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The Development of Evaluation Instruments in Online Learning using the Quizizz Application: During Covid-19 Pandemic

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Abstract

This study aims to produce an online learning evaluation instrument that is considered feasible by material experts, evaluation experts and through item analysis and user response questionnaires. This research was conducted with a 4D development model. The instruments used in this study were the material expert's feasibility assessment sheet, evaluation expert, item analysis and user response questionnaires, namely lecturers and students. The data analysis in this study used a rating scale and the item analysis used the product-moment, Kuder-Richardson, the discrimination power and the difficulty level of the questions. Through the item analysis of the 25 questions selected 10 questions that meet the discrimination power,difficulty level, validation and reliability. The reliability coefficient is 0.851 which is classified as high reliability. Meanwhile, the evaluation of material experts was 85.4%, expert evaluation was 88%, student response was 90.7% and lecturers were 90%. Based on the feasibility content, the overall learning evaluation instrument using the quizizz application is declared feasible.

Kata kunci:
Instrumen Evaluasi Pembelajaran
Pembelajaran Daring
Aplikasi Quizizz
Covid-19

Abstrak

Penelitian ini bertujuan untuk menghasilkan instrumen evaluasi pembelajaran daring yang dinilai layak oleh ahli materi, ahli evaluasi dan melalui analisis butir soal serta angket respon pengguna. Penelitian ini dilakukan dengan model pengembangan 4-P. Instrumen yang digunakan dalam penelitian ini adalah lembar penilaian kelayakan ahli materi, ahli evaluasi, analisis butir soal serta angket respon pengguna yakni dosen dan mahasiswa. Analisis data dalam penelitian ini menggunakan skala penilaian dan pada analisis butir soal menggunakan product momen, Kuder-Richardson, uji daya beda dan tingkat kesukaran soal. Melalui analisis butir soal dari 25 soal terpilih 10 soal yang memenuhi syarat uji daya beda, tingkat kesukaran, validasi dan reliabilitas. Koefisien reliabilitas sebesar 0,851 yang tergolong reliabitas tinggi. Sementara untuk penilaian ahli materi sebesar 85,4%, ahli evaluasi sebesar 88%, respon mahasiswa 90,7% dan dosen 90%. Berdasarkan pedoman kriteria kelayakan, maka secara keseluruhan

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instrumen evaluasi pembelajaran menggunakan aplikasi quizizz ini dinyatakan layak.

INTRODUCTION

The rise of the Covid-19 outbreak that has hit almost all parts of the world is very dangerous. Indonesia is one of a country that has contracted the Covid-19. Everyday cases of spread continue to increase. This caused the government to close schools in anticipation of the spread of Covid-19. All learning activities must still be carried out even though students are prohibited from going to school. Educators continue to carry out their role in guiding students to master learning material even though they are not directly facing to face with students (Adnan & Anwar, 2020; Mailizar; Almanthari et al., 2020; Zaharah et al., 2020).

Ministry of Education and Culture Circular No.4 of 2020 prohibits universities from conducting face-to-face lectures and orders online learning. This is one of the government's efforts to stop the spread of Covid-19. Online learning aims to provide quality learning services online, which are massive and open to reach students (Firman & Rahayu, 2020; Sadikin & Hamidah, 2020). Online learning development should be carried out systematically and methodically to provide the benefits it should be. Online learning has an evaluation cycle before, during, and after learning (Anderson, 2008).

Evaluation in learning is needed to determine the extent to which the learning objectives have been achieved. In general, learning evaluation is measuring and assessing learning where an educator measures or assesses students using a test or instrument. The importance of evaluation in learning can be seen from the objectives and functions of the evaluation and the learning system itself. Evaluation cannot be separated from learning, so that educators inevitably have to evaluate learning. In the end, educators will get an overview of the effectiveness of the learning process (Arifin, 2012). In online learning, it is necessary to choose an instrument that can measure the achievement of learning objectives.

The world of education today has developed rapidly with the support of technology. Information and Communication Technology (ICT) is growing rapidly. The development of ICT in education can be felt in the online learning process. Through ICT, the teaching and learning process, which was previously scheduled to be more flexible, can be done anywhere and anytime. Besides, ICT facilitates communication between educators and students, between students so that the online learning process can run optimally (Gleason, 2020; Ismail et al., 2010; Suryadi, 2007; Tang, 2020). ICT also contributes to developing learning evaluation instrument applications such as Quizizz, Kahoot, and others (Göksün, Derya Orhan & Gülden, 2019).

Quizizz was founded by Antik Gupta and Deepak Joy Cheenath in 2015, and it started to use in a school in Bengaluru, India (Takahashi, 2018). Quizizz is a free online gamification application that can be opened via a web browser. This game-based learning can be done in 'live' mode in the classroom, or it can also be given as homework in 'homework' mode. This is possible because Quizizz provides a timer; when the quiz will open and when it will end. Students are given game pins, and they will still be able to learn wherever they are. The advantage of quizizz is in the part of the process that adjusts to the students' speed. Students will not be judged based on their speed in answering questions. Besides, the scores can be downloaded in the form of excel documents, making it easier for teachers/lecturers to carry out assessments (Nugroho, 2019; Zhao, 2019).

The Quizizz application is a form of test that is presented online. This evaluation system can handle the process of evaluating student learning in the form of multiple-choice tests, the results of the scores obtained by students are immediately known after completing the test. In addition, this evaluation system also handles evaluation in the form of an essay test in which students send answers to the educator's email address. Based on the assessment of students' perceptions, it was found that students tended to accept/rate this online learning evaluation system well (Ju & Zalika, 2018; Rahayu & Purnawarman, 2019; Setiawan et al., 2020; Zhao, 2019).

In this study, the Quizizz application was used as an evaluation instrument when learning was carried out online during the Covid-19 pandemic. This research was conducted in the Chemistry Education Study Program, Riau University, in the introductory chemistry subject. The need for the development of this evaluation instrument is because introductory chemistry courses have material

characteristics with a more dominant calculation concept. So that through the development of evaluation instruments using the Quizizz application, students can be helped to master the material in a fun way even though learning is carried out online.

METHODS

This research is development research with R & D (Research and Development) approach to the 4-D development model proposed by Triagarajan & Semmel. The 4-D stage consists of Define, Design, Develop and Disseminate (Trianto, 2010). However, it is conducted by the researcher only until the third stage, namely Develop. The data collection technique was done by using a validator assessment sheet and a respondent's questionnaire. Meanwhile, for the question instrument, analysis of the items was carried out, namely the test of discrimination power, difficulty level, validation, and reliability (Arifin, 2012).

a. Validity Test

To test the validity of the test questions, the product-moment correlation with the formula is used, as follows:

$$r_{xy} = \frac{n\sum XY - \left(\sum X\right)\left(\sum Y\right)}{\sqrt{\left(n\sum X^2 - \left(\sum X\right)^2\right)\left(n\sum Y^2 - \left(\sum Y\right)^2\right)}} \qquad (1)$$

where :
rxy: correlation coefficient
X : Value for each item
Y : total value of each item
n : Number of samples

The rxy value obtained is interpreted by consulting the critical value of r product moment with α = 0.05, that is, if the value of the item is> r table then the item is said to be valid or significant, and vice versa if the item <r table, then the item is said to be invalid so the question must be discarded or replaced.

b. Difficulty Index

In determine the level of difficulty of the arranged test items, it is carried out using the difficulty level test, with the following formula:

$$P = \frac{C}{NT} \qquad (2)$$

where :
P : test difficulty index
C : Number of subjects who answered correctly
NT : The total number of test-takers

Based on the difficulty index obtained, the difficulty classification is consulted as follows:
Problems with a P value less than 0.30 are difficult
Problems with a value of P: 0.30 to P: 0.70 are moderate
Problems with a P-value of more than 0.7 are easy

c. Test of Discrimination Power

Calculating the discrimination power of the test can be done with the discrimination index formula as follows:

$$D = \frac{Q_t}{G_t} - \frac{Ql}{G_l} = P_t - P_t \qquad (3)$$

where :
D : Discrimination power

Gt: Many participants in the top group
Gl: Many participants in the lower group
Qt: Many participants in the upper group who answered the questions correctly
Ql: Many of the lower group participants answered the questions correctly

Discrimination power classifications:
Discrimination power less than 0.20 is bad
Discrimination power 0.20 to 0.40 is sufficient
Discrimination power 0.41 to 0.70 is good
Discrimination power 0.71 and 1.00 is very good

d. Reliability Test

To test the reliability of the test questions used the Kuder-Richardson formula (KR - 20), as follows:

$$r_{11} = \left(\frac{k}{k-1}\right)\left(\frac{S^2 - \sum pq}{S^2}\right) \quad (4)$$

where :
r11: Reliability test
k : number of questions
S2 : total variance
p : proportion of subjects answered correctly on an item
q : proportion of subjects answered incorrectly on an item

The reliability coefficient of this test is then consulted with the criteria limit of (Arikunto, 2010), namely:
- Between 0.000 - 0.199 is categorized as very low
- Between 0.200 - 0.399 is categorized as low
- Between 0.400 - 0.599 is categorized as moderate
- Between 0.600 - 0.799 is categorized as high
- Between 0.800 and 0.100 is categorized as very high

Out of the 25 item questions made, 10 were obtained, which were declared valid, reliable, and had different tests and difficulty indexes. In contrast, questions were developed using the quizizz application and assessed by material expert validators and evaluation experts through validation sheets.

Validity is determined from the average score given by the validator. The assessment categories are as in Table 1 below:

Table 1. Categories of assessment by validators

Assessment score	Categories
5	SA : *(Strongly Agree)*
4	A : *(Agree)*
3	U : *(Undecided)*
2	D : *(Disagree)*
1	SD: *(Strongly Disagree)*

Validity is determined by calculating the percentage of the validation value.

$$Percentage = \frac{Score\ obtained}{Maximum\ Score} \times 100\% \quad (5)$$

The criteria for determining validity are:

Table 2. Product Validity Criteria

Percentage	Description
0 – 20	Very Unfeasible/Very Bad
21 – 40	Not Feasible/Bad
41 – 60	Feasible Enough/Good Enough
61 – 80	Feasible/Good
81 – 100	Very Feasible/Very Good

(Riduwan, 2011)

FINDINGS AND DISCUSSION

The development of an online learning evaluation instrument with the quizizz application used the 4-D development model proposed by Triagarajan & Semmel. The 4-D stages consisted of Define, Design, Develop and Disseminate. However, the researcher conducted the research until the third stage, namely Develop (Trianto, 2010). The result of developing a learning evaluation instrument with the Quizizz application on this research was an anticipation for the spread of covid-19 were as follows:

a. The Definition Stage (Define)

Activities at this stage were carried out to define and define learning requirements with a needs analysis. According to the Ministry of Education and Culture's circular letter No.4 of 2020, it prohibited the tertiary institutions from conducting face-to-face lectures and orders to conducted online learning. This is one of the government's efforts to stop the spread of Covid-19. Learning organized with scenarios that could prevent physical contact between students and lecturers and between students and students (Adnan & Anwar, 2020; Firman & Rahayu, 2020; Mailizar; Almanthari et al., 2020; Sadikin & Hamidah, 2020; Zaharah et al., 2020). Online learning had an evaluation cycle before, during and after learning. Evaluation in learning was needed to determine the extent to which the learning objectives had been achieved. So that in online learning, it was necessary to choose an instrument that can measure the achievement of learning objectives (Arifin, 2012).

b. The Design Stage (Design)

The design stage of an online learning evaluation instrument used the Quizizz application started from making evaluation CV questions which were then given to students who had studied the material to see the quality of the items. The material in this study was acid-base—problems made of a grid based on indicators of learning achievement of acid-base material. They were testing 25 items to determine the power difference test, level of difficulty, validation, and reliability. Testing this question was given to level II students who had studied acid-base material.

The Difficulty Index of the 25 questions tested contained 5 easy questions, 12 medium questions, and 8 difficult questions. For the research instrument, 10 of the 12 medium questions were taken. The Difference Power Test of the 25 questions tested, 15 questions tested the difference in good power, 6 questions that tested the difference between enough and 4 questions that tested the lousy ability. Validity test using product-moment correlation. In this study, 10 questions out of 16 valid questions were used. Of the 25 questions tested, 16 questions were valid and deemed worthy of being tested, and 9 questions were invalid and deemed unfit for use as a research instrument—reliability test based on calculations using the KR-20 formula. Obtained r account = 0.851 stated reliability with high reliable category.

Of the 25 item questions, 10 items were obtained that met the test of difference power, difficulty level, validity and reliability. In accordance with the opinion of Arifin, (2012), the degree of validity and reliability was very dependent on the characteristics of the problems. The purpose of item analysis was to increase the degree of validity and reliability of the questions as a whole.

c. The Development Stage (Develop)

Triagarajan & Semmel divided the development stage into two activities, namely: expert appraisal and developmental testing. An expert appraisal is a technique for validating or assessing the feasibility of a product design. In this activity, evaluation is carried out by 2 material experts and 2 evaluation experts. The results of the material expert validation were presented in table 3:

Table 3. Results of the Material Expert's Assessment

No	Indicator	Score	Criteria
1.	The concept of the problem material is correct.	86,5%	Very Feasible
2.	Material coverage according to student level.	84,3%	Very Feasible
3.	The terms used are clear.	84,3%	Very Feasible
4.	The material is easy to understand.	86,5%	Very Feasible
5.	The question material is written systematically, coherently, and with a clear logical flow	85,4%	Very Feasible
	Average	85,4%	Very Feasible

Assessment by material experts aims to ensure the validity of the content of the development evaluation instrument. The result of the material expert's assessment was 85.4%, with the very feasible category. Improvements have been made according to the advice of material experts including the material is written in shorter and easier to understand.

The results of the evaluation instrument expert validation are presented in table 4.

Table 4. Results of the Evaluation Expert's Assessment

No	Indicator	Score	Criteria
1.	The question items are based on the indicators.	90%	Very Feasible
2.	The content of the material being asked is according to the student's level.	90%	Very Feasible
3.	The questions contain only one correct answer.	100%	Feasible
4.	The subject matter does not point to the correct answer.	80%	Feasible
5.	Distraction items work.	80%	Very Feasible
6.	The subject matter does not contain multiple negative statements.	80%	Feasible
7.	Between items are independent of each other.	100%	Very Feasible
8.	The sentence formulation does not contain multiple interpretations.	80%	Very Feasible
9.	Communicative sentence formulation.	80%	Feasible
10.	Objective scoring.	100%	Very Feasible
	Average	88%	Very Feasible

Table 4 shows that the average percentage of evaluation expert evaluations is 88% with feasible criteria. The assessment by the evaluation instrument expert aims to ensure the validity construction of the development evaluation instrument. Improvements have been made according to suggestions from evaluation instrument experts, including sentence formulation that is easier to understand, does not contain multiple statements, and adds distracting items. The suggestions given are used to improve the online learning evaluation instrument. Figure 1 shows the display of the online learning evaluation instrument using Quiziiz.

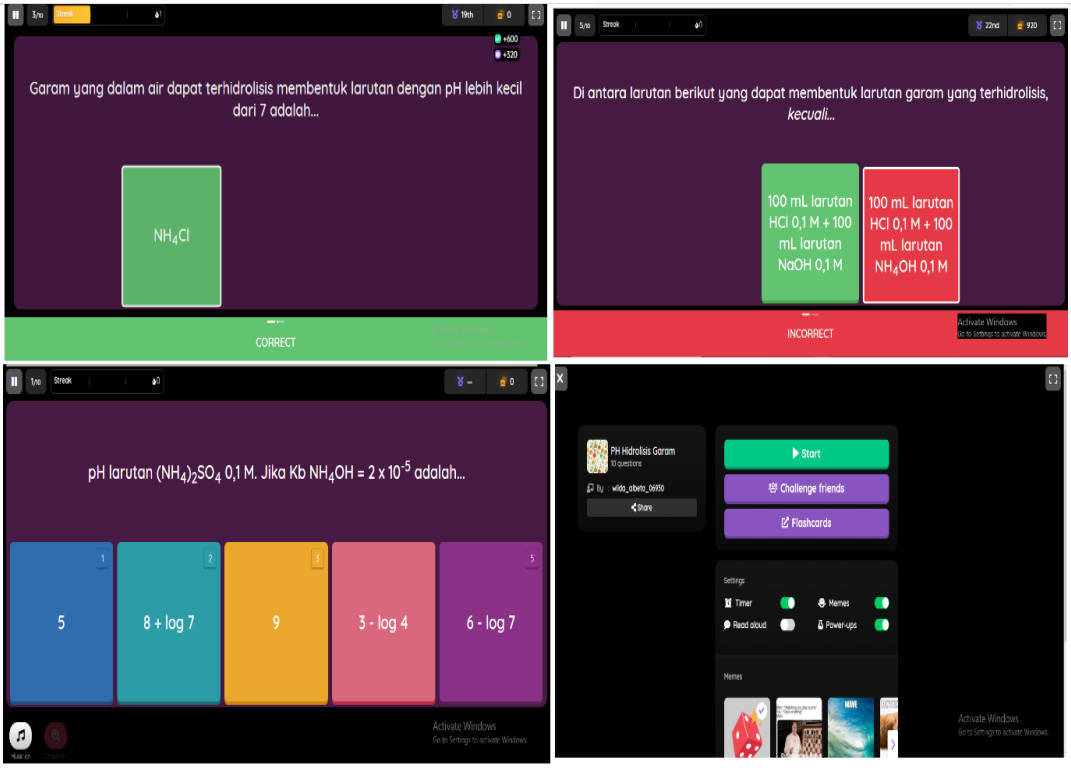

Figure 1. Evaluation Instruments In Online Learning Using The Quizizz Application

The assessment of material experts and evaluation experts as validators at the expert appraisal development stage was 85.4% and 88% with very feasible categories. Riduwan (2011) stated that the learning instrument could be said to be very feasible if the validator's assessment is above 81%.

Developmental testing is the activity of testing product designs on the real target subject. At the time of this trial, the respondent's data or comments were obtained from the target users' evaluation instrument. The trial results are used to improve the product.

The evaluation instrument can be a good measurement tool if it meets the quality requirements of a valid, reliable, objective and practical test. The practicality of the evaluation instrument is obtained from the results of user assessments. In this study, the practicality of the evaluation instrument was assessed by 5 lecturers. Factors that affect the practicality of the evaluation instrument include ease of administration, the time provided for smooth evaluation, ease of scoring, ease of interpretation and application, availability of an equivalent or comparable form of evaluation instrument (Dimyati, 2006). The assessment results of the practicality of the evaluation instrument are presented in table 5.

Table 5. Assessment of the Practicality of the Evaluation Instrument by the Lecturer

No	Indicator	Score	Criteria
1.	Ease of administration.	89%	Very Good
2.	Ease of scoring.	90%	Very Good
3.	ease of interpretation and application	89%	Very Good
4.	the time allocated for smooth evaluation	95%	Very Good
5.	availability of an equivalent or comparable evaluation instrument	87%	Very Good
	Average	90%	Very Good

The assessment of lecturers as users of evaluation instruments using the Quizizz application is 90%. The practicality assessment of the evaluation instrument using the Quizizz application is considered very good. The evaluation instrument was carried out using the Quizizz application anytime and anywhere obtains the highest assessment score that is 95%. This assessment is

motivated by the Covid-19 pandemic so that a practical evaluation instrument is needed to implement time and place without reducing the value of evaluation as a means of measuring learning achievement. In accordance with the findings of Firman & Rahayu, 2020; Mailizar et al., 2020; Zaharah et al., 2020), educators are required to carry out online learning during the pandemic in an effort to prevent the spread of the Covid-19 virus.

The lecturer's response to the Quizizz application in managing data on learning evaluation results or the ease of scoring was 90% with the very good category. The Quizizz application makes it easy for lecturers or educators to process learning evaluation data because Quizizz provides data and statistics about student performance in the form of Ms. Excel that educators can download. Educators can monitor students during learning evaluations.

The response of lecturers as educators to the arrangement of evaluation instruments or the ease of administration using the Quizizz application was 89%, with the very good category. Meanwhile, for the ease of interpretation and application of evaluation instruments using Quizizz is 89% in the very good category. The Quizizz application is accessed online, meaning that it can be used if there is internet connection support. Quizizz is easy to make and use in learning. Educators only need to share links and/or pins for entry access for students.

A trial on students was carried out to see student responses regarding evaluation instruments using the Quizizz application. The following are the results of 72 students' assessments of the evaluation instrument using the Quizizz application.

Table 6. Student Assessments of the Evaluation Instrument

No	Indicator	Score	Criteria
1.	Concentration on answering the test.	89%	Very Good.
2.	Motivation to be the best.	93%	Very Good.
3.	Fun and interesting.	90%	Very Good.
	Total	90,7%	Very Good.

The assessment of students as users of the evaluation instrument using the Quizizz application was 90.7%. Student assessment of the evaluation instrument using the Quizizz application is considered very good. The indicator for the assessment of motivated to be the best students when the evaluation test using the Quizizz application gets the highest score that is 93%. With tests using the Quizizz application, students compete with each other. This is in line with the findings of mention here, which state that Quiziz is a game and tournament-based educational application. Using Quizizz allows students to compete with each other and motivates them to learn to increase learning outcomes. Students open the quiz link at the same time and can see their rank directly during the test. Quizzes can be carried out in class and outside class hours. Through Quizizz, participants are more eager to be better at learning because this application is tournament-based so that students are triggered to become winners in tournaments (Ju & Zalika, 2018; Rahayu & Purnawarman, 2019; Zhao, 2019).

The concentration of students as learners in doing evaluation tests using the Quizizz application is in the very good category, which is 89%. Student response as learners to evaluation instruments using the Quizizz application is fun and interesting is 90%. Quizizz is a game-based educational application, which brings multiplayer activities and makes training interactive and fun. Unlike other educational applications, Quizizz has game characteristics such as avatars, themes, memes, and entertaining music in the learning process (Mulyati & Evendi, 2020; Zhao, 2019).

At the development stage of the expert appraisal, user responses were obtained, such as lecturers as educators 90% and students 90.7% in the very good category. According to Riduwan (2011), the learning instrument can be said to be very good if the limited trial is above 81%.

CONCLUSION

The development of learning evaluation instruments using the Quizizz application is an effort of online learning to reduce the spread of Covid-19. The development of this evaluation instrument uses a development model according to Triagarajan & Semmel, namely Define (Definition stage), Design (Design stage), Develop (Development stage), and Disseminate (Deployment stage). However, this research was only carried out until the Develop stage (Development stage). The process of developing learning evaluation instruments using the Quizizz application goes through the validation stage of material experts and evaluation experts and analysis of test questions to determine the feasibility of the evaluation instrument. Before being developed using the Quizizz application, the evaluation questions were analyzed for discrimination power, difficulty level, validity, and reliability of the item questions. Out of the 25 initial test questions, 10 were taken that met the requirements for discrimination, difficulty level, validity, and reliability. The assessment results of the evaluation of material experts are 85.4% and evaluation experts by 88% with the very feasible category. The limited trial was conducted on 5 lecturers and 72 students. The results of the response from the lecturers were 90% and categorized very well. Quizizz is easy to make and use in learning. Educators only need to share links and/or pins for entry access for students. The implementation time of the evaluation instrument using the Quizizz application is carried out anytime and anywhere. With the Covid-19 pandemic, a practical evaluation instrument is needed to implement time and place without reducing the value of evaluation as a means of measuring learning achievement. The Quizizz application makes lecturers or educators easier to process learning evaluation data because Quizizz provides data and statistics about student performance in the form of Ms. Excel that educators can download. Educators can monitor students during learning evaluations. The results of student responses to evaluation instruments using the Quizizz application were 90.7%. Student assessment of the evaluation instrument using the Quizizz application is considered very good. Students are motivated to be the best during the evaluation test using the quizizz application. The concentration of students as learners in doing evaluation tests using the Quizizz application is in the very good category. The evaluation instrument using the Quizizz application is fun and interesting for students. Based on the results of the item analysis, the assessment of material experts and evaluation experts as well as the responses of lecturers and students. It can be concluded that the online learning evaluation instrument using the Quizizz application as an effort to spread Covid-19 is said to be very feasible to use.

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