Edmodo-Based Blended Learning Media in Learning Mathematics

Yullys Helsa[1*], Ary Kiswanto Kenedi[2]
[1]PGSD, Universitas Negeri Padang, Padang City, Indonesia
[2] PGSD, Universitas Samudra, Langsa City, Indonesia
[*] yullys@fip.unp.ac.id

Abstract

This research is motivated by the need of a media that can support student teachers in elementary teacher education in learning mathematics. Therefore, the purpose of this study is to develop Edmodo-based blended learning media in learning mathematics. This research is a research and development (R&D) that uses the ADDIE procedures. This study results a valid, effective and practical Edmodo-based blended learning media in learning mathematics for student teachers in elementary teacher education. It is implied that Edmodo-based blended learning media can be applied by the lecturers to support student teachers' learning activities and process.

Keywords: *blended Learning, Edmodo, mathematics*

1. INTRODUCTION

The rapid development of the digital era requires a change in the educational paradigm (Špiranec & Banek Zorica, 2010). This change obligates the educational sector to shift the classroom learning system. In fact, what is happening today is conventional learning still dominating the learning method. However, it is believed that conventional learning is not suitable anymore to be used in today context when the information-based digital era is penetrated (Leow, 2010). What is needed today is technology as a learning resource, while conventional learning does not provide that mission.

The technology-based learning method is a method that believed to be in line with the characteristics of the millennial students (Henderson, Selwyn & Aston 2017) who like to use technology in everyday life (Corrin, Lockyer & Bennett, 2010). They cannot be separated from the use of technology since they are not only able to use technology, but also understand technology as a whole. The use of technology has become a mandatory part for the students today. Therefore, the teacher as a practitioner of the activity must be able to adjust the learning process for such students because good learning is learning that fits to the characteristics of the students, (Hwang, Sung, Hung & Huang, 2013).

Technology-based learning is a learning method that uses technology as a learning tool. One of the methods that can be applied in such term is e-learning, (Wu, Tennyson & Hsia, 2010). A learning method using the internet or intranet

grows along with the development of the age of information technology. E-learning is very suitable in the learning process for millennial students' characteristics (Moore, Dickson-Deane & Galyen, 2011).

E-learning has various types of strategies such as blended learning or hybrid learning. Blended learning is a learning model that combines online learning with face-to-face learning (Hom & Staker, 2011). Many studies state that good blended learning can improve the learning process and student learning outcomes (López-Pérez, Pérez-López & Rodríguez-Ariza, 2011). With the implementation of blended learning, the students can study online wherever they are. It also utilizes technology so that students do not feel common learning and their learning motivation getting higher, (Hoic-Bozic, Mornar & Boticki, 2009). The students in the industrial revolution 4.0 have a very close relationship with technology, so that blended learning makes them happy to learn by using technology. Blended learning can also make the learning atmosphere comfortable, (Lim & Morris, 2009). Thus, the learning process will increase. From the above research, it can be concluded that blended learning has many benefits to be applied in college learning for the learning process.

In its process, blended learning uses a form of a system called the learning management system (LMS). LMS is a software system that virtualizes the online learning process. This LMS aims to provide learning processes such as classroom management, material or content creation, discussion forums, scoring systems, examination systems and all functions related to the teaching process. This LMS helps teachers in the blended learning process, (Wang et al., 2012). Therefore, it is necessary to use LMS in the process of implementing blended learning. One of the LMS that can be used is Edmodo. It is a private social platform application that provides opportunities for teachers and students to interact with each other, (Thongmak, 2013). Edmodo provides a platform that simplifies the online learning process.

Based on the facts above, it is needed to develop suitable learning that fits the characteristics of students in today era, (Kenedi, 2018). The Present study that the researchers carried out was the development of blended learning using edmodo in the learning process of mathematics for elemetary teacher education students.

2. RESEARCH METHOD

This research was a research and development (R&D) using the ADDIE model (analysis, design, development, implementation, and evaluation).

The analysis phase is the stage of needs analysis seen from the analysis of lecturers, students and curriculum. At this stage an observation sheet, interview sheets and questionnaires are needed as instruments for data collection. The observation sheet is used to observe the curriculum. The interview sheet is used to determine the needs of lecturers and questionnaires to find out the needs of students. The design phase consists of

material design and virtual class design. The design phase used the observation sheet for the data collection instrument. The observation sheet determines the design of the prototype. The development phase consists of developing a prototype design that has been made. At this stage, observation sheets and questionnaires are used for data collection. The observation sheet is used to develop the prototype and questionnaire to determine the validity of the prototype. The implementation stage is the stage of implementing the prototype that has been made and carried out the effectiveness test. At this stage the test is used in the form of questions for data collection. The test is used to determine the effectiveness of the prototype. The evaluation phase is the stage to evaluate the prototype and the practical test is carried out. At this stage, observation sheets and questionnaires are used in data collection. The observation sheet is used to collect information about the lack of prototypes used to complete the prototype and questionnaire used for practical testing.

The research was conducted at the elementary teacher education students of Universitas Negeri Padang in the academic year 2016 AT 01 class. The data collection methods were a closed questionnaire to media experts, mathematical learning experts, teachers, and students to find out the level of practicality. While, the test was useful to see its effectiveness. The research data analysis was conducted in 3 ways,

namely the validation analysis of the results, analysis of blended learning practicality using descriptive percentages, and descriptive statistics of the test.

3. RESULT AND DISCUSSION

The results of this study were described into 5 parts: the analysis, design, development, application, and evaluation of Edmodo-based for blended learning media.

a. The need analysis of Edmodo-based for blended learning media.

The needs analysis was started by interviewing a mathematics lecturer at elementary teacher education department. The results of the interview analysis showed that there were many unfinished learning materials to be conducted face to face, the imbalance portion between material mastering and practical activities carried out by the students, the absence of blended learning to be carried out by the lecturers.

The next analysis was analyzing the curriculum in the program. The results of the analysis found that the program used KKNI (Indonesian National Qualifications Framework). One of the aims of this curriculum is the students' capability and skill in the use of technology in mathematical learning. This demand is in line with the development of technology-based blended learning.

The next analysis is an analysis of the ability of students to use technology. Based on the results of the questionnaire

carried out, 98% of students were able to operate computers well and 100% of students were able to use the internet properly. The ability to use computers and the internet is an ability that students must have in the blended learning process. The results of the questionnaire also stated that as many as 96% of students were interested in learning to use edmodo. This matter can be as a prerequisite criterion to develop a suitable Edmodo-based blended learning for the students.

The last was the material analysis. The subject that being developed was mathematics learning in elementary school. This course had a broad scope which could not be completed only by face-to-face learning.

Based on this analysis, we could argue that there was a need for Edmodo-based blended learning as the first step in its development. Dudlet (in Pushpanathan, 2013) stated that the needs analysis was needed to create and evaluate teachers' and students' attitudes, opinions, and beliefs about new innovations in order to meet the objectives criteria (Pushpanthan, 2013).

b. Edmodo-based blended learning design development

After the result being analyzed, the researchers then made a draft development (Cheung, 2016). The Edmodo design arrangement was based on the results of the needs analysis and consultations from learning media experts and mathematical material experts. This design stage consisted of drafting material and a virtual class at Edmodo.

The draft material was in the form of display design and material presentation, while the draft virtual class at Edmodo included informational draft, display of virtual classes, material insertion, and setting system for lecturers and students. At this stage, researchers must focus on designs that were made to fit the goals (Aldoobie, 2015). The design made had been adjusted to the analysis of the needs and objectives to be achieved in the lesson.

c. Edmodo-based blended learning media development

The stage development of Edmodo-based blended learning media consisted of media development and validation tests. The development carried out was the development of learning materials. The products of the development were PDF, PPT, and learning videos. The results of the learning materials development then inserted into Edmodo. These learning materials were used as learning resources for the students. The material developed must facilitate the students in finding learning resources, (Sulistyani, 2013). The resources had also to be technology-based that suited to current student characteristics (Kosasi, 2015).

The second product developed was the Edmodo virtual class. This class was developed according to a predetermined design. The selection of the Edmodo class was very helpful for lecturers in implementing the learning process since

it was very easy to use because the detail features, (Warawudhi, 2017). Besides, it also had supporting features that facilitated the online learning process, (Balasubramanian, Jaykumar & Fukey 2014).

After the developing stage, the next step was a validation test. Rusman (2011: 264) stated that the criteria for evaluating validity consist of interactivity, independency, accessibility, and enrichment.

The results of the development can be seen in table 1:

Table 1. Media experts' validation result

Parameter	Validation result			Average	Category
	Validator 1	Validator 2	Validator 3		
Interactivity	84	86	81	83,67	Valid
Independency	86	85	88	86,33	Highly Valid
Accessibility	87	87	86	86,67	Highly Valid
Enrichment	88	86	82	85,33	Valid
Average Total	-	-	-	85,50	Valid

It can be inferred that the validity aspect of online learning media was declared to be valid (85.50%). This showed that the developed learning media had met the standards.

Furthermore, the next stage was validating the online learning materials.

Heinich (1996) mentioned some indicators for online learning materials: clear goals, the right content, motivational, the right technical, clear ownership, and having instructions for users. The results can be seen in table 2:

Table 2. Online learning material experts' validation result

Parameter	Validation result			Average	Category
	Validator 1	Validator 2	Validator 3		
Goal	87	87	87	87,00	Highly Valid
Content	86	84	88	86,00	Highly Valid
Motivation	82	81	81	81,33	Valid
Technical	86	84	84	84,67	Valid
Ownership	85	84	83	84,00	Valid
Instruction for users	82	83	83	82,67	Valid
Average Total	-	-	-	84,28	Valid

The result above indicated that online learning materials were feasible to be used.

Therefore, this prototype could be used after being validated by the expert, (Semadiartha, 2012). The prototype validity showed to be in line with the specified standards.

d. Edmodo-based blended learning media implementation

At this stage, the Edmodo-based blended learning media was tested. The result of its effectiveness toward the students' learning outcomes can be seen in figure 1.

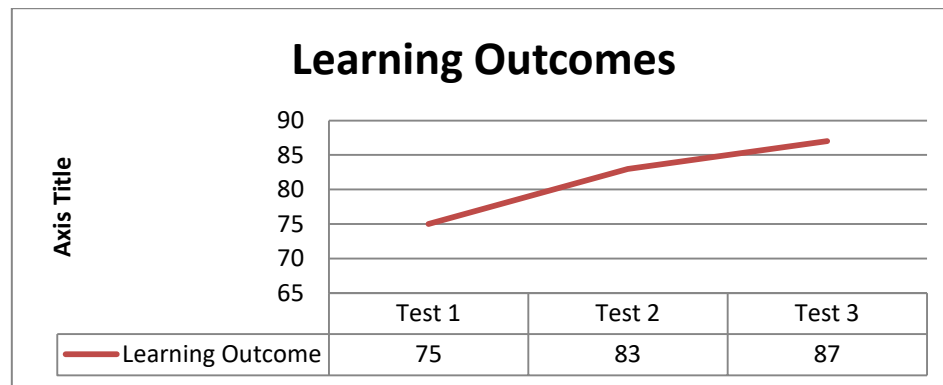Figure 1. Learning Outcomes graphic

	Test 1	Test 2	Test 3
Learning Outcome	75	83	87

Figure 1 showed that the students' learning outcome increased in each given test using Edmodo-based blended learning media. The average result on test 1 scored 75, 83 for the second test, and 87 on the third test. This result indicated that Edmodo-based blended learning media was effective, (Effendi, 2016).

This raise happened because of the change of students' experience in learning from conventional to Edmodo-based blended learning methods because good learning was fun learning for the students, (Nurseto, 2011). Edmodo was one of the fun lessons that had advantages to improve student perceptions of the learning process, (Enriquez, 2014) since it accommodated the students' characteristics in today's era. In addition, it could also increase the interaction between the lecturers and students, (Mokhtar & Dzakiria, 2015). Thus, the strong communication between them resulted in a good communication to make the learning processes run optimally. In addition, Ekici (2017) stated that learning using Edmodo media can be practically implemented for students and has a positive impact.

e. Edmodo-based blended learning media evaluation

The evaluation aimed to see the practicality of the developed prototype. The practicality test consisted of the teachers' and students' practicality tests.

The teacher practicality test took into account features developed in Edmodo. The feature was adapted and developed from Kurniawati (2014) that included course code, notes, alerts, assignments, quizzes, polls, and progress. The results can be seen in table 3.

Table. 3 the Lecturers' responses on the learning material practicality

Figure 1	Result			Average	Category
	Teaching 1	Teaching 2	Teaching 1		
course code	85	84	83	84,00	Good
Notes	83	84	84	83,67	Good
Alerts	83	82	83	82,67	Good
assignments	81	83	81	81,67	Good
Quiz	84	84	83	83,67	Good
Polls	83	84	83	83,33	Good
progress	83	82	83	82,67	Good
Average Total	-	-	-	83,10	Good

Table 3 showed that the lecturers agreed to its practicality. In addition, the students were also asked to carry out practicality tests. Their practicality test was based on features used by the students such as alerts, notes, assignments, quizzes, and progress. The results can be seen in table 4:

Table. 4 The students' responses on the learning material practicality

Feature	Students' response	Category
Course code	81,30	Average
Notes	83,70	Average
Alerts	81,50	Average
Assignments	83,30	Average
Quiz	83,70	Average
Polls	81,30	Average
Progress	82,70	Average
Total average	82,70	Average

Table 4 showed the students' preference in Edmodo-based blended learning media practicality. They said that the media was practically used.

In conclusion, table 3 and 4 indicated that Edmodo-based blended learning media was very practical to use because the features designed were easy to use as some scholars agreed that Edmodo is an application that has easy features to use, (Ekmekçi, 2016; Yagci, 2015; Charoenwet, 2016).

4. CONCLUSION

From all sequences taken place on the study, it can be inferred that the Edmodo-based blended learning media that has been developed is valid,

effective, and practical. The results of this study need to be disseminated more widely so that each mathematics lecturer can use Edmodo's media in blended learning in mathematics learning. The application of this research can be used as a reference in the development of blended learning in other subjects related to mathematics.

REFERENCES

Aldoobie, N. (2015). ADDIE Model. American International *Journal of Contemporary Research, 5*(6), 68-72. Retrieved from http://www.aijcrnet.com/journals/Vol_5_No_6_December_2015/10.pdf

Balasubramanian, K., Jaykumar, V., & Fukey, L. N. (2014). A study on "Student preference towards the use of Edmodo as a learning platform to create responsible learning environment". *Procedia-Social and Behavioral Sciences*, 144, 416-422. https://doi.org/10.1016/j.sbspro.2014.07.311

Charoenwet, S., & Christensen, A. (2016). The effect of Edmodo learning network on students' perception, self-regulated learning behaviors and learning performance. no. Imsci, 297-300. Retrieved from http://www.iiis.org/CDs2016/CD2016Summer/papers/EA948HG.pdf

Cheung, L. (2016). Using the ADDIE Model of Instructional Design to Teach Chest Radiograph Interpretation. *Journal of Biomedical Education, 2016,* 1-6. http://dx.doi.org/10.1155/2016/9502572

Corrin, L., Lockyer, L., & Bennett, S. (2010). Technological diversity: An investigation of students' technology use in everyday life and academic study. Learning, *Media and Technology, 35*(4), 387-401. https://doi.org/10.1080/17439884.2010.531024

Effendi, M. (2016). Integrasi Pembelajaran Active Learning dan Internet-Based Learning dalam Meningkatkan Keaktifan dan Kreativitas Belajar. *Nadwa, 7*(2), 283-309. http://dx.doi.org/10.21580/nw.2013.7.2.563

Ekici, D. I. (2017). The Use of Edmodo in Creating an Online Learning Community of Practice for Learning to Teach Science. *Malaysian Online Journal of Educational Sciences, 5*(2), 91-106. Retrieved from https://files.eric.ed.gov/fulltext/EJ1142512.pdf

Ekmekçi, E. (2016). Integrating Edmodo into foreign language classes as an assessment tool, *Participatory Educational Research (PER), 1*(1), 1-11. http://dx.doi.org/10.17275/per.16.spi.1.1

Enriquez, M. A. S. (2014). Students' Perceptions on the Effectiveness of the Use of Edmodo as a Supplementary Tool for Learning, DLSU Research Congress, Manila Philipiness, Toward Rigorous, Relevant and Socially Responsive Lasllian Research. Retrieved from https://s3.amazonaws.com/academia

.edu.documents/45658692/LLI-II-010-FT.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=15560948222&Signature=aHKc0VURXZnXBSKc4K7nH23eNVI%3D&response-content-disposition=inline%3B%20filename%3DStudents_Perceptions_on_the_Effectivenes.pdf

Heinich, R. (1996). *Instructional media and technologies for learning*. Simon & Schuster Books For Young Readers.

Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful'digital technology in university teaching and learning. *Studies in Higher Education, 42*(8), 1567-1579. https://doi.org/10.1080/03075079.2015.1007946

Hoic-Bozic, N., Mornar, V., & Boticki, I. (2009). A blended learning approach to course design and implementation. *IEEE transactions on education, 52*(1), 19-30. https://doi.org/10.1109/TE.2007.914945

Hwang, G. J., Sung, H. Y., Hung, C. M., & Huang, I. (2013). A learning style perspective to investigate the necessity of developing adaptive learning systems. *Journal of Educational Technology & Society, 16*(2), 188-197. Retrieved from https://www.jstor.org/stable/pdf/jeductechsoci.16.2.188.pdf?seq=1#page_scan_tab_contents

Kenedi, A. K. (2018). Desain Instrument Higher Order Thingking Pada Mata Kuliah Dasar-Dasar Matematika Di Jurusan PGSD. *AR-RIAYAH: Jurnal Pendidikan Dasar, 2*(1), 67-80. http://dx.doi.org/10.29240/jpd.v2i1.440

Kosasi, S. (2015). Perancangan E-Learning untuk meningkatkan motivasi belajar guru dan siswa. In Seminar Nasional Pendidikan Teknik Informatika, Singaraja. Retrieved from http://www.jurnal.stmikpontianak.ac.id/file/SANDY_KOSASI_-_SENAPATI_2015.pdf

Kurniawati, R. (2014). Pengembangan Media Blended Learning Berbasis Edmodo Di Sekolah Menengah Kejuruan. *Indonesian Journal of Curriculum and Educational Technology Studies, 2015*(1), 16-24. https://doi.org/10.15294/ijcets.v3i2.10924

Leow, F. T., & Neo, M. (2014). Interactive multimedia learning: Innovating classroom education in a Malaysian university. Turkish Online *Journal of Educational Technology-TOJET, 13*(2), 99-110. Retrieved from https://files.eric.ed.gov/fulltext/EJ1022913.pdf

Lim, D. H., & Morris, M. L. (2009). Learner and instructional factors influencing learning outcomes within a blended learning environment. *Journal of Educational Technology & Society,12*(4), 282-293. Retrieved from https://www.jstor.org/stable/pdf/jed

uctechsoci.12.4.282.pdf?seq=1#page_scan_tab_contents

López-Pérez, M. V., Pérez-López, M. C., & Rodríguez-Ariza, L. (2011). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & education, 56*(3), 818-826. https://doi.org/10.1016/j.compedu.2010.10.023

Mokhtar, F. A., & Dzakiria, H. (2015). Illuminating the potential of Edmodo as an interactive virtual learning platform for English Language learning and teaching. *Malaysian journal of distance education, 17*(1), 83-98. Retrieved from http://mjde.usm.my/vol17_1_2015/MJDE%2017(1)%202015%20-%20Art.%206(83-98).pdf

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same?. *The Internet and Higher Education, 14*(2), 129-135. https://doi.org/10.1016/j.iheduc.2010.10.001

Nurseto, T. (2011). Membuat media pembelajaran yang menarik. *Jurnal Ekonomi dan Pendidikan, 8*(1), 19-35. https://doi.org/10.21831/jep.v8i1.706

Pushpanthan, Ln. T. (2013). A Need For Needs Analysis. *International Journal of Applied Research & Studies, 2*(1), 1-6.

Rusman. (2011). *Pembelajaran Berbasis Teknologi Informasi dan Komunikasi, Mengembangkan Profesionalitas Guru,* Jakarta: PT. Rajagrafindo Persada

Semadiartha, I. K. S. (2012). Pengembangan media pembelajaran berbasis komputer dengan Microsoft Excel yang berorientasi teori Van Hiele pada Bahasan Trigonometri kelas X SMA untuk Meningkatkan Prestasi dan Motivasi Belajar Matematika Siswa. *Jurnal Pendidikan dan Pembelajaran Matematika Indonesia, 1*(2), 1-15. Retrieved from http://119.252.161.254/e-journal/index.php/JPM/article/view/445

Špiranec, S., & Banek Zorica, M. (2010). Information Literacy 2.0: hype or discourse refinement?. *Journal of documentation, 66*(1), 140-153. https://doi.org/10.1108/00220411011016407

Sulistyani, N. H. D., Jam, J., & Rahardjo, D. T. (2013). Perbedaan hasil belajar siswa antara menggunakan media pocket book dan tanpa pocket book pada materi kinematika gerak melingkar kelas X. *Jurnal Pendidikan Fisika, 1*(1), 164-172. Retrieved from http://www.jurnal.fkip.uns.ac.id/index.php/pfisika/article/view/1784/1277

Thongmak, M. (2013). Social network system in classroom: Antecedents of edmodo© adoption. *Journal of e-Learning and Higher Education, 2013*(1), 1-15. https://doi.org/10.10.5171/2013.657749

Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., & Liu, M. (2012). Using the

Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology, 43*(3), 428-438. https://doi.org/10.1111/j.1467-8535.2011.01195.x

Warawudhi, R. (2017). The evaluation of Edmodo in business reading class. *International Journal of Information and Education Technology, 7*(2), 153. Retrieved from http://www.ijiet.org/vol7/858-T106.pdf

Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education, 55*(1), 155-164. https://doi.org/10.1016/j.compedu.2009.12.012

Yagci, T. (2015). Mobile Social Media in Higher Education & Implementation of" Edmodo" in reading classes. In *6th International Visible Conference on Educational Studies and Aplied Linguistics* , 436-442. Retrieved from https://www.researchgate.net/profile/Fatimah_Al_Bajalani/publication/321212633_An_Evaluation_of_the_Teaching_of_General_English_for_University_Students_at_Salahaddin_University-Erbil/links/5a152684a6fdccd697bc075e/An-Evaluation-of-the-Teaching-of-General-English-for-University-Students-at-Salahaddin-University-Erbil.pdf#page=448