



Development of M-Learning Media Illustrated Crossword Puzzles to Increase Learning Motivation for Middle School Students

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(Received: 15-02-2023; Reviewed: 21-05-2023; Accepted: 22-07-2023;

Available online: 25-08-2023; Published: 28-08-2023)



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Abstract. Abstract. This study aims to produce M-Learning learning media illustrated with crossword puzzles assisted by Google Sites to increase student motivation in class VII SMP and describe the feasibility of the media in terms of validity, practicality, and effectiveness. This research is development research using the ADDIE model, which includes analysis, design, development, implementation, and evaluation stages. The results showed that the quality of M-Learning learning media illustrated with crossword puzzles assisted by Google sites to increase student motivation, for the validation aspect of M-Learning was categorized as valid. For the practicality questionnaire, the teacher response questionnaire obtained 91.67% of the very practical criteria and the 9 student response questionnaire was 90.40% with very practical criteria, so M-Learning was stated to be very practical. For the aspect of effectiveness, it can be seen from the results of the study tests where all students passed or met the KKM, student response questionnaires with a percentage of 90.20% were very effective criteria. And the N-Gain value of 0.76 indicates that there is an increase in learning motivation in the high category so M-Learning is effective for increasing student motivation.

Keywords: Learning Media; M-Learning; Crosswords; Google site; motivation to learn;

INTRODUCTION

Education is a process of developing reasoning power, skills, and moral life from the potential of all human beings. The progress of science and technology is determined by the education level of the population. Education is considered a successful endeavor if it leads to an increase in the quality of education, and this is achieved through an effective educational process. The effectiveness of student learning is influenced by various factors, including the use of learning media and the level of student motivation itself (Adan et al., 2020).

Motivation is one of the most important aspects of the learning process because motivation is able to direct or guide individuals in making a decision or action so that the desired goals can be achieved (Arianti, 2019). Motivation is the power that drives a person to achieve an expected goal because there is a high commitment from motivation to achieve that goal (Winata, 2021). Students who have high learning motivation are very likely to get good learning results, because of their hard work and all their efforts in learning the subject matter (Emda, 2018; Nurfallah & Pradipta, 2021).

Mathematics is a science that is taught at all levels of education. In the world of education, mathematics plays an important role because it is related to other fields of science (S. S. Y. Putri & Jatmiko, 2018). Arifin (2017) states that everyone should study mathematics because mathematics is needed to solve problems, ways of thinking, and measurements that can be used in other fields of science. However, the majority of opinions still think that mathematics is a difficult and frightening subject.

Based on the results of observations by interviewing mathematics teachers who teach in class VII E at SMP Negeri 7 Muaro Jambi, it is known that the motivation to learn mathematics in class is still relatively low. There is no initiative to read or study independently before learning. This is due to low motivation so there is no impetus or effort for students to exert their abilities. Supported by The results of the learning motivation questionnaire given during observation show that the percentage of student learning motivation is 0.54 or 54% which according to (Palupi et al., 2020) belongs to the low level of learning motivation. Based on information from the mathematics teacher who teaches In that class, printed books are still the main learning media, but additional media based on the use of the Quiziz web are also used in learning, which contain learning quizzes that can be accessed by students. With this media, it has apparently not had an effect on student learning motivation. The causal factor is that students feel that mathematics is a difficult subject and has many formulas. This feeling of dislike makes students not motivated to participate in learning. For this reason, more interesting learning media are needed to stimulate students' enthusiasm in learning.

According to Mahnun (2012) "media" comes from the Latin "medium" which means "intermediary" or "introduction". The media is a message carrier from the sender to the recipient of the message, thus the media is a means of channeling information or learning messages. Learning media is used as a learning tool in schools to improve the quality of education (Masykur et al., 2017). For teachers it is very important to use learning media in conveying material during the learning process. Learning is not always in the form of concrete things, both in terms of concepts and facts. In this case, the media can help the teacher's limitations in

communicating the material being taught (Husniyah et al., 2021).

Nowadays almost everyone has a smartphone because this technology is very useful for life. In the world of education, many students use Android in teaching and learning activities (KBM). The use of Android in the field of education certainly benefits all parties involved, including teachers and students (Larasati, 2021). One of the Android-based learning media that teachers can use is Mobile Learning (M-Learning). The development of Android-based learning media will be a new innovation that can be used interactively in the learning process to attract students' interest with a complete and attractive application (Amirullah & Hardinata, 2017; Sutiasih & Saputri, 2019). M-learning is part of e-learning that allows teachers to deliver learning materials to students via mobile devices. M-Learning allows students to access learning materials, instructions and information anywhere and anytime, without space and time limitations. M-Learning can also overcome the limitations of time allocation for some materials, as well as train students to learn independently from the various sources provided (Cahyana et al., 2018; D. A. Wulandari et al., 2019).

In addition, there is an innovative learning media in the form of crossword puzzles (TTS). Crossword puzzles (TTS) are innovative learning media that combine game elements in learning, so as to create a fun learning atmosphere for students. Student Worksheets in the form of Crosswords are proven to be able to increase student learning motivation and help understand the material taught by the teacher (Yulianti & Andriyanto, 2020). The use of crossword puzzles makes students motivated and enthusiastic in memorizing vocabulary which can stimulate their thinking power in understanding the material, so that the learning experience becomes meaningful, knowledge becomes easier to remember (Maryanti & Kurniawan, 2017; Yulianti & Andriyanto, 2020).

Based on the description above, the researcher wanted to conduct this research with the aim of producing M-Learning learning media illustrated with crossword puzzles assisted by Google sites to increase the learning motivation of class VII junior high school students and describe the feasibility of the media in terms of validity, practicality, and effectiveness.

METHOD

The type of research being conducted is a type of research and development R&D (Research and Development). Research and Development (R&D) is a process or steps to develop a new product or perfect an existing product so that it can be accounted for (Rusinta et al., 2019). The model used in developing this research product is the ADDIE model, which consists of 5 stages, namely: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation (evaluation). The ADDIE model also provides an opportunity for researchers to evaluate each stage of product development. By evaluating each stage of development, it will minimize the level of product errors or deficiencies in the final stages of product development (Putra et al., 2019; Ramadhan & Rusijono, 2020).

The research was conducted at SMP Negeri 7 Muaro Jambi in odd semesters. The test subjects in this study were one of the mathematics teachers and class VII students. The types of data in this study are qualitative data and quantitative data. At the product validation stage, the data obtained is qualitative data in the form of suggestions, criticisms, input and responses from a team of design experts and material experts used to revise M-Learning products, the goal is that the products developed are better. Meanwhile, quantitative data is obtained from assessments. validators, teachers, and students who act as respondents. This quantitative data comes from a response questionnaire given at the individual trial and small group trial stages. While at the implementation stage, quantitative data was obtained from calculating the percentage of student learning outcomes through learning achievement tests and student learning motivation questionnaires.

Questionnaire data analysis technique uses a Likert scale with a score of 1 to 4 which is analyzed descriptively quantitatively, based on the acquisition of the assessment score obtained, both by the validator and teacher and student respondents.

The stages of developing this research product are based on the ADDIE model, in the figure 1.

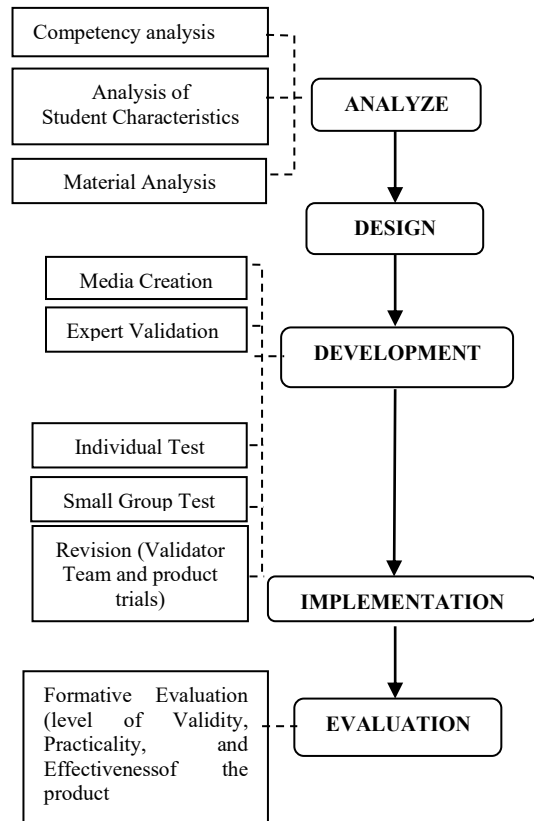


Figure 1. Steps of ADDIE Method

The following is the product navigation flow of the M-Learning media that will be made.

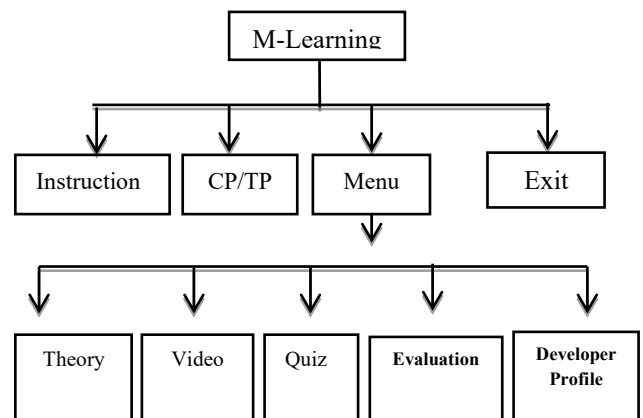


Figure 2. Product Navigation Flow

RESULTS AND DISCUSSION

Result

There are several steps taken during the development stage, namely validating research instruments and validating the quality test of M-Learning products. To test the quality of M-Learning products, it consists of validity

tests, practicality tests and effectiveness tests. The aim is to measure the level of validity, practicality and effectiveness of the developed M-Learning product.

Table 1. Expert Validation Results

Category	Score	Percentage	Category
Instrument expert	147	75%	Valid
Theory expert	71	80,68%	Valid
Design expert	60	88,23%	Very Valid

Based on the table above, the results of the assessment from the expert team stated that M-Learning was valid to use.

Then tested the practicality of M-Learning by conducting product trials. The first is individual trials. the individual trial subject was a mathematics teacher related to the class to be studied, namely Mrs. Dini Adriani, S.Pd as a Mathematics teacher who teaches in class VII E SMP Negeri 7 Muaro Jambi. while the respondents selected at this trial stage were 9 class VII students with various levels of academic ability (low, medium and high).

Table 2. Practicality Trial Results

Trials	Average score	Percentage (%)	Category
Individual Trial	3,6667	91,67%	very practical
Small group trials	3,6667	90,4%	very practical

Based on table of practicality results by teachers and students, the average practicality of M-Learning learning media illustrated crossword puzzles is obtained with a percentage of 91% in the "Very Practical" category.

The purpose of the implementation stage is to find out how the effectiveness of M-Learning learning media illustrated with crossword puzzles that have been developed and revised can support increased student motivation in learning in the classroom. The test subjects at this implementation stage were 31 students in class VII E of SMP Negeri 7 Muaro Jambi.

Table 3. Learning Outcomes Test and Motivation Questionnaire

Instrument	Percentage
Student Learning Outcomes Test	100%
Student Learning Motivation Questionnaire	90,2%

Based on table, the percentage of effectiveness of M-Learning media illustrated with crossword puzzles is obtained to increase student learning motivation, which is 95.1% which is included in the "very effective" category.

Discussion

Research conducted by Khefrianti (2021), with the title "Development of M-Learning Chemical Bonds to Increase Student Motivation and Learning Outcomes". From the results of this study it can be concluded that (1) the developed M-Learning contains chemical bond material in the form of text, images, videos and is equipped with a competency test with its use that is not limited by space and time; (2) the developed M-Learning was declared fit for use based on an assessment by the material validator, design, teacher and student responses; and (3) the use of M-Learning effectively increases student motivation and learning outcomes with an N-gain of motivation, namely 0.50 in the medium category and an N-gain in learning outcomes of 0.79 in the high category. in accordance with the results of this study, where m-learning was declared feasible for use based on an assessment of the aspects of validity, practicality, and effectiveness. besides that the calculation of the N-Gain value shows that there is an increase in student learning motivation of 0.76 which indicates that the increase is in the high category.

There is also research conducted by Maria Yuniati Nona Ade et al., (2021), with the title "Development of Crossword Puzzle Learning Media (TTS) on Motion Systems Material for Class XI SMA". From this study it can be concluded that with the TTS learning media students are more interested in learning and understanding the material. TTS media is categorized as very valid and suitable for use in learning.

Therefore in this study, due to students' dislike of mathematics because it is considered to only focus on numbers and formulas, according to Silberman's opinion, compiling media or tests in the form of crossword puzzles can provoke students' motivation and active participation. (Izzaty et al., 2021). It is supported by the statement that crossword puzzles function to awaken brain nerves which refresh or refresh memory so that they optimize brain function again, so that they can continue to study in a relaxed manner (Edriati et al., 2017; Khalilullah, 2012). So in this case, students learn while playing with words, thus it is expected to reduce students' dislike of mathematics and be motivated to learn.

CONCLUSIONS AND SUGGESTIONS

Learning media M-Learning learning media illustrate crossword puzzles assisted by Google Sites to increase student motivation in integer material, using the ADDIE model with stages namely Analyze, Design, Development, Implementation, and Evaluation.

M-Learning learning media illustrated with Google Site-assisted crossword puzzles to increase students' learning motivation on integer material for class VII Junior High School is assessed in terms of valid, practical and effective. For valid criteria, it can be seen from the results of the assessment by material experts and design experts using closed questionnaires. The validity level of M-Learning from the material aspect obtained a percentage of 80.68% (valid) while from the design aspect it was 88.23% (very valid). Furthermore, for practical criteria, it can be seen from the results of individual trial questionnaires filled in by the teacher and small group trials filled out by 9 students with various levels of academic ability. The practicality level of M-Learning from the teacher's response questionnaire obtained a percentage of 91.67% (very practical) while the practicality level of the student response questionnaire was 90.40% (very practical). Furthermore, for the criteria of effectiveness, the level of effectiveness of M-Learning can be seen from the results of the student learning motivation questionnaire and student learning achievement tests. for the effective level of M-Learning from the learning motivation questionnaire is 90.20%. supported by data from N-Gain calculations which show that there is an increase in student motivation in the high

category. while the level of effectiveness of measuring student learning outcomes tests, student learning completeness obtains a percentage of 100% with KKM 70. Based on the results obtained from the learning motivation questionnaire and student learning achievement tests, M-Learning is stated to be very effective.

REFERENCES

- Adan, S. A., Indana, S. I., & Budijastuti, W. (2020). Penggunaan Media Teka Teki Silang (Tts) Untuk Meningkatkan Motivasi Dan Hasil Belajar Siswa Kelas X Sma Swasta Karanu *Jurnal Education and Development*, 8(3), 909–917. <http://journal.ipts.ac.id/index.php/ED/article/view/2065>
- Amir, M., Muris, & Arsyad, M. (2015). Pengembangan Perangkat Pembelajaran Berbasis Pengalaman pada Peserta Didik Kelas XI IPA SMA Negeri 9 Pinrang. *Jurnal Sains Dan Pendidikan Fisika (JSPF)*, 11(3), 202–213.
- ARIANTI, A. (2019). PERANAN GURU DALAM MENINGKATKAN MOTIVASI BELAJAR SISWA. *DIDAKTIKA : Jurnal Kependidikan*, 12(2), 117–134. <https://doi.org/10.30863/didaktika.v12i2.181>
- Aripin, I. (2018). konsep dan aplikasi mobile learning dalam pembelajaran biologi. *Bio Education*, 3(1), 01–09. <http://jurnal.unma.ac.id/index.php/BE/article/view/853>
- Cahyana, U., Paristiowati, M., & Fauziyah, S. (2018). Development of Android-Based Mobile learning media on Atomic Structure and Periodic Table. *IOP Conference Series: Materials Science and Engineering*, 434(1). <https://doi.org/10.1088/1757-899X/434/1/012095>
- Edriati, S., Handayani, S., & Sari, N. P. (2017). PENGGUNAAN TEKA-TEKI SILANG SEBAGAI STRATEGI PENGULANGAN DALAM MENINGKATKAN PEMAHAMAN KONSEP MATEMATIKA SISWA SMA KELAS XI IPS. *Jurnal Pelangi*, 9(2), 71–78. <https://doi.org/10.22202/jp.2017.v9i2.2047>

- Emda, A. (2018). KEDUDUKAN MOTIVASI BELAJAR SISWA DALAM PEMBELAJARAN. *Lantanida Journal*, 5(2), 172. <https://doi.org/10.22373/lj.v5i2.2838>
- Husniyah, R., Widiatsih, A., & Kurniawan, N. (2021). PENGEMBANGAN WEBSITE MENGGUNAKAN GOOGLE SITES MATERI PRODUKSI PADA TUMBUHAN DAN HEWAN UNTUK SMP / MTs PADA MASA PADEMI COVID 19 PENDAHULUAN Pada Abad 21 adalah merupakan era teknologi informasi & Komunikasi yang sangat berkembang pesat . 4 pilar tentang p. *Education Journal : Journal Education Research and Development*, 6(1), 47–58.
- Izzaty, R. E., Astuti, B., & Cholimah, N. (2021). Penerapan Metode Pembelajaran Crossword Puzzle (Teka-Teki Silang) Untuk Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran Ips Kelas Viii Di Smp Baiturrosyad Lembur Awi Pacet. *Angewandte Chemie International Edition*, 6(11), 951–952., 5–24.
- Khalilullah, M. (2012). PERMAINAN TEKA-TEKI SILANG SEBAGAI MEDIA DALAM PEMBELAJARAN BAHASA ARAB (MUFRADAT). *Jurnal Pemikiran Islam*, 37(1), 15–25. <http://krisna1.blog.uns.ac.id/2009/10/19/pengertian-dan-ciri-ciri-pembelajaran/>
- Khefrianti, S. (2021). Pengembangan Mobile Learning Ikatan Kimia Untuk Meningkatkan Motivasi Dan Hasil Belajar Siswa. *Jurnal Guru Dikmen Dan Dikus*, 4(2), 191–207. <https://doi.org/10.47239/jgdd.v4i2.352>
- Larasati, A. & S. S. S. (2021). Media Pembelajaran Chemlovers Berbasis Aplikasi Android Pada Materi Termokimia. *Journal of Chemistry In Education*, 10(2), 48–54.
- Mahnun, N. (2012). Media Pembelajaran (Kajian terhadap Langkah-langkah Pemilihan Media dan Implementasinya dalam Pembelajaran). *An-Nida'*, 37(1), 27–35.
- Maria Yuniati Nona Ade, Yohanes Bare, & Oktavius Yoseph Tuta Mago. (2021). Pengembangan Media Pembelajaran Teka-Teki Silang (TTS) Pada Materi Sistem Gerak Untuk Kelas XI SMA. *Jurnal Pendidikan Mipa*, 11(2), 63–75. <https://doi.org/10.37630/jpm.v11i2.485>
- Maryanti, S. M., & Kurniawan, D. T. (2017). Implementasi Pemanfaatan Media Teka Teki Silang (TTS) Online Dalam Matakuliah Neurosains Untuk Mahasiswa Calon Guru Raudhatul Athfal (RA). *AWLADY: Jurnal Pendidikan Anak*, 3(2), 124. <https://doi.org/10.24235/awlad.v3i2.1487>
- Masykur, R., Nofrizal, N., & Syazali, M. (2017). Pengembangan Media Pembelajaran Matematika dengan Macromedia Flash. *Al-Jabar : Jurnal Pendidikan Matematika*, 8(2), 177. <https://doi.org/10.24042/ajpm.v8i2.2014>
- Nurfallah, M., & Pradipta, T. R. (2021). Motivasi Belajar Matematika Siswa Sekolah Menengah Selama Pembelajaran Daring di Masa Pandemi COVID-19. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 5(3), 2425–2437. <https://doi.org/10.31004/cendekia.v5i3.752>
- Palupi, M. T., Istihapsari, V., & Afriady, D. (2020). Peningkatan Motivasi dan Hasil Belajar Siswa dalam Pembelajaran Tematik dengan Metode DIScovery Learning Berbantuan LKPD di Kelas IV SD Kanisius Beji Tahun 2020/2021. *Prosiding Pendidikan Profesi Guru*, 5(3), 1227–1236.
- Putra, I. P. D., . S., & Sukajaya, I. N. (2019). Pengembangan Media Pembelajaran Berbasis Geogebra Untuk Pembelajaran Persamaan Linier Dua Variabel Di Smp. *Jurnal Pendidikan Dan Pembelajaran Matematika Indonesia*, 7(1), 1–12. <https://doi.org/10.23887/jppm.v7i1.2808>
- Putri, S. S. Y., & Jatmiko, B. (2018). Respon Peserta Didik SMA Terhadap Model Pembelajaran Inkuiri Terbimbing Dengan Pendekatan CTL (Contextual Teaching And Learning). *Inovasi Pendidikan Fisika*, 07(02), 316–319.
- Ramadhan, A. Z., & Rusijono. (2020). *MANUSIA SUBTEMA MANUSIA DAN LINGKUNGAN PADA PEMBELAJARAN TEMATIK KELAS V MIN I TRENGGALEK Avinda Zakcy Ramadhan Rusijono*. 0–216.
- Rusinta, D., Hambali, D., & Winarni, E. W.

- (2019). Pengembangan Bahan Ajar Buku Cerita Berbasis Discovery Learning Pada Materi IPA Konsep Perpindahan Panas Di Kelas V Sekolah Dasar. *Jurnal Pembelajaran Dan Pengajaran Pendidikan Dasar*, 2(2), 199–209. <https://doi.org/10.33369/dikdas.v2i2.11963>
- Sutiasih, A. D., & Saputri, R. P. (2019). Pengembangan mobile learning berbasis android sebagai media pembelajaran organisasi arsitektur komputer. *Jurnal Inovasi Teknologi Pendidikan*, 6(2), 137–147. <https://doi.org/10.21831/jitp.v6i2.27772>
- Winata, I. K. (2021). Konsentrasi dan Motivasi Belajar Siswa terhadap Pembelajaran Online Selama Masa Pandemi Covid-19. *Jurnal Komunikasi Pendidikan*, 5(1), 13. <https://doi.org/10.32585/jkp.v5i1.1062>
- Wulandari, D. A., Wibawanto, H., Suryanto, A., & Murnomo, A. (2019). Pengembangan Mobile Learning berbasis Android pada Mata Pelajaran Rekayasa Perangkat Lunak di SMK Sultan Trenggono Kota Semarang. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, 6(5), 577. <https://doi.org/10.25126/jtiik.201965994>
- Yulianti, E., & Andriyanto, A. (2020). Pengembangan Media Pembelajaran Teka-Teki Silang IPA Terpadu Untuk Siswa Kelas VII SMPN 56 Merangin. *Biodik*, 7(2), 153–162. <https://doi.org/10.22437/bio.v7i2.10971>