The Effectiveness of Multimedia Animation-Based Integrative Learning Model During Covid-19 Pandemic at Primary School

Siti Maisaroh[✉] and Nafisah Endahati

Universitas PGRI Yogyakarta, Yogyakarta, Indonesia
`sitimaisaroh@upy.ac.id`

Abstract. Problems arise on learning process during pandemic covid-19, those are feeling bored of children, no communication and interaction between teacher and students, the inadequate learning tools and facilities, and the low motivation of students' motivation. A way to overcome the problems is done with various learning resources such as multimedia animation. This study is to reveal multimedia animation-based integrative learning model effectiveness during the pandemic covid-19 in primary schools. The research was conducted at Bantul Warung primary school. Experimental quantitative research was conducted, by one-group pre-test and post-test designs. The study used 32 fifth graders of SD Bantul Warung. Data was collected through tests and documents. It was analysed by using paired sample T-Test. The results showed that by using integrative learning model based on multimedia animation, the average student learning achievement increases. It showed 73.44 before treatment categorized in medium. While the average student achievement after the treatment reaches 86.66 in the high category. Indicating the results of the Paired Sample Test, the t-value is -9.262 with a Sig. (2-tailed) value of 0.000. The value of Sig. $0.000 < 0.05$ indicates that there is a difference between the values before and after treatment, finally declared that multimedia animation-based integrative learning model is effective in improving pupils' achievement.

Keywords: integrative learning · animation · multimedia · and pandemic covid-19

1   Introduction

The existence of technological developments affected the education system in Indonesia. Starting from primary to universities they have been using technology to support learning process as well in class and outside activities. The role of technology as to facilitate learning process needs to be addressed widely, especially during current covid-19 pandemic. As an educator or teacher, you must be able to respond and follow the development of technology as a learning model that could be applied in the classroom.

Educational technology will provide benefits for learning, as regarding information on learning process and material will be given more quickly to students. The existence

of learning models developing due to technological developments, such as e-learning or virtual classes. Those platforms make students easier to manage their learning time more flexible but still achieve their learning goals.

Covid-19 pandemic forced government to implement education system policies to help minimize the spread of covid-19 virus. Since the beginning of January 2022, the government has declared the policy of the enforcement of community activity restrictions (PPKM). This effects the implementation of learning and school system. Schools were closed so that the mobilization and interaction could be minimized. Online learning system became the best choice that all school stakeholders must obey. One of the points stated in the emergency PPKM regulations is point number 4, namely compulsory online or online teaching and learning activities. Mona (2020) mentions online learning can be done using various media as modules (print media), and audio, video, internet, radio and television (non-print ones) [1]. We also can other various learning media as multimedia [2].

In primary schools in the province of Yogyakarta (DIY), the implementation of the online learning system is implemented, although with various obstacles and problems. Some of the obstacles are as follows; 1) students and parents received poor knowledge about information technology, 2) learning becomes boring, 3) learning assessment is hampered, 4) learning becomes less effective so that student achievement results decreased [3]. These obstacles can be reduced by providing learning assistance. Learning mentoring is a business that can be done by accompanying, providing assistance, motivating, providing facilities and supervising during the learning process [4]. In online learning, teachers experience obstacles, especially in using the right media for learning [5].

Observation on teaching and learning process was taken to students at SD Bantul Warung. Online learning activities make students bored. The limitations of communicating and interacting with fellow classmates in class and with the teacher resulted in students not being enthusiastic in learning. Learning that requires students to communicate and interact directly with classmates and teachers is also significantly affected. The availability of supporting facilities such as laptops and mobile phones is also a problem for students. In general, students in the primary schools cannot use mobile phones sharing with their parents. Those with mobile phone facilities also still find it difficult to provide internet data even though the government has assisted them. However, there are still students who do not receive internet quota assistance even though they have been registered as beneficiaries.

The efforts of teachers to teach by applying variations of various online learning methods are less than optimal in increasing students' motivation to learn. When participating in online learning, students look passive, less communicative and interactive. This condition causes learning motivation to decrease. Low learning motivation can have a negative impact on students, namely in the form of decreased learning achievement [6]. Student learning motivation is different for each child, there are students who have high learning motivation but some have low learning motivation [7]. One of the teacher's efforts that need to be made in online learning is to apply creative and innovative learning by developing animation learning media based on local wisdom [8].

To improve student learning achievement during the covid pandemic, one way that can be done is by utilizing information technology to support increased learning success in schools. Teachers may use information technology as one of the more interesting learning models for students. In this study, an integrative learning model based on multimedia animation would be applied as a way to improve learning achievement which has decreased during this pandemic. By using this model abstract subject matter can be better explained to pupils. Therefore, this study was done to determine the effectiveness of multimedia animation-based integrative learning media to improve student learning achievement during covid-19 pandemic at Bantul Warung Primary School.

2   Literature Study

Learning model is a pattern of guidance in planning learning in groups and tutorials [9]. It is to guide the teachers and educators in carrying out learning process [10]. So the learning model is a conceptual framework functioned as a learning guide to achieve goals.

Integrative learning model is a learning model that is not teacher-centered so that students will be actively concerned in process. Along with the process, interactions between teachers and students designed to assist students in achieving learning goals, namely helping understanding related to systematic knowledge and improving critical thinking skills [11]. Interactive multimedia learning media has an informative and attractive appearance so that it can make it easier and increase student interest in learning [12]. The integrative learning model is a synergistic learning activity between several disciplines in an integrated manner and based on the same theme and in a similar learning context with the aim of mastering the same graduate competency. Integrative is reflected in the determination of certain graduate competencies that are used as themes for learning several related subjects by going through certain steps, namely: (1) determining themes according to the competencies of selected graduates, (b) organizing themes using topic networks, namely making integration with other subjects that can support the mastery of this competency, (c) collecting materials and resources, (d) designing activities and projects. The results conveyed applying integrative learning model could boost pupils learning outcomes [13]. Likewise, the application of the integrative learning model in Indonesian language learning can boost pupils learning achievement [14].

Learning that manipulates information, communication technology or multimedia is termed interactive multimedia-based learning media. The use of learning media is meant to accommodate teachers in delivering subject and in understanding the lesson being taught. In addition, content of the subject matter can be adapted to be more interesting and easier to comprehend, the objectives of difficult material will be undemanding, the stressful learning atmosphere turns to be fun.

Interactive multimedia is the implication of computers to combine text, graphics, audio, moving images (video and animation) into a single unit with the right links and tools to enable multimedia users to navigate, interact, create, and communicate [15]. Furthermore, multimedia is also interpreted as a computer system comprising of hardware and software. Those systems unite images, video, photography, graphics and animation with sound, text and voice data controlled by computer programs interactively [16]. Hence, animation is a series of frames which, when operated in order with ample speed, is able to cause images smoothly moving as in film or video. With the change from visual media in the form of still images into animated multimedia that moves, students are easier to understand the material presented by the teacher [17]. The advantages of applying animated multimedia in process of learning can clarify the presentation of learning material so that it can be effective and efficient [18]. Animated media is a device that has features in the form of audio and visual that can be used in the implementation of learning that can be recorded on a video disc [19]. Its outcome exhibits that the animated multimedia was more effective in improving student learning outcomes than using still image visual media [20]. To improve student achievement, it is influenced by the learning media used, namely using multimedia [21]. Based on theoretical studies and research studies that have been carried out previously, a hypothesis can be formulated that the multimedia animation-based integrative learning model effectively improves student achievement.

3   Material and Research Method

This research was carried out at the Bantul Warung Primary School, which is located at Jalan Jendral A. Yani, Bantul. Sample of study were all students of SD Bantul Warung, with a sample of 32 students in class V. This research took one independent and one dependent variables. The former variable was interactive learning model based on multimedia animation and the dependent variable was student achievement. Data was collected through tests and documents. Quantitative experimental method with a one-group pre-test-post-test design was taken. The design can be described as shown in Fig. 1.

Prior to testing the hypothesis, the analysis requirements test was carried out, namely the normality test using the One-Sample Kolmogorov-Smirnov Test, then to discover the multimedia animation-based integrative learning model effectiveness utilizing the paired sample t-test. The pre-test and post-test assessments were analysed using the Paired Sample t-Test. Paired Sample t-Test is a two-sample difference test in pairs. Paired samples are the same subject, but experience different treatments. The test was managed on the pre-test and post-test scores for the before-after class, namely before and after using an integrative learning model based on multimedia animation. The method of data analysis in the Paired Sample T-test utilizes the T-Test (Pre-test – Post-test) formula for the Two-Mean Paired Data Difference Test, as shown in Fig. 2 [22].
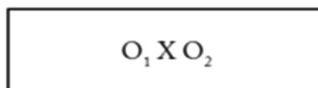
$$O_1 \; X \; O_2$$

Fig. 1. Design of Quantitative Experimental Method

$$t = \frac{\sum di}{\sqrt{\dfrac{N\sum di^2 - (\sum di)^2}{N-1}}}$$

Fig. 2. Formula of Two–Mean Paired Data Difference Test

4   Data Analysis

4.1   Students Learning Achievement

Analysis of student achievement in learning is shown from the pre-test and post-test scores. The pre-test score was acquired from the students' scores before using the multimedia animation-based integrative learning model, and the post-test scores were obtained from students' scores after using multimedia animation-based integrative learning model. In this research, the calculation of the value of student achievement in learning is done to determine whether the multimedia animation-based integrative learning model is effective in improving student achievement in learning.

Based on the average value obtained before and after treatment using an integrative learning model based on multimedia animation has increased. The average value before treatment was 73.44 and the average value after treatment was 86.66. The value of student achievement before using the multimedia animation-based integrative learning model is categorized in Table 1.

Based on Table 1, 43.75% of student achievement is in the high category, and 56.25% is in the medium category. Based on the average value before treatment of 73.44, it is on the criteria of 25 X $\leq$ 75 so it can be concluded that the average student achievement before receiving treatment with an integrative learning model based on multimedia animation is in the medium category.

The value of student achievement after using the multimedia animation-based integrative learning model is categorized in Table 2.

Based on the Table 2, 93.75% of student achievement is in the high category, and 6.25% is in the medium category. Based on the average value after treatment of 86.66, it is on criteria X $>$ 75 so it can be concluded that the average student achievement after receiving treatment with an integrative learning model based on multimedia animation is in the high category.

4.2   Normality Test

The obtained research data is spoken normally distributed or not could be checked by normality test. Calculation of normality test from student achievement data before and after treatment calculated using the Kolmogorov-Smirnov test can be read in Table 3.

Ground on the results of the Kolmogorov-Smirnov normality test in Table 3, the Asymp.Sig (2-tailed) value before treatment was 0.095 and the post-treatment value was 0.128 which was greater than 0.05. It means that the values pre and post treatment are normally distributed.

Table 1. The value of student learning achievement before treatment

Criteria	Frequency	Percentage	Category
X > 75	14	43,75%	High
25 ≤X≤75	18	56,25%	Medium
X <25	0	0,00%	Low
Total	32	100%	

Table 2. The value of pupil learning achievement after treatment

Criteria	Frequency	Percentage	Category
X > 75	30	93,75%	High
25 ≤X≤75	2	6,25%	Medium
X <25	0	0,00%	Low
Total	32	100%	

Table 3. Value of Normality test before and after treatment

One-Sample Kolmogorov-Smirnov Test		Pre-	Post-
N		32	32
Normal Parameters[a,b]	Mean	73.44	86.66
	Std. Deviation	9.708	5.807
Most Extreme Differences	Absolute	.143	.138
	Positive	.138	.096
	Negative	-.143	-.138
Test Statistic		.143	.138
Asymp. Sig. (2-tailed)		.095[c]	.128[c]
a. Test distribution is Normal.			
b. Calculated from data.			

4.3 Paired Sample T-Test

After knowing the values pre and post treatment are normally distributed through Kolmogorov-Smirnov normality test, the next step is to find out whether student learning achievement has increased significantly or not, then data interpretation is executed using Paired-sample T-Test with the criteria for the value of Sig(2-tailed). 0.05. The results of the Paired Sample T-Test is described in Table 4 (Tables 5 and 6).

The multimedia animation-based integrative learning model effectiveness in this research can be seen through increasing student achievement in learning. It can be seen from the value before and after treatment. This assessment of learning achievement

Table 4. Paired Samples Statistics Test Result

Paired Samples Statistics				
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	73.44	32	9.708	1.716
	Post	86.66	32	5.807	1.026

Table 5. Paired Samples Test Result Correlations

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pre- and Post-	32	.557	.001

Table 6. Paired Samples Test Result

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre – & Post -	-13.219	8.071	1.427	-16.129	-10.309	-9.265	31	.000

improvement was carried out before using an integrative learning model based on multimedia animation. Researchers conducted a pre-test before learning on 32 students with an average pre-test score of 73.44. Then the researchers conducted learning activities using an integrative learning model based on multimedia animation and conducted a post-test. After the data was analysed, the post-test average value after learning was 86.66. This shows an increase in student achievement in learning after using an integrative learning model based on multimedia animation. Lead to the conclusion that the multimedia animation-based integrative learning model effectively increases pupil achievement.

Based on t-test results using a significance level of 5%, the Paired Samples Test table obtained a t value of -9.265 with a Sig. (2-tailed) value of 0.000. The value of Sig. 0.000 < 0.05 specified that there is a difference between the values pre and post treatment. So it would be underlined that multimedia animation-based integrative learning model can improve pupil achievement in learning. The research outcome is in accordance with the statements of Haris Budiman's research (2017), that in the current era of globalization, the rapid development of information technology has an influence on the area of education [23]. The world of education needs to constantly adapt with technological developments to improve the quality of education, especially in the learning process. The same thing was also expressed by [24], the use of ICT in education is very useful, especially in the learning process. Those findings are also in line with the findings of

research conducted by Treesly Y. N. Adoe & Herlin Glorina Manane (2022) that interactive learning media Lectora inspire is effectively used to increase student achievement motivation [25]. Martinus Tekege (2017) also concludes in his research that in education the need for technology is not something new, utilizing technology will make learning more conducive and innovative, and has been shown to have a major influence on the smooth teaching and learning process [26]. By utilizing technology as one of the learning media, it finds uncomplicated for teachers to teach and interact both in and outside classrooms. A well-designed and professional learning process will facilitate the achievement of educational goals. In every learning activity there will be interaction between teacher and student. The teacher designs the lesson, while the students will carry out the lesson designed by the teacher. Throughout covid-19 pandemic era, teacher's role in designing learning, especially with interactive multimedia animation-based learning models, will greatly assist students in understanding the subject matter, because it has been designed in an attractive manner and has proven to be effective in improving student achievement.

5   Conclusion and Suggestion

5.1   Conclusion

Multimedia animation-based integrative learning model effectiveness in this study can be seen through increasing student achievement in learning. The increase in student achievement can be seen from the pretest and posttest scores conducted to 32 students. The average pretest score before treatment was 73.44 in the medium category and the posttest average score after treatment was 86.66 in the high category. Ground on the outcome of the t test with a significance level of 5%, the Paired Samples Test table obtained a t value of -9.265 with a Sig. (2-tailed) value of 0.000. The value of Sig. 0.000 < 0.05 indicates that there is a difference between the values before and after treatment. Consequently, it is drawn a conclusion that multimedia animation-based integrative learning model is effective to boost student achievement.

5.2   Suggestion

Teachers should be able to deal with worldwide innovations, one of which is by turning to account technology. The learning model that is created must suit with the learners needs, the typical of the lesson, and the conditions of the school.

References

1. V. No and N. Mona, "Konsep Isolasi Dalam Jaringan Sosial Untuk Meminimalisasi Efek Contagious (Kasus Penyebaran Virus Corona Di Indonesia)," *J. Sos. Hum. Terap.*, vol. 2, no. 2, pp. 117–125, 2020, doi: https://doi.org/10.7454/jsht.v2i2.86.

2. R. Noveandini and M. S. Wulandri, "Pemanfaatan Media Pembelajaran Secara Online (E-Learning) Bagi Wanita Karir Dalam Upaya Meningkatkan Efektivitas Dan Fleksibilitas Pemantauan Kegiatan Belajar Anak Siswa / I Sekolah Dasar," *Semin. Nas. Apl. Teknol. Inf.*, vol. 2010, no. Snati, pp. 71–74, 2010, [Online]. Available: https://journal.uii.ac.id/Snati/article/view/1865/1641

3. L. T. Prawanti and W. Sumarni, "Kendala Pembelajaran Daring Selama Pandemic Covid-19," *Pros. Semin. Nas. Pascasarj. UNNES*, pp. 286–291, 2020.

4. T. Handayani, H. N. Khasanah, and R. Yoshinta, "Pendampingan Belajar Di Rumah Bagi Siswa Sekolah Dasar Terdampak Covid-19," *ABDIPRAJA (Jurnal Pengabdi. Kpd. Masyarakat)*, vol. 1, no. 1, p. 107, 2020, doi: https://doi.org/10.31002/abdipraja.v1i1.3209.

5. T. Sekarwangi, K. E. Sartono, A. Mustadi, and A. Abdulah, "The Effectiveness of Problem Based Learning-Based Interactive Multimedia for Elementary School Students," *Int. J. Elem. Educ.*, vol. 5, no. 2, p. 308, 2021, doi: https://doi.org/10.23887/ijee.v5i2.31603.

6. R. Rimbarizki, "Penerapan Pembelajaran Daring Kombinasi dalam Meningkatkan Motivasi Belajar Peserta Didik Paket C Vokasi Di Pusat Kegiatan Belajar Masyarakat (Pkbm) Pioneer Karanganyar," *J+Plus Unesa*, vol. 6, no. 2, pp. 1–12, 2017.

7. B. Wulandari and H. D. Surjono, "Pengaruh problem-based learning terhadap hasil belajar ditinjau dari motivasi belajar PLC di SMK," *J. Pendidik. Vokasi*, vol. 3, no. 2, pp. 178–191, 2013, doi: https://doi.org/10.21831/jpv.v3i2.1600.

8. Bulkani, M. Fatchurahman, H. Adella, and M. Andi Setiawan, "Development of animation learning media based on local wisdom to improve student learning outcomes in elementary schools," *Int. J. Instr.*, vol. 15, no. 1, pp. 55–72, 2022, doi: https://doi.org/10.29333/iji.2022.1514a.

9. Agus Suprijono, *Model-model Pembelajaran*. Jakarta: Gramedia Pustaka, 2011.

10. Trianto, *Model pembelajaran terpadu: konsep, strategi dan implementasi dalam KTSP*. Jakarta: Bumi Aksara, 2010.

11. Eggen P & Kauchak D, *Strategi dan model pembelajaran.* Jakarta: PT Indeks, 2012.

12. W. Wiana, "Interactive Multimedia-Based Animation: A Study of Effectiveness on Fashion Design Technology Learning," *J. Phys. Conf. Ser.*, vol. 953, no. 1, 2018, doi: https://doi.org/10.1088/1742-6596/953/1/012024.

13. A. and N. Sebayang, "Penerapan Model Pembelajaran Integratif Untuk Meningkatkan Hasil Belajar Melaksanakan Pekerjaan Dasar-Dasar Survey Dan Pemetaan," *Educ. Build.*, vol. 1, no. 2, pp. 127–132, 2015, doi: https://doi.org/10.24114/eb.v1i2.2814.

14. G. M. M.Si, "Peningkatan Hasil Belajar Menyusun Teks Laporan Hasil Observasi Pada Peserta Didik Kelas X Sman 7 Malang Dengan Model Pembelajaran Integratif," *JINoP (Jurnal Inov. Pembelajaran)*, vol. 5, no. 1, p. 39, 2019, doi: https://doi.org/10.22219/jinop.v5i1.7244.

15. Hofstetter, *Multimedia Interaktif*. Jakarta: Yudistira, 2001.

16. Azhar Arsyad, *Media pembelajaran.* Jakarta: PT Raja Grafindo Pustaka, 2010.

17. A. Suheri, "Animasi Pembelajaran," *Jur. Tek. Inform.*, vol. 2, pp. 27–33, 2AD.

18. P. S. Nugroho and A. F. Sofyan, "Perancangan Media Pembelajaran Berbasis Multimedia Untuk Dasar-Dasar Pembuatan Animasi 2D Menggunakan Macromedia Flash Mx 2004," *Data Manaj. dan Teknol. Inf.*, vol. 12, no. 4, p. 50, 2011.

19. O. Thomas, "Effectiveness of Animation and Multimedia Teaching on Students' Performance in Science Subjects," *Br. J. Educ. Soc. Behav. Sci.*, vol. 4, no. 2, pp. 201–210, 2014, doi: https://doi.org/10.9734/bjesbs/2014/3340.

20. H. Maksudi, O. Wiharna, and D. Rohendi, "Pengaruh Penggunaan Multimedia Animasi Pada Pembelajaran Kompetensi Dasar Memperbaiki Sistem Starter Terhadap Peningkatan Hasil Belajar Siswa Smk," *J. Mech. Eng. Educ.*, vol. 3, no. 2, p. 174, 2016, doi: https://doi.org/10.17509/jmee.v3i2.4548.

21. R. M. Lubis, E. Napitupulu, and N. Simbolon, "Development of Multimedia-Based Learning Models in Fourth Grade English at Amaliyah Sunggal Elementry School," *Proc. 6th Annu. Int. Semin. Transform. Educ. Educ. Leadersh. (AISTEEL 2021)*, vol. 591, no. Aisteel, pp. 273–281, 2022, doi: https://doi.org/10.2991/assehr.k.211110.096.

22. Riadi Edi, *Statistik Penelitian.* Yogyakarta: Andi Offset, 2016.

23. H. Budiman, "Peran Teknologi Informasi Dan Komunikasi Dalam Pendidikan," *Al-Tadzkiyyah J. Pendidik. Islam*, vol. 8, no. 1, p. 31, 2017, doi: https://doi.org/10.24042/atjpi.v8i1.2095.

24. I. Harun, "Efektifitas Penggunaan Teknologi Informasi Dan Komunikasi Dalam Pembelajaran Pendidikan Agama Islam," *POTENSIA J. Kependidikan Islam*, vol. 1, no. 2, pp. 175–190, 2015.

25. T. Y. N. Adoe and H. Glorina, "Pengembangan Media Pembelajaran Interaktif Menggunakan Lectora Inspire untuk Meningkatkan Motivasi Berprestasi Siswa Keas IV SD Inpres Oeba 1 Kupang," no. April, 2022.

26. M. Tekege, "Pemanfaatan teknologi informasi dan komunikasi dalam pembelajaran SMA YPPGI Nabire," *J. Teknol. dan Rekayasa*, vol. 2, no. 1, pp. 40–52, 2017, [Online]. Available: https://uswim.e-journal.id/fateksa/article/view/38