree or value (Kuznetsova et al. 2019; Van Dinther, Dochy & Segers 2011). It means that the assessment is a broader concept than measurement and is part of the evaluation — likewise, the use of the results of the judges' assessment as a follow-up to learning. Descriptions of the understanding evaluation above imply that the evaluation is a process conducted by the teacher to collect, interpretation, and synthesis learning information at the beginning, the process, and the end teaching by using a variety of techniques in effort enhancing the quality of learning.

Computer animation can use to help the learning process and assessment, but only some understand how to use it properly. There are specific indications that the animation will offer for strength to improve learning when there is a need for external visualization, and the content depends on the motion understanding. There is also the fact that students need help to complete the relevant animation part. According to Bello-Bravo et al. (2017) stated (a) multimedia animation learning tools as an alternative to transforming knowledge. (b) information technology can use in the process of learning to be a tool for help and options in learning. Utilization of ICT in multiplier representation learning can be built into e-learning media (Widianingtiyas, et al. 2015, Bakri et al. 2018; Yulita et al. 2018; Muliyati et al. 2019).

In addition to clicking the use animation, the application of the assessment can be integrated into the model Interactive Lecture Demonstration (ILD). ILD is a learning model that shows scientific equipment and then asks inquiry questions about "what will happen " (predictions) or "how something might happen" (explanation). Interactive Lecture Demonstration is a learning model that is student-centered, where students asked to predict the results of an experiment, observe the results, and discuss them. ILD designed to contradict students' misconceptions to produce a process of conceptual change. ILD is used to explore the effect of the con Flik cognitive process conceptual change and the role of interactivity students from this process (Taufik et al. 2017).

Meanwhile, the activities can be in the form of class experiments, surveys, simulations, or secondary data analysis. According to the explanation previously, one of the subjects to be studied physics right there was the matter of optical geometry. Therefore, further research needed regarding the Virtual Test Assessment based on Interactive Lecture Demonstration on geometrical optical material.

METHODS

This type of research is research and development. Model developers used is a modification of 4D models. The 4D model research procedures include define, design, develop, and disseminate (Richey et al. 2010).

Define

The define phase consists of preliminary studies and literature studies. The preliminary study intended to find out the development of Physical learning in one of the high schools in the City of Serang related to the average daily physics test scores of the students. This preliminary study carried out by way of the non-formal interview on physics teachers concerned about physics learning in class and assessment that often used—a literature study conducted to examine the findings of previous research. The study is also done to look for theories relating to premises employability indicators. Physical skills against the competency core (CC) and basic competence (BC) has specified. The results of the literature study, then, are used as a basis for developing instruments in the form of "ASVITE" items.

Design

The results obtained from preliminary studies and literature used to design the initial product (draft). The instrument based on the results of the analysis of CC, BC, and indicators regarding students' employability skills that expected to emerge after learning done. The assessment instrument made in the form of an "ASVITE" test is a question with an animated choice of four answers.

Develop

After the development and design of the instrument items "ASVITE", then do judgment to 3 people expert material to determine the validity of its content, and an assessment by an ICT expert to show that the model is an excellent instrument to be used in research. Analysis of the content validity of the instrument uses the formula Lawch e in (Wilson, Pan, and Sc Humsky 2012), namely Content Validity Ratio (CVR) with equation (1) :

$$CVR = \frac{\left(n_e - \frac{N}{2} \right)}{\frac{N}{2}} \quad (1)$$

Where, n_e: Number of experts who gave an essential response; N: Total number of experts. If the CVR value is> 0, then the instrument items are included in the valid category. At this stage also, the instrument was tested by giving learning with ILD and finally given ASVITE to 32 students at SMAN 1 Serang. The experimental design used a one-shot case study (Creswell 2018). In this study, there were no control groups, and students were given special treatment or learning for some time. Subjects in this study will get treatment, namely the use of ILD learning models. Then at the end of the program, students are given ASVITE and fill in the student response sheet.

Scores obtained from the instrument trial results are then analyzed to see the reliability of the ASVITE. The reliability value can be determined by determining the reliability coefficient. In this study, reliability analysis can see using the Winsteps program in the Summary Statistics table. The table can provide overall information about the quality of student response patterns, instruments used, and the relationship between students and items. The reliability value between students and items can be determined using the following TABLE 1:

TABLE 1. Instrument Reliability Value

No	Range	Category
1	<0.67	Weak
2	0.67 - 0, 80	Enough
3	0.80 - 0.90	Very nice
4	0.91 - 0.94	Very good
5	> 0.94	Special

While the analysis of the results of student responses to ASVITE by using *rating scale* analysis. The score obtained from the feasibility assessment by the expert test will calculate using equation (2).

$$NP = \frac{R}{SM} \text{x}100\% \quad (2)$$

In which *NP*: The average value in percent (%) are given; R: Scores obtained from every aspect; and *SM*: Maximum score from all aspects.

TABLE 2. Interpretation of ASVITE Feasibility Test Results by ICT Experts

Score in Percent (%)	Interpretation
<20	Very less
21-40	Less
41-60	Enough
61-80	Well
81-100	Very good

Disseminate

Disseminate the dissemination phase of the final product. ASVITE finished later in conference and in selecting teachers for Physical in Serang city, Indonesia.

RESULTS AND DISCUSSION

Define Results

The results of the preliminary study show that students ' abilities are still quite low, as evidenced by the average value of students' daily physics tests of only 62. Then, the results of interviews with teachers showed that assessment in the form of animation is still rarely used, especially in optics geometry. Furthermore, these findings can be used as a platform that later on the item "ASVITE" can receive with a positive response from the students and teachers concerned. Results of literature studies show that k curricula have used the curriculum of 2013. The basic competency studied is CC 3.9. They were analyzing the workings of optical devices using the mirroring and lensing properties of light and habituation. Then from the CC are broken down into some indicators related to employability skills, i.e. (1) Explain the principle of formation-shadow and magnification on the glasses, magnifier, microscope, binoculars, and cameras. (2) Analyzing the workings of optical devices using the mirroring and refracting properties of mirrors and lenses. (3) Distinguish observations without accommodation by maximum accommodation in optical devices

The Result of "ASVITE" Problem Item Design Instrument

The appearance of ASVITE can seen in FIGURE 1.

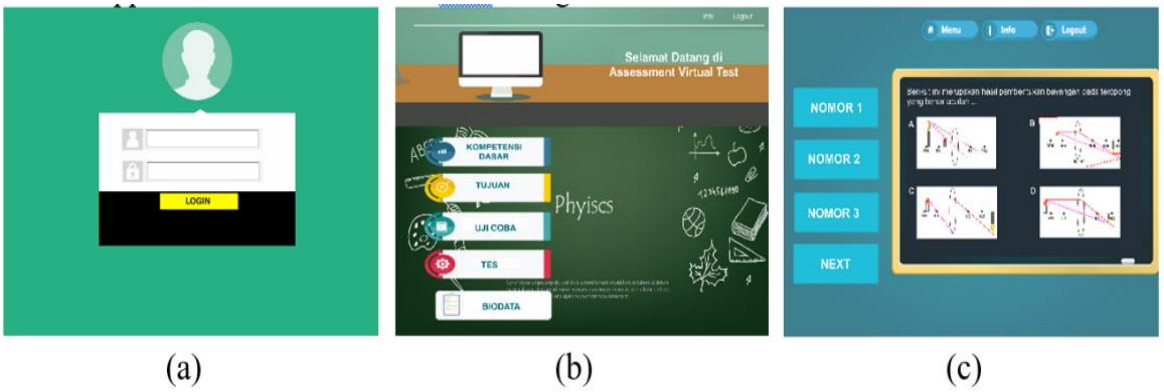

FIGURE 1. (a) Initial view entered into ASVITE; (B) Initial menu after logging in ; (c) Display of the test students will be working on

ASVITE is accessed offline because it developed using Adobe Flash software so that the file extension is .swf. However, to be able to enter into the ASVITE program, a user and password are needed, which will be provided by the researcher. FIGURE 1 (a) is a preliminary display of ASVITE. After logging in, students will be presented with a choice menu consisting of a list of essential competencies, objectives, trials, tests, and biodata of researchers. Then when students choose the test button, a test will appear, as shown in FIGURE 1 (c). The questions will automatically come out, then the answers in the form of animation can be selected by students by clicking on the animation that the students think is correct. ASVITE is different from other ICT based tests because, in ASVITE, the choice of answers are presented in the form of animation, thus showing real conditions.

The ASVITE item that made consisted of 20 questions, but valid items included 18 items with details in TABLE 1.

TABLE 3. ASVITE

No	***Employability skills* Indicator**	**Item no**
1	Explain the principle of image-formation and magnification in glasses, glasses, microscopes, binoculars, and camera.	1, 2, 3, 4, 5, 6, 7
2	Analyze the way optical devices work using the mirroring and refracting properties of mirrors and lenses.	8, 9, 10, 11, 12, 13, 14
3	Distinguish observations without accommodation with maximum accommodation in optical devices	15, 16, 17, 18, 19, 20

The media feasibility test based on ICT experts obtained an average value of 84.17% and was declared very feasible. The average results of assessing the feasibility of ICT experts for ASVITE shown in FIGURE 2.

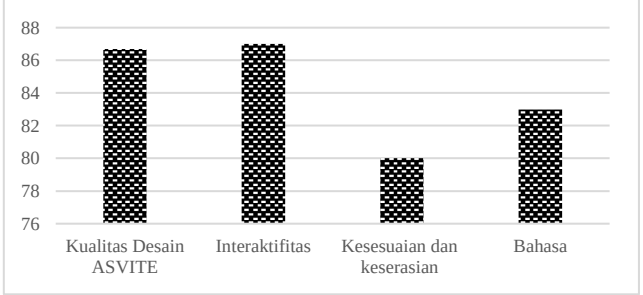

FIGURE 2. ICT Expert Validation Results

Student Response to ASVITE

ASVITE, which has been validated by the expert team, was revised based on suggestions and notes from the expert team. The trial conducted in Serang City 1 High School with 32 students as the trial subjects. The results of assessing students' responses to ASVITE based on limited trials in every aspect can be seen in FIGURE 4.

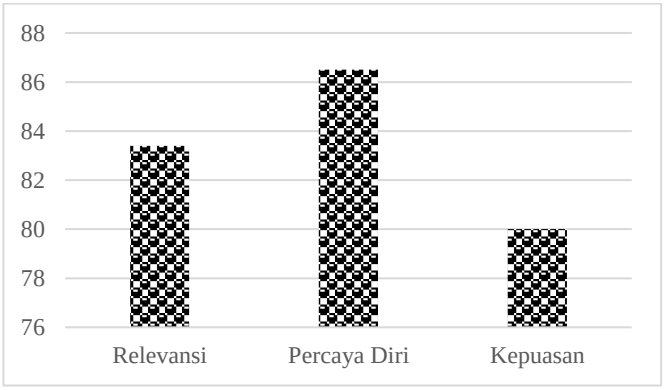

FIGURE 4. Results of Student Responses to ASVITE

Assessment of student responses includes three aspects, namely relevance, self-confidence, and satisfaction. The results of the assessment of student responses based on limited trials get an average value of each aspect of 83.4% and are categorized very well. The following is a description of the results of students' responses to ASVITE obtained from the results of limited trials: (1) Students are quick to adapt and understand in using ASVITE because it is user friendly; (2) The application of ILD using ASVITE provides a high understanding of students. That is, ILD is in accordance with ASVITE because learning can be combined with simulations, so that when learning students better understand the material; (3) The appearance of the ASVITE design is attractive in terms of color composition and animation; (4) Students are motivated in the assessment process by using ASVITE because the answers are packaged in the form of interesting and informative animations; (5) The language used in the questions can be easily understood by students; (6) ASVITE can facilitate students to master employability skills in geometry optics material. The media or application produced in this study is ASVITE, which can be used as an assessment in learning physics. From the positive responses given by the students above, it can be concluded that ASVITE can be used in physics assessment, especially in optical geometry, and is useful in facilitating employability skills.

The Pearson's correlation coefficient was used to establish the relationship among employability skill determinants after learning to use ASVITE.

TABLE 4 shows the results of the correlation between employability skills. With the exception of technical knowledge, almost all skill components represent a positive correlation. The correlation coefficient 0.818 shows that there is a strong positive relationship between planning and control and decision making. It shows that students with planning and control skills can also have decision-making skills. The correlation coefficient -0.006 shows that there is a negative correlation between analytical skills and technical knowledge. This means that students with analytical skills have insufficient technical knowledge.

TABLE 4. Correlations Matrix

Employability Skill	Personal Quality	Communication	Team Lead	Technical	Higher Order	Decision Making	Planning & Control	Analytical
Personal Quality	1	.493**	.249**	.420**	.443**	.464**	.489**	.117
Communication		1	.569**	.688**	.666**	.647**	.655**	.120
Team Lead			1	.697**	.741**	.705**	.697**	.345**
Technical Knowledge				1	.747**	.726**	.713**	-.106
Higher Order					1	.812**	.727**	.230
Decision Making						1	.818**	.145
Planning & Control							1	.121
Analytical Skills								1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

SUMMARY

The product developed is an ASVITE test, which is an objective test with four animated answer choices related to geometry optics material. Judgment results by physical material experts obtained 18 valid questions, and based on ICT experts received an average value of 84.17% with the category "Very True " in supporting employability skills. The results of the test try in instruments are received by the average amount of 83.4% to the category of "Very Good" based on student responses. In addition, the Virtual Test Assessment (ASVITE) Virtual Assessment Based on Interactive Lecture Demonstration (ILD) to Support Employability Skills.

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