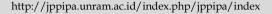


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Development of Learning Evaluation Based on Automatic Assessment through Quizizz Paper Mode to Improve Students' Natural and Social Sciences Learning Outcomes

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Abstract: Class IV teachers have not implemented technology-based learning evaluation. This research aims to develop, test the feasibility and effectiveness of Automatic Assessment-based learning evaluation through Quizizz Paper Mode to improve the cognitive learning outcomes of class IV students. The type of research used is Research and Development with the Borg and Gall model. The subjects of this research were 20 class IV students. Data collection techniques use technical tests (pretest and posttest); and non-test techniques (observation, interviews, questionnaires). Initial data analysis technique with normality test; final data analysis using the T test and N-Gain test. The results of this research show: Evaluation of learning based on Automatic Assessment via Quizizz Paper Mode with components of questions, answers, question stimuli (images, videos, audio and tables), scores and duration of work with MOTS and HOTS cognitive levels; The results of the feasibility test for material experts and media experts are in the very feasible category; Effectiveness is seen from the pretest and posttest results. The T test results show Sig. (2-tailed) 0.000 < 0.05. N-Gain score is 0.70 in the high category. The conclusion of this research is that the development of learning evaluation based on Automatic Assessment through Quizizz Paper Mode has been successfully developed, is very feasible, and is effective in improving the cognitive learning outcomes of class IV students.

Keywords: Automatic assessment; Learning outcomes; Natural and social sciences; Quizizz paper mode

Introduction

Education is important and cannot be separated from human life. Based on Law Number 20 of 2003, it is explained that education has efforts to prepare quality human resources by developing their potential. To prepare quality human resources, of course, a quality education system is needed through adaptation to current technological developments. Technology is not only developing in the industrial world, but is also developing in the world of education (Alexopoulos et al., 2020). According to Hamidah et al. (2021) education is used as a component of individual life and society

which is always changing, where individual competencies are required to continue to change from time to time. Teachers are required to be able to innovate and make good use of technology for the smooth running of the learning process (Dick et al., 2020). Teachers need to create a quality learning process to achieve good educational goals (Bobi et al., 2023). This requires teachers to be encouraged to carry out various learning innovations so that learning can run effectively, efficiently and productively so that the quality of learning increases (Susilo, 2020).

Improving the quality of learning cannot be separated from learning evaluation activities. Learning

evaluation is one of the competencies that a teacher must have (Suttrisno et al., 2022). Moreover, the curriculum currently being implemented in Indonesia is an independent curriculum. The independent curriculum is a new curriculum that can answer the challenges of education today (Anggrayni et al., 2023). Here teachers are given the freedom to organize the learning carried out in order to carry out enjoyable learning, including in the learning evaluation process.

However, in its implementation there are still many evaluation activities that are often ignored by some teachers (Suttrisno et al., 2022). On the other hand Ramdani et al. (2019) explains that teachers need to be facilitated and motivated to develop students' skills in learning. A learning can be said to be successful if the results of the student evaluation test have reached the predetermined standards or goals (Jahring et al., 2022). This is also reinforced that the higher the level of students' understanding of the material and learning outcomes, the higher the level of learning success (Pusparani, 2020). Learning outcomes according to Safitri et al. (2023) are the final results of the student learning activity process from all student activities in participating in class learning. To obtain good results, teachers need appropriate, practical and effective evaluation tools. Therefore, teachers should be able to carry out learning evaluations by utilizing technology. Teachers need to do this to overcome the less than optimal process and results of conventional learning evaluations (Farman et al., 2021).

Teachers experience obstacles in implementing learning evaluation using technology (Kurniati et al., 2022). Obstacles were also found at Wonosari 01 State Elementary School as evidenced by the results of observations and interviews conducted by researchers in class IV B of Wonosari 01 State Elementary School, Semarang City. It is known that teachers still carry out learning evaluation activities conventionally using paper or dictation methods and have not utilized technology due to limitations. facilities infrastructure. Learning evaluations carried conventionally using paper media seem boring to students. When working on conventional evaluation questions, students generally play, tell stories with friends and other activities that make them unable to focus and thus waste learning time (Rahmawati et al., 2022). Apart from that, conventional evaluation is considered troublesome in processing values which takes time because it is done manually (Fatiah et al., 2023). These problems affect the concentration and cognitive learning outcomes of students who have not met the Learning Goal Achievement Criteria (KKTP). The KKTP for the Natural and Social Sciences learning content is 70. Data on the value of the Natural and Social Sciences learning content shows an incomplete percentage of 55% of the total number of 20 students.

From several research findings related to existing problems regarding the evaluation of Natural and Social Sciences learning in class IV B Wonosari 01 State Elementary School. Efforts that can be made are the need to develop interactive and fun learning evaluations by utilizing technology based on Automatic Assessment, one of which is through the Quizizz application. Paper Mode. Through fun learning evaluations, it can improve the overall class atmosphere and help students develop motivation to learn, thereby having an effect on improving learning outcomes (Zhang et al., 2024). Another urgency with quizzes that utilize technology is that they can increase students' learning concentration so that learning objectives are achieved (Piran et al., 2020).

One of the fun evaluation activities based on Automatic Assessment can be done by using Quizizz Paper Mode (Gani et al., 2023). Quizizz Paper Mode is one of the features of the Quizizz application which is an online-based quiz tool, allowing students to practice via quizzes on a laptop or smartphone (Pham, 2023). Now Quizizz has a Paper Mode feature, which is an interactive quiz that allows students to see questions on the screen and show the answers using paper with a QR Code (Q-cards). Apart from that, Quizizz Paper Mode also provides benefits to teachers where teachers can easily check student learning outcomes because they will be directly recorded by the system (Angelina et al., 2023). This gives teachers the possibility to directly provide feedback to students. Another advantage of the Quizizz Paper Mode feature is that it can eliminate the need for students to use smartphones or internet data (Abadi et al., 2023). So this Quizizz Paper Mode feature can be a reference for teachers in carrying out learning evaluations using technology, even though students have limited access to electronic devices.

Several research results state that the Quizizz Paper Mode learning evaluation is suitable for use as a learning evaluation (Gani et al., 2023). Quizizz Paper Mode is also an interactive quiz that is suitable for use in learning evaluation because it has a high influence in improving student learning outcomes (Al Mawaddah et al., 2021). However, this research has not explained whether Quizizz Paper Mode can make it easy and practical for students to use in evaluating technology-based learning. Other research explains that Quizizz Paper Mode has a positive impact in increasing students' motivation and enthusiasm for learning, as well as making it easier for students to learn (Azizah et al., 2023). Directly or indirectly, technological facilities in the world of education have an important role in overcoming the problems of limited facilities in education and the learning process (Kurniati et al., 2022).

Based on previous research, the difference with this research lies in the type of research used, where the type of research used is Research and Development with the Borg and Gall model which has 10 stages and has been modified by researchers into 8 stages, namely, analysis of potential and problems, data collection, product design, design validation, design revision, product testing, product revision, and usage trials. Apart from that, the learning material used by researchers is contained in the class IV Natural and Social Sciences learning content, namely plant breeding material and Wonosari 01 State Elementary School has also implemented an independent curriculum. This research provides updates by presenting the cognitive level of MOTS questions, namely applying, and the HOTS question level, namely analyzing and evaluating. Apart from that, there is question stimulus in the form of video and audio, and the score and duration of processing time are adjusted to the cognitive level of the question and the existing question stimulus.

It is hoped that the development of learning evaluation based on Automatic Assessment through Quizizz Paper Mode carried out by researchers will be able to provide updates regarding learning evaluation for science and science lesson content on plant development which can later be applied by teachers in the learning evaluation process. This research aims to develop learning evaluation based on Automatic Assessment through Quizizz Paper Mode; testing the feasibility of Automatic Assessment-based learning evaluation via Quizizz Paper Mode; tested the effectiveness of Automatic Assessment-based learning evaluation via Quizizz Paper Mode on the cognitive learning outcomes of Natural and Social Sciences lesson content for class IV B students at Wonosari 01 State Elementary School, Semarang City.

Method

Types of Research

This research uses the Research and Development (RnD) type of research. Research and Development (RnD) research is a type of research used to produce a product and test the effectiveness of the product that has been developed (Sugiyono, 2018)(Sugiyono, 2019). The model used in this research is the Borg and Gall development model.

Research Procedure

The Borg and Gall development model has 10 (ten) stages to produce a product (Fikriana et al., 2023; Ulfa et al., 2020). The Borg and Gall development scheme is in Figure 1.

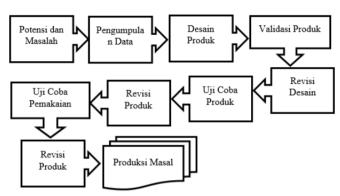


Figure 1. Borg and Gall model development scheme (Sugiyono, 2018)

This research's Borg and Gall stages were modified to only 8 (eight) development stages such as research conducted by Kristi et al. (2023) and Liana et al. (2022) which was implemented as follows. The first stage is the analysis of potential and problems, the researcher determines the research location and examines the potential and problems at the school; The second stage of data collection, the data collection process was carried out using non-test techniques (observation, interviews, questionnaires) and technical tests (pretest and posttest); The third stage in this research was product design, the researcher prepared an Automatic Assessment-based learning evaluation via Quizizz Paper Mode in the science and sciences subject on plant reproduction. In this stage, researchers need to prepare materials, grids and evaluation questions, as well as stimuli used in evaluation questions with multiple choice questions; In this fourth stage, design validation is carried out. Products to be tested must be validated (Wulandari, 2017). Design validation was carried out by 2 (two) expert validators (Ibnusaputra et al., 2023), namely a material expert validator and a media expert validator to test its feasibility; The fifth stage is design revision. After going through design validation, we obtain assessments, suggestions and input from expert validators. The existing assessments, suggestions and input are used by researchers to become a reference in improving product design development; The sixth stage is product testing. Product trials are carried out on small groups of students to obtain results in the form of input to improve the initial product; The seventh stage is product revision before use in trial use; The final stage in this research is trial use. Products that have been revised after being tested are then tested at the usage trial stage to determine the effectiveness of using the product for student learning outcomes.

Research Subject

The subjects in this research were students in class IV B of the Wonosari 01 State Elementary School, Semarang City, totaling 20 students.

Research Instrument

instruments used include: Validation questionnaire for material experts and media experts. The expert validation questionnaire was submitted to material expert validators and media expert validators (Suhailah et al., 2021). This questionnaire is used to determine the feasibility of the product being developed, both in terms of material and appearance; Pretest and posttest questions are used to measure the effectiveness of the product being developed. Apart from that, this instrument is used to test students' initial and final understanding of the learning material being taught (Fauziah et al., 2023); Teacher and student response questionnaire. Respondents who assess learning evaluations are teachers and students (Ali et al., 2021). Teacher and student response questionnaires were given to teachers and students who used the learning evaluation that had been developed.

Data Analysis Technique

The data obtained in this research was analyzed according to data groups, namely product feasibility analysis, product practicality analysis, and product effectiveness analysis. Product feasibility analysis was carried out to test that the Automatic Assessment-based learning evaluation via Quizizz Paper Mode that was developed met the appropriate criteria. Feasibility is measured using an expert validation questionnaire using a four-point Likert scale, namely very good with a score of 4 to poor with a score of 1. Product feasibility can be tested using the following formula (1) (Purwanto, 2017).

$$NP = \frac{R}{SM} x \ 100\% \tag{1}$$

Where NP is the percent value sought, R is the raw score obtained, and SM is the ideal maximum score. Next, the percentage values obtained are converted to the eligibility criteria presented in Table 1 (Wulandari, 2017).

Table 1. Product Eligibility Criteria

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Percentage	Criteria
81% - 100%	Very Worthy
61% - 85%	Worthy
41% - 60%	Pretty Decent
21% - 40%	Less Decent
0% - 20%	Very Unworthy

Product practicality analysis is carried out to determine the practicality and support the feasibility of the product that has been developed. Product practicality data was obtained from the analysis of teacher and student response questionnaires. The

practicality of Automatic Assessment-based learning evaluation via Quizizz Paper Mode is measured using a four-point Likert scale, namely very good with a score of 4 to poor with a score of 1. To calculate the practicality value, you can use formula (1) and then the results are converted to the practicality criteria presented in Table 2 (Maryana et al., 2019).

Table 2. Product Practicality Criteria

Criteria
Very Practical
Practical
Quite Practical
Less Practical
Impractical

Product effectiveness data was obtained from the results of students' pretest and posttest. The pretest and posttest questions are in the form of multiple choice questions. The Automatic Assessment-based learning evaluation development product through Quizizz Paper Mode is said to be effective in improving learning outcomes if the data is normally distributed with a significance value > 0.05. If Sig. (2-tailed) < 0.05 so Ha is accepted with the Ha hypothesis that there is a significant difference between pretest and posttest learning outcomes using Automatic Assessment-based learning evaluation development products via Quizizz Paper Mode. All data obtained from the pretest and posttest were analyzed by initial data by testing for normality, then final data analysis by using the T test, and N-Gain test with the help of SPSS version 23.

Result and Discussion

This research is research into the development of learning evaluation based on Automatic Assessment through Quizizz Paper Mode on Natural and Social Sciences lesson content, material on plant reproduction for class IV B, Wonosari 01 State Elementary School, Semarang City. The results of the development research that has been carried out are reviewed in these results and discussion, namely: the results of the development of learning evaluation based on Automatic Assessment via Quizizz Paper Mode; feasibility of Automatic Assessment-based learning evaluation via Quizizz Paper Mode; effectiveness of Automatic Assessmentbased learning evaluation via Quizizz Paper Mode based on pretest and posttest results in the use of Automatic Assessment-based learning evaluation via Quizizz Paper Mode in Natural and Social Sciences lesson content on plant breeding for class IV B Wonosari 01 State Elementary School, Semarang City.

Development of Automatic Assessment Based Learning Evaluation through Quizizz Paper Mode

This development research was carried out using the Borg and Gall model. The first stage is analysis of potential and problems. To analyze the potential and problems that exist at the Wonosari 01 State Elementary School, Semarang City, at this stage a series of observation processes were carried out on learning with activities. interviews class teachers. documentation, and data on learning outcomes of class IV B students at the Wonosari 01 State Elementary School, Semarang City. Based on the potential and problem analysis stage carried out, it shows that: teachers have not utilized technology in the process of evaluating Natural and Social Sciences learning; Learning evaluation in class IV B is still carried out conventionally, namely using paper or dictation methods; the length of time for correcting and giving student scores; limited facilities in the form of smartphones or laptops owned by students to support evaluation activities that utilize technology; students' lack of concentration in working on evaluation questions, which results in low student learning outcomes. To overcome this problem, researchers studied research on the development of learning evaluation based on Automatic Assessment via Quizizz Paper Mode on Natural and Social Sciences lesson content on plant reproduction.

The second stage carried out by researchers was data collection. The data collected are student learning outcomes as well as a questionnaire regarding the needs of teachers and students regarding the development of Automatic Assessment-based learning evaluation via Quizizz Paper Mode. Based on the results observations and interviews with class IV B teachers at Wonosari 01 State Elementary School, it is known that student learning outcomes in the Natural and Social Sciences subject content are low. The results of the analysis of teacher and student needs questionnaires stated that there was a need for an interactive learning evaluation based on Automatic Assessment by taking into account the limitations of existing facilities and infrastructure. Students need an Automatic Assessmentbased learning evaluation through Quizizz Paper Mode with multiple choice questions accompanied by stimulus questions in the form of images, videos, audio and tables which are packaged attractively in the Natural and Social Sciences lesson content on plant reproduction.

In the third stage, researchers carry out product design. Automatic Assessment via Quizizz Paper Mode is designed using the Quizizz application with the final result in the form of a Quizizz Paper Mode link placed on the Canva interactive PowerPoint. The Automatic Assessment-based learning evaluation design through

Quizizz Paper Mode includes the quiz title, lesson content, logo assignment, questions and answers with multiple choice questions. Multiple choice questions are considered effective in measuring student learning outcomes (Suhandi et al., 2022). Questions in Automatic Assessment via Quizizz Paper Mode are presented at the MOTS (apply) and HOTS (analyze and evaluate) cognitive levels. Apart from that, the researcher included question stimuli (images, videos, audio, and tables), scores, and the duration of time needed to complete each question item. Researchers also created a design using Canva interactive PowerPoint as a place for the Quizizz Paper Mode link that had been developed.

The fourth stage is design validation. Products to be tested must be validated (Wulandari, 2017). Validation of the Automatic Assessment-based learning evaluation design via Quizizz Paper Mode was carried out by material experts and media experts. After going through design validation, we obtain assessments, suggestions and input from expert validators. In the fifth stage, researchers need to revise the design in accordance with the assessments, suggestions and input provided by material experts and media experts until the development product is suitable for testing.

The sixth stage is product testing. Product trials were carried out involving students as respondents (Ihsan et al., 2022). In this research, product testing activities were carried out on small groups of students with the aim of obtaining suggestions for developing Automatic Assessment through Quizizz Paper Mode. The small group trial was carried out at the Wonosari 01 State Elementary School, Semarang City with 6 students in class IV B. After the trial was carried out, the researcher distributed teacher and student response questionnaires to find out the responses of teachers and students to the practicality of Automatic Assessment-based learning evaluation via Quizizz. Paper Mode on Natural and Social Sciences lesson content material on plant reproduction.

In the seventh stage, researchers carry out product revisions. Based on the results of the questionnaire analysis of teacher and student responses in small group trials, there were no product revisions because they were appropriate and met practical criteria.

The eighth stage is trial use. The use trial was carried out on a large group which was carried out in class IV B of the Wonosari State Elementary School, Semarang City with a total of 20 students. The results of the design for developing Automatic Assessment-based learning evaluation via Quizizz Paper Mode are presented in figure 2, figure 3, figure 4, and figure 5.



Figure 2. Cover place link quizizz paper mode

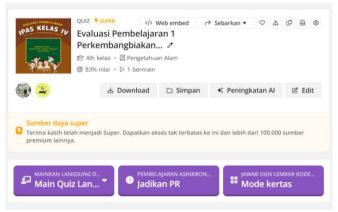


Figure 3. Initial display quizizz paper mode

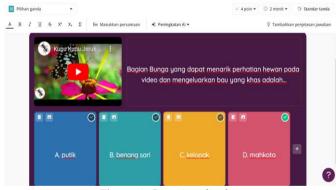


Figure 4. Question display

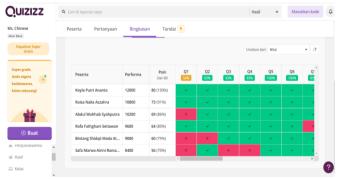


Figure 5. Display of automatic assessment via quizizz paper mode

Feasibility of Automatic Assessment-based Learning Evaluation via Quizizz Paper Mode

The feasibility of Automatic Assessment via Quizizz Paper Mode in the science and science lesson content on plant reproduction is determined from the results of feasibility tests by material expert validators and media experts, supported by teacher responses and student responses. The feasibility test was carried out by providing a validation questionnaire to material experts and media experts (Suhailah et al., 2021). There are several aspects of assessment in the material expert validation questionnaire including: accuracy of learning objectives; suitability of students' level of thinking; evaluation content; stimulus in evaluation matters; accuracy of lesson content in the form of facts, concepts, principles and generalizations. The assessment aspects in the media expert validation questionnaire include: quality of content and objectives; instructional; technical or appearance. Assessment aspects in teacher and student response questionnaires include: content; Language; presentation. The results of the assessment analysis by material and media expert validators are presented in Table 3.

Table 3. Validator Assessment of Eligibility Aspects

Validator	Assessment Percentage	Criteria
Material Expert	91.25%	Very Worthy
Media Expert	87.5%	Very Worthy

Based on Table 3, the Automatic Assessment-based learning evaluation development product through Quizizz Paper Mode has met the criteria for being very suitable for testing with a percentage score of 91.25% from material expert validators and a score percentage of 87.5% from media expert validators. These results are supported by the results of the analysis of teacher and student response questionnaires which are presented in Table 4.

Table 4. Results of Teacher and Student Response Ouestionnaire

Respond	Assessment Percentage	Criteria
Learners	86%	Very Practical
Class IV B teacher	96.25%	Very Practical

Based on Table 4, the results of the questionnaire responses from teachers and students show very practical criteria with a percentage score of 86% from students and 96.25% from teachers. Previous research findings also state that the use of Automatic Assessment via Quizizz Paper Mode is very suitable for use as a varied and fun evaluation medium in classroom learning (Gani et al., 2023). This is also in line with previous research (Hairida, 2023; Hanif et al., 2023) which explains that Quizizz is feasible and practical to

use. It can be concluded that Automatic Assessmentbased learning evaluation via Quizizz Paper Mode is very suitable for use in evaluation activities.

Effectiveness of Learning Evaluation Based on Automatic Assessment via Quizizz Paper Mode

The effectiveness of learning evaluation based on Automatic Assessment via Quizizz Paper Mode on plant breeding material is determined based on students' learning outcomes by analyzing students' pretest and posttest scores. The effectiveness test was carried out by providing pretest and posttest questions (Ule et al., 2021). The design used is a pre-experimental design with a one group pretest-posttest design model, that is, a pretest will be given before treatment and a posttest after treatment. The results of the pretest and posttest are presented in Table 5.

Table 5. Pretest and Posttest Results

Aspects	Pretest Score	Posttest Score
Average	49.5	83.95
Top Value	77	97
Lowest Value	27	60

Based on Table 5, it is known that there is an average increase in learning outcomes in the pretest score from 49.5 to 83.95 in the posttest score. This research uses the help of the SPSS version 23 program in analyzing initial and final data. Initial data analysis was carried out using the normality test and final data analysis was carried out using the T test and N-Gain test.

To find out whether the data is normally distributed or not, a normality test is carried out. The normality test in this research was carried out with the help of the SPSS version 23 program with Shapiro-Wilk. The normality test results are presented in Table 6.

Table 6. Normality Test Results

	Shapiro-Wilk	
	Sig. value	Information
Pretest	.85	Normal
Posttest	.05	Normal

Data is normally distributed if the Sig value. > 0.05 and vice versa if the Sig value. < 0.05 then the data is not normally distributed. Based on Table 6, it is known that the Sig value referring to the Shapiro-Wilk pretest data is 0.854 and posttest data is 0.051. Sig value. in both normality test results it is known that it is more than 0.05, so it can be concluded that the pretest and posttest data are normally distributed so that a Paired T-test can be carried out using SPSS version 23 to determine the effectiveness of Automatic Assessment-based learning evaluation via Quizizz Paper Mode. The results of the Paired T-test are presented in Table 7.

Table 7. Paired T-test Results

Paired Samples test		
	Mean	Sig. (2-tailled)
Pretest -Posttest	-34.45	.000

In the Paired T-test, it was stated that there was a significant difference in the pretest and posttest results if the Sig. (2-tailed) < 0.05. Based on Table 7. Sig. (2-tailed) < 0.05, namely 0.000, so there is a significant difference between the pretest and posttest results with the difference in increase shown being 34.45%. It can be concluded that learning evaluation based on Automatic Assessment via Quizizz Paper Mode is effectively used to improve learning outcomes in Natural and Social Sciences.

The N-Gain test was carried out to determine the average of the pretest and posttest. In this research, the N-Gain test was carried out using the SPSS version 23 program. The results of the N-Gain test are presented in Table 8.

Table 8. N-Gain Test Results

Action	Average	Average Difference	N-Gain	Criteria
Pretest	49.50	34.45	0.70	High
Posttest	83.95			_

Based on Table 8, the N-Gain test results show that the cognitive learning results of class IV B students at the Wonosari 01 State Elementary School, Semarang City using Automatic Assessment-based learning evaluation via Quizizz Paper Mode experienced an increase in the average N-Gain score of 0.7089 in the high category. This is in line with previous research findings (Capinding, 2022; Ccoa et al., 2023; Handoko et al., 2021; Jahring et al., 2022; Purba, 2020) stating that Quizizz is effective in improving learning outcomes supported by research (Dewi et al., 2023; Putra, 2023) states that Quizizz Paper Mode is effectively used as a learning evaluation and can improve learning outcomes and students' understanding.

Data analysis that has been carried out in the research shows that the results of the feasibility test show the category is very feasible and very practical. The N-Gain test results show the high category. Based on data analysis, it was concluded that the use of Automatic Assessment-based learning evaluation via Quizizz Paper Mode is very feasible and effective as a learning evaluation in the classroom.

Conclusion

Development of Automatic Assessment-based learning evaluation via Quizizz Paper Mode for Natural and Social Sciences subject content using Research and Development research with the Borg and Gall model adapted to research needs. Automatic Assessmentbased learning evaluation via Quizizz Paper Mode was declared very suitable for use as an interactive learning evaluation as evidenced by the results of material expert validation tests with an assessment percentage of 91.25% and media expert validation with an assessment percentage of 87.5%. Automatic Assessment-based learning evaluation via Quizizz Paper Mode was declared effective in use, in terms of the increase in student learning outcomes which were analyzed using a normality test which showed Sig. > 0.05, namely 0.85 so the data is normally distributed. The results of the T test calculation showed that the Sig (2-tailed) < 0.05 was 0.000, so there was a significant difference between the pretest and posttest learning results. The N-Gain test result is 0.70 in the high category. Research into the development of learning evaluation based on Automatic Assessment through Quizizz Paper Mode has been successfully developed, is very feasible and effective for improving cognitive learning outcomes in Natural and Social Sciences for students in class IV B of the Wonosari 01 State Elementary School, Semarang City.

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Author Contributions

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Conflicts of Interest

The authors declare no conflict of interest.

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