JURNAL PEMBELAJARAN FISIKA

http://jurnal.fkip.unila.ac.id/index.php/JPF

Vol 8 (1), 2020, 19-27 ISSN: 2302-0105 (p); 2684-9828 (e)

Development Of Assessment Instruments Assisted By Schoology To Student' Learning Outcomes In Newton Law Materials

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Received: February 21, 2020 *Accepted: June 29, 2020* *Published: June 30, 2020*

Abstract: The purpose of this study was to develop an assessment instrument aided by schoology in Newton's motion material. This research development refers to the research design by Lee and Owens with statistics consisting of analysis, design, development, implementation, evaluation. The results obtained from this study are the validity of the assessment instruments that have been developed very high with an average score of material expert tests 0.90, construct expert tests 0.94, and language expert tests 0.91, very high validity criteria, readability test 0 , 90 with a very good category. The assessment instruments that have been developed can already be used to assess student learning outcomes. This can be seen through the results of small group trials that produce a Cronbach alpha value of 0.886 which is included in the category of instruments with high reliability. Students respond positively to online exams through schoology. The conclusion of this study produced a valid assessment instrument to assess student learning outcomes with the help of schoology.

Keywords: Assessment instrument, Learning outcome, Schoology use

DOI: http://dx.doi.org/10.23960/jpf.v8.n1.202003

INTRODUCTION

Information and communication technology in the 21st century is developing very repidly. The rapid of current development, human needs can be fulfilled easily and instantly. All needs according to (Sek et al., 2012), experienced changes into electronic form for example the use of e-books, e-learning, e-mail, e-banking, e-bay, e-games, mobile learning, and many more. The use of electronic media also takes effect on education. Information and communication technology according to Azizah (2017), can be used as a learning medium or as a learning resource. One of the uses of electronic media in the education is online learning (e-learning). It can facilitate teachers in the teaching and learning process because it can be carried out without having to face-to-face, while the assessment can be conducted online (e-assessment). According to Purnama (2017), Mobile learning makes students able to carry out activities in the form of learning materials as well as learning information wherever and whenever.

Along with the development of information and communication technology, currently the national exam began to be carried out using a computer called the Computer-Based National Examination (UNBK). According to (Wirawan & M. Bayu, 2018) the use of computer for national exam requires extra preparation, in addition to learning about the material presented, students must also learn about computer technology. The teacher can help students to prepare for the national exam by making a practice of doing work on the test or practice using a computer with a similar application. Based on this the teacher can use schoology-assisted e-assessment as a form of preparation to train students in dealing with UNBK.

E-assessment according to (Alruwais et al., 2018), is an electronic assessment, the assessment process from the beginning to the end of the assessment is done electronically. Design, carry out tests, record responses, and provide feedback can be completed using ICT. The use of e-assessment according to (Gogri & Coughlan, 2013), is very effective to improve student learning so that it can provide instant and detailed feedback, and as a communication tool between teacher and student. Using e-assessment can save teacher time in correcting assignments and exams that have been given, can also reduce the burden of teachers to assess students in large numbers. The use of e-assessment in an exam can minimize cheating committed by students even though the teacher does not oversee the course of the exam because the test is conducted outside of teaching and learning hours and can be worked at each student's home.

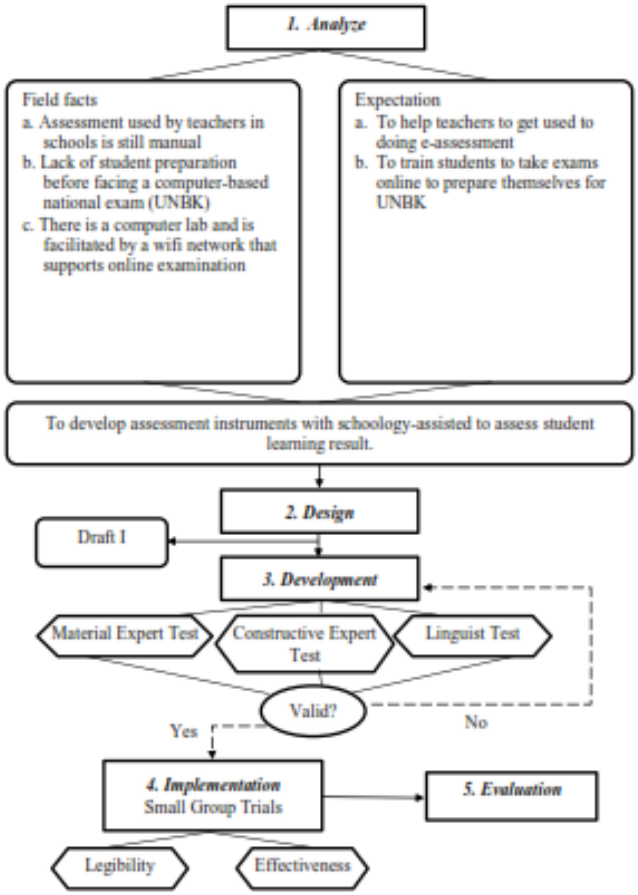
The use of e-assessment has many benefits, but also has shortcomings. According to (Alruwais et al., 2018) the lack of using e-assessment for students that is still have not experienced with computer and online assessment process, it will make students become confused. In this e-assessment system students are required to use a computer that is connected to the internet, if students do not have a computer that is connected to the internet then the student will have difficulty because they cannot do the assignments or objectives that given. Sometimes when the test takes place the system may suddenly have problems.

METHOD

Research that refers to the development model adapted from the development model by ADDIE (Analysis, Design, Development, Implementation, and Evaluation) by (Lee & Owens, 2012).

Research Design & Procedures

Flowchart of the stages of this research development can be see in Figure 1.



Picture 1. Flowchart of the stages this research development

Data Collection, Instrument and Data Analysis

The instrument used for research is first validated by material experts, construct experts, and linguists. The analyze phase is carried out to determine the potential and problems that exist in schools through interviews with teachers. The design phase is carried out to create an assessment instrument framework that is developed based on the indicators to be achieved. This stage results in draft 1, which is an assessment instrument. The development phase was tested for validity on two Lampung University lecturers and a Physics teacher. Validity test is conducted by filling out a questionnaire from material experts, construct experts, and linguists. Scoring criteria on a questionnaire using a Likert scale adapted from Ratumanan & Lauurent (2011, p. 131). Each questionnaire consists of four answer choices consisting of (1) invalid, (2) less valid, (3) valid, and (4) very valid. Products that have been validated or can be said to be feasible by the validator are then tested for readability by five students by providing a readability test questionnaire. Data collection instrument used were questionnaire. Data on the results of the answers to the questionnaire were analyzed using percentage analysis based on the formula below:

$$Assessment\ score = \frac{Number\ of\ scores\ obtained}{The\ highest\ number\ of\ scores}$$

After the readability test results obtained by the students were very good, then the assessment instrument was tested by a small group of class X Mipa students, amounting to 32 people. Small group trials are needed to see internal validity or empirical validity which consists of test item validity, item reliability, item difficulty level, item differentiation power. Test the internal validity or empirical validity of the product is conducted by giving questions to students by means the questions are displayed through schoology. The questions that have been worked will be tested for the validity of the items, the reliability of the items, the level of difficulty of the items, the differentiation of the items using the SPSS program.

RESULT AND DISCUSSION

The results of this development research are to produce a valid and reliable assessment instrument that can be used to assess student learning outcome. The assessment instrument used was a multiple choice quiz regarding Newton's laws of motion material that is displayed through schoology and is worked online by students. The developed instrument was tested for validity and readability. The validity test was carried out by two Lampung University lecturers and a High School Physics teacher by filling out questionnaire tests from material experts, construct experts and linguists. The results of the material experts test, construct experts, and linguists as a whole we can see in Table 1.

Table 1. Overall Expert Validation Results

No	Aspect	Score
1.	Material Aspect	0,90
2.	Construct Aspect	0,94
3.	Language Aspect	0,91
	Average Score	0,92

Based on the overall instrument validation assessment as shown in Table 1, the assessment instrument on Newton's motion law material that has been developed can be declared feasible for further use to assess student learning outcome. The revisions made are small revisions because according to the results of the validation test, the instrument can be declared valid and may be used but by making minor revisions.

The revision of validation in general is in the cognitive domain of questions, the suitability of questions with indicators, the writing procedures contained in the items, and the accuracy of the pictures and their explanations. The overall validation results from the aspects of material, construct, and language were 92,17% so that the assessment instrument was declared to be very valid and could be used as a limited trial after revision in accordance with the suggestions for improvement by the validator.

The test instrument was declared valid and feasible to use, then the instrument was tested for readability by five students to see whether students had understood the intention of the questions contained in each item. The testing instrument for readability used a questionnaire consisting of five questions. The questions contained in the questionnaire in the form of language clarity, letters, numbers, pictures, symbols, and graphics contained in each item provided as shown in Table 2.

Table 2. Student Readability Test Results

No	Rated Aspect	Tester Score	Qualitative Statement
1.	Clarity of Items	0,85	Very Good
2.	Words or sentences do not cause double perception	0,90	Very Good
3.	Clarity in the use of symbols, numbers, letters, images and graphics in questions	0,90	Very Good
4.	The use of physics terms that are familiar to students	0,70	Good
5.	The used language is easy to understand	0,85	Very Good

The results of the readability test by five students showed that the assessment instruments that had been developed were very good. That is, the language used in each developed item is clear and does not contain multiple interpretations so it is easy for students to understand. Symbols, graphics, letters, numbers, and images contained in each item can be seen clearly. Based on the results of the readability test by five students, the instrument that was developed was declared feasible, then it can be used in small group trials.

This small group trial was conducted at SMA Negeri 1 Sidomulyo with 32 students of class X Mipa. This small group trial was conducted on August 23, 2018. The assessment instrument used 20 items about Newton's laws of motion. After being tested, then obtained the results of the validity of the questions, the reliability of the questions, the level of difficulty, and the distinguishing items.

The validity test of the assessment instrument which has been tested is a way to find out the validity level of the questions that have been tested previously. This validity test uses the SPSS 21.0 program. Questions that have been tested amounted to 20 items on Newton's motion law material. The results of the data validity test obtained from the small group trial found that 20 items were declared to have been valid.

The reliability test is conducted after the validity test has been declared valid. The reliability test data are in Table 3.

Table 3. Test Data Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
,886	20

Test the level of difficulty to measure whether the question is included in the easy, medium, or difficult category, so that it can determine the proportion of the number of easy, medium, and difficult questions. Data about the item difficulty test results are in Table 4.

Table 4. Item Difficulty Level

Difficulty level interpretation	**Number of items**
Difficult (0,00-0,29)	-
Medium (0,30-0,69)	7
Easy (0,70-1,00)	13

Distinguishing items are a trick made to be able to see students' abilities and can distinguish between students who have high level of ability and students who have low level of ability. Data on the results of the test of distinguishing items can be seen in Table 5.

Table 5. Distinguishing Trick of Items

Interpretations on Distinguishing Trick of Items	**Number of Items**
Poor (0,00-0,19)	-
Enough (0,20-0,39)	2
Good (0,40-0,69)	13
Very Good (0,70-1,00)	5
Not Good (Negative)	-

Students' perceptions about the use of schoology as a medium for online examinations are carried out by giving questionnaires which are then used as qualitative data by researchers.. The obtained data from student responses based on questions provided by researchers. Based on student responses regarding the use of schoology as a medium for doing online tests, it can be seen that overall student responses to the use of schoology are very good and can be accepted for sustainable use.

The developed assessment instrument, before being trialed to students should first be tested on validity to experts in terms of material, construct, and language so that the data obtained can later be accounted for. The results of the validation of the expert developed assessment instrument from the material aspects is 0,90, the construction aspect is 0,94, and the aspect of the language is 0,91, then overall the results obtained by expert validation from all three aspects is 0,92 are categorized in the validity criteria expert test instruments are included in a very valid assessment instrument so it is feasible to use to assess student learning outcome.

The instrument was validated by the expert and then readability was tested by five high school students with the aim that when the trial was limited, students did not experience misinterpretation of the questions in each item relating to the use of language in the questions that might be difficult to understand, and clarity letters, numbers, symbols, graphics, and images presented in the item. After the legibility test, a limited trial was carried out on 32 students of class X Mipa, SMA Negeri 1 Sidomulyo. This limited trial was conducted on August 23, 2019 which was carried out using schoology.

Analysis of the trial data obtained from 20 items that had been tested beforehand to 32 students was declared 100% valid. The number of students to test the validity of the questions as many as 32 people with α = 0,050 so that the r_table is, .349. Based on the results obtained, it can be seen that 20 questions tested in the value of r_count ranged from 0,377 to 0,810, with α = 0,050, from these results it can be seen that $r_{hitung} > r_{tabel}$ so that the question can be said to be valid

The reliability test is conducted after the validity test has been declared valid. The results of data analysis of the overall reliability value of Croncbach's alpha is 0,886. The result of data analysis obtained from the result of small group trials found that the Pearson correlation of 20 items was declared valid and the Cronbach's alpha value of 0,886 included in the instrument category with high reliability.

The difficulty level test is a measurement of whether the questions are included in the easy, medium, or difficult category, so that it can determine the proportion of the number of easy, medium, and difficult questions. The test results of the item difficulty level ranged from 0,56 to 0,94, and of the 20 items that have been tested obtained seven items with moderate difficulty level, 13 items with easy difficulty level, and there is no difficulty level of items found.

Distinguishing items are a trick made to be able to see students' abilities and can distinguish between students who have high level of ability and students who have low level of ability. The index value of the tested distinguishing items ranged from 0,377 to 0,810. The result of the analysis of distinguishing items obtained that 2 items with sufficient differentiating categories, 13 items with good differentiating categories, and 5 items with excellent distinguishing categories.

Based on a questionnaire about the students' responses given to students after they worked on the questions through schoology, it is obtained positive opinions about the use of the schoology. They say that using schoology in working on items is easy to follow because they only need to use a cellphone and the internet, no need to use or waste a lot of paper. Working on questions using schoology that can be carried out outside school hours also makes it easier for them to work on the questions, this is because students are not too tense because they are not supervised directly by the

teacher. Schoology is also useful for students to broaden their horizons about online exams, because they can prepare themselves for the computer-based national exams. The appearance of questions in schoology looks more clear when compared to the display of offline questions which sometimes looks blurry and some are unclear. The use of online media, especially schoology, can have a positive impact on students, because mobile phones owned by students are not only used for playing games and social media, but can also be used for learning as well.

Work on questions that carried out through online media can make it easy for students to work on them, and students' responses regarding working on problems online are very positive. in accordance with research by (Setemen, 2010), that based on the results of small group tests that have been conducted, it is found that 13 out of 15 students tend to choose strongly agree with the online learning evaluation system. Two students still have difficulty reading the question instructions and are not quickly accustomed to the evaluation display online so they cannot answer all questions before the question time runs out. This is supported by research by (Coal, 2017) which states that the implementation of online exams is in good category but the condition of supporting resources in conducting online exams according to some respondents is still inadequate, especially regarding wifi networks which are sometimes less stable in accordance with research by (Khoiri et al., 2018) which states that from based on the results of his research it can be concluded that the computer-assisted exam gets a positive response and students by conducting a computer-assisted exam on a daily test.

The strengths of this research are that the researchers provide training to students first, starting from teaching them how to create a schoology account and then joining the schoology group created by the researchers by entering the access code. All group members will be notified when there are assignments or tests. So that students are accustomed to using schoology, the researchers create a discussion forum by uploading videos, then students are asked to provide their responses about the video through the comments column. After that, the researchers gave the test using multiple choice questions, the questions and answers were randomized so that between 1 student and the other student the questions looked different, with a work time of 120 minutes and a time limit for students to work on the questions starting at 17.00 until 23.59. Work on the question is given three opportunities of working and the highest score is saved, so that when the system suddenly error or the connection is suddenly cut off students can still work on the question. The obstacle in this research is that some students are forced to repeat working on the exam questions because suddenly the internet connection is cut off.

CONCLUSION

From the results of research that has been done, it can be concluded that the assessment instrument developed has been valid so that it can be used to assess student learning outcomes. This can be seen in the expert material test which obtained an average score of 0.90 with very high validity, the construct expert test which obtained an average score of 0.94 with very high validity, and the linguist test which obtained an average score of 0 91 with very high validity. The results of the experimental data analysis showed that the Pearson correlation coefficient of all instrument items was valid, meanwhile the Cronbach alpha value of the developed instrument is 0,886

included in the instrument which has high reliability. The average score obtained by students during small group trials is very good. The use of schoology as an online media in working test questions gets a positive response by students.

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