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# Effect Of Problem-Based Learning Media Teaching Edugame To Improve Science Literacy And Collaboration Solar System Material

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***ABSTRACT***

*Innovative and interesting approach to learning is a learning innovation in the delivery of material to students. One approach that continues to evolve is the use of technology-based teaching media packaged in the form of educational games or so-called edugame. The purpose of this study is to describe and analyse the implementation of edugame learning media with PBL method in improving students' scientific literacy and learning outcomes. This study uses pre-experimental with the research design used is a group pretest-posttest design. This study was conducted in Cabak Primary School, Jiken District, Blora Regency, with the subject of research consisting of students of class V. The research sample was selected by purposive sampling, namely class V consisting of 60 students, divided into two classes, namely class A and class B, each consisting of 30 students. Data analysis was done using t-test and measuring instruments to measure the students' ability on the Solar System material using the Problem Based Learning method. The results of this study showed a significant improvement in students' grades, which reflected not only an improvement in academic results but also a positive change in the liveliness aspect of learning. Conclusion The use of active and innovative learning methods can improve students' learning outcomes and their engagement in the classroom. Further research is needed to extend the understanding of the influence of learning methods on student learning outcomes with a wider scope.*
***Keywords**: problem based learning ; media teaching edugame ; science literacy ; collaboration ; solar system*

**ABSTRAK**

Pendekatan pembelajaran inovatif dan menarik merupakan inovasi pembelajaran dalam menyampaikan materi kepada siswa. Salah satu pendekatan yang terus berkembang adalah penggunaan media ajar berbasis teknologi yang dikemas dalam bentuk permainan pendidikan atau yang disebut sebagai edugame. Penelitian ini bertujuan untuk mendiskripsikan dan menganalisis pelaksanaan pembelajaran media edugame dengan model PBL dalam meningkatkan literasi sains dan hasil belajar siswa. Model penelitian menggunakan Pre-Eksperimental dengan Desain penelitian yang digunakan adalah One Group Pretest-Posttest Design. Penelitian dilakukan di SD Negeri Cabak, Kecamatan Jiken, Kabupaten Blora, dengan objek penelitian yang terdiri dari siswa kelas V. Sampel penelitian dipilih secara purposive sampling, yaitu kelas V yang terdiri dari 60 siswa, terbagi dalam dua kelas yaitu Kelas A dan Kelas B, masing-masing terdiri dari 30 siswa. Analisis data menggunakan uji t dan alat ukur mengukur kemampuan siswa pada materi Tata Surya menggunakan model

Problem Based Learning. Hasil dari penelitian ini menunjukkan peningkatan yang signifikan dalam nilai siswa, yang tidak hanya mencerminkan peningkatan hasil akademis tetapi juga perubahan positif dalam aspek keaktifan belajar. Simpulan penerapan model pembelajaran yang aktif dan inovatif dapat meningkatkan hasil belajar siswa dan keaktifan mereka di kelas. Penelitian lebih lanjut diperlukan untuk memperluas pemahaman tentang pengaruh model pembelajaran terhadap hasil belajar siswa dengan lingkup yang lebih luas.
**Kata Kunci**: problem based learning; media ajar edugame ; literasi sains; kolaborasi; tata surya

## INTRODUCTION

An innovative and interesting learning approach is a learning innovation in the delivery of materials to students (Putra & Negara, 2021). One model that is evolving is the use of technology-based instructional media packaged in the form of educational games or so-called edugames (Lubis et al., 2022; Sagita & Mulyani, 2023). Edugame is a form of learning media that uses game elements to teach learning concepts in an interactive and entertaining way (Ella et al., 2024; Firdaus et al., 2024; Mizan et al., 2024). Learning with edugame media can be applied to subjects in the field of education. One of the interesting topics that can be explored through edugames is the solar system.

Combining PBL with Edugame has become especially relevant in the context of 21st Century Education, which demands the development of collaboration, creativity and problem-solving skills. PBL, as an active learning approach, requires students to solve contextual problems and develop critical thinking skills as well as collaborative abilities. Previous studies have shown that PBL can lead to a deeper mastery of concepts in a variety of subjects, including science. The solar system consists of the sun, planets, natural satellites and other celestial bodies, the solar system presents a variety of science and astronomy concepts that are important for students to understand (Nurhamidah et al., 2022; Sahari & Wahyudi, 2020). In the field, the teaching of the solar system is still based on conventional models that do not allow students to float in the learning process. The development of edugame about the solar system can be an interesting solution to be applied to students. Through interactive games, students can more easily understand complex concepts about the solar system and actively engage in the learning process (Khatimah et al., 2023). Edugames about the solar system can also provide a fun learning experience and motivate students to explore the world of science and astronomy more deeply. This approach is in line with the increasingly advanced development of information and communication technologies, where children and young people are often involved in various digital games.

Educators should be able to tap into learners' natural interest in technology and games; solar system edugame can be an effective tool to stimulate their interest in learning science (Agita & Arifin, 2024; Dwiningrum et al., 2024; Prameswari & Andriani, 2024). This research will explore the potential use of edugame in teaching solar system materials. The use of edugame in the teaching of the solar system has a number of significant advantages. Firstly, edugame can create an active and enjoyable learning experience for students (Ranuharja et al., 2021; Widjayatri et al., 2022). By incorporating elements of play, students tend to be more emotionally and cognitively involved in the learning process. They become more enthusiastic about exploring new concepts and solving the challenges they encounter in the game. In addition, edugame can also improve retention and understanding of the material. By

presenting information through interactive experiences, students have the opportunity to experience the concepts being taught first-hand, thereby strengthening the neural connections in their brains. This can help them to better understand and remember abstract concepts in the long term. Edugame also allows for more effective differentiation of learning.

Science literacy is the ability to understand, analyse and use information related to science and technology in everyday life (Armas et al., 2019; Subaidah et al., 2019). In this modern era, science literacy is becoming a very important skill for learners or students to function effectively in an increasingly complex and globally connected society. The ability to understand scientific concepts, evaluate evidence, and think critically and creatively in a scientific context is crucial in shaping individuals who are able to adapt and contribute to a growing society (Nisa et al., 2021; Rohana et al., 2020). The importance of scientific literacy in the information age is used to understand and interpret scientific information in the learning process. Scientific literacy in students can make them intelligent and able to distinguish right from wrong information, as well as able to explore and develop new ideas in different scientific fields. The ability to be scientifically literate is not only an academic skill, but also has far-reaching benefits in learners' everyday lives (Noor, 2020). Developing a deep understanding of the world around them, making the right decisions, improving critical and creative thinking, contributing in a growing society.

This study provides theoretical contributions in developing literature on the integration of PBL and Edugame in improving science literacy. A better understanding of how these two approaches can work together to facilitate a deeper understanding of science concepts, particularly solar system matter, is a major focus of this research. In addition, the study is expected to provide new insights into the role of collaboration in science learning through technology-based and game-based approaches.

Previous literature reviews have shown that the use of technology-based educational media, such as edugame, is effective in increasing students' interest and understanding of science materials (Alfani & Huda, 2020; Azzahra et al., 2023). In addition, the PBL approach has been used in the educational context to develop students' critical thinking and problem solving skills (Ernawati, 2023). However, there are not many studies that integrate these two approaches specifically in the context of solar system science literacy. Such integration is a novelty of previous studies. Theories on the use of technology in education suggest that interactive and fun aspects, such as in edugame, can increase students' motivation and engagement in learning (Nurdini et al., 2018; Ranuharja et al., 2021). On the other hand, the PBL concept emphasises problem-based learning, which allows students to develop deep understanding through exploration and problem solving. Previous research has also shown that the integration of PBL in the development of instructional media can enhance the impact of learning.

Field conditions of the value of science subjects solar system material in SD Negeri Cabak in grade 5 students amounted to 60 students in semester 1 found 80% of students in the category of less, 10% are and 10% in the category of good. The data was taken according to the value of KKM with a cut-off value of 80. The percentage of observations and interviews with students in the learning process, which is still conventional, shows that students are less motivated in understanding the learning conveyed by the teacher (Multazam et al., 2024). The trend of using educational games in science education is showing significant results in

increasing student engagement and understanding of science concepts.This research contributes by filling the gap through the development of edugame educational media that use PBL models to improve students' understanding of the solar system. This approach is expected to make new contributions to the science education literature.

The purpose of this study is to describe and analyse the implementation of edugame learning media with PBL model in improving students' scientific literacy and learning outcomes. To analyse the effect of Problem Based Learning supported by edugame educational media in improving solar system material science literacy. To analyse the influence of edugame educational media on students' learning outcomes in solar system. The novelty of this research lies in the integration between the PBL approach and the use of edugame media designed specifically for the material of the solar system. This not only provides a more engaging learning experience but also helps students develop critical thinking skills, problem solving, and scientific understanding in greater depth. This research is expected to fill the literature gap and provide new insights into innovative learning strategies in Science Education.

## METHODS

### Type and Design

The type of research used is experimental research, which aims to determine the cause and effect relationship between the variables being studied. The approach used is descriptive quantitative, which is an approach that describes the problem by analysing the data collected. This study uses pre-experimental design, which is a form of experiment, but does not use a control group, so there is only one group of subjects who have been treated. The study design used was a one group pre-test post-test design, which is a design where there is only one group of subjects tested with a pre-test before treatment and a post-test after treatment, without a control group. In this design, the subjects are not randomly assigned and the effect of the treatment is measured by comparing the pretest and posttest scores.

| | | |
|---|---|---|
| T1 | X1-X3 | T2 |

**Description :**

T1 : Initial test (pre-test)
X : Treatment
X1 : Model PBL
X2 : Media Edugame
X3 : Collaborative learning
T2 : Final tests (post test) (Hasibuan, 2022)

### Data and Data Sources

This study was conducted in Cabak Primary School, Jiken District, Blora Regency, with the research population consisting of students in grade V. The selection of research sites is based on elements of location affordability and ease of access. The population in this study were all students of SD Negeri Cabak, a total of 345 students. The research sample was selected through purposive sampling, namely Class V consisting of 60 students divided into two classes: Class A and Class B, each consisting of 30 students.

The data in the study include the assessment of cognitive aspects, affective, psychomotor and students' learning activity, which are included in Tables 1, 2, 3 and 4. In addition, the results of the intervention are also an important source of data used to assess the effectiveness of the measures taken during the study. The main source of data in this study is the fifth grade

students of SD Cabak, supported by information from teachers and school environment conditions were also observed.

Table 1. Assessment Of Cognitive Aspects

| No. | Cognitive Aspects | Score (1-5) |
|---|---|---|
| 1 | Ability to understand the concept of the solar system broadly and deeply | |
| 2 | Ability to apply PBL concepts to real-life situations | |
| 3 | Ability to solve problems and deal with situations related to the study of the solar system | |
| 4 | Ability to process information and make connections between learning concepts using edugame and kolaborsi. | |

Table 2. Assessment of Affective Aspects

| No. | Affective Aspects | Score (1-5) |
|---|---|---|
| 1 | Level of interest and enthusiasm in studying the solar system | |
| 2 | Ability to concentrate and focus while learning | |
| 3 | Level of confidence and satisfaction in applying PBL learning concepts to Solar System materials | |
| 4 | Level of concern and responsibility for the group when applying the PBL learning model | |
| 5 | An attitude of respect and consideration for the human rights of each individual | |
| 6 | Ability to listen, share ideas and take action that is good for the group as a whole | |
| 7 | A positive attitude towards one's own ability to complete tasks and achieve goals. | |

Table 3. Assessment Of Psychomotor Aspects

| No. | Psychomotor Aspects | Score (1-5) |
|---|---|---|
| 1 | Ability to apply concepts and techniques to solar system materials in practical learning situations | |
| 2 | Ability to demonstrate skills and abilities to solve problems in solar system learning | |
| 3 | Ability to adapt and collaborate in solving problems in a team. | |
| 4 | Ability to demonstrate creativity and innovation in learning about the Solar System using Edugame media. | |

Table 4. Student Learning Activeness Questionnaire

| No. | Questionnaire | Score (1-5) |
|---|---|---|
| 1 | How involved are you in using edugame to learn about the solar system? | |
| 2 | How often do you discuss with friends during Problem Based Learning (PBL) activities using edugame? | |
| 3 | How effective is edugame in helping you understand solar system concepts? | |

| | |
|---|---|
| 4 | Do you feel more motivated to learn solar system material when you use edugame? |
| 5 | After using PBL and edugame, how often do you look for additional information about the solar system outside of class? |
| 6 | How much do you participate in group discussions when learning with the edugame-supported PBL model? |
| 7 | How much influence does edugame have on your ability to solve the problems given in Solar System learning? |
| 8 | Do you feel more confident to collaborate with friends after using edugame in learning? |
| 9 | How do you rate the availability of time and opportunity to ask questions to teachers during learning with PBL and edugame? |
| 10 | How much did you participate in group tasks during solar system learning with the edugame-supported PBL model? |

**Data collection technique**

This study was conducted over one month, with twice the amount of data collection and twice the amount of treatment delivery (treatment). The data were collected using two models, namely tests and evaluation sheets. The test is used to measure the results of scientific learning on solar system materials, covering cognitive, affective and psychomotor aspects.

**Data analysis**

Data analysis in this study was carried out in a number of systematic stages. Firstly, the validity test was carried out to ensure that the measuring instrument measures students' ability to use solar system materials using the problem-based learning (PBL) model. Furthermore, the reliability test assesses the consistency of the measuring instrument, ensuring that the test results are consistent when repeated. The test results (pre-test and post-test) are then described by calculating descriptive statistics such as mean, median, standard deviation, variance and highest and lowest scores.

A Kolmogorov-Smirnov normality test was performed to test the normal distribution of the data, which is important in determining the type of statistical test to be used. Furthermore, the t-test is used to test the effect of the PBL model by comparing the pre- and post-test scores. To ensure the similarity of variance between groups, the homogeneity test was carried out using Levene's test with SPSS 23.0. Finally, the hypothesis test using T-test was analysed through SPSS 23.0, with the aim of testing hypotheses about the influence of PBL models on student learning outcomes. Once all the stages of analysis have been completed, the results will be interpreted in order to draw conclusions about the effectiveness of the PBL model in improving student learning outcomes on solar system materials..

**RESULTS AND DISCUSSION**

Validity test using Principal Component Analysis (PCA) model. The results of the analysis showed that the two assessment tests, namely learning outcomes and student learning questionnaires, were the same, namely 0.892. This shows that the two variables have a high correlation and can be used as a factor in factor analysis. Reliability analysis using Cronbach's Alpha. The reliability value obtained is 0.720, which indicates that the instrument used to

measure the two variables has a fairly good level of consistency. From the results of both tests it can be concluded that the results of validity and reliability are valid and reliable.

Table 5. Construction validation test with Principal Component Analysis (PCA)

| | Component |
|---|---|
| | 1 |
| Learning outcomes | .892 |
| Student study questionnaire | .892 |
| Extraction Method: Principal Component Analysis. | |
| a. 1 components extracted. | |

Table 6, Reliability with Cronbach's alpha

| Cronbach's Alpha | N of Items |
|---|---|
| .720 | 2 |

The results of the study in Table 7 show the pretest, the posttest and the difference between them for each of the 60 students. The pretest value is taken before the application of the learning model, while the posttest value is taken after the application. The difference between the post-test and the pre-test indicates an improvement in the students' learning outcomes, with most students making significant progress. For example, student 7 showed the greatest improvement with a difference of 17 points, from 30 on the pretest to 47 on the posttest. Meanwhile, Table 8 provides a descriptive statistical summary of the student learning outcomes data. There were 60 students in the sample, with the lowest score on the pretest being 28 and the lowest score on the posttest being 38, indicating the presence of students with low initial scores. The highest pretest score was 40 and the highest posttest score was 48, indicating that some students achieved maximum scores on both tests. The mean pre-test score was 33.20, while the mean post-test score was 42.91, indicating a significant improvement in overall learning outcomes. The standard deviation on the pre-test was 3.47 and on the post-test 2.91, indicating that the variation in post-test scores is less than on the pre-test, so that students' scores after treatment tend to be more centred around the mean. From these two tables it can be concluded that there was a significant improvement in the students' learning outcomes after the application of the learning model, both in the cognitive, affective and psychomotor aspects. This can be seen from the increased mean score and the positive difference between post-test and pre-test scores, which shows the effectiveness of the applied learning model in improving students' learning outcomes.

Table 7. Data on student learning outcomes, affective, cognitive and psychomotor aspects

| Aspect | Description |
|---|---|
| Average change | Each student showed improvement after learning, with posttest-pretest grade differences ranging from 5 to 17 points. |
| The Biggest Increase | Sample 7 (17 points) and Sample 8 (14 points) showed significant improvement, reflecting the effectiveness of PBL model-based edugame media. |

| | |
|---|---|
| Smallest Increase | Sample 14 (5 points) and Sample 24 (2 points) showed smaller changes, likely influenced by initial understanding or level of student engagement. |
| General Conclusion | PBL-based Edugame can improve students ' overall learning outcomes on affective, cognitive, and psychomotor aspects. |

Table 8. Descriptive Statistics of Student Learning Outcomes Data

| Data | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Pretest | 60 | 28.00 | 40.00 | 33.2000 | 3.47290 |
| Postest | 60 | 38.00 | 48.00 | 42.90703 | 2.90703 |
| Valid N (litwise) | 60 | | | | |

The results of the questionnaire on students' learning activities before and after the application of the learning model in Table 9, divided into five categories: "less than once", "less", "sufficient", "good" and "very good", together with the frequency and percentage for the pre-test and post-test. In the category "Less than once", no students recorded active learning in this category, both in the pre-test and in the post-test, with a frequency of 0 and a percentage of 0%. The category "Less" showed that in the pre-test there were 5 students (9%) who felt that their learning activity was in this category, but after using the learning model none of the students reported activity in this category, indicating an increase in learning activity. A total of 45 students (75%) rated themselves as "sufficient" in the pre-test, but only 11 students (18%) remained in this category after the post-test, indicating a shift to a higher category. In the "Good" category, there were 10 students (16%) who rated their learning activity as good on the pre-test, and this number increased to 24 students (40%) after the post-test, indicating a significant increase in student learning activity. Finally, none of the students reported learning activity in the "very good" category on the pre-test, but after the post-test, 25 students (42%) categorised their activity in this category, showing a significant positive change after using the learning model. Overall, the results of the questionnaire showed a positive change in students' learning activity, with a significant increase in the 'Good' and 'Very Good' categories and a decrease in the 'Less' and 'Enough' categories, indicating the success of the learning model in improving students' learning activity.

**Table 9. Student Learning Activeness Questionnaire Results**

| No | Category learning outcomes | Pre-test (frequency) | Pre-test (percentage) | Post-test (frequency) | Post-test (percentage) |
|---|---|---|---|---|---|
| 1 | Less Than Once | 0 | 0% | 0 | 0% |
| 2 | Less | 5 | 9% | 0 | 0% |
| 3 | Enough | 45 | 75% | 11 | 18% |
| 4 | Good | 10 | 16% | 24 | 40% |
| 5 | Very Good | 0 | 0% | 25 | 42% |

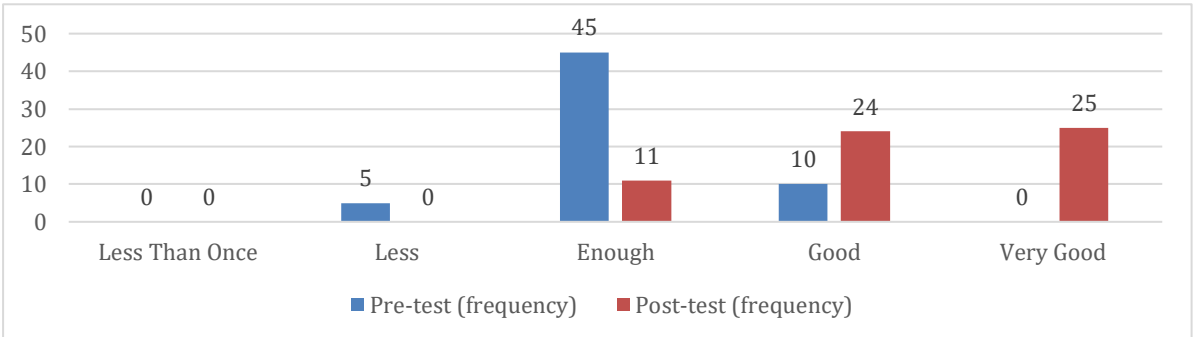

Figure 1. Student Learning Activeness Questionnaire Results

The results of the t-test, one-sample test in Table 10 measure the difference in student learning outcomes between pretest and posttest scores. The test results showed that on the pretest, the value of t obtained is 74.049 with 59 degrees of freedom (df) and significance (Sig. 2-tailed) amounted to .000, indicates a very significant difference between the pretest value and zero. The average pretest score was 33,200 with a 95% confidence interval ranging from 32,3029 to 34,0971, indicating a fairly below-average level of student comprehension prior to learning. On the contrary, in the posttest, the value of t obtained is 113.777 with 59 degrees of freedom and a significance of .000, which also indicates a very significant difference between the posttest and zero values. The average posttest score reached 42,700 with a 95% confidence interval between 41,9490 to 43,4510, which indicates a substantial improvement in student learning outcomes after the application of the learning model. Overall, the results of this T-test showed that there was a significant difference between the pretest and posttest scores, with the average value of students increased substantially, indicating the success of the learning model in improving student learning outcomes.

Table 10. Student Learning T Test Results

| Variabel | t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval |
|---|---|---|---|---|---|
| Pretest | 74.049 | 59 | .000 | 33.20000 | 32.3029 - 34.0971 |
| Postest | 113.777 | 59 | .000 | 42.70000 | 41.9490 - 43.4510 |

The novelty of this research lies in the integration between the PBL approach and the use of edugame media designed specifically for the material of the solar system. Problems in education today are often related to low student learning outcomes caused by various factors, including less effective teaching models. To address these issues, it is important to identify and implement teaching strategies that can improve students' understanding and involvement in the learning process. This study investigates the influence of specific learning models on student learning outcomes, using a quantitative approach to measure change through pre- and post-tests.

The results of this study showed a significant improvement in students' grades, reflecting not only an improvement in academic outcomes, but also a positive change in the liveliness aspect of learning. However, in order to understand the further implications of these findings, we need to analyse them in the context of educational theory and previous research, as well as explore their implications and limitations. The results of this study show a significant difference between the pre-test and post-test scores, which reflects the effectiveness of the learning model used.

The results obtained not only show an increase in numbers, but also provide a deep insight into how this model can facilitate the learning process of students. Some students experienced a very significant improvement, such as the 7th student who recorded an increase of 17 points, indicating that there are some students who may need a more personalised approach or more

attention in their learning.The results of the questionnaire which showed an increase in different categories of learning activities were also very interesting. The shift of students from the "Less" category to the "Very Good" category shows that this learning model is not only successful in improving academic results but also in increasing student participation.

This finding is consistent with learning principles that emphasise that learning that directly involves students can increase student motivation and understanding (Arisanti, 2022; Janah et al., 2023). The theory of constructivism developed by Piaget and Vygotsky is highly relevant to current research. Both emphasise the importance of direct experience and social interaction in the learning process (Barca et al., 2022; kusuma et al., 2022). The use of learning models that encourage active student engagement reflects learning principles that suggest that students who engage in active learning tend to have better understanding and higher learning outcomes (Hendaryan et al., 2022; Secha et al., 2023).

Some previous studies, such as those by Nisa and Susetryo (Nisa et al., 2021; Susetyo, 2020), have shown that project-based models improve learning outcomes. Other research by (Sardiman, 2020) also highlights the importance of classroom interaction as a factor that has a significant impact on learning outcomes (Harvianto & Bernisa, 2019; Yudho et al., 2022). The results of this study support these findings, showing that the application of an active and collaborative learning model has a significant positive impact. One of the novel aspects of this study is the measurement of student learning activity. While much of the previous research has focused on academic outcomes (Nisa et al., 2021; Novianti et al., 2020; Widhayanty & Tjahyo, 2023), this study adds a new dimension by exploring how learning models affect student activeness and engagement.

The increase in the 'good' and 'very good' categories shows that the learning model does not only serve to improve academic grades, but can also shape the character of the students and their motivation to learn. The implications of this study are significant. By proving that certain learning models can improve students' learning outcomes and activity, this study provides practical guidelines for educators in choosing and applying the right model in the teaching and learning process. This is very important in today's educational era, where students' involvement is very influential on their learning success.

## CONCLUSION

The use of an active and innovative learning model can improve students' learning outcomes and their activity in the classroom. These findings are consistent with constructivist theory and previous research that emphasises the importance of student involvement in the learning process. This research makes a significant contribution to educational practice, although it should be noted that there are limitations that need to be considered. This study shows that PBL-based edugame effectively improves students ' science literacy and learning outcomes on solar system materials. However, this study has limitations, namely the sample size is limited and has not been analyzed external variables such as socioeconomic conditions and learning environment support. Further research follow-up can be done by involving a larger sample to increase the validity of the findings and incorporating external factor analysis to provide a more comprehensive understanding. In addition, the application of PBL-based edugames to other materials or different levels of education needs to be explored to test their effectiveness in a broader context.

**REFERENCES**

Agita, S. C. A., & Arifin, S. F. A. (2024). PENGEMBANGAN MEDIA EDUGAME GETAR SIDAQU BERBASIS REMO GAGRAK ANYAR PADA MATA PELAJARAN SENI BUDAYA KELAS V SDN PENJARINGANSARI 2. In *Jurnal Pendidikan Dasar* (Vol. 14, Issue 2, pp. 30–36). Universitas Negeri Jakarta. https://doi.org/10.21009/jpd.v14i2.39530

Alfani, M. I., & Huda, N. (2020). Pengembangan Alat Permainan Arabic Edugame Sebagai Media Pembelajaran Bahasa Arab Kelas VII A MTs Negeri 10 Sleman. *EDULAB Majalah Ilmiah Laboratorium Pendidikan*, *4*(2). https://doi.org/10.14421/edulab.2019.42-05

Arisanti, D. A. K. (2022). ANALISIS KURIKULUM MERDEKA DAN PLATFORM MERDEKA BELAJAR UNTUK MEWUJUDKAN PENDIDIKAN YANG BERKUALITAS. In *Jurnal Penjaminan Mutu* (Vol. 8, Issue 2, pp. 243–250). Institut Hindu Dharma Negeri Denpasar. https://doi.org/10.25078/jpm.v8i02.1386

Armas, A. R. K., . R., & Syahrir, M. (2019). HUBUNGAN ANTARA LITERASI SAINS DENGAN PRESTASI BELAJAR PESERTA DIDIK PADA PEMBELAJARAN KIMIA KELAS XI MIPA SMA NEGERI SE-KOTA MAKASSAR. *Chemistry Education Review (CER)*, *2*(2), 67–75. https://doi.org/10.26858/cer.v2i2.8950

Azzahra, N. K., Rofian, R., & Budiman, M. A. (2023). Pengembangan Media Belajar Planetarium Toys Sebagai Peningkat Pemahaman Siswa Kelas VI Materi Tata Surya Bidang Studi IPA. *Indonesian Research Journal On Education*, *3*(2), 1106–1112. https://doi.org/10.31004/irje.v3i2.274

Barca, M., Quinto, A. M. V., & Sgrò, F. (2022). Assessing Declarative Tactical Knowledge in Physical Education. In *Advances in Early Childhood and K-12 Education* (pp. 277–293). IGI Global. https://doi.org/10.4018/978-1-7998-9621-0.ch015

Dwiningrum, S. I. A., Rukiyati, R., Murti, R. C., Setyawan, S. L. H. P., & Utami, A. A. N. (2024). Metode Pelatihan Pembuatan Edugame dalam Pembelajaran Sekolah Dasar. In *INOTEKS : Jurnal Inovasi Ilmu Pengetahuan, Teknologi, dan Seni* (Vol. 1, Issue 1, pp. 44–54). Universitas Negeri Yogyakarta. https://doi.org/10.21831/ino.v1i1.72640

Ella, C. G., Setiani, P. P., Sunuyeko, N., & Agustin, A. (2024). Edugame Wordwall: Media Pembelajaran Inovatif IPS Kelas 7 SMP Sunan Ampel Poncokusumo Materi Sosialisasi dalam Masyarakat. In *Ideguru: Jurnal Karya Ilmiah Guru* (Vol. 9, Issue 3, pp. 1329–1337). Dinas DIKPORA Daerah Istimewa Yogyakarta. https://doi.org/10.51169/ideguru.v9i3.1030

Ernawati, E. (2023). PENGARUH MODEL PEMBELAJARAN PROBLEM BASED LEARNING (PBL) DALAM MENINGKATKAN KONSENTRASI BELAJAR SISWA SEKOLAH DASAR PADA MATA PELAJARAN TEMATIK TERPADU DITINJAU DARI HASIL BELAJAR. *Jurnal Elementary: Kajian Teori Dan Hasil Penelitian Pendidikan Sekolah Dasar*, *6*(1), 90–98.

Firdaus, Z., Zubaidah, S., & Munzil, M. (2024). Pengembangan Edugame pada Materi Sistem Saraf untuk Siswa SMA. In *Bioscientist : Jurnal Ilmiah Biologi* (Vol. 12, Issue 1, p. 1472). LPPM IKIP Mataram. https://doi.org/10.33394/bioscientist.v12i1.11924

Harvianto, Y., & Bernisa, B. (2019). PELATIHAN PEMBELAJARAN PENJAS YANG MENARIK DENGANMETODE PROGRESS CARD MELALUI CIRCUIT TRAININGDANLADDER DRILL. *Abdi Masyarakat*, *1*(2). https://doi.org/10.36312/abdi.v1i2.1090

Hasibuan, I. S. (2022). *Pengaruh Permainan Tradisional Engklek Terhadap Kemampuan Geometri Anak*. Center for Open Science. https://doi.org/10.31219/osf.io/x5rkc

Hendaryan, R., Hidayat, T., & Herliani, S. (2022). PELAKSANAAN LITERASI DIGITAL DALAM MENINGKATKAN KEMAMPUAN LITERASI SISWA. In *Literasi : Jurnal Bahasa dan Sastra Indonesia serta Pembelajarannya* (Vol. 6, Issue 1, p. 142). Universitas Galuh

Ciamis. https://doi.org/10.25157/literasi.v6i1.7218

Janah, R., Widyaningrum, A., & Purnamasari, V. (2023). PENGGUNAAN MEDIA LAGU PADA MATA PELAJARAN BAHASA INDONESIA UNTUK MENINGKATKAN LITERASI SISWA KELAS III SDN 02 KROMPENG. In *Didaktik : Jurnal Ilmiah PGSD STKIP Subang* (Vol. 9, Issue 4, pp. 779–791). STKIP Subang. https://doi.org/10.36989/didaktik.v9i04.1602

Khatimah, I. A. K., Fatkhomi, F., Atika, N., & Taowatto, S. (2023). EFEKTIFTAS MEDIA SOLAR SYSTEM SCOPE DALAM MENINGKATKAN PEMAHAMAN SISWA TERHADAP MATERI TATA SURYA. *School Education Journal PGSD FIP Unimed*, *13*(1), 73–82. https://doi.org/10.24114/sejpgsd.v13i1.45635

kusuma, wening sekar, Sukmono, N. D., & Tanto, O. D. (2022). Stimulasi Perkembangan Kognitif Anak Melalui Permainan Tradisonal Dakon, Vygotsky Vs Piaget Perspektif. *Raudhatul Athfal Jurnal Pendidikan Islam Anak Usia Dini*, *6*(2), 67–81. https://doi.org/10.19109/ra.v6i2.14881

Lubis, A. M., Kasih, I., & Simatupang, N. (2022). PENGEMBANGAN PERMAINAN EDU GAME MODEL CIRCUIT UNTUK ANAK TUNAGRAHITA RINGAN. *Jurnal Pedagogik Olahraga*, *8*(1), 13–18. https://doi.org/10.24114/jpor.v8i1.41964

Mizan, M., Rahayu, H. M., & Setadi, A. E. (2024). Uji Kevalidan Media Edugame Berbasis Android sebagai Penunjang Pembelajaran Materi Virus Kelas X SMAS Mujahidin Pontianak. In *Bioed : Jurnal Pendidikan Biologi* (Vol. 12, Issue 1, p. 57). Universitas Galuh Ciamis. https://doi.org/10.25157/jpb.v12i1.13158

Multazam, G. M., Sulastianto, H., & Suryadi, A. (2024). Augmented Reality sebagai Media Pembelajaran Alternatif dalam Pembuatan Poster. In *EDUKATIF : JURNAL ILMU PENDIDIKAN* (Vol. 6, Issue 5, pp. 5678–5690). Universitas Pahlawan Tuanku Tambusai. https://doi.org/10.31004/edukatif.v6i5.7480

Nisa, K., Wiyanto, W., & Sumarni, W. (2021). SISTEMATIK LITERATUR REVIEW: LITERASI SAINS DAN SETS (SCIENCE, ENVIRONMENT, TECHNOLOGY, AND SOCIETY). *EDUSAINS*, *13*(1), 73–82. https://doi.org/10.15408/es.v13i1.18717

Noor, F. M. (2020). Memperkenalkan Literasi Sains Kepada Peserta Didik: Perspektif Calon Guru PIAUD. *ThufuLA Jurnal Inovasi Pendidikan Guru Raudhatul Athfal*, *8*(1), 56–67. https://doi.org/10.21043/thufula.v8i1.7066

Novianti, A., Bentri, A., & Zikri, A. (2020). Pengaruh Penerapan Model Problem Based Learning (Pbl) Terhadap Aktivitas Dan Hasil Belajar Siswa Pada Pembelajaran Tematik Terpadu Di Sekolah Dasar. *Jurnal Basicedu*, *4*(1), 194–202.

Nurdini, N., Sari, I. M., & Suryana, I. (2018). ANALISIS BUKU AJAR FISIKA SMA KELAS XI SEMESTER 1 DI KOTA BANDUNG BERDASARKAN KESEIMBANGAN ASPEK LITERASI SAINS. *WaPFi (Wahana Pendidikan Fisika)*, *3*(1), 96–102. https://doi.org/10.17509/wapfi.v3i1.10948

Nurhamidah, S. D., Sujana, A., & Karlina, D. A. (2022). PENGEMBANGAN MEDIA BERBASIS ANDROID PADA MATERI SISTEM TATA SURYA UNTUK MENINGKATKAN PENGUASAAN KONSEP SISWA. *Jurnal Cakrawala Pendas*, *8*(4), 1318–1329. https://doi.org/10.31949/jcp.v8i4.3190

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

Putra, W. P., & Negara, I. G. A. O. (2021). Pengembangan Multimedia Sistem Tata Surya pada Muatan IPA. *Mimbar Ilmu*, *26*(1), 108–117. https://doi.org/10.23887/mi.v26i1.32183

Ranuharja, F., Ganefri, G., Fajri, B. R., Prasetya, F., & Samala, A. D. (2021). DEVELOPMENT OF INTERACTIVE LEARNING MEDIA EDUGAME USING ADDIE MODEL. *Jurnal*

*Teknologi Informasi Dan Pendidikan*, *14*(1), 53–59. https://doi.org/10.24036/tip.v14i1.412

Rohana, R., Asrial, A., & Zurweni, Z. (2020). Profil Kemampuan Literasi Sains Peserta Didik Berdasarkan Instrumen Scientific Literacy Assessments (SLA). *BIOEDUSAINS Jurnal Pendidikan Biologi Dan Sains*, *3*(2), 176–185. https://doi.org/10.31539/bioedusains.v3i2.1848

Sagita, M., & Mulyani, P. K. (2023). Numeracy E-Module with Edugame As A Support For Mathematics Learning for Sixth-Grade Elementary School Students. *Journal of Education Technology*, *7*(3), 439–448. https://doi.org/10.23887/jet.v7i3.65920

Sahari, S., & Wahyudi. (2020). Pengembangan Media Tata Surya Berbasis Macromedia Flash Sebagai Inovasi Pembelajaran DARING Untuk Siswa SD. *JURNAL PENDIDIKAN DASAR NUSANTARA*, *6*(1), 174–183. https://doi.org/10.29407/jpdn.v6i1.14711

Sardiman, A. M. (2020). *Interaksi & motivasi belajar mengajar*.

Secha, M. N., Fajrie, N., & W, S. S. (2023). Strategi Pembelajaran Concept Mapping dengan Media CD Pembelajaran untuk Meningkatkan Kualitas Pembelajaran PKn. *Journal on Education*, *05*(03), 5841–5848.

Subaidah, T., Muharrami, L. K., Rosidi, I., & Ahied, M. (2019). ANALISIS KEMAMPUAN LITERASI SAINS PADA ASPEK KONTEKS DAN KNOWLEDGE MENGGUNAKAN COOPERATIVE PROPLEM SOLVING (CPS) DENGAN STRATEGI HEURISTIK. *Natural Science Education Research*, *2*(2), 113–122. https://doi.org/10.21107/nser.v2i2.6238

Susetyo, A. M. (2020). PENGEMBANGAN MEDIA PEMBELAJARAN UNTUK MATA KULIAH BAHASA INDONESIA BERBASIS ANDROID. In *Pena Literasi* (Vol. 3, Issue 1, p. 1). Universitas Muhammadiyah Jakarta. https://doi.org/10.24853/pl.3.1.288-296

Widhayanty, M. S., & Tjahyo, B. F. (2023). Upaya Meningkatkan Hasil Belajar Siswa SD Melalui Model Pembelajaran Make a Match pada Materi Permainan Tradisional. *Jumper: Jurnal Mahasiswa Pendidikan Olahraga*, *4*(1), 177–187.

Widjayatri, R. D., Suzanti, L., Sundari, N., Fitriani, Y., Nurazka, R. A., Rahmadini, F., Ichsan, R. Y., & Qotrunnida, N. (2022). EduGame Maru: Application for Early Mathematics Learning as an Alternative for Optimizing Cognitive Ability for 4-6 Years Children. *EduBasic Journal Jurnal Pendidikan Dasar*, *4*(1), 11–22. https://doi.org/10.17509/ebj.v4i1.40684

Yudho, P. K., Hartono, M., & Sumartiningsih, S. (2022). The Effect of Mental Exercise and Muscle Endurance on the Shots of Archery Athletes. *JUARA Jurnal Olahraga*, *7*(3), 658–672. https://doi.org/10.33222/juara.v7i3.2406