



THE EFFECT OF BLENDED LEARNING METHOD ASSISTED BY CHATBOT DARA APPLICATION ON FIFTH GRADE STUDENTS' LEARNING OUTCOMES

Hidayatul Fitri¹, Hermansyah², Vidya Setyaningrum³

^{1,2,3}Universitas Islam Negeri Pontianak

Surel: vidyasetyaningrum@iainptk.ac.id

Abstrak

Penelitian ini dilatarbelakangi oleh pemanfaatan teknologi digital yang telah menunjukkan dampak positif terhadap presentasi akademik peserta didik. Aplikasi chatbot merupakan salah satu teknologi yang dapat dimanfaatkan untuk meningkatkan kualitas pembelajaran di kelas. Metode penelitian yang digunakan adalah Quasi Eksperimental dengan desain *pretest-posttest control group design*. Jumlah populasi dalam penelitian ini adalah 128 peserta didik kelas 5 SD. Sampel yang digunakan adalah kelas 5B dan Kelas 5C. Teknik pengumpulan data menggunakan tes dan non tes. Instrumen pengumpulan data yang digunakan adalah lembar soal, lembar observasi, dan pedoman dokumentasi. Teknik analisis yang digunakan adalah analisis deskriptif dan uji hipotesis. Berdasarkan analisis data yang diperoleh: 1) Hasil belajar pretest kelas kontrol sebesar 34 sedangkan posttest sebesar 59. 2) Hasil belajar pretest kelas eksperimen sebesar 46,77 sedangkan posttest sebesar 80,96. 3) Terdapat pengaruh yang signifikan pada penerapan metode blended learning berbantuan aplikasi chatbot DARA dengan uji *effect size* sebesar 9,1935. Sehingga dapat disimpulkan bahwa secara umum penggunaan metode *blended learning* berbantuan aplikasi chatbot DARA memberikan pengaruh yang tinggi terhadap hasil belajar peserta didik.

Kata Kunci: Blended Learning, Chatbot DARA, Hasil Belajar

Abstract

This research is motivated by the use of digital technology that has shown a positive impact on the academic presentation of students. Chatbot applications is one technology that can be utilized to improve the quality of learning in the classroom. The research method used is Quasi Experimental with pretest-posttest control group design. The total population in this study were 128 5th grade students. The samples used were class 5B and Class 5C. Data collection techniques used tests and non-tests. The data collection instruments used were question sheets, observation sheets, and documentation guidelines. The analysis technique used was descriptive analysis and hypothesis testing. based on data analysis obtained: 1) Control class pretest learning outcomes was 34 while the posttest was 59. 2) Experimental class pretest learning outcomes was 46,77 while the posttest was 80,96. 3) There is a significant effect on the application of the blended learning method assisted by DARA chatbot application. with an effect size test of 9.1935. So it can be concluded that in general the use of blended learning methods assisted by DARA chatbot applications has a high influence on student learning outcomes.

Keywords: Blended Learning, Chatbot Dara, Learning outcomes

A. INTRODUCTION

Based on the daily test scores for science lessons at SD Negeri 34 Kota Pontianak, the scores for class 5B were 53.4 and for class 5C were 40.47. The average scores obtained by students in these two classes are still insufficient to meet the minimum passing grade of 70. Teachers are still lacking in variety when delivering science material, so learning is still teacher-centered, resulting in some students still lacking concentration during lessons. As a researcher aiming to improve learning outcomes, the researcher wishes to apply technology to the material on the circulatory

system using the blended learning method. This research is motivated by the use of digital technology that has shown a positive impact on the academic presentation of students. with the use of technology in education that is growing today. Using chatbot applications is one of the technologies that can be utilized to improve the quality of learning in the classroom. Blended learning is learning that utilizes technology by conducting classes online and combined with in-person classroom learning. Learners who follow blended learning can access their own learning materials and learn independently, while still receiving instructions from teachers through face-to-face interaction or online media. In addition, thanks to technological advances, chatbots supported by artificial intelligence can now serve as learning assistants for learners.¹

A chatbot is a software that talks to human users. It is a virtual assistant that can answer a number of user questions, providing the correct responses. As said earlier, one of the application areas of Chabot is Education. Recently there has been the biggest rise of Chatbots to support learners' learning. Chatbot technology can be considered as an important innovation in this technology as they are turning out to be the most innovative solution in filling the gap between technology and education.² According to Istiqomah et al³, a chatbot is a PC program created to connect with people using ordinary language. The main ability of chatbots is to revive human discussions. Chatbots can copy human discussions in a normal structure including being structured or communicated in language by utilizing man-made reasoning strategies, for example Natural Language Processing (NLP), image handling, video, and voice checking. A chatbot or commonly called a conversational robot is a computer program created to interact with humans using natural language. The main function of a chatbot is to simulate human conversation.

The chatbot that will be used in this research is a chatbot that has been developed by previous researchers. Istiqomah et al⁴ found that there are three aspects of their research that need to be validated in the Chatbot teaching material product. First, it was found that the quality of the material has a "very high" validity category based on Gregory's calculation. Second, to determine the score and placement of Qualification 1 Software in the "very high" category, it will be validated using the calculation results that Gregory has provided. Third, the language is considered to be of sufficient quality. Gregory's calculations yielded results with a validity score of 1 and a very high class. As a result, it was determined that the chatbot teaching material was of a high enough level to be used as an additional teaching resource both inside and outside the classroom. However, there is no research that tests the effectiveness of DARA chatbot in the context of blended learning on circulatory system material in elementary school. This research aims to determine the effect of using Dara chatbot through the use of blended learning methods on student learning outcomes.

¹ Alifia Rachmawati and Erwin Erwin, "Pengaruh Model Pembelajaran Think Pair Share (TPS) Berbantuan Media Video Animasi Terhadap Hasil Belajar Siswa Sekolah Dasar," *Jurnal Basicedu* 6, no. 4 (2022): 4, <https://doi.org/10.31004/basicedu.v6i4.3613>.

² Francesco Colace et al., "Chatbot for E-Learning: A Case of Study," *International Journal of Mechanical Engineering and Robotics Research* 7, no. 5 (2018): 528-33, <https://doi.org/10.18178/ijmerr.7.5.528-533>.

³ Khusnul Istiqomah et al., "Pengembangan Bahan Ajar Chatbot Berbasis Artificial Intelligence Materi Sistem Peredaran Darah Manusia Kelas V," *Perspektif Pendidikan dan Keguruan* 14, no. 1 (2023): 50-56, [https://doi.org/10.25299/perspektif.2023.vol14\(1\).12455](https://doi.org/10.25299/perspektif.2023.vol14(1).12455).

⁴ Khusnul Istiqomah et al., "Pengembangan Bahan Ajar Chatbot Berbasis Artificial Intelligence Materi Sistem Peredaran Darah Manusia Kelas V," *Perspektif Pendidikan dan Keguruan* 14, no. 1 (2023): 1, [https://doi.org/10.25299/perspektif.2023.vol14\(1\).12455](https://doi.org/10.25299/perspektif.2023.vol14(1).12455).

B. METHOD

According to Sugiyono⁵ "research methods are basically scientific ways to get data with specific purposes and uses". Thus, in conducting research, it is necessary to have an appropriate research method to obtain data that will be examined in a study. The research method used in this study uses quantitative research with a quasi experimental approach with a pretest-posttest control group design. Quasi experimental design is a design that has a control group, but cannot fully function to control external variables that affect the implementation of the experiment.⁶ Then, the pretest posttest control group design involves randomly selecting two groups, which are then examined first to see if there is a difference between the experimental group and the control group. This study involved 61 learners who were divided into 2 classes, namely 5B which consist of 30 students became the control class and 31 students of class 5C became the experimental class.

The techniques that researchers use in this study are tests and nontests. In this study, the test used was a multiple choice question given with a pretest-posttest. The instrument was tested for validity using expert tests and shows that the instrument has a high validity category. The data obtained was then analyzed by researchers to find answers about whether there was an effect of using the blended learning method assisted by the DARA chatbot application on the material of the human circulatory system on the learning outcomes of class V students at SD Negeri 34 Pontianak Kota.

C. RESULT AND DISCUSSION

The results of this study were conducted on December 4, 2023 until completion at SD Negeri 34 Pontianak Kota where this research was held in 2 classes, namely class 5B as a control class and class 5C as an experimental class. The instruments in this study were interviews, observations, and test questions on test questions totaling 10 multiple choice questions. The purpose of this study was to determine the effect of the application of the blended learning method assisted by chatbot application on human circulatory system material on learning outcomes at SD Negeri 34 Pontianak Kota in 2023/2024 academic year.

Table 1. Learning Outcomes of Control, Experimental and Difference Classes.

Statistic	Experiment		Control		Difference	
	<i>Pretest</i>	<i>Posttest</i>	<i>Pretest</i>	<i>Posttest</i>	<i>Experiment</i>	<i>Control</i>
Total	1450	2510	1020	1770	10,60	750
Maximum Value	70	100	60	80	60	40
Minimum Value	10	50	10	30	10	0
Standard Deviation	16,40	12,20	15,22	12,68	12,58	10,74
Varians	269,24	149,03	231,72	161,03	158,49	115,51
Average	46,77	80,96	34	59	34,19	25

The data shows that the experimental group experienced a greater improvement in learning outcomes compared to the control group. The decrease in standard deviation and variance in the experimental group's posttest also indicates more consistent results. Furthermore, the effect of using the DARA chatbot can be seen in more detail through the following test results:

1. Difference test

Using Independent Sample T-Test

Independent Sample T-Test Hypothesis Formula:

⁵ Sugiyono Sugiyono, *Metode Penelitian Kuantitatif* (Bandung: CV Alfabeta, 2022).

⁶ Sugiyono, *Metode Penelitian Kuantitatif*.

Ho: There is no difference in the average difference score between the control class and the experimental class.

Ha: There is a difference in the average difference score between the control class and the experimental class.

Table 2. Independent Sampel T-Test Result

Independent Sample T-Test	Sig.(2-tailed)
Control and experiment class	0,003

Based on the "Test Statistics" output, it is known that the Sig. (2-tailed) of 0.003 then Ha is accepted, so it can be concluded that the hypothesis is accepted. Thus it can be said that there is a difference in the average learning outcomes between the control class and the experimental class. Because there is a significant difference, it can be said that "there is an effect of using the blended learning method assisted by the Chatbot dara application on learning outcomes in the subject of the human circulatory system in class V at SD Negeri 34 Pontianak Kota."

2. Effect Size test

The effect size test in this study using Hedge's formula was used to calculate the level of influence in the effect size test. This is due to the relatively small sample size in the primary research. From the comparison of pretest and posttest scores, it is known: results SD_{pooled} which is 3.360, then the next is to find out the effect size as follows:

$$\text{Hedges' } g = \frac{M_1 - M_2}{SD_{pooled}} = \frac{25,0000 - 34,1935}{3,360} = 9,1935$$

From the above calculations with the results of $9.1935 > 1.45$, it can be categorized in the use of blended learning methods assisted by Chatbot application on learning outcomes of human respiratory system material in class V at SD Negeri 34 Pontianak Kota has a high influence.

Discussion

1. Control Class learning outcomes

According to an interview with one of the students, the cause of the low pretest results is that students find it difficult to understand and confuse the questions. Due to the teacher using the usual teaching pattern, it is more monotonous and boring for students, so the level of initial knowledge about the human circulatory system, which is the field of study of this study, is still quite low. This is in accordance with Segara et al⁷ which states that the initial conceptual errors in the circulatory system material are in the students' errors in arranging the sequence of the circulatory system, misunderstanding the function of the chambers, and classifying the lung organ as an organ of the circulatory system.

Also teachers are more focused on using printed books, so students lack mastery of the lesson. Parents also lack support and guidance for students in learning all subjects, especially in this case science lessons at home.⁸ Meanwhile, mindset of students towards science lessons that are difficult, monotonous, and only dominated by the teacher alone causes a sense of boredom and boredom when following the learning process in class so that it has an impact on the low motivation of students during the learning process, and the role of parents in

⁷Angga Bayu Segara et al., "The Types and Causes of Misconceptions about the Circulatory System in Madrasah Ibtidaiyah Negeri of Pontianak City," *Jurnal IPA & Pembelajaran IPA* 8, no. 2 (2024): 143–55, <https://doi.org/10.24815/jipi.v8i2.38563>.

⁸Rachmawati and Erwin, "Pengaruh Model Pembelajaran Think Pair Share (TPS) Berbantuan Media Video Animasi Terhadap Hasil Belajar Siswa Sekolah Dasar."

supervising students when outside the school environment is still low.⁹

In this study, the control class used learning with a scientific approach. The learning outcomes of control class students on the posttest score were 59. There were 12 out of 30 students or 40% who had reached the KKM of 70. Scientific methods improve students' ability to think critically and solve problems.¹⁰ With a scientific approach, students are encouraged to actively seek information, analyze data, and draw their own conclusions. Learners not only receive information passively, but they are also encouraged to ask questions, test hypotheses, and draw conclusions.

Meanwhile, the scientific approach teaches 21st century skills such as communication, collaboration, technological understanding, and critical thinking.¹¹ Learners learn to work together in teams, convey ideas well, use technology for research and analysis, and critically evaluate information. These skills are essential for success in various aspects of life. However, further efforts are needed to achieve optimal understanding. Lack of teacher understanding of the concepts and steps of scientific learning, lack of facilities and infrastructure, heavy curriculum load, lack of teacher and student motivation, and ineffective evaluation are the main factors for the less than optimal implementation of scientific learning.¹²

2. Experimental Class learning outcomes

The learning outcomes of students in the experimental class were measured by cognitive tests. Learning outcomes are measured before being given treatment (posttest). The data on the results of this study were conducted in class V C, obtained a recapitulation of the pretest learning outcomes of students in class V C. The learning outcomes of experimental class students on the pretest score were 46.77. In the pretest value 1 of 31 students who have reached the KKM which is 70 with a percentage of 66.81%. researchers conducted interviews before conducting research in the experimental class. Interviews at SD Negri 34 Pontianak with the focus of observation on the ongoing learning process and teaching materials used. Based on the results of observations, it can be concluded that the learning process still uses teaching materials in the form of books and is assisted by the use of power point media. This was also obtained from the results of interviews with the homeroom teacher.

Learning using technology has characteristics that can involve students directly operating the technology during the learning process so that students become more active¹³. Not only that, the application and use of interactive digital teaching materials can support learning that can improve students' learning achievement.¹⁴ This happens because interactive digital teaching materials can describe the material clearly and are attractively designed. Learning in the 4.0 era requires utilizing existing technology in the learning process, so that the learning process can be easy and can improve student learning outcomes.¹⁵

⁹ Banun Havifah Cahyo Khosiyono et al., *Teori dan Pengembangan Pembelajaran Berbasis Teknologi Digital di Sekolah Dasar* (Deepublish, 2022).

¹⁰ Ade Rimelda Sibuea and Elfia Sukma, *Analisis Langkah-Langkah Pendekatan Saintifik pada Pembelajaran Tematik Terpadu di Sekolah Dasar Menurut Para Ahli*, 4, no. 1 (2021).

¹¹ Khosiyono et al., *Teori dan Pengembangan Pembelajaran Berbasis Teknologi Digital di Sekolah Dasar*.

¹² Anita Jojor and Hotmaulina Sihotang, "Analisis Kurikulum Merdeka Dalam Mengatasi Learning Loss Di Masa Pandemi Covid-19 (Analisis Studi Kasus Kebijakan Pendidikan)," *Edukatif: Jurnal Ilmu Pendidikan* 4, no. 4 (2022): 4.

¹³ Maharani Putri Kumalasani, "Kepraktisan Penggunaan Multimedia Interaktif Pada Pembelajaran Tematik Kelas IV SD," *Jurnal Bidang Pendidikan Dasar* 2, no. 1A (2018): 1A, <https://doi.org/10.21067/jbpd.v2i1A.2345>.

¹⁴ Ngulmi Khamidah et al., "Discovery Learning: Penerapan Dalam Pembelajaran IPA Berbantuan Bahan Ajar Digital Interaktif Untuk Meningkatkan Prestasi Belajar Siswa," *JIPVA (Jurnal Pendidikan IPA Veteran)* 3, no. 1 (2019): 87, <https://doi.org/10.31331/jipva.v3i1.770>.

¹⁵ Kumalasani, "Kepraktisan Penggunaan Multimedia Interaktif Pada Pembelajaran Tematik Kelas IV SD."

In this study, the experimental class used learning with the DARA chatbot. The learning outcomes of experimental class students on the posttest score were 80.96. There are 29 out of 31 learners or 93.54% who have reached the KKM which is 70. Chatbots in education have the potential to increase learner engagement through dynamic and responsive interactions. In addition, chatbots can assist the learning process and provide feedback to learners, especially during distance learning. According to research conducted by Istiqomah et al¹⁶, students who use chatbots to learn about the material of the human circulatory system of living things have better learning outcomes compared to students who do not use chatbots. This can be caused by the chatbot's ability to deliver material interactively, gradually, and repeatedly. A chatbot may be a better way to teach. According to Musfiroh¹⁷ chatbots can present material in a more interactive and engaging way, such as by using animations, videos, or games. Animations and videos can help learners understand the material better because they can provide a clearer picture of the concept. Meanwhile Alam et al¹⁸ showed through chatbot digital tools, educational materials comprising images, videos, and texts hoping to motivate students to review the lesson.

3. The Effect of Blended Learning Method Assisted by DARA Chatbot Application on Learning Outcomes.

In this study for the normality test using the Kolmogorov-Smirnov test, it is known that the control pretest value is $0.008 > 0.05$, the experimental pretest is $0.040 > 0.05$, the control posttest is $0.002 < 0.05$ and the experimental posttest is $0.001 < 0.05$, it can be concluded that the control and experimental pretest values are normally distributed while the control posttest and experimental posttest are not normally distributed. Then the results of the homogeneity test using the Levene statistical test show that the pretest value is $0.996 > 0.05$ and the posttest is $0.441 > 0.05$, then H_a is accepted, meaning, the data is homogeneous. As for the pretest difference test using the U mann-whitney test, the Asymp. Sig. (2-tailed) $0.004 < 0.05$, then Hypothesis is accepted. Thus it can be said that there is a difference in pretest results between the control class and the experimental class.

Then the difference test uses the pretest difference test. By reducing the control class pretest and posttest and the experimental class pretest and posttest. By using normality test, homogeneity test and Independent Sample T-Test test. In the normality test, the difference is known that the control class pretest value is $0.001 > 0.05$, so H_a is accepted, meaning that the data is homogeneous. Then by using the Independent Sample T-Test test, it is known that the Sig value. (2-tailed) $0.003 < 0.05$, then Hypothesis is accepted. Thus it can be said that there is a difference in posttest results between the control class and the experimental class. Because there is a significant change, it can be said that the use of a blended learning method assisted by chatbot application has a significant influence on the learning outcomes of human circulatory system material in class V at SD Negeri 34 Pontianak Kota.

Blended learning methods with the help of chatbot applications are proven to improve learner learning outcomes in science subjects. Chatbots can help learners acquire 21st century skills that are important for their future.¹⁹ In addition, chatbots can increase learners'

¹⁶ Istiqomah et al., "Pengembangan Bahan Ajar Chatbot Berbasis Artificial Intelligence Materi Sistem Peredaran Darah Manusia Kelas V," 2023.

¹⁷ kulsum Musfiroh, "Pengembangan Media Pembelajaran Interaktif Berbasis Chatbot Website Pada Materi Jaringan Tumbuhan" (sarjana, Universitas Siliwangi, 2023), <https://doi.org/10.10.20BAB%20V.pdf>.

¹⁸ Indra Nurul Alam et al., "Rancang Bangun Chatbot Zeno Sebagai Media Ajar Tata Surya Dan Bahasa Inggris," *Infotech: Journal of Technology Information* 9, no. 2 (2023): 137–44, <https://doi.org/10.37365/jti.v9i2.187>.

¹⁹ Pustikayasa et al., *TRANSFORMASI PENDIDIKAN*.

motivation and improve their engagement in learning. According to Lee et al²⁰, chatbots can be an effective blended learning tool that can help students learn better and make learning more enjoyable and independent. The results showed that there was a significant difference between the use of chatbots and student learning outcomes. This is in accordance with Rahmawati et al²¹, shows that the application of blended learning methods with the help of chatbot applications is effective in increasing student motivation and learning activeness. There was an increase in student learning motivation from both intrinsic and extrinsic aspects, as well as an increase in student learning activeness through active participation in learning. The chatbot application helps students understand the material more easily, provides personalized feedback, and encourages self-learning.

The magnitude of the effect of the application of the blended learning method assisted by DARA chatbot application in this study was calculated using the effect size test. It is known that the results of the effect size test are $9.1935 > 1.45$, so it can be categorized in the use of blended learning methods assisted by chatbot applications on learning outcomes of human circulatory system material in class V at SD Negeri 34 Pontianak Kota has a "high influence". According to research conducted by Fikri et al²² based on testing the effectiveness of the treatment applied in this study, namely the use of chatbot media in the direct instruction learning model as an effort to improve student learning outcomes, the results of the effect size calculation showed a value of 0.046. So it can be concluded that the level of effectiveness of using chatbot media in the direct instruction learning model is 0.046 or 4.6% with the interpretation of the effect size value small or showing a small effect.

Learning with chatbot media can change from learning from the teacher as a source of information to active and independent learners who seek information and complement the knowledge provided.²³ Chatbot can be developed with the presentation of material information and questions interactively like students are communicating with teachers quickly and efficiently. The chatbot works by scanning the keywords in the input, after which it replies with the most matching keywords or most similar word patterns from the textual database. Meanwhile, according to research conducted by Suriyah et al²⁴, based on the results of this study, online lectures are learning that is carried out by utilizing technology through virtual applications and using the internet. As a lecturer, it is important to first understand students' learning preferences or tendencies by using appropriate methods or media that can spark their interest in online learning. However, students with limited technological literacy may face difficulties in engaging effectively in online learning activities. Online lectures themselves refer

²⁰ Juyeon Lee et al., "Improving Science Conceptual Understanding and Attitudes in Elementary Science Classes through the Development and Application of a Rule-Based AI Chatbot," *Asia-Pacific Science Education* 9, no. 2 (2023): 365–412, <https://doi.org/10.1163/23641177-bja10070>.

²¹ Lailia Rahmawati et al., "Penerapan Chatbot Auto Reply Pada Whatsapp Sebagai Pelayanan Informasi FIFGroup Menggunakan Artificial Intelligence," *Jurnal Intake: Jurnal Penelitian Ilmu Teknik Dan Terapan* 12, no. 2 (2021): 66–72.

²² Ely Khuzatul Fikri et al., "Penggunaan Media Chatbot dalam Model Pembelajaran Direct Instruction sebagai Upaya Meningkatkan Hasil Belajar Siswa," *Global Education Journal* 1, no. 3 (2023): 335–51, <https://doi.org/10.59525/gej.v1i3.210>.

²³ Utin Febri Yantika, "Chatbot Sebagai Solusi Pembelajaran Mandiri Untuk Bab Kimia Unsur: Tinjauan Literatur Dan Rekomendasi Pengembangan Dengan ADDIE," *Dharmas Education Journal (DE_Journal)* 4, no. 1 (2023): 33–43, <https://doi.org/10.56667/dejournal.v4i1.900>.

²⁴ Puput Suriyah et al., "Effectiveness Of Vaksin Assisted Blended Learning Model On Student Learning Outcomes In Geometry," *Jurnal Math Educator Nusantara: Wahana Publikasi Karya Tulis Ilmiah Di Bidang Pendidikan Matematika* 8, no. 1 (2022): 39–47, <https://doi.org/10.29407/jmen.v8i1.17785>.

to the delivery of learning materials without the constraints of time and location, utilizing various technologies within an open, flexible, and distributed learning environment.

Based on the experts' opinions above, it can be concluded that blended learning assisted by DARA chatbot application can be an effective tool to improve students' learning, learning motivation, learning engagement, and good learning outcomes. In addition, chatbot can also provide personalized and timely feedback to help learners with their learning needs. Therefore, the application of the blended learning method assisted by the DARA chatbot application is highly recommended to be applied in various schools in order to assist or facilitate educators in providing the delivery of learning materials during the learning process so that students' learning outcomes can improve in accordance with the learning objectives to be achieved.

D. CLOSING

Conclusions

Based on the results of the research on the effect of the application of the Blended Learning method assisted by the DARA Chatbot application on student learning outcomes associated with the formulation of problems and research objectives, the following conclusions can be obtained: The learning outcomes of control class students on the pretest score are 34. On the average pretest score of 30 students none of them have reached the KKM. The learning outcomes of control class students with an average posttest score of 59. There are 12 (40%) of the 30 students who have reached the KKM. The learning outcomes of experimental class students on the pretest score were 46.77. In the pretest of 4 (12.90%) of 31 learners who have reached the KKM. The learning outcomes of experimental class students on the posttest with an average score of 80.96. There are 29 (93.54%) of 31 learners who have reached the KKM. Based on the results of statistical tests, it shows that the use of blended learning methods assisted by chatbot applications has a significant influence on the learning outcomes of human circulatory system material in class V at SD Negeri 34 Pontianak Kota. The effect of blended learning method assisted by DARA chatbot calculated by effect size is (9.1935) which means it has a high influence.

Recommendations

Teachers should implement the blended learning method using the DARA chatbot application during science lessons by providing clear and structured instructions. This approach helps prevent student boredom caused by textbook-only learning. Additionally, teachers are encouraged to design creative and engaging learning experiences that boost students' motivation and enthusiasm.

E. REFERENCES

- Alam, Indra Nurul, Dhafa Alifandra, Suciana Wijirahayu, and Mentari Yuliani. "Rancang Bangun Chatbot Zeno Sebagai Media Ajar Tata Surya Dan Bahasa Inggris." *Infotech: Journal of Technology Information* 9, no. 2 (2023): 137–44. <https://doi.org/10.37365/jti.v9i2.187>.
- Colace, Francesco, Massimo De Santo, Marco Lombardi, Francesco Pascale, Antonio Pietrosanto, and Saverio Lemma. "Chatbot for E-Learning: A Case of Study." *International Journal of Mechanical Engineering and Robotics Research* 7, no. 5 (2018): 528–33. <https://doi.org/10.18178/ijmerr.7.5.528-533>.
- Febri Yantika, Utin. "Chatbot Sebagai Solusi Pembelajaran Mandiri Untuk Bab Kimia Unsur: Tinjauan Literatur Dan Rekomendasi Pengembangan Dengan ADDIE." *Dharmas Education Journal (DE_Journal)* 4, no. 1 (2023): 33–43. <https://doi.org/10.56667/dejournal.v4i1.900>.

- Fikri, Ely Khuzatul, Ai Nur Solihat, and Iis Aisyah. "Penggunaan Media Chatbot dalam Model Pembelajaran Direct Instruction sebagai Upaya Meningkatkan Hasil Belajar Siswa." *Global Education Journal* 1, no. 3 (2023): 335–51. <https://doi.org/10.59525/gej.v1i3.210>.
- Istiqomah, Khusnul, Vidya Setyaningrum, and Dwi Surya Atmaja. "Pengembangan Bahan Ajar Chatbot Berbasis Artificial Intelligence Materi Sistem Peredaran Darah Manusia Kelas V." *Perspektif Pendidikan dan Keguruan* 14, no. 1 (2023): 50–56. [https://doi.org/10.25299/perspektif.2023.vol14\(1\).12455](https://doi.org/10.25299/perspektif.2023.vol14(1).12455).
- Istiqomah, Khusnul, Vidya Setyaningrum, and Dwi Surya Atmaja. "Pengembangan Bahan Ajar Chatbot Berbasis Artificial Intelligence Materi Sistem Peredaran Darah Manusia Kelas V." *Perspektif Pendidikan dan Keguruan* 14, no. 1 (2023): 1. [https://doi.org/10.25299/perspektif.2023.vol14\(1\).12455](https://doi.org/10.25299/perspektif.2023.vol14(1).12455).
- Jojo, Anita, and Hotmaulina Sihotang. "Analisis Kurikulum Merdeka Dalam Mengatasi Learning Loss Di Masa Pandemi Covid-19 (Analisis Studi Kasus Kebijakan Pendidikan)." *Edukatif: Jurnal Ilmu Pendidikan* 4, no. 4 (2022): 4.
- Khamidah, Ngulmi, Winarto Winarto, and Vita Ria Mustikasari. "Discovery Learning : Penerapan Dalam Pembelajaran IPA Berbantuan Bahan Ajar Digital Interaktif Untuk Meningkatkan Prestasi Belajar Siswa." *JIPVA (Jurnal Pendidikan IPA Veteran)* 3, no. 1 (2019): 87. <https://doi.org/10.31331/jipva.v3i1.770>.
- Khosiyono, Banun Havifah Cahyo, Muhamad Fajarudin, Endar Dwi Jayanti, et al. *Teori dan Pengembangan Pembelajaran Berbasis Teknologi Digital di Sekolah Dasar*. Deepublish, 2022.
- Kumalasani, Maharani Putri. "Kepraktisan Penggunaan Multimedia Interaktif Pada Pembelajaran Tematik Kelas IV SD." *Jurnal Bidang Pendidikan Dasar* 2, no. 1A (2018): 1A. <https://doi.org/10.21067/jbpd.v2i1A.2345>.
- Lee, Juyeon, Taesoo An, Hye-Eun Chu, Hun-Gi Hong, and Sonya N. Martin. "Improving Science Conceptual Understanding and Attitudes in Elementary Science Classes through the Development and Application of a Rule-Based AI Chatbot." *Asia-Pacific Science Education* 9, no. 2 (2023): 365–412. <https://doi.org/10.1163/23641177-bja10070>.
- Musfiroh, Kulsum. "Pengembangan Media Pembelajaran Interaktif Berbasis Chatbot Website Pada Materi Jaringan Tumbuhan." Sarjana, Universitas Siliwangi, 2023. <https://doi.org/10.10.20BAB%20V.pdf>.
- Pustikayasa, I. Made, Imam Permana, Fitriani Kadir, et al. *TRANSFORMASI PENDIDIKAN : Panduan Praktis Teknologi di Ruang Belajar*. PT. Sonpedia Publishing Indonesia, 2023.
- Rachmawati, Alifia, and Erwin Erwin. "Pengaruh Model Pembelajaran Think Pair Share (TPS) Berbantuan Media Video Animasi Terhadap Hasil Belajar Siswa Sekolah Dasar." *Jurnal Basicedu* 6, no. 4 (2022): 4. <https://doi.org/10.31004/basicedu.v6i4.3613>.
- Rahmawati, Lailia, Fiana Kusuma Agis Kuncara, and Izzatul Umami. "Penerapan Chatbot Auto Reply Pada Whatsapp Sebagai Pelayanan Informasi FIFGroup Menggunakan Artificial Intelligence." *Jurnal Intake: Jurnal Penelitian Ilmu Teknik Dan Terapan* 12, no. 2 (2021): 66–72.
- Segara, Angga Bayu, Kartini Kartini, and Vidya Setyaningrum*. "The Types and Causes of Misconceptions about the Circulatory System in Madrasah Ibtidaiyah Negeri of Pontianak City." *Jurnal IPA & Pembelajaran IPA* 8, no. 2 (2024): 143–55. <https://doi.org/10.24815/jipi.v8i2.38563>.
- Sibuea, Ade Rimelda, and Elfia Sukma. *Analisis Langkah-Langkah Pendekatan Saintifik pada Pembelajaran Tematik Terpadu di Sekolah Dasar Menurut Para Ahli*. 4, no. 1 (2021).
- Sugiyono, Sugiyono. *Metode Penelitian Kuantitatif*. Bandung: CV Alfabeta, 2022.

Suriyah, Puput, Anita Dewi Utami, and Cahyo Hasanudin. "Effectiveness Of Vaksin Assisted Blended Learning Model On Student Learning Outcomes In Geometry." *Jurnal Math Educator Nusantara: Wahana Publikasi Karya Tulis Ilmiah Di Bidang Pendidikan Matematika* 8, no. 1 (2022): 39–47. <https://doi.org/10.29407/jmen.v8i1.17785>.