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The Effect of Visual Auditory Kinesthetic Learning Model (VAK) Assisted by Bamboozle Game on Learning Outcomes of Grade IV Students in IPAS Learning

Pengaruh Model Pembelajaran Visual Auditory Kinesthetic (VAK) Berbantuan Game Bamboozle Terhadap Hasil Belajar Peserta Didik Kelas IV Dalam Pembelajaran IPAS

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***Abstract*— Learning activities at one of Malang City's primary schools are still dominated by the lecture method, resulting in less interaction, variety and motivation for students to learn. This causes the achievement of learning outcomes has not met the expected standards. Therefore, it is necessary to apply innovative learning models and interactive media such as Visual, Auditory, Kinesthetic (VAK) and edugame to increase student interest and participation. This study aims to determine the effect of the VAK learning model assisted by the Bamboozle game on the learning outcomes of fourth grade students on the material "Economic Activities" in IPAS learning at SDN 02 Sukun Malang. The method used is quantitative with the type of quasi experiment using pretest-posttest control group design. The sample consisted of two classes, namely class IVB as an experimental group with the VAK model assisted by the Bamboozle game, and class IVA as a control group with the lecture method. The research instruments were tests and observations. Data analysis was carried out through validity, reliability, difficulty, and differentiation tests, followed by normality, homogeneity, and hypothesis testing using Independent Sample t-Test. The results showed a significant difference between the learning outcomes of the two classes. The significance value of the posttest hypothesis test is 0.013 <0.05, which means that the VAK learning model assisted by the Bamboozle game has a positive effect on improving learning outcomes. This model also increases students' enthusiasm and involvement in learning.**

Keywords*— *VAK Model, Bamboozle Game, Learning Outcomes

I. INTRODUCTION

The rapid development of technology today requires teachers to develop their creativity in providing learning materials to students so that they can be understood optimally (Azizah & Widiyati, 2023).Teachers need to innovate learning, learning facilities, and forms of evaluation that will be used to measure the success of students (Murdiana et al., 2020). Inappropriate use of learning methods by teachers can cause students to be unmotivated in the teaching and learning process. The loss of motivation of students often makes students experience boredom in capturing learning material (Hanina et al., 2021). The boredom felt by students can reduce student participation during the learning process so that it affects student learning outcomes (Asrul Sultan & Putri Paurru, 2019). Therefore, it is important for educators to continue to evaluate and adapt the learning methods and media used to remain relevant and interesting for students. Learning is a process, such as organizing, coordinating the learning environment around students so that students can develop and be helped while following the learning process (Nur Azis, Gali Pribadi, 2020). A learning can be said to be effective if there is a transfer of learning between teachers and students, which means that the material explained by the teacher can be understood by students (Dewi, 2019). The use of learning models provides an alternative for educators to choose the most appropriate, relevant, and effective approach in achieving predetermined educational goals (Albina et al., 2022). The learning model is a guide for educators in planning classroom learning, starting from preparing learning tools, media and tools, to evaluation tools that lead to efforts to achieve lesson objectives (Mirdad, 2020). According to (Rokhimawan et al., 2022) the learning model is defined as an example of a description of a learning process that has been presented by the teacher in class. The implementation of the right learning model not only increases the effectiveness of learning, but also contributes to the development of students' competencies and skills in the learning process.

In addition to the use of learning models, one component that also needs to be kept in mind is the use of learning media. Media is a link between the teacher's understanding and students so that it can make it easier for students to understand a material, the media also functions to attract students' interest in learning and reduce boredom following learning (Susanti, 2020). Therefore, the selection and utilization of creative and innovative learning media is quite important in creating a comfortable and effective learning environment for students. Previous research provides various explanations regarding the application of the VAK learning model in improving student learning outcomes at various levels and subjects. Widodo et al (2024) in their research entitled “The Effect of Visual Auditory Kinesthetic (VAK) Learning Model Assisted by Pamphlets on Student Learning Outcomes” emphasized the use of pamphlet media as a learning support to improve learning outcomes. Salsabila et al (2024) with the title “The Effect of Visual Auditory Kinesthetic (VAK) Learning Model on Students' Cognitive Learning Outcomes on Disaster Mitigation Material in Class XI IPS SMA Negeri 1 Jakarta” and Sukmawati et al (2022) which only focus on improving students' cognitive learning outcomes regarding the material used with the VAK model. Firdaus et al (2024) developed the VAK model by adding elements of Suggestopedia in their research entitled “The Effect of the VAKS Method (Visual, Auditory, Kinesthetic, Suggestopedia) on Social Studies Cognitive Learning Outcomes of Elementary School Learners”, thus providing a more comprehensive approach to social studies learning and Nurhuda et al (2021) in a study entitled “The Effect of Visual Auditory Kinesthetic (VAK) Learning Model Assisted by Corner Clock Media on Learning Achievement of Grade III Learners” also showed that the VAK model supported by appropriate learning media can significantly improve student learning achievement.

In some previous studies, it can be explained that this research is different from previous studies because it focuses on the application of the VAK learning model combined with Bamboozle edugame media to improve student interaction and understanding which will have an impact on learning outcomes. Most of the previous studies only highlighted the importance of learning innovation without specifically linking the VAK model with game-based media. In addition, this research was conducted on IPAS learning in grade IV SD, which is still rarely discussed in the context of using edugames as learning aids. Based on observations at SDN Sukun 02 Malang, the learning process in the fourth grade is less interactive and varied. During learning, the teacher only conveys material using the lecture method and also the teacher re-writes the textbook material on the blackboard, so that learning is only teacher-centered and the lack of use of learning media that attracts students' interest in learning. As a result, students are less active during the learning process because students are too busy writing and listening to the teacher's explanation. In addition, when the teacher asks questions about the material that has been delivered, only a few students can answer the questions. The average learning outcome of students in IPAS subjects in class IV SDN 02 Sukun Malang is 68 so that it does not reach the minimum standard for achieving student learning outcomes with a score of 70.The solution to the problems that exist at SDN 02 Sukun school in IPAS learning can be overcome by using innovative learning models and also interactive learning media so that students have an interest in participating in learning.

One of the learning models is the VAK learning model. The use of the VAK model can help educators to collaborate the three learning styles (Visual Auditory Kinesthetic) of each student to train and develop the potential that students already have (Trianasari et al, 2019). According to (Oktania & Fitri, n.d., 2025) the VAK learning model is a learning method that prioritizes direct and enjoyable experiences for students by training three learning styles: visualization, discussion, and practice, which are used simultaneously or alternately to achieve effective learning outcomes. So the application of the VAK learning model not only improves student understanding, but also creates a more dynamic and fun learning atmosphere.

In addition, the kinds of learning media that can be used by educators such as print media, audio, visual, audio visual, interactive multimedia, and E-learning (Wasiyah et al, 2023). Edugame is also an example of interactive multimedia that can provide students with various games and learning related to the material explained by the teacher in class (Nurrohman, 2021). One example of edugame is the bamboozle game, this game is a web-based media that can be utilized in learning as a choice of quiz

games. Bamboozle games can be played individually or in groups, so that teachers can take advantage of Bamboozle as a means of learning by teachers as a fulfillment of learning needs for students (Khoiro et al., 2023). The use of edugames such as Bamboozle in learning not only provides a variety of learning media, but also has the potential to increase motivation and active participation of students in the teaching and learning process. The purpose of this research is to find out about the effect of VAK learning assisted by Bamboozle game so that it will have an impact on the motivation and learning outcomes of students. Based on these results, it will be able to compare cognitive learning outcomes between the control class using the lecture method and the experimental class using the VAK model assisted by bamboozle games.

II. METHOD

This study uses a quantitative approach because it aims to prove the impact of the VAK model assisted by the Bamboozle game on learning outcomes. The type of research used is quasi-experimental, with a pretest-posttest control group design. This research was conducted at SDN Sukun 02 Malang during the odd semester in February of the 2024/2025 academic year. The population consisted of two classes: Class IV A and Class IV B. The sampling method used was cluster random sampling. Class IV B was selected as the experimental group, which applied the VAK model assisted by the Bamboozle game, while Class IV A served as the control group using the lecture method.

Table 1. Sample: Grade IV A and IV B students

of SDN Sukun 02 Academic Year 2024/2025

Group	**Class**	Number of Sample
Experimen	IV A SDN Sukun 02	29
Control	IV B SDN Sukun 02	29
	Total	58

Student achievement was assessed using pretest and posttest sheets consisting of 15 multiple-choice questions. Before being given to the actual research subjects, the questions were first tested on different subjects to ensure their quality. This process involved instrument validity testing to ensure that each item truly measured what it was intended to measure, followed by reliability testing to determine the consistency of the measurement results. Additionally, item difficulty and discrimination indices were analyzed to ensure the quality of the test items. Once all tests confirmed that the items were appropriate, they were then administered to the actual student participants. The pretest and posttest scores obtained were analyzed using a normality test with the Chi-Square formula and a homogeneity test using Levene's test formula. If the data met the requirements of both tests, a hypothesis test was conducted using the t-test formula. The formula for the Independent Sample t-test is as follows:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{Sg\sqrt{(\frac{1}{n_1} + \frac{1}{n_2})}}$$

The t-test is a parametric statistical method used to determine whether there is a significant difference between two sample groups, thereby helping to identify whether the applied model has a positive effect on students' learning outcomes (Putri et al., 2023). This data analysis is used to evaluate the effectiveness of the implemented learning model.

III. RESULTS AND DISCUSSION

Before conducting the research, the researcher carried out a validity test, reliability test, item difficulty level test, and discrimination index test to ensure that the questions used in the study were truly appropriate, high-quality, and capable of accurately and objectively measuring students' abilities. These tests were conducted on a trial sample at SDN Gondowangi 2.

The Validity

The validity test was conducted on Thursday, February 13, 2025, at SDN Sukun 2 Malang. A total of 21 questions were prepared based on indicators aligned with the IPAS subject for fourth grade, specifically the topic "Me and My Needs." The participants involved in this stage were 20 students. Based on the students' scores, the researcher classified the test items according to their validity. From the 21 items, 15 were found to be valid and 6 were invalid. Therefore, the researcher used the 15 valid questions as the research instrument.

Table 2. Validity Test Results of Test Items – Grade IV Students

at SDN Gondowangi 2, Academic Year 2024/2025

Result	**Aspects and Question Criteria**
Valid	2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20
Invalid	1, 3, 7, 14, 17, 21

Reliability Test

The reliability test functions to assess how accurately the test participants answered the questions. An instrument is considered reliable if the calculated r-value (r-count) is greater than the critical r-value from the table (r-table). The results of the reliability test are as follows:

Table 3. The Reliability Test Result

Cronbach's Alpha	**N of Items**
.868	15

Difficulty Level Test

The item difficulty test was conducted to determine how difficult the test items were, which would be used to measure learning outcomes and pretest performance. The analysis of the difficulty level showed that out of 15 test items, 1 item was categorized as easy, while the remaining 14 items were classified as moderate. An item is considered easy if its difficulty index is greater than 0.70, which indicates that most students were able to answer it correctly.

Table 4. Difficulty Level Test Results of Test Items Table – Grade IV Students

at SDN Gondowangi 2, Academic Year 2024/2025

Result	Aspects and Question Criteria
Valid	2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20
Invalid	1, 3, 7, 14, 17, 21

Discrimination Index Test

The discrimination index test is a method used to evaluate the ability of a test item to distinguish between high- and low-performing students (Solichin, 2017). Based on the analysis of the 15 questions, the results showed excellent discrimination. Each item's discrimination index fell into the "very good" category, indicating that the questions could clearly differentiate between students with high and low abilities. This proves that the test items used were truly effective in measuring students' abilities in a deeper and fairer way.

After completing the item testing on the trial sample, the validated items were then administered to the actual sample group for the real research process.

Normality Test

The normality test is a statistical test used to assess whether the data distribution follows a normal distribution. Parametric statistics require the data of each variable to be normally distributed (Ahadi & Zain, 2023). The results of the normality test for the pretest and posttest in both the experimental and control classes can be seen in the following table:

Table 5. Normality Test Table – Grade IV Students

at SDN Sukun 2 Malang, Academic Year 2024/2025

Class	Sig. Pretest	Sig. Postest
Ex**s**perimen	0,390	0,224
Control	0,291	0,109

Based on the normality test results table, it is known that the pretest and posttest data in both the experimental and control classes are normally distributed, as the significance values obtained are greater than 0.05. Therefore, it can be concluded that the posttest data from both the experimental and control groups follow a normal distribution.

Homogeneity Test

The homogeneity test was conducted to ensure that the variance among the samples was consistent, so the assumption of uniform distribution is fulfilled before performing further statistical analysis such as the independent t-test (Sianturi, 2022). The results of the homogeneity test are presented in the following table:

Table 6: Homogeneity Test of the Control Class

Levene Statistic	df1	df2	Sig.
0,901	1	56	0,347

Table 7: Homogeneity Test of the Experimen Class

Levene Statistic	df1	df2	Sig.
0,627	1	56	0,432

Based on Tables 6 and 7, it can be seen that the significance values are 0.347 and 0.432, which are greater than 0.05 (sig. > 0.05). Therefore, it can be concluded that the data are homogeneous.

Hypothesis Testing

The hypothesis test used in this study is the independent sample t-test. The t-test is used to measure the difference in means between two populations by comparing the means of two samples (Mustafidah et al., 2020). The decision rule is as follows,if the significance value (p-value) is ≥ 0.05, then accept H_0 and reject H_1. If the significance value is < 0.05, then reject H_0 and accept H_1. The results of the mean difference test for the pretest and posttest scores are presented in Tables 8 and 9.

Table 8: Hypothesis Testi Table for Pretest

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
hasil	Equal variances assumed	1.265	.266	.166	56	.869	.655	3.956	-7.269	8.580
	Equal variances not assumed			.166	55.155	.869	.655	3.956	-7.272	8.582

Table 8 shows the results of the mean difference test with the assumption of homogeneous variance (equal variance assumed). The calculated p-value (sig-2 tailed) is 0.869, which is ≥ 0.05. Therefore, we accept H_0 and reject H_1, meaning there is no significant difference in the mean pretest scores for cognitive IPAS learning outcomes between the experimental and control classes.

Table 9: Hypothesis Testi Table for Posttest

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
hasil	Equal variances assumed	1.566	.216	-2.563	56	.013	-8.207	3.202	-14.621	-1.793
	Equal variances not assumed			-2.563	53.274	.013	-8.207	3.202	-14.628	-1.786

Table 9 shows the results of the mean difference test with the assumption of homogeneous variance (equal variance assumed). The calculated significance value is 0.013, which is < 0.05. Therefore, we reject H_0 and accept H_1, meaning there is a significant difference in the mean posttest scores for cognitive IPAS learning outcomes between the experimental and control classes. This proves that H_1 is accepted, indicating that the use of the Visual, Auditory, Kinesthetic (VAK) model with the Bamboozle game has a positive effect on the improvement of learning outcomes for Grade IV students on the topic of Economic Activities.

DISCUSSION

Based on the analysis of the instruments, the questions used in this study have met the validity and reliability criteria. Out of 21 questions, 15 were valid, and the reliability reached a value of 0.868, indicating excellent consistency. Most of the questions also fall into the medium difficulty category and have a very good discriminating power. This is supported by the study of Juliani & Erita (2023), who found that out of 20 questions, 15 were valid and the instrument's reliability reached 0.89, indicating that the instrument is highly suitable for accurately and consistently measuring students' abilities. This analysis shows that the instrument used is appropriate for objectively measuring students' abilities. According to Sari & Nugroho (2021), valid and reliable instruments are crucial for obtaining accurate data in learning evaluations, which increases confidence in the research results.

In the data analysis stage, normality, homogeneity, and hypothesis tests were conducted to ensure the validity of the results before further statistical analysis. The normality test results show that the pretest and posttest values from both classes have a normal distribution because the significance value is greater than 0.05, meaning the data meet the requirements for parametric statistical analysis. This finding is also supported by Wulandari & Octaryan (2021), where the normality test results show that the pretest and posttest data from the experimental and control classes have a significance value greater than 0.05. Furthermore, if the significance value for both the pretest and posttest is greater than 0.05, the data can be validated as normally distributed and eligible for parametric analysis (Triastuti et al., 2024). Therefore, the use of parametric statistical analysis is appropriate because the normality assumption of the data has been met. The homogeneity test also shows significance values of 0.347 and 0.432, which are greater than 0.05, indicating that the data are homogeneous, and thus comparisons between the two groups can be made fairly. This aligns with the homogeneity test criteria described by Ismail (2022), who states that data are considered homogeneous if the Levene test significance value is greater than 0.05, meaning the variances between the groups are equal, and the comparison analysis can be conducted validly.

Furthermore, the hypothesis test shows that there is no significant difference between the pretest scores of the two groups, with a calculated p-value (sig-2 tailed) of $0.869 \geq 0.05$. However, there is a significant difference in the posttest scores, with a calculated significance value of $0.013 < 0.05$, meaning we reject H_0 and accept H_1, indicating a significant difference in the posttest mean scores. This result proves that the use of the VAK learning model with the Bamboozle game has a significant impact on students' learning outcomes. This is in line with the research by Mustafidah et al. (2020), which stated that using a learning model that engages multiple senses can significantly enhance students' understanding.

The improvement in students' learning outcomes after the implementation of the Visual, Auditory, Kinesthetic (VAK) learning model with the Bamboozle game shows that this learning model is effective in creating an enjoyable, interactive learning environment that helps students better understand the material. The Bamboozle game also helps in increasing students' enthusiasm for learning and reinforcing their memory of the material presented. This is supported by Marlina's (2021) research, which found that a VAK-based learning approach with interactive media significantly improves students' learning outcomes, particularly in cognitive aspects. Based on these results, the VAK learning model is not just a variation of teaching methods but also an effective solution to increase student engagement and learning outcomes. This study successfully demonstrated the effectiveness of the VAK model, in line with Askalia & Husna's (2024) opinion that the VAK model is effective in enhancing students' multirepresentational mathematical abilities with excellent implementation of learning. Additionally, Nurjanah et al. (2022) also stated that the application of the VAK model significantly influences the improvement of students' learning outcomes, further strengthening the validity of using this model in diverse learning contexts.

IV. CONCLUSION AND SUGGESTIONS

Based on the results of the research conducted, it can be concluded that the implementation of the VAK model assisted by interactive games in IPAS learning also demonstrates that students' diverse learning styles can be effectively accommodated through this approach. Students who tend to be visual learners benefit from engaging material presentations, auditory learners are assisted through teacher explanations and discussions, while kinesthetic students actively engage through game activities. The combination of these approaches creates a learning experience that is not monotonous and more meaningful. Moreover, the use of digital media such as Bamboozle makes the learning process more relevant to the technological habits of today’s children. This supports the idea that adaptive learning, which caters to students' needs and learning styles, is crucial in promoting academic success and opens up opportunities for teachers to continually innovate in designing effective and enjoyable teaching strategies in the classroom. As a suggestion, future research could further develop the VAK model with other interactive digital media variations to make learning even more engaging and aligned with technological advancements and students' needs.

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