JPPIPA 10(8) (2024)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Development of Interactive Edugame Learning Evaluation Assited by Wordwall to Improve IPAS Learning Outcomes

Avina Prameswari[1], Aldina Eka Andriani[2*]

Elementary School Teacher Education, Faculty of Education and Research, Universitas Negeri Semarang, Indonesia

Received: January 5, 2024
Revised: June 21, 2024
Accepted: July 25, 2024
Published: July 31, 2024

Corresponding Author:
Wiji
Maswiji@upi.edu

DOI: 10.29303/jppipa.v10i8.8224

Abstract: Teachers are less than optimal in conducting a variety of technology-based learning evaluations, this is supported by learning evaluations that are still conventional, causing low students learnig outcomes. Purpose of this research is to develop a design, test the feasibility and effectiveness of interactive edugame learning evaluation assisted by wordwall to improve IPAS learning outcomes. Type of research is Research and Development (RnD) using the Borg and Gall model. The subjects of this study were 25 fourth grade students of SDN Harjosari 01. Data collection techniques used tests and non-tests. Technical data analysis using normality test, homogeneity test, t test and N-gain test. The results showed: (1) the design of this interactive edugame learning evaluation uses wordwall and canva applications with cover, learning objectives, learning flow, and learning evaluation; (2) the feasibility of learning evaluation is shown from the validation results of media experts, material experts, student responses, and teacher responses with a very feasible category; (3) the effectiveness of learning evaluation is shown from the results of the analysis of pretest and posttest scores. The t-test results obtained a sig value. 0,000> 0,05. N - gain test results 0.43 with moderate criteria. The conclusion of this study is the development of interactive edugame learning evaluation assisted by wordwall successfully developed, very feasible, and effective to improve the learning outcomes of IPAS fourth grade students of SDN Harjosari 01.

Keywords: Learning evaluation; Learning outcomes; Interactive edugame; IPAS; Wordwall

Introduction

Education is very important to develop the potential and quality that exists in humans for the advancement of science and technology. Learning activities allow a person to gain new knowledge so that their thinking develops and is formed so as to make quality humans. National education according to the SIDIKNAS Bill in 2023 is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual strength, self-control, intelligence, personality, noble character, and skills needed for themselves, society and the state.

The purpose of national education is to form learners into people who have faith and devotion to God, have noble character, are healthy, knowledgeable, capable, independent, democratic, and responsible. The success of national education is determined by how students learn.

One of the ways that can be done to find out the learning needs of students to be more qualified is by improving the learning management process in the classroom. Classroom learning management is needed

How to Cite:
Prameswari, A., & Andriani, A. E. (2024). Development of Interactive Edugame Learning Evaluation Assited by Wordwall to Improve IPAS Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, *10*(8), 5885–5894. https://doi.org/10.29303/jppipa.v10i8.8224

to be able to create a comfortable learning atmosphere for students. The more comfortable and interesting the learning process is, the higher the likelihood of material being received by students.

Learning can be supported by web-based applications or materials that are interactive or involve students directly. Learning evaluation is one of the learning tools that teachers must develop to facilitate the delivery of material. The use of interactive learning evaluations in the process of teaching and learning activities can generate new desires and excitement, generate motivation, and desire to carry out learning activities. If the material delivered can be received well by students, then students can also solve problems in the school environment well.

Increasing students understanding can be done by providing stimulation so that students are more active in learning, including developing appropriate learning evaluation tool. In this case the teacher must be able to act as a determinant of the direction of learning so that learning is in a accordance with the desired goals.

Based on the Regulation of the Minister of National Education Number 21 of 2022 concerning educational assessment standards, educational evaluation is an effort to collect and or manage information to determine the achievement of student learning outcomes. Through this evaluation activity the teacher can find out the ability of students, the effectiveness of the learning methods used, and the success in achieving the learning objectives that have been set. In this case, the evaluation in question is an interactive edugame.

Interactive edugame is a game design that contains education or learning in it. In its use in learning, this educational game has several benefits including making it easier for students during learning activities, being one of the effective learning media to use, and increasing students' learning motivation because the learning process becomes fun this is because learning is designed using games that can stimulate children's creativity, train intellectuals, train empathy, and discover new things.

Based on the results of pre-research through observations, interviews, and questionnaires that have been conducted with class teachers and fourth grade students of SDN Harjosari 01, there are still problems in learning, especially learning evaluation. The problems found include teachers being less than optimal in conducting a variety of technology-based learning evaluations. During evaluation activities, what the teacher does is make questions then print the questions and distribute them to students. In addition, teachers conduct evaluations by dictating or writing questions on the blackboard then the teacher directs students to write in their respective books. The teacher corrects the answers manually sometimes the teacher asks students to correct the answers together. This is very unfortunate because the available technology-based facilities and infrastructure are quite supportive.

The learning evaluation conducted by the teacher is not yet an interactive edugame, this reduces the involvement and interest of students in learning. Conventional evaluation methods such as written tests and multiple choice questions that are still dominant tend to make the learning process feel monotonous and less interesting.

This is supported by the results of the percentage of completeness showing that the results of the diagnostic assessment of photosynthesis material in class IV SDN Harjosari 01 with an average of 71, a total of 13 out of 25 students scored above KTTP. In addition, the identification of problems in photosynthesis material is the lack of understanding of students about the basic concepts of photosynthesis, this is because in photosynthesis material there are foreign terms for students, making it difficult for students to understand the material properly.

To solve the above problems, researchers will develop learning evaluations for IPAS subjects in the form of interactive edugames for photosynthesis material for class IV SDN Harjosari 01. Photosynthesis material was chosen because it contains foreign terms or difficult vocabulary for students which causes students to be less than optimal in understanding the material.

Research that can strengthen researchers to conduct research on developing interactive edugame learning evaluations with wordwall assistance in elementary schools is research conducted by Anisa Auliya in 2021 entitled "Development of wordwall-based evaluation instruments for junior high school science subjects grade VII". Based on the results of the study that science learning in class VII, almost all students gave a positive response to the evaluation instrument given, the results of the feasibility test from the validation of material experts were 80.4%, media experts 98.6%, and linguists 96% with a very feasible category. As for the results of the practicality test, the average results of the student response questionnaire were 87.9% with a very practical category.

Another supporting research is research conducted by Nurul Isma Azizah in 2023 entitled "Development of wordwall-based learning media to improve student learning achievement in class V building material MI Raden Fatah Malang". Wordwall-based learning media for building space material is categorized as very interesting media based on the results of the student response questionnaire which is 94.3%. And it can improve student achievement in building space material with an average increase from 80,6 to 86,2.

Another supporting research is research conducted by Ditania Oktariyanti etc in 2021 entitled "Development of Online Leraning Media Based on Wordwall Eduacation Games with the Theme of Beautifull Togetherness for Elementary School Students". The results of the validation of linguists, media experts, and material experts with high enough interpretation. Overall, the results of expert validation are in the good category (high enough). Meanwhile, the one to one, small group and teacher response practicality trials were categorized as very practical. It is concluded that the Online Learning Media Based on Wordwall Educational Games on the theme of Beautiful Togetherness in Class IV Students of SDNegeri 58 Lubuklinggau is valid and practical to use.

Method

The type if research used in this study is Research and Development (RnD). In this case, the research and development approach is used because it is in accordance with the research objectives, namely to produce certain products and is used for research that is a need analysis. This research functions in the wider community, so research is needed to test the effectiveness of the product.

The RnD research model uses Borg and Gall which has been modified by Sugiyono (2020). This development research is a type of development research conducted by individuals. The results of the research that have been carried out are designed as new products and then field testing, evaluation, revision, until they get effective results. The stages of Borg and Gall development research are: 1) Needs analysis; 2) Data collection; 3) Product design; 4) Design validation; 5) Usage trial; 6) Product revision; 7) Small-scale trial; 8) Design revision; 9) Final product revision; 9) Final product revision; 10) Mass production.

Researchers only carried out up to stage eight, steps nine and ten were not carried out due to time and cost constraints. The stages of Borg and Gall development research are illustrated in Figure 1.

Figure. 1. The stages of Borg and Gall Development research

The research subjects used to determine the needs of this research are students, teachers, and experts. Learners who are the source of data in this study are fourth grade students of SDN Harjosari 01, totaling 25 students. The teacher who is the source of data in this study is the fourth grade teacher at SDN Harjosari 01. Expert lecturers who act as consultants for the development of interactive learning evaluations assisted by wordwall consist of two lecturers, namely expert lecturers in the field of material and expert lecturers in the field of media.

The data collection techniques used in this study were test and non-test techniques. Technical tests carried out are pre tests and post tests given before and after students use interactive edugame evaluations assisted by wordwall. While the non-test techniques carried out are by observing learning activities carried out in class IV using observation sheets, interviews with class IV teachers of SDN Harjosari using interview guides, needs questionnaires given to students and teachers, and document data using the results of cognitive diagnostic assessments on photosynthesis material.

Data analysis techniques in this study were using normality test, homogeneity test, Paired sample t-test, and N-gain test. Normality and homogeneity tests were conducted on data generated from pretests and posttests. The T test was conducted to determine whether or not there was a difference between after and before treatment. And the N-gain test was obtained from the pretest and posstest results which were analyzed descriptively

Result and Discussion

Development of Learning Evaluation Design for Wordwall-assisted Interactive Edugame

Potential and problems

Based on observations that have been made, researchers found that: the learning evaluation used by teachers in IPAS learning has not been varied; has not maximally utilized technology-based learning evaluation; and the learning model applied is still conventional so that it affects the low learning outcomes of IPAS students.

Through interviews with fourth grade teachers, researchers identified that the curriculum used was the independent curriculum. Then a needs analysis was conducted using a questionnaire given to teachers and students regarding the learning evaluation needed.

The results of data collection show that the learning evaluation conducted by teachers has not been varied. Teachers need technology-based

learning evaluations to train students' abilities. The evaluation developed must be adapted to the material and characteristics of students with concise and clear language so that it is easy to understand.

The observation also shows that the school has adequate facilities to support the learning process. The school provides LCD projectors, wifi, and chrome books, which can be utilized by teachers to apply technology-based learning media in the classroom. Thus, researchers will develop an Interactive Edugame Learning Evaluation with the help of Wordwall in IPAS learning.

Data collection

The results of data collection show that the learning evaluation used by teachers has not been varied so that it does not attract the attention of students. Teachers need to vary the learning evaluation to improve students' learning outcomes and skills. To overcome these IPAS learning problems, the learning evaluation should be developed into an interactive learning evaluation that contains images, audio, video, animations so that it is more interesting for students.

The observation results also show that the school has adequate facilities to support the learning process. the school provides LCD, projector, wifi, pointer, chrome book, which can be utilized by teachers and students to support a more interactive learning process. Thus, researchers will develop an interactive edugame learning evaluation assisted by wordwall in IPAS learning.

Product desain

The wordwall-assisted interactive edugame learning evaluation is designed using the canva application that can be opened through a website or application. The interactive edugame learning evaluation consists of various types of media including text, images, animations, audio, and learning videos. The interactive edugame learning evaluation contains a cover, learning outcomes and objectives, learning flow, learning evaluation linked to links, and a dashboard of evaluation results

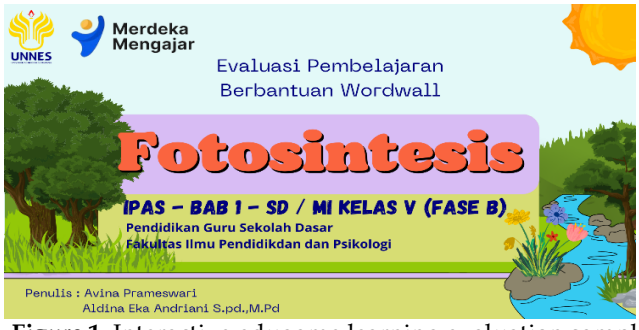


Figure 1. Interactive edugame learning evaluation sample

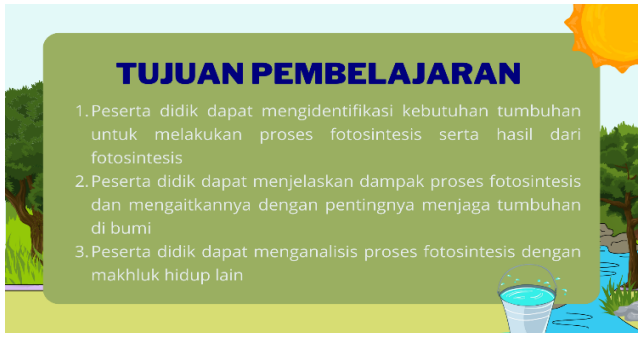


Figure 2. Learning objectives

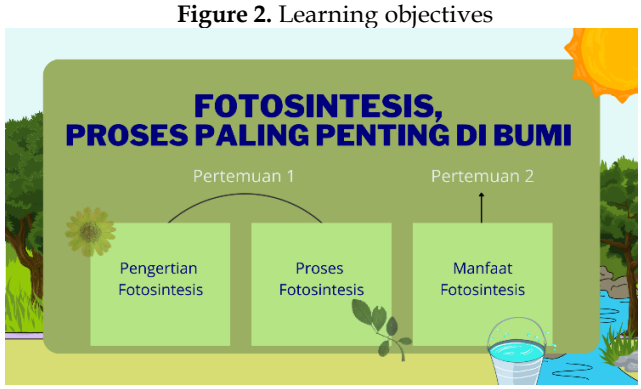


Figure 3. Learning flow

The wordwall templates used in this learning evaluation are plane and group short templates. The plane template was chosen because its simple yet attractive design makes it easy for learners to understand. The way to play this template is by directing the plane to the correct answer of the question. Short group was chosen because it allows easy and brief grouping of information making it easier for students to work with. How to play the sort group template is by grouping the correct answers according to the question.

Figure 4. Learning evaluation 1 with plane template

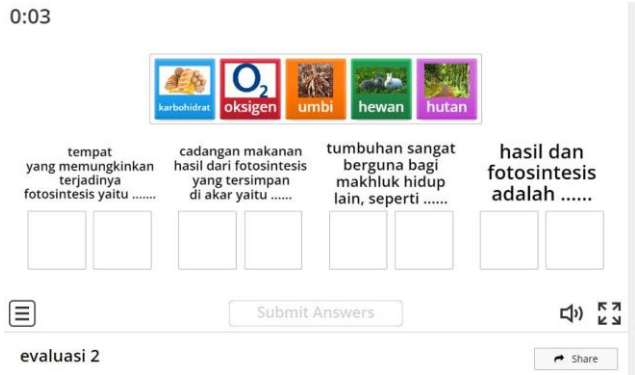
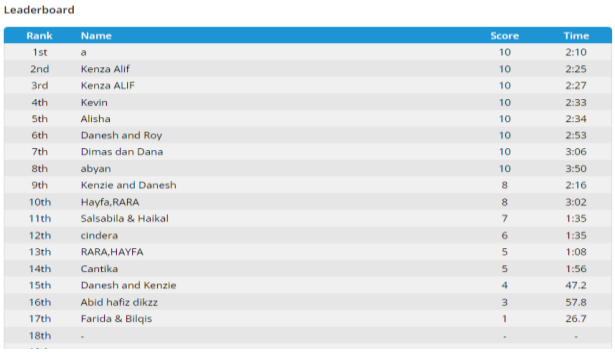


Figure 5. Learning evaluation 2 with short group template



Leaderboard

Rank	Name	Score	Time
1st	a	10	2:10
2nd	Kenza Alif	10	2:25
3rd	Kenza ALIF	10	2:27
4th	Kevin	10	2:33
5th	Alisha	10	2:34
6th	Danesh and Roy	10	2:53
7th	Dimas dan Dana	10	3:06
8th	abyan	10	3:50
9th	Kenzie and Danesh	8	2:16
10th	Hayfa,RARA	8	3:02
11th	Salsabila & Haikal	7	1:35
12th	cindera	6	1:35
13th	RARA,HAYFA	5	1:08
14th	Cantika	5	1:56
15th	Danesh and Kenzie	4	47.2
16th	Abid hafiz dikzz	3	57.8
17th	Farida & Bilqis	1	26.7
18th	-	-	-

Figure 6. Learning evaluation leaderboard

Desain validation

Product trials were carried out by validators, in this case involving 2 expert validators, namely media expert validators and material expert validators. The results of the trial are in the form of validation from the validator. This validation aims to test the product whether it is good or not if it will be applied in learning.

In this case, the validator is given a questionnaire to assess, provide criticism and suggestions on the evaluation developed and the material presented. Thus, it can be seen the shortcomings that need to be addressed in the learning evaluation so that it becomes better and ready to be applied.

The results of the validation of the interactive edugame learning evaluation assisted by wordwall show that there are still shortcomings in the evaluation. In terms of material, it is still necessary to improve the learning objectives and stimuli provided. while in terms of media, it still needs to be improved in the use of colors in the fonts that use

First Product Revision

This stage is conducted after the learning evaluation is validated by the validator. Deficiencies that have been conveyed by expert validators are corrected at the initial product revision stage before being tested in the field. The goal is that the learning evaluation developed can be better, quality, and in accordance with the needs of students and teachers in learning.

The revisions made were to improve the learning objectives to be applied, add stimuli to the test questions, improve the writing of the test questions, and change the font color to make it more attractive.

Field Trial

After the learning evaluation has been revised and declared feasible to use, it is then tested in the field, namely the fourth grade students of SD Negeri Harjosari 01 Semarang. Field trials consisted of two tests, namely small group trials and large group trials.

The small group trial was conducted on Monday, June 3, 2024 until it was completed in the fifth grade classroom. This test was conducted by 6 fourth grade students who were selected heterogeneously based on their ability level. The purpose of this test is to find out whether the learning evaluation developed is interesting for students or not and to find out where the shortcomings of the media according to the students.

After that, a large group trial was conducted on Saturday, June 8, 2024 until Saturday, June 15, 2024. This trial was conducted by 25 fourth grade students using 15 chrome books. In this large group trial, students were given reinforcement of the material first like learning activities as usual. then students were asked to do an evaluation using the prepared learning evaluation questions. After that, participants and teachers were asked to fill out a questionnaire about their responses to the evaluation of interactive edugame learning with the assisted by wordwall.

Final Product Revision

Final product revision is a stage that is carried out if the evaluation of interactive edugame learning aided by wordwall after being applied to IPAS learning still has shortcomings. However, in this case the researcher did not make revisions because there were no revisions from the results of teacher and student responses.

Feasibility of Learning Evaluation of Interactive Edugame Assisted by Wordwall

The feasibility of wordwall-assisted interactive edugame learning evaluation is determined based on the results of the validity test of material experts, media experts, teacher and student responses. The validity test by material experts and media experts serves to see the feasibility of interactive multimedia using an assessment questionnaire based on instruments that have been made. The validity test

results are presented in Table 1.

Table 1. Material Expert and Media Expert Validity test results

validator	Assessment precentage	criteria
Media expert	88.7%	Very feasible
Materi expert	90.0%	Very feasible

Based on table 1, the results of the validity test of interactive edugame learning evaluation assisted by wordwall from media experts obtained a score of 88.7% with a very feasible category. The assessment aspects in the media expert validation questionnaire include: (1) Design aspect; (2) Language aspect; (3) Ease of use. The results of the validity test of the interactive edugame learning evaluation assisted by wordwall from the material expert obtained a score of 90% with a very feasible category. The assessment aspects in the material expert validation questionnaire include: (1) Language Use; (2) Content and Purpose Aspects; (3) Instructional Aspects; (4) Display Aspects. These results are supported by the results of the analysis of teacher and learner responses in Table 2.

Table 2. Results of Teacher and Learner Response Questionnaires

validator	Assessment precentage	criteria
Teacher	76%	Very feasible
Students	90%	Very feasible

Based on table 2, the results of the analysis of the teacher's response questionnaire to the evaluation of interactive edugame learning with wordwall is 76% with a very feasible category and from students obtained a percentage of 90% with a very feasible category. The aspects of assessment in the teacher and learner response questionnaire include: (1) material; (2) presentation; (3) use.

From the results of the validity test of material experts, media experts, teacher responses and student responses, it can be concluded that the evaluation of interactive edugame learning aided by wordwall is very feasible to use in learning.

Effectiveness of Learning Evaluation of Interactive Edugame Assisted by Wordwall

The effectiveness of wordwall-assisted interactive edugame learning evaluation on photosynthesis material is determined based on students' learning outcomes by analyzing students' pretest and posttest scores. The pretest and posttest test results are presented in Table 3.

Table 3. Pretest and posttest test result

Aspect	Pretest score	Posttest score
Average	71.37	84.66
Highest score	83.00	95.00
Lowest score	60.00	75.00

Based on table 3, it can be seen that there is an increase in the average learning outcomes of 13.29 from the pretest average of 71.37 to 84.66 on the average protest. This study uses initial data analysis and final data analysis using the help of the Microsoft excel 2013 program. Initial data analysis includes normality test and homogeneity test, while final data analysis includes t-test and N-Gain test.

Normality test is used to determine whether the research data is normally distributed or not. The normality test in this study used the Microsoft Excel 2013 program with Saphiro-Wilk. The results of the normality test are presented in Table 4.

Tabel 4. Normality test result

Saphiro-wilk	Sig.value	Information
Pretest	.639	Normal
Posttest	.177	Normal

The normality test criteria are normally distributed if the sig value. (2-tailed) > 0.05, otherwise if the sig value. (2-tailed) < 0.05 means not normally distributed. Based on table 4, it is known that the sig value (2-tailed) which refers to Shapiro-wilk, pretest data is 0.639, and posttest data is 0.177. The significance value of the two research data> 0.05 so it can be concluded that the pretest and posttest research data are normally distributed.

The homogeneity test is used to determine whether the research data comes from the same population or not. The homogeneity test in this study used Microsoft Excel 2013. The homogeneity test results are presented in Table 5.

Table 5. Homogeneity test result

	Levene statictic	df1	df2	df3
Based on mean	.404	1	48	.528

Based on Table 5, it is known that the significance value (Sig.) Based on Mean is 0.528>0.005. so it can be concluded that the data variants are the same or homogeneous. Based on the prerequisite test results, it can be concluded that the research data is normally distributed and homogeneous, so that the Paired T-test can be carried

out. The T-test results are presented in Table 6.

Table 6. T-test result

Paired sample test	Mean	Sig. (2-tailled)
Pretest - posttest	-9.026	.000

In the Paired t-test test, if the sig value (2-tailed) < 0.05 then there is a significant difference in the pretest and posttest results. conversely, if the sig value (2-tailed) > 0.05 then there is no significant difference in the pretest and posttest results. based on the results of table 6, the sig value. (2-tailed) 0.000 <0.05 which indicates that there is a significant difference between the pretest and posttest with an increase of 9.02%. The increase in pretest and posttest results is shown in Figure 7.

Figure 7. Improvement in pretest and posttest results

Based on these results, it can be concluded that the interactive edugame learning evaluation assisted by wordwall is effectively used to improve IPAS learning outcomes especially on photosynthesis material. The average increase in pretest and posttest can be known through the N-Gain test. This study uses the Microsoft Excel 2013 program to conduct the N-Gain test. The N-Gain test results are presented in Table 7.

Table 7. N-Gain test result

Action	Average	Average Difference	N-Gain	Category
Pretest	71.37	13.29	0.43	Medium
Posttest	84.66			

Based on Table 7, the results of the N-Gain test show that the learning outcomes of fourth grade IPAS participants at SDN Harjosari 01 using the interactive edugame learning evaluation l have increased by an average N-Gain score of 0.43 with a moderate category. The results of the average increase in the medium category while the product developed received a very feasible category from material experts, media experts, teacher and student responses. This is due to variations in learning readiness, learning habits, and learning styles of students that affect student learning outcomes. Readiness is a condition in which a person shows the ability to respond to situations or answers to problems given (Mulyani, 2013). Learning habits are the behavior of students who are repeatedly carried out in participating in learning and completing their assignments (Kaban, 2019). a person's learning style is determined by ease, comfort, and level of confidence in terms of a person's time and taste for learning.

From the explanation above, it can be concluded that the evaluation of interactive edugame learning assisted by wordall is effective for use in IPAS learning, especially on photosynthesis material

Conclusion

Based on the results and discussion, it can be concluded that the wordwall-assisted interactive edugame learning evaluation was developed using Canva and wordwall applications which include a cover, learning outcomes and objectives, learning flow, learning evaluation connected to links, and a dashboard of evaluation results. The feasibility of wordwall-assisted interactive edugame learning evaluation is shown from the validity test of material experts and media experts; and teacher response questionnaires and student response questionnaires which show a very feasible category. The effectiveness of interactive edugame learning evaluation is shown from the analysis of pretest and posttest scores. The t-test results obtained a sig value of 0.000>0.05. N-gain test results 0.43 with moderate category. The conclusion of this study is the development of interactive edugame learning evaluation aided by wordwall has been successfully developed, very feasible, and effective for improving the learning outcomes of IPAS fourth grade students of Harjosari 01 State Elementary School.

Acknowledgments

Acknowledgments are conveyed to Faculty of Education UNNES, Lecturers, and SD Negeri Harjosari 01 for their invaluable support in facilitating this research.

Author Contributions

This research article was published thanks to the collaboration of the first writer, Avina Prameswari, and the second writer, Aldina Eka Andriani. Author contributions to paper: create learning media and devices; conduct research; data analysis; and compile article. All authors reviewed the results and approved the final version of the manuscript.

Funding
This research received no external funding.

Conflict of Interest
The authors declare no conflicts of interest.

References

Abdullah, N. (2017). Development of interactive software for implementing the science process skills in science primary school. International Journal of Academic Research in Business and Social Sciences, 7(6), 728-744. http://dx.doi.org/10.6007/IJARBSS/v7-i6/3033

Afandi, R. (2015). Pengembangan media pembelajaran permainan ular tangga untuk meningkatkan motivasi belajar siswa dan hasil belajar IPS di sekolah dasar. JINoP (Jurnal Inovasi Pembelajaran), 1(1), 77-89. https://doi.org/10.22219/jinop.v1i1.2450

Aini, A. D. N. (2023). Pengembangan media pembelajaran berbasis macromedia flash untuk meningkatkan hasil belajar mata pelajaran IPAS siswa Kelas IV di SDN Merjosari 4 Kota Malang. Ibtidaiyyah: Jurnal Pendidikan Guru Madrasah Ibtidaiyah, 2(3), 172-182. http://etheses.uin-malang.ac.id/id/eprint/54041

Amirullah, G., & Susilo, S. (2018). Pengembangan Media Pembelajaran Interaktif Pada Konsep Monera Berbasis Smartphone Android. WACANA AKADEMIKA: Majalah Ilmiah Kependidikan, 2(1), 38-47. Arikunto, S. (2018). Dasar – dasae Evaluasi Pendidikan. Yogyakarta : Pustaka Pelajar. https://doi.org/10.30738/wa.v2i1.2555

Ar-Rahmah, A. N. (2021). Pengembangan evaluasi pembelajaran berbasis game edukatif menggunakan platform wordwall. net pada siswa Kelas V SDIT Al-Mishbah Sumobito Jombang (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim). http://etheses.uin-malang.ac.id/id/eprint/30150

Artanti, Y., Nuryadi, N., & Marhaeni, N. H. (2022). Peningkatan Prestasi Belajar Matematika pada Materi Teorema Pythagoras Menggunakan Aplikasi Tepytha. *Transformasi: Jurnal Pendidikan Matematika dan Matematika*, *6*(1), 25-38.Asrul. Ananda, R., & Rosnita. (2015). Evaluasi Pembelajaran. Bandung : Cita Pustaka Media. https://doi.org/10.36526/tr.v6i1.1935

Astuti, F. K., Cahyono, E., Supartono, S., Van, N. C., & Duong, N. T. (2018). Effectiveness of elements periodic table interactive multimedia in Nguyen Tat Thanh high school. IJIET (International Journal of Indonesian Education and Teaching), 2(1),1-10. https://ejournal.usd.ac.id/index.php/IJIET/article/view/951/744

Auliya, A. (2021). Pengembangan instrumen evaluasi berbasis wordwall untuk mata pelajaran IPA SMP kelas VII (Doctoral dissertation, UIN FAS BENGKULU). http://repository.iainbengkulu.ac.id/id/eprint/7085

Azizah, N. I. (2023). Pengembangan media pmbelajaran berbasis wordwall untuk meningkatkan prestasi belajar siswa pada materi bangun ruang Kelas V MI Raden Fatah Malang (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim). http://etheses.uin-malang.ac.id/id/eprint/54880

Baharuddin dan Esa (ed). (2015). Teori Belajar Dan Pembelajaran. Yogyakarta : Ar Ruzz Media

Batubara, H. H. (2020). Media Pembelajaran Efektif. Semarang : Fatawa Publishing.

Fitri, Amalia., dkk (2021). Buku Siswa IPAS Kelas IV (Kementrian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia Ilmu Pengetahuan Alam dan Sosial untuk SD Kelas IV).

Damayanti, A. (2022). Pengembangan media pembelajaran berbasis game edukasi Wordwall dalam penguasaan kosakata Bahasa Arab siswa Kelas III MI Almaarif 02 Singosari (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim). http://etheses.uin-malang.ac.id/id/eprint/35897

Dharma, P. K. S., & Agung, A. A. G. (2021). Pengembangan Multimedia Online pada Muatan Pelajaran IPA. Jurnal Ilmiah Pendidikan dan Pembelajaran,5(1),115-123. https://doi.org/10.23887/jipp.v5i1.32164

Dwiqi, G. C. S., Sudatha, I. G. W., & Sukmana, A. I. W. I. Y. (2020). Pengembangan multimedia pembelajaran interaktif mata pelajaran IPA untuk siswa SD kelas V. Jurnal Edutech Undiksha, 8(2), 33-48. https://doi.org/10.23887/jeu.v8i2.28934

Dyanti, C. R., Rahmatan, H. .,Halim, A., Syukri, M. ., & Elisa. (2022). Pengaruh Aplikasi Kahoot Sebagai Media Pembelajaran terhadap hasil belajar peserta didik pada materi getaran gelombang kahoot merupakan aplikasi dengan bantuan koneksi internet yang bersifat sederhana namun bisa menyena. *Jurnal Penelitian Pendidikan IPA 8(3),1483–1488.* https://doi.org/10.29303/jppipa.v8i3.146

Eriyanti, I, L., Jumadi, Yanarti, Rosiningtias, W., &

Zulfaria, H. (2023). Pengembangan Lembar Kerja Peserta Didik Elektronik Berbasis Mobile Learning Model Inkuiri Terbimbing pada Materi Hukum Newton. *Jurnal Penelitian Pendidikan IPA,9(8),5935-5944.* https://doi.org/10.29303/jppipa.v9i8.3562

Fatih, M., Alfi, C., & Muqtafa, M. A. (2024). Science Learning Game (SLG) Berbasis Augmented Reality untuk Meningkatkan Kemampuan Literasi Sains dan Berfikir Kritis Siswa Kelas VI SD. *Jurnal Penelitian Pendidikan IPA, 10(2),973-981.* https://doi.org/10.29303/jppipa.v10i2.6107

Fauzan, Z. S. (2022). Pengaruh media pembelajaran Word Wall terhadap minat dan hasil belajar siswa pada mata pelajaran IPS di Kelas VIII MTsN 1 Kota Malang (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim). http://etheses.uin-malang.ac.id/id/eprint/40731

Fitriana, F. (2023). Pengembangan media pembelajaran berbasis android untuk meningkatkan hasil belajar siswa pada mata pelajaran IPS di SMP Negeri 1 Lawang Malang (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim). http://etheses.uin-malang.ac.id/id/eprint/50987

Isti'adah, F. N. (2020). Teori – Teori Belajar dalam Pendidikan. Tasikmalaya: Edu Publisher

Indriani, N. (2022). Efektivitas Penggunaan Aplikasi Kahoot pada Proses Evaluasi Pembelajaran Siswa Kelas IV SD MI NU Ngingas Kabupaten Sidoarjo. *Jurnal Teknologi Pendidikan: Jurnal Penelitian dan Pengembangan Pembelajaran*, *7*(1), 81-87. https://doi.org/10.33394/jtp.v7i1.5106

Putri, E. F. (2021). Media Pembelajaran Powtoon untuk Meningkatkan Hasil Belajar Peserta Didik pada Mata Pelajaran Ekonomi.*jurnal Penelitian Dan Pengembangan Pendidikan, 5(2), 198-205.* https://doi.org/10.23887/jppp.v5i2.34339

Maulia, E., Hamik, R., Bentri, A., & Darmansyah, D.(2024). Pengembangan E-Modul Berbasis Pembelajaran Inkuiri Terbimbing Pada Mata Pelajaran IPAS di Sekolah Dasar. *Jurnal Penelitian Pendidikan IPA, 10(4),* 1551-1555. https://doi.org/10.29303/jppipa.v10i446997

Muslimah. (2022). Pemanfaatan Teknologi Dan Peningkatan Kompetensi Guru Dalam Pembelajaran Abad 21. https://doi.org/10.31237/osf.io/enz7u

Nurhayati, I. (2021). Pengembangan Media Wordwall Berbasis Game Online Untuk Meningkatkan Minat Siswa Dalam Pembelajaran Tematik Muatan IPA Kelas IV SD Negeri Salam. (Doctoral dissertation, Universitas Sarjanawiyata Tamansiswa).

Oktariyanti, D., Frima, A., & Febriandi, R. (2021). Pengembangan media pembelajaran online berbasis game edukasi wordwall tema indahnya kebersamaan pada siswa sekolah dasar. *Jurnal Basicedu*, *5*(5), 4093-4100. https://dx.doi.org/10.31004/basicedu.v5i5.1490

Pamorti, O.A., Winarno, & SUyandari, K. C.(2024).Efektivitas Media Pembelajaran Berbasis Augmented Reality Untuk Meningkatkan Keterampilan berpikir kritis pada Materi IPAS.*Jurnasl Penelitian Pendidikan IPA, 10(5),*2211-2219. *https://doi.org/10.29303.jppipa.v10i57139*

Pamungkas, Z. S., Randriwibowo, A., Nur, L., Wulansari, A., Melina, N. G., & Purwasih, A. (2021). Pengembangan Media Pembelajaran Interaktif Wordwall Dalam Meningkatkan Motivasi Belajar Siswa Kelas VII SMP Negeri 4 Gunung Sugih. Social Pedagogy: Journal of Social Science Education, 2(2), 136.

Parwati, N. N., Suryawan, I. P., & Apsari, R A. (2018). Belajar dan Pembelajaran. Depok: Rajagrafindo Persada.

Putri, A. L., Rahmad, M., & Sahal, M. (2023). Application of the STAD-Type Cooperative Model Assisted by Wordwall to echance students critical thinking ability. *Jurnal penelitian pendidikan IPA, 9(10),800-8078 https://doi.org/10/29303/jppipa/v9i10.3838*

Ramdani, A., Jufri, A. W., Gunawan, G., Hadisaputra, S., & Zulkifli, L. (2019). Pengembangan Alat Evaluasi Pembelajaran Ipa Yang Mendukung Keterampilan Abad 21. *Jurnal Penelitian Pendidikan IPA*,*5*(1). https://doi.org/10.29303/jppipa.v5i1.221

Ratnawulan, E & Rusdiana. (2017). Evaluasi Pembelajaran. Bandung : Penerbit CV Pustaka Setia.

Rizki, A., Khaldun, I., & Pada, A.U.T.(2021).Development of Discovery Leraning Studentd Worksheets to Improve Students Critical Thinking Skills in Chemical Balance Materials. *Jurnal Penelitian PendidikanIPA,7(4),707-7011. https://doi.org/1029303.jppipa.v7i48s9*

Rianti, R. R. P., Karyanto, P., & Wahyuningsih, D. (2022). Pengembangan Media Pembelajaran Daring Berbasis Aplikasi Smart Apps Creator (SAC) untuk Meningkatkan Hasil Belajar Kognitif Siswa. INKUIRI: Jurnal Pendidikan IPA, 11(2), 103-110. https://doi.org/10.20961/inkuiri.v11i2.58704

Rizky, A. T. (2022). Pengembangan Media Peta Interaktif Untuk Meningkatkan Hasil Belajar Siswa Pada Materi Persebaran Flora Fauna

Kelas Xi Ips Sma Yp Unila Bandar Lampung.

Salama, N. L. Pengembangan Alat Evaluasi Pembel; ajaran Konsep Sistem Pencernaan Menggunakan Aplikasi Quizizz (Bachelor's thesis, Jakarta: FITK UIN Syarif Hidayatullah Jakarta).

Samsudin, M. A., Haniza, N. H., Muhammad, M., & Abdul-Talib, C. (2014). Utilizing Malaysian traditional games to implement kinesthetic intelligence approach in informal science learning environment. International Journal of Education and Research, 2(11), 133-146.

Saputri, A.L.,&Sukmawati, W.(2024). The Influence of the Team Games Tournament (TGT) Learning Model Assisted by Wordwall on the Scientific Literacy of Class V Elementary School Students. *Jurnal Penelitian Pendidikan IPA, 10(7),3738-3798 https://doi.org/10.29303/jppipa.v10i7.7992*

Sartika, S.B., Untari, R.S., Rezania, V.,& Rochmah, L.I. (2022). Buku Ajar Belajar Dan Pembelajaran. *Unsida Press.* 1-214. https://doi.org/10.21070/978-623-464-043-4

Sugiyono. (2005). Metode Statistika. Bandung : Tarsito

Sugiyono. (2019). Metode Penelitian dan Pengembangan. Bandung : Alfabeta

Sugiyono. (2020). Metode Peneitian, Kuantitatif, Kualitatif, dan R&D. Bandung : Alfabeta

Suyono, & Hariyanto. (2017). Belajar dan Pembelajaran. Bandung : Remaja Rosdakarya

Utami, E. N., & Bektiningsih, K. (2022). Pengembangan Media Pembelajaran Puzzle Berbantuan Android Berbasis Kearifan Lokal Untuk Meningkatkan Hasil Belajar Ips. Jurnal Kreatif: Jurnal Kependidikan Dasar, 13(1). https://journal.unnes.ac.id/journals/kreatif/article/view/5154

Wahab, G., Rosnawati. (2021). Teori – teori Belajar dan Pembelajaran. Indramayu : CV. Adanu Abimata.

Yasa, A. D., Suastika, K. K., & Zubaidah, R. S. A. N. (2020). Pengembangan e-evaluation berbasis aplikasi hot potatoes untuk siswa kelas V sekolah dasar. Jurnal Ilmiah Sekolah Dasar, 4(1), 26-32. https://doi.org/10.23887/jisd.v4i1.23987

Yasra, D. W. "Pengembangan Media Pembelajaran Matematika Berbasis Web Menggunakan Wordwall pada Materi Bangun Ruang Sisi Datar (Bachelor's thesis, Jakarta: FTK UIN Syarf Hidayatullah Jakarta). https://repository.uinjkt.ac.id/dspace/handle/123456789/72517