e-ISSN: 2808-8263
p-ISSN: 2829-0976

Learning Online: the Effect of Learning Digital Badges on Learning Outcome

Nasrah ✉[1], Fitri Yanty Muchtar[2], Fathiyah Nitaninnawa[3], Muhammad Ilham S[4]

[1,2]PGSD Muhammadiyah University of Makassar, Makassar, Indonesia

[3] SD Muhammadiyah 2 Mamajang, Makassar, Indonesia

[4] Universitas Sulawesi Barat, Indonesia

✉ nasrah.fis05@unismuh.ac.id

Abstract. During the COVID-19 pandemic, student learning outcomes have decreased. An effort is needed to increase student learning motivation so that student learning outcomes increase. Based on research, giving reward is one way to increase students' learning motivation. Giving digital badges is an economical and fun way to give rewards to students. This research is collaborative research between lecturers and teachers which aims to develop the ability of lecturers and teachers in conducting collaborative research and to support the technology-based Merdeka Learning program. This research is expected to find out the effect of digital badges in online thematic learning on learning outcomes, and can be a solution to the problem of decreasing student learning outcomes which is the main goal of this research. Data collection using the Experimental method with a Quasi-experimental model. The results showed that there was a significant effect of digital badges on students' online thematic learning outcomes. Based on the results of this study, digital badges can be used as a solution to improve student learning outcomes, especially elementary schools.

Keywords: Digital Badges, Online Learning, Thematic, Motivation, Learning Outcomes.

How to Cite: Nasrah, Muchtar, F. Y., Nitaninnawa, F., & Ilham, M. (2022). Learning Online: the Effect of Learning Digital Badges on Learning Outcome. *Proceeding The 4th International Conference on Elementary Education, 4*(1), 505-514.

INTRODUCTION ~ Education today is growing in the world, this is supported by the development of information and communication technology that is growing. Even with the support of the development of technology and communication, online learning or blended learning is still very minimally implemented in Indonesia.

Various efforts have been carried out by the government to improve the quality of education in Indonesia, for example the implementation of the International Standard School (SBI) to date, namely the Merdeka Learning program. According to the Ministry of Education and Culture's policy on independent learning, teachers must always be ready to carry out learning according to the times and needs of future students.

The Universe supports, in March 2020 almost all countries in the world were affected by the COVID-19 outbreak, so that it had an impact on the economic, social and cultural sectors as well as education. To reduce the spread of this virus, Education is automatically directed to online learning so that teachers, students and parents inevitably go online (learning in the network).

Teachers in Indonesia must learn to make lesson plans in line with online learning. Kindergarten and Elementary teachers must prepare interesting and innovative online learning so that they can motivate students. Generation Z students are familiar with technology, so learning is expected to use a touch of technology in order to optimize the learning process.

e-ISSN: 2808-8263
p-ISSN: 2829-0976

To carry out online learning is not an easy thing for teachers, various obstacles must be overcome, this is in accordance with the results of Rigianti's research (2020), namely the various obstacles experienced by teachers during online learning such as learning applications, internet networks and devices, learning management, assessment and monitoring. To be successful online learning must be accompanied by student independence, this is in accordance with the results of research by Kusumadewi et al., (2020) that independent character is the right character in the application of online learning. To grow the independent character of students, something that can motivate them to learn is needed, one solution is the provision of cheap and attractive rewards in the form of digital badges.

According to Shields & Chugh, (2017) digital badges are an easy, precise and efficient way for educators to show appreciation to students who can motivate students. Delello et al., (2018) the use of digital badges is a means of motivating and rewarding the learning process, besides that digital badges are more important for students than real prizes. This is in line with the research findings of Abramovich et al., (2013) that digital badges encourage student motivation, where digital badges have a positive effect on declining student motivation.

High learning motivation is directly related to improving student learning outcomes. This is in accordance with the results of research by researchers on learning motivation and learning outcomes that have a significant relationship, with aspects of the drive and need in learning that have a very high correlation value (Nasrah & Muafiah, 2020).

The digital badge system has become a common feature in various computer-based learning management systems, this is because it is considered an effective tool to encourage students to be more active in online learning because the features are more like games (Denny, 2015). Physical badges have long been used as a means of achievement. Digital badges are an icon or shape that represents the achievement of a level, which can show the development of the learning process step by step (Bowen & Thomas, 2014).

According to Shields & Chugh, (2017) digital badges represent skills, one's achievements, interests and visual rewards in learning. Badges are a means. The digital badge system can trigger students' learning enthusiasm so that it can be used as a medium to facilitate students to achieve instructional goals and improve learning outcomes (Anderson, A., Huttenlocher, D., Kleinberg, J., & Leskovec, 2013).

Digital badges can be designed as unique as possible which can make students happy and interested in getting them and interested in competing and collaborating. Learning will get the expected results if the learning process goes well, students are active and happy. According to Finkelstein et al., (2013) the use of badges is most widely used in the context of education and learning which is one way of activating engagement and motivating students. The benefits of digital badges are as an easy instrument to verify the implementation of learning and provide motivation in learning (McDaniel & Fanfarelli, 2016).

According to Hickey, et.al (2014) several factors need to be known about the use of digital badges in learning, namely: (a) The use of digital badges characterizes learning and giving digital badges gradually, (b) Aligning digital badges with results or standards, (c) Understanding the use of digital badges for students and how they work, (d) Explaining to students what digital badges are, how digital badges work and where they are used.

Online learning is learning that is done in the network. Nowadays, online learning is increasingly being carried out both at the elementary school level and at the university level. Various digital platforms used in online learning such as Lerning Management System (LMS), Google Classroom, WhatsApp, Telegram, etc. In online learning, interactions are carried out alternately with online participants. According to (Chou & He, 2017) there are three types of online interactions, namely: learner-content, student-teacher and student-student.

Thematic learning is a collaborative program of various aspects of subject perspectives into one theme. Thematic learning is also known as integrated learning. This learning provides active and meaningful learning models for students by empowering students' knowledge and experience to help them better understand life.

METHOD

This type of research is experimental research. In this study, a Quasi Experimental design was used (Quasi Experiment Design). Quasi Experimental design does not assign samples of control and experimental classes randomly (Hastjarjo, 2019). This is in line with Sugiyono (2019) Quasi Experimental control and experimental classes were not chosen randomly. The design used in this study was a pre-test-post-test control group design.

Sources of data in this study are divided into two, namely primary data and secondary data. The primary data sources in this study were students of SD Muhammadiyah 2 Mamajang Makassar. The primary data in this study was a test of student learning outcomes in SD Muhammadiyah 2 Mamajang Makassar. Sources of secondary data in this study were student data of SD Muhammadiyah 2 Mamajang, articles, journals and related literature.

Normality Check Normality test is used to assess whether the data is normally distributed or not. The One Sample Kolmogorov-Smirmov test hypothesis was used to perform the normality test, as shown below. T-test is used in statistical inferential procedure for hypothesis research. The researcher conducted a normality test as a test prerequisite before testing the hypothesis.

RESULTS

Digital badges are badges that are digitally designed to be given to students during the learning process. The following are some examples of digital badges generated in this study:

e-ISSN: 2808-8263
p-ISSN: 2829-0976

Figure 1. Digital Badges

The following is presented in tabular form regarding the initial description of the pre-test learning outcomes for the experimental class and the control class:

Table 1. Statistics of Pre-Test Learning Outcomes

Statistic	Score	
	Control class	Experiment class
Mean	58	57
Median	60	60
Mode	60	60
Std. Deviation	8.00	8.26
Variance	64.01	68.27
Range	24	24
Minimum	43	43
Maximum	67	67

Based on table 1, it can be seen that the average value of the control and experimental classes is under the poor category, with a fairly small difference in value. From these results, it can be seen that the initial ability of the experimental and control class learning outcomes is not much different so that it is possible for the two classes to be able to compare their abilities after the experiment.

If the learning outcomes are grouped into four categories, the frequency and percentage distributions are obtained as follows:

Table 2. Distribution of Frequency and Percentage of Pre-Test Learning Outcomes

No	Score	category	Frequency	Persentase
		Experiment class		
1	93 - 100	Very high	0	00,00%
2	84 - 92	high	0	00,00%
3	75 - 83	currently	0	00,00%
4	<75	enough	11	100.00%
		Control class		
1	93 - 100	Very high	0	00,00%
2	84 - 92	high	0	00,00%
3	75 - 83	currently	0	00,00%
4	<75	enough	10	100.00%

Table 2 shows that from 10 students in the control class and 11 students in the experimental class, the average score of student learning outcomes was converted into the four categories above, so the average pretest learning outcome for the experimental class was included in the poor category, namely 57. While the control class also included in the less category, namely 58.

The following is presented in tabular form regarding the description of post-test learning outcomes for the experimental class and the control class:

Table 3. Statistics of Post-Test Learning Outcomes

Statistik	Score	
	Control	Exsperiment
Mean	77.80	87.82
Median	78	90
Mode	70	75
Std. Deviation	6.98	9.20
Variance	48.84	84.76
Range	17	25
Minimum	70	75
Maximum	87	100

Based on table 3, it can be stated that the average score of post-test learning outcomes for the control class has increased, while the average score for post-test learning outcomes for the experimental class has also increased. In addition, the experimental class has students who reach a value of 100 while the control class only reaches a value of 87. From these results, it can be seen that the learning outcomes of the experimental class and the control class are much different, this means that there is a significant effect on the experimental class.

If the science learning outcomes are grouped into four categories, the frequency and percentage distributions are obtained as follows:

Table 4. Distribution of Frequency and Percentage of Post-Test Learning Outcomes

No	Score	Category	Frequency	Persentase
		Exsperiment class		
1	93 - 100	Very high	4	36,36%
2	84 - 92	High	4	36,36%
3	75 - 83	currently	3	27,28%
4	<75	Enough	0	00,00%
		Control class		
1	93 - 100	Very high	0	00,00%
2	84 - 92	High	3	30,00%
3	75 - 83	currently	3	30,00%
4	<75	Enough	4	40,00%

e-ISSN: 2808-8263
p-ISSN: 2829-0976

Table 4 shows that the frequency of students who scored in the less category reached 0%. For the average score of student learning outcomes converted into the four categories above, the average posttest learning outcomes of the experimental class were included in the high category, namely 87.82. While the control class is also included in the medium category, namely 77.80. The frequency of learning outcomes in the very high category in the control class was around 36, 36%.

After the descriptive analysis was carried out, an inferential analysis was carried out using the pairet sample t-test, the following are the results of the Normality Test:

Table 5. Normality Test Results

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
score	1.00	.192	11	.200*	.882	11	.109
	2.00	.168	10	.200*	.872	10	.106

In the SPSS Test of Normality Shapiro-Wilk output table above, it shows that all data are normally distributed. Based on the results of the normality test, it is stated that it can be continued for the next test, namely hypothesis testing. The following are the results of hypothesis testing (test independent sample t-test).

Table 6. Independent Samples Test

		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
score	Equal variances assumed	.483	.496	2.786	19	.012	10.018	3.596	2.491	17.545

Equal variances not assumed		2.823	18.456	.011	10.018	3.548	2.577	17.460

Based on the table, it can be seen in Sig. (2-tailed). 0.012 < 0.05 then there is a significant effect of digital badges on online thematic learning outcomes for students of SD Muhammadiyah 2 Mamajang.

DISCUSSION

The use of digital badges is a means of motivating and rewarding the learning process, besides that digital badges are more important for students than real prizes so that they affect student learning outcomes. Newby & Cheng (2020) digital badges are widely recognized as innovative pedagogical tools in higher education that support today's learning. In general, digital bagdes are used in higher education in a learning system using a learning management system (LMS) as a reward for students who have done assignments on this platform. In this study, researchers tried to apply digital badges to learning at the elementary level, namely Elementary School (SD) by taking samples of students in high grade, namely fifth grade (V) with consideration of the use and utilization of digital badges required sufficient technological knowledge for students. At the beginning of the application of badges, it was enough for students to understand less, especially writing names on their digital badges, but we made a strategy by writing down the names of students. This is quite inconvenient for teachers who teach who are none other than our team in collaborative research between lecturers and teachers. While teaching students little by little how to write their own name on digital badges.

Based on the research findings, the average posttest learning outcomes of the experimental class were included in the high category, namely 87.82. While the control class is also included in the medium category, namely 77.80. From these results, it can be seen that the learning outcomes of the experimental class and the control class are much different, this means that there is a significant increase in the experimental class, namely the class that applies digital buges. This is in line with Abramovich et al., (2013) that digital badges encourage student motivation, where digital badges have a positive effect on decreased student motivation and student learning outcomes. This is because its features are more like games, the digital badges system has become a feature that is often used in many computer-based learning management systems. This is because it is considered an excellent tool to encourage students to be more involved in online learning (Denny, 2015), (Hurst, 2015).

Thematic learning is a collaborative program of various aspects of subject perspectives into one theme. Thematic learning is also known as integrated learning. So, in need of an innovative learning process, one of them is by applying digital budgets. After the statistical test was carried out, the results of the independent sample t test were obtained by Sig. (2-tailed). 0.012 <0.05 so

e-ISSN: 2808-8263
p-ISSN: 2829-0976

that there is a significant effect of digital badges on online thematic learning outcomes for students of SD Muhammadiyah 2 Mamajang. Papoutsoglou et al., (2020) explained that digital badges are able to change conservative thinking to become more open-minded and enthusiastic. Digital badges are awards that are digitally designed and attractive that can motivate students so that learning outcomes increase. To cultivate the drive and need for learning outcomes requires something that can trigger it. Digital badges are perfect for helping foster a sense of drive and need to learn. Learning is a complex process resulting from the interaction between learning content, student characteristics, instructional staff, and the learning environment (Chou & He, 2017), (West & Lockley, 2016).

CONCLUSION

Based on the results of the study and digital badges, it can be concluded that there is a significant effect of digital badges on students' thematic learning outcomes, this can be seen in the analysis of the independent test data sample t test obtained sig 0.0012 <0.005. The experimental class learning outcomes reached the maximum value and the control class did not at all. So digital badges can be used as online classroom innovations to increase motivation and learning outcomes that require sufficient technological skills for students to be used in class and are more effective when used on LMS platforms.

ACKNOWLEDGMENTS

Acknowledgments to SD Muhammadiyah 2 Mamajang who have contributed a lot in this research and become a place for researchers to conduct research. Furthermore, the authors also thank LP3M Muhammadiyah University of Makassar which provided research grants.

REFERENCES

Abramovich, S., Schunn, C., & Higashi, R. M. (2013). Are badges useful in education?: It depends upon the type of badge and expertise of learner. *Educational Technology Research and Development*, *61*(2), 217–232. https://doi.org/10.1007/s11423-013-9289-2

Anderson, A., Huttenlocher, D., Kleinberg, J., & Leskovec, J. (2013). Steering user behav- ior with badges. *Proceedings OfWorldWide Web 2013 Conference*. http://cs.stanford.edu/people/jure/pubs/badges-www13.pdf

Bowen, K., & Thomas, A. (2014). Badges: A Common Currency for Learning. *Change: The Magazine of Higher Learning, 46(1), 21–25. https://doi.org/10.1080/00091383.2014.867206*

Chou, C. C., & He, S. J. (2017). *The Effectiveness of Digital Badges on Student Online Contributions. Journal of Educational Computing Research, 54(8), 1092–1116. https://doi.org/10.1177/0735633116649374*

Delello, J. A., Hawley, H., McWhorter, R. R., Gipson, C. S., & Deal, B. *(2018). Gamifying education: Motivation and the implementation of digital badges for use in higher education. International Journal of Web-Based Learning and Teaching*

Technologies, 13(4), 17–33. https://doi.org/10.4018/IJWLTT.2018100102

Denny, P. *(2015). The effect of virtual achievements on student engagement. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 763–772. https://doi.org/10.1145/2470654.2470763*

Finkelstein, J., Knight, E., & Manning, S. (2013). *The potential and value of using digital badges for adult learners. American Institutes for Research, 1–46.*

Hastjarjo, T. D. (2019). *Rancangan Eksperimen-Kuasi. Buletin Psikologi, 27(2), 187. https://doi.org/10.22146/buletinpsikologi.38619*

Hickey, D. T., & Willis, J. E. (2017*). Badges design principles documentation project. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). https://doi.org/10.1007/978-3-319-13296-9*

Permendikbud No. 20 Tahun 2016 Tentang Standar Kompetensi Lulusan Pendidikan Dasar dan Menegah, (2016).

Kusumadewi, R. F., Yustiana, S., & Nasihah, K. (2020). *Menumbuhkan Kemandirian Siswa Selama Pembelajaran Daring Sebagai Dampak COVID-19 Di SD. JRPD (Jurnal Riset Pendidikan Dasar), 1(1), 7–13.*

McDaniel, R., & Fanfarelli, J. (2016). *Building Better Digital Badges: Pairing Completion Logic With Psychological Factors. Simulation and Gaming, 47(1), 73–102. https://doi.org/10.1177/1046878115627138*

Nasrah, & Muafiah. (2020). *Hubungan Motivasi dengan Hasil Belajar IPA Mahasiswa Pada Masa Pandemi COVID-19. Jurnal Riset Pendidikan Dasar, 03(2), 207–213.*

Hurst, E. J. (2015). Digital Badges: Beyond Learning Incentives. *Journal of Electronic Resources in Medical Libraries*, *12*(3), 182–189. https://doi.org/10.1080/15424065.2015.1065661

Newby, T. J., & Cheng, Z. (2020). Instructional digital badges: effective learning tools. *Educational Technology Research and Development*, *68*(3), 1053–1067. https://doi.org/10.1007/s11423-019-09719-7

Papoutsoglou, M., Kapitsaki, G. M., & Angelis, L. (2020). *Modeling the effect of the badges gamification mechanism on personality traits of Stack Overflow users. Simulation Modelling Practice and Theory, 105(August), 102157. https://doi.org/10.1016/j.simpat.2020.102157*

Rigianti, H. A. (2020). *Kendala Pemeblajaran Daring Guru Sekolah Dasar. Elementary School, 7(2), 297–302.*

Setyowati, A., & Subali, B. (2011). *Implementasi Pendekatan Konflik Kognitif Dalam Pembelajaran*

e-ISSN: 2808-8263
p-ISSN: 2829-0976

Fisika Untuk Menumbuhkan Kemampuan Berpikir Kritis Siswa Smp Kelas Viii. Jurnal Pendidikan Fisika Indonesia, 7(2), 89– 96. https://doi.org/10.15294/jpfi.v7i2 .1078

Shields, R., & Chugh, R. (2017). *Digital badges – rewards for learning? Education and Information Technologies, 22(4), 1817– 1824. https://doi.org/10.1007/s10639-016-9521-x*

Sugiyono. (2019). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D.* Alfabeta.

West, D., & Lockley, A. (2016). Implementing digital badges in Australia: The importance of institutional context. In *Foundation of Digital Badges and Micro-Credentials: Demonstrating and Recognizing Knowledge and Competencies*. https://doi.org/10.1007/978-3-319-15425-1_26