Development of Mobile-Learning Apps using I-spring-Suite software for Relation and Function Material

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ABSTRACT

This study aims to develop a mathematics Mobile Learning Apps for 8th grade students using I-spring Suite software. This Apps is developed for learning in Relation and Function in mathematics classroom. The Apps contains mathematics subject matters in Relation and Function, interactive mathematics games and Ispring Suite quizzes. This Apps can be run on any smartphones, which makes it easier for students and teachers to use it anytime dan anywhere. This study is conducted at SMPI Radlatul Ulum Jombang, involving 26 8th grade students. This study employs Research and Development method by applying ADDIE model which consists of five stages, 1) Analysis, 2) Design, 3) Development, 4) Implementation, and 5) Evaluation. The results shows that the Apps obtains 82.1% for experts' reviews (average) which is in a Valid category, and it receives 94% for media/application reviews which is also in a Valid category. The implementation results shows that the Apps receives 84% for practicality reviews, which means that it is practical to be used in mathematics learning. Learning outcome test which is conducted at the end of this study shows that the Apps is effective for learning Relation and Function for 8th grade students.

Keywords: Mobile Learning; Apps; I-spring Suite; Relation and Function; 8th grade

INTRODUCTION

Mathematics is a universal subject matter that is very useful in human life. Mathematics has become a basic for other branches of knowledge such as medicine, economics, accounting, information and the application of technology (Akbar, Chotimah & Bungsu 2018). Critical thinking skills in mathematics can also support individual's problem-solving ability, communication and collaboration skills (Rachmantika & Wardono, 2019). "In terms of attitude, learning mathematics also can improve attitudes of conscientiousness, patience, accuracy, in which it will be reamined for a long time in memory" (Samudro, 2022). Therefore, it can be concluded that mathematical abilities is important to be acquared.

Despite the importance of studying mathematics, it turns out that many students are reluctant to study mathematics due to of its difficulties. Based on Putri's study (2020), it was shown that many students had difficulty solving mathematics problems because the students did not understand the material, lacked independent practice, and lacked the ability to do the work. Such difficulties are also found in a study by Salvia, Sabrina, & Maula, (2022) and Ikhsan (2019) which explained that the majority of students experienced difficulties when faced with symbols, number manipulation questions and solving mathematical problems due to a lack of understanding. material. This is reinforced by the results of interviews and observations conducted at SMPI Raudlatul Ulum. Students stated that they had difficulty understanding the material, had difficulty solving problems and had difficulty understanding the questions that had been given.

To help overcome this problem, it is necessary to master the material from mathematics lessons, especially the basic material, so that students do not have difficulty learning the derived material. Friantini (2020) stated that mastery of concepts is important, because concepts that are firmly embedded from the start can make it easy for students to follow mathematics learning and master more complex concepts later. This will certainly reduce students' difficulties in learning mathematics and actually increase their success in learning mathematics so that their grades can increase. One of the basic and important materials studied in mathematics is relations and functions.

Material regarding relations and functions is important because "relationships and functions material is a prerequisite for subsequent mathematical material such as straight line equations, systems of

linear equations and geometry" (Ramadan & Arfiranti, 2019). Behind the importance of relationship and function material, it was found that students found this material quite difficult. According to the results of study conducted by Nugraha (2019) at SMP Mutiara 1 Bandung, it also shows that students' learning difficulties in function material include: 1) lack of understanding of positive and negative operations, 2) lack of understanding of reading questions, 3) errors in calculations, 4) use of the wrong process. According to Agustin (2023), most students face difficulties in converting problems in questions into mathematical models, so they have difficulty working on math problems and are unable to solve problems related to the correct questions. A study of Yanti, Melati, Zanty (2019) shows that the percentage of students' correctness in relating one relationship concept to another concept, and realizing the process they are carrying out is only 28%, so it can be categorized as low in analyzing and explaining statements.

The learning difficulties as found in several previous studies above are in line with several facts obtained from observations and interviews with students. The results of the interviews showed that the chapter that students thought was very difficult was the chapter on relations and functions. Students have difficulty working on relationship and function questions because they do not understand basic concepts, lack understanding of the use of positive and negative signs and often make mistakes in calculations. Students also have difficulty distinguishing relations and functions which are then expressed in Cartesian diagrams, sets of ordered pairs and story problems. Apart from that, many students have difficulty connecting one concept with another concept. The above difficulties cause students to be anxious and afraid. This anxiety can affect psychology and emotions which can cause difficulty thinking, lack of focus and concentration making students reluctant, lazy and away from mathematics because they feel it is difficult and they are left behind by smarter students (Anggraeni, 2022).

One solution to overcome the difficulties experienced by students is the use of appropriate learning media which can make learning mathematics easier, more enjoyable, and regenerate students' focus and interest. According to Supriadi & Hignasari (2019) appropriate learning media can attract students' attention and strengthen students' concentration on the material presented so that learning objectives can be achieved. This is in accordance with a study by Nasution, Siddiq & Manurung (2021) which shows that a relevant learning media can encourage attention, focus, feelings, interests, and thoughts which make the learning process easier and more interesting for students.

In accordance with technological developments, the appropriate form of learning media is digital media, one of which is smartphones. Smartphone use in Indonesia has currently reached 199.18 million users in 2021 (Nurhayati, 2021a) According to data from the Central Statistics Agency (BPS), currently 67.88% of the Indonesian population aged 5 years and over already have a smartphone, while in the province of Java East, there are 65.22% of the population who already have a smartphone. This is in line with field research conducted at SMPI Raudlatul Ulum Brangkal which stated that 85% of students had personal smartphones and the other 15% were still with their parents. Facts like this were also found through the research results of Ramadan & Arfiranti (2019) which stated that 92% of students already have smartphones, but as much as 71% of smartphone use is focused on entertainment. This has reinforced that students' smartphones are underutilized in learning.

One form of using smartphones as a learning medium is in the form of mobile learning. The results of Widyatama & Pratama's research (2022) show that Mobile learning is a medium that can support learning practically, effectively and can improve learning outcomes. The advantages of mobile learning include (1) users can access learning content from anywhere, including quizzes, journals, games, and others, with instructions (2) learning can be done at any time in real time (3) the use of books is replaced with RAM. can organize and connect learning, (4) can improve student-centered learning, can self-assess as feedback (5) Mobile learning can be used more effectively for students with different ability levels, different types of learning and private learning (6) and can increase interaction between students, students, and instructors (Khaliq, 2021).

Mobile learning is very diverse and varied, but it's good that mobile learning is interesting so it's not inferior to other entertainment applications. One application that can be used to develop interesting learning media is iSpring Suite. ISpring Suite is a practical and easy-to-use computer program for designing learning because the iSpring Suite features are integrated directly with PowerPoint, where PowerPoint can be designed according to user creativity (Batubara, 2021). In line with that, Sumargono, Susanto & Rachmedita (2019) explained that iSpring Suite is a type of software that is easy for educators to use and does not require programming languages or scripts. Various iSpring Suite 9 features are integrated with PowerPoint, including video recording, slide narrative recording, adding interactive teaching materials, creating quizzes, and publishing learning content in HTML5, video, and SCORM

formats. Of course, mobile learning-based learning media can attract attention, focus, interest and thoughts which makes the learning process more interesting for students without feeling left behind by smarter friends.

Based on the facts described above, the author feels it is necessary to conduct research with the title "Development of ISpring Suite 11 Mobile Learning Based Learning Media on Relationships and Functions". ISpring Suite 11 is the latest version of the iSpring Suite 9 application but with more varied features. The hope of this research is that the mobile learning application developed can become an interesting mathematics learning resource for students, which can be used anytime and anywhere.

METHOD

Amethod used in developing mobile learning is Research and Development/(R&D). Research and Development is a research method for creating or developing existing products by testing the product based on valid and practical criteria (Maydiantoro, 2020). Research and Development is a process for developing a new product or improving an existing product, which can be accounted for (Setiawan, 2021). This study employs ADDIE model, whuch consist of five stages, there are 1) analysis, 2) design, 3) development, 4) implementation and 5) evaluation. The development of this research will produce a learning media product based on the iSpring Suite mobile learning that is adapted to relationship and function material and meets valid and practical criteria. To test this mobile learning media product to be useful on target, research based on trials is needed to determine the effectiveness of the product. In the framework of this research, data collection techniques involve steps such as preliminary studies, observations, interviews, and the use of questionnaires. The research instruments include interview guides, media assessment questionnaires, material assessments, and teacher responses, accompanied by assessment criteria

RESULT AND DISCUSSION

The development of this learning media is in accordance with the steps of the ADDIE Research and Development model research procedure which consists of the Analysis, Design, Development, Implementation and Evaluation stages which were modified by the researcher. The five stages of the ADDIE model in developing learning media are carried out systematically. The following is an explanation of the stages in developing learning media in mathematics learning in accordance with the ADDIE model.

Result

- **Analyze**

  The needs analysis in this research is based on interviews with mathematics subject teachers and students, to find out the mathematics learning process in class and the difficulties experienced by teachers and students of SMPI Raudlatul Ulum Brangkal in mathematics subjects.

  The results of interviews from mathematics teachers show that the mathematics learning process carried out in Class VIII SMPI Raudlatul Ulum Brangkal still uses the lecture method with the help of a blackboard based on teaching materials in the form of modules and textbooks. Mathematics teachers say students are still low in solving mathematics problems because they do not understand basic concepts. The results of observations carried out at school also show that students have difficulty understanding the material in the modules and textbooks, have difficulty solving problems, and have difficulty understanding the questions given so that they become lazy and stay away from mathematics lessons.

  The results of interviews with SMPI Raudlatul Ulum students also showed that the chapter that according to the students was very difficult was the chapter on relations and functions. Students have difficulty working on relationship and function questions because they do not understand basic concepts, lack understanding of the use of positive and negative signs and often make mistakes in calculations. Students also revealed that they had difficulty distinguishing relations and functions which were then expressed in Cartesian diagrams, sets of ordered pairs and story problems. This is in line with the results of the pre-test distributed to students which showed that 92% of students in class VIII SMPI Raudlatul Ulum Brangkal whose scores did not reach the Minimum Completeness Criteria (KKM).

- **Design**

  This media was created with the basic idea of creating learning media that is interesting, can be

studied without limitations of place and time, is economical, can arouse students' enthusiasm for learning by utilizing existing technology, and of course can convey learning objectives well. This learning media is specifically for material on Relations and Functions for class VIII SMP/MTs and equivalent. Then proceed with planning activities to determine the Mobile Learning design using PowerPoint and Ispring Suite with the framework structure in Mobile learning as follows:

o   Home
o   Learning Menu
o   Introduction
o   Learning Material
o   Games (practice questions)
o   Quiz

- **Development**
  The product design that has been prepared is then developed based on the following stages:
  o   The product design that has been prepared is then produced into mathematics learning media which must go through a correction stage. The following is a display of the media that has been developed.

Figure 1. Home
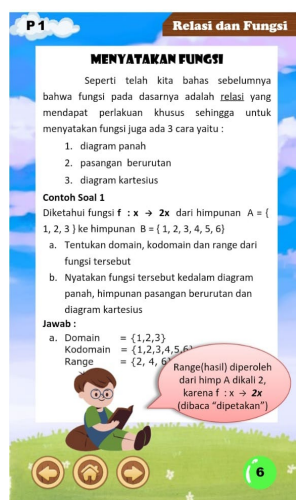

Figure 2. Learning Activities

Figure 3. Introduction

Figure 4. Learning Material
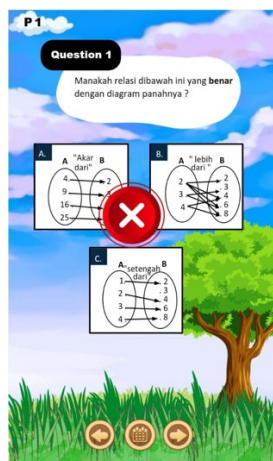

Figure 5. YouTube

Figure 6. Games
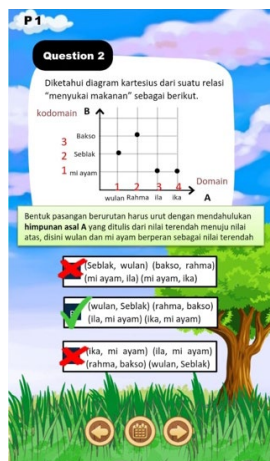
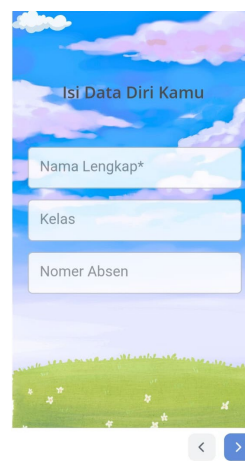**Figure 7.** Games   **Figure 8.** Answer key   **Figure 9.** Personal ID
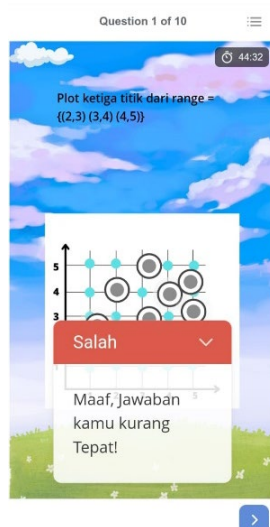

Figure 10. Quiz

Figure 11. Question List Quiz

o After the media is developed, the next step is to carry out an assessment. The assessment is carried out by experts consisting of material experts and media experts. The results of the expert assessment were analyzed using the following references:

$$x_i = \frac{\sum s}{s_{max}} \times 100\%$$

s_{max}	= maximum score
$\sum s$	= total score
x_i	= feasibility value

Based on calculations using the formula above, qualifications are used which have the following criteria.

Table 1. Expert Assessment Qualification

Presentase (%)	Kategori
81% - 100%	Very Valid
61% - 80%	Valid
41% - 60%	Fairly Valid
21% - 40%	Invalid
0% - 20%	Very Invalid

(Source: Hodiyanto, 2020, with researcher modifications)

Learning media in the form of an RME-based Mathematics E-Booklet may be implemented if it obtains a minimum assessment category of "fairly valid" provided the product has been revised in accordance with the validator's suggestions. Based on the results of material validation by mathematics lecturers and teachers, the average was 82.1%, this percentage meets the "Very Valid" category. Meanwhile, the score obtained by media experts obtained a validity level of 94%, where this percentage fell into the Very Valid category. Therefore, the media developed in this research is considered suitable and very good for use in learning mathematics regarding relationships and functions.

- **Implementation**

The implementation stage of the mobile learning media that is being developed is carried out in class VIII B of SMPI Raudlatul Ulum Jombang. Implementation assessments are assessed based on learning and test results. After participating in learning using Mobile learning media, students also provide their opinions about Mobile learning through the response questionnaire that has been provided. The average value of learning outcomes obtained was 82.884, indicating good improvement. The results of the pretest and posttest obtained values of 44.375 and 79.615 respectively, which were then tested for media effectiveness employing N-Gain which obtained an average percentage of 64.52%, which meets the quite effective category. The student response results obtained through the response questionnaire had an average percentage of 84% in the very practical category.

- **Evaluation**

Referring to the learning outcomes and pretest post-test results, it can be concluded that the aim of creating Mobile learning was to support students' conceptual understanding of relationship and function material was achieved, because students' learning outcomes were above the KKM at school. Apart from that, the results of the student response questionnaire showed that the mobile learning developed was very practical to apply.

Discussion

The learning media developed is Android-based mobile learning and developed using the Ispring Suite application. The media is intended for learning relationship and function material for junior high school students. The results of the expert assessment showed that the material aspect received an assessment of 91.5% and was in the very valid category, while the media aspect received an assessment of 90.5% which was also in the very valid category. In this way, the media developed is very feasible and can be applied in real classroom learning. Based on the results of student responses, an overall assessment of 84% was obtained, which corresponds to a very good indicator. Moreover, the results of the pretest and posttest obtained values of 44,375 and 79,615 respectively, which were then tested for media effectiveness employing N-Gain which obtained an average percentage of 64.52%, which meets the quite effective category. The results of expert assessments, student responses in using the media, and the pretest and posttest N-Gain tests show that the learning media developed is suitable for use in learning activities, is practical and has potential effects. This is in line with the results of research conducted by Hulwani, Pujiastuti, & Rafianti (2021) which shows that Android interactive mathematics learning media is practical and has a potential effect on improving students' mathematical abilities.

This learning media also has several advantages compared to existing learning media in schools, usually only in the form of modules or PowerPoint. The advantages of this media include: (1) the material presented is in short form and easy to understand, (2) it is packaged in an attractive, colorful application with additional images and animations that convey the information well, (3) it is equipped with YouTube link that directs learning via video, (4) equipped with practice questions in the form of interactive games complete with answer keys and reasons, (5) questions are not only multiple choice, (6) quiz work is equipped with filling in personal data, correct assessment wrong, timer and score that appears when finished (7) easy download and installation of the application (8) can be run without the help of the internet with a file size of only 30 MB which does not take up much storage space.

CONCLUSION

This research is development research carried out through five development stages with the steps of the ADDIE Research and Development model research procedure consisting of the Analysis stage, Design stage, Development stage, Implementation stage and Evaluation stage (Evaluation). The research

results show that learning media based on the Ispring mobile learning suite can have a positive influence on student learning, the media has also been proven suitable for use. The results of material testing by material experts obtained an average score of 82.1% which was in the very valid category, the results of testing by media experts received a score of 94% which was in the very valid category, the results of practicality level testing by students received a score of 84% which was in the very valid category. practical. This mobile learning can also support students' understanding of relationship and function material, this is proven by the average student learning outcomes which reached 82.884. This mobile learning is effective in conveying learning objectives as evidenced by the N-Gain results obtaining an average percentage of 64.52%, which meets the quite effective category.

Some suggestions for further research are that media can be developed with various online learning resource features. These include linking to mathematics learning websites, and interactive practice questions that can be accessed online. Apart from that, games on learning media can be developed into interactive games where users can earn points, or there is a win-lose system. Games like this will motivate students to learn more.

REFERENCES

Anggraeni, D. P. (2022). Pengaruh Kecemasan Matematis (Math Anxiety) Terhadap Kemampuan Pemahaman Matematis Pada Materi Relasi Dan Fungsi Siswa Kelas VIII di MTs Hidayatul Mubtadiin Sidodadi Jember Tahun Pelajaran 2021/2022 (Doctoral dissertation, UIN KH Achmad Siddiq Jember).

Batubara, H. H. (2021). Media Pembelajaran Digital. PT Remaja Rosdakarya: Bandung.

Chotimah, S., Ramdhani, F. A., Bernard, M., & Akbar, P. (2018). Pengaruh Pendekatan Model-Eliciting Activities Terhadap Kemampuan Berpikir Kritis Matematik Siswa Smp Negeri Di Kota Cimahi. Journal on Education, 1(2), 68-77.

Friantini, R. N., Winata, R., Annurwanda, P., Suprihatiningsih, S., Annur, M. F., & Ritawati, B. (2020). Penguatan konsep matematika dasar pada anak usia sekolah dasar. Jurnal Abdimas Bina Bangsa, 1(2), 276-285.

Hodiyanto, H., Darma, Y., & Putra, S. R. S. (2020). Pengembangan Media Pembelajaran Berbasis Macromedia Flash Bermuatan Problem Posing terhadap Kemampuan Pemecahan Masalah Matematis. *Mosharafa: Jurnal Pendidikan Matematika*, *9*(2), Article 2. https://doi.org/10.31980/mosharafa.v9i2.652

Hulwani, A., Pujiastuti, H., & Rafianti, I. (2021). Pengembangan Media Pembelajaran Interaktif Android Matematika dengan Pendekatan STEM pada Materi Trigonometri. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *5*(3), 2255-2269. https://doi.org/10.31004/cendekia.v5i3.717

Ikhsan, M. (2019). Pengaruh kecemasan matematis terhadap hasil belajar matematika. De Fermat: Jurnal Pendidikan Matematika, 2(1), 1-6.

Khaliq, A. (2021). Aplikasi Mobile Learning Berbasis Android Untuk Belajar Huruf Hijaiyah. Jurnal Nasional Teknologi Komputer, 1(1), 28-36.

Maydiantoro, A. (2021). Model-Model Penelitian Pengembangan (Research and Development). Jurnal pengembangan profesi pendidik indonesia (JPPPI).

Nasution, A., Siddik, M., & Manurung, N. (2021). Efektivitas Mobile Learning Dalam Pembelajaran Bahasa Inggris Pada Sekolah Menengah Kejuruan (SMK). Journal Of Science and Social Research, 4(1), 1-5.

Nugraha, N., Kadarisma, G., & Setiawan, W. (2019). Analisis kesulitan belajar matematika materi bentuk aljabar pada siswa smp kelas vii. Journal On Education, 1(2), 323-334.

Nurhayati, H. (2021a, Agustus). Number of smartphone users in Indonesia from 2017 to 2020 with forecasts until 2026. Statista. https://www.statista.com/statistics/266729/smartphone-users-in-indonesia/

Putri, A. E. (2020). Diagnosis Kesulitan Belajar Matematika Peserta Didik Kelas Viii-F Pada Materi Relasi Dan Fungsi Di Mts Sunan Kalijogo Kranding Mojo Kediri Tahun Ajaran 2019/2020.

Rachmantika, A. R., & Wardono, W. (2019, February). Peran kemampuan berpikir kritis siswa pada pembelajaran matematika dengan pemecahan masalah. In PRISMA, Prosiding Seminar Nasional Matematika (Vol. 2, pp. 439-443).

Ramadan, F. A., & Arfinanti, N. (2019). Pengembangan mobile learning rensi (relasi dan fungsi) berbasis android pada pokok bahasan relasi dan fungsi sebagai sumber belajar mandiri siswa kelas viii smp. Jurnal Pengembangan Pembelajaran Matematika, 1(1), 42-50.

Salvia, N. Z., Sabrina, F. P., & Maula, I. (2022, January). Analisis kemampuan literasi numerasi peserta didik ditinjau dari kecemasan matematika. In ProSANDIKA UNIKAL (Prosiding Seminar Nasional Pendidikan Matematika Universitas Pekalongan) (Vol. 3, No. 1, pp. 351-360).

Samudro, G. D., Shodikin, A., & Aini, K. N. (2022). Pengembangan Media Pembelajaran Berbasis Android Menggunakan ISpring Suite 10 Pada Materi Turunan Fungsi Aljabar. Jurnal Eksakta Pendidikan (JEP), 6(2), 161-169.

Sarmiyatin, S. (2021). Pengembangan Media Pembelajaran Mobile Learning Berbentuk Aplikasi Android Menggunakan Ispring Suite 9 Untuk Materi Usaha Dan Energi (Doctoral dissertation, https://ummetro. ac. id/).

Setiawan, H. R., Rakhmadi, A. J., & Raisal, A. Y. (2021). Pengembangan media ajar lubang hitam menggunakan model pengembangan addie. Jurnal Kumparan Fisika, 4(2), 112-119.

Sumargono, S., Susanto, H., & Rachmedita, V. (2019). Pengembangan Media Pembelajaran Sejarah Berbantuan ISpring Suite 6.2 untuk Meningkatkan Hasil Belajar Pada Siswa Kelas XI IPS SMAN 1 Surakarta. Jurnal Pendidikan Sejarah Indonesia, 2(1), 82-99.

Supriadi, M., & Hignasari, L. V. (2019). Pengembangan media pembelajaran berbasis virtual reality untuk meningkatkan hasil belajar peserta didik Sekolah Dasar. KOMIK (Konferensi Nasional Teknologi Informasi dan Komputer), 3(1).

Widyatama, A., & Pratama, F. W. (2022). Pengembangan mobile learning pinthir berbasis android sebagai sumber belajar dan sarana mengerjakan soal trigonometri SMA. Mosharafa: Jurnal Pendidikan Matematika, 11(1), 25-36.

Yanti, R. N., Melati, A. S., & Zanty, L. S. (2019). Analisis kemampuan pemahaman dan kemampuan komunikasi matematis siswa smp pada materi relasi dan fungsi. Jurnal Cendekia: Jurnal Pendidikan Matematika, 3(1), 209-219.