Interactive learning media based on MySQL technology in mathematics

H Aliyah, T A Kusmayadi and L Fitriana
Universitas Sebelas Maret, Department of Mathematics Education,
Jl. Ir. Sutami No. 36A, Pucangsawit, Jebres, Surakarta, Indonesia

E-mail: himmasaja@gmail.com

Abstract. Interactive learning media is one of the factors supporting success in the learning process. This study aims to develop interactive learning media based on MySQL technology and to determine the feasibility of media developed for 8th-grade students on straight line equation material. This system works by using a web application. The population in this study were all 8B grade students at MTs Negeri 7 Kediri odd semester 2019/2020. The model used in this study is the ADDIE model which includes Analysis, Design, Development, Implementation, and Evaluation. The first step is analyzing students' difficulties, the second step is designing an appropriate learning program, the third step is developing learning media, the fourth step is implementing learning media for students, and the last step is evaluating students' abilities by giving tests. The results showed that the interactive learning media had fulfilled the validity, practicality, and effectiveness aspects so that the media was appropriate to be used.

1. Introduction
Mathematics is one of the subjects studied at school, from the elementary level to the college level. Mathematics is an abstract lesson [1]. Algebra is one of the materials learned in class VIII, which includes algebraic groups namely factoring, relations and functions, and straight-line equations. Algebra is the gateway to mathematics [2]. Algebra is a language used to define equations appropriately so that students' ability to associate with real situations can increase [3]. However, there are still many studies [4, 5, 6, 7] which show that students have difficulty in learning algebra, especially straight-line equations. In this case, the researchers found a similar problem, namely difficulty learning straight line equations in 8th-grade students at MTs Negeri 7 Kediri based on interviews with 8th-grade mathematics teachers.

The results of the research in the field show that students' ability to learn straight-line equations is still low. The teacher must find a way for students to easily understand the material presented [8]. During this time student access to learning depends only on the teacher and the mathematics textbooks used in schools [9]. However, there are several other supporting factors in learning activities, one of which is the use of media [10]. Learning media in schools should be improved to keep abreast of the times [11, 12]. Media is used as a tool to facilitate teachers and students in learning activities [1]. The selection of appropriate learning media can serve to improve understanding, motivation and learning outcomes [13]. Besides, the media also serves to clarify information so that it is not too abstract;
overcoming the limitations of space, time and sense power; and make learning more interesting [14] so students do not feel bored [15, 16].

Interactive media-based learning needs to be developed, especially in the process of learning mathematics [17]. Interactive learning media is a media display that is designed to display messages and have interactivity with users. In this case, the researchers developed a learning media based on MySQL technology, this system can work using a website. MySQL is known as a database that was first supported by the script programming language for internet PHP and Perl. PHP and MySQL are considered as the ideal web-based application development software pair. MySQL is Open Source software, so it is free to use and modify by everyone. Besides, anyone can also download MySQL from the internet and use it without paying [18]. MySQL has the advantage of being able to save time in data filling, data retrieval, and data retrieval processes more flexibly. Data in interactive media used are student data, teacher data, question data, and computer-based student test result data.

Based on the description, research on the development of interactive learning media based on MySQL technology is valid, practical and effective. Also, students can use these learning media easily. This learning media is called Mathpegarus stands for Mathematics Persamaan Garis Lurus.

2. Method
This type of research is research and development (R&D). The development of research methods is a research method used to produce certain products and test the effectiveness of these products. Research development is not to test the theory [19]. This study aims to produce interactive learning media on the materials of Straight Line Equations, packaged in the form of a website.

The development model used in this study is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE development model was chosen because it is one of the models that is often used to develop effective products [20, 21, 22]. Media is valid if it meets the criteria of feasible, practical and effective [23]. Through the ADDIE stages, it is obtained that media is suitable for learning. The results of the experts’ validation became an important factor in this study. This method is done to help students understand the material in straight line equations.

The first stage in the ADDIE development model is to analyze difficulties, by visiting schools and conducting interviews with mathematics teachers related to learning problems that have been faced by students. The second stage is making designs, this is done by designing learning programs so that learning objectives can be achieved. The third stage is development, researchers begin to develop learning media that will be used for learning activities. The fourth stage is implementation, researchers apply learning media to students. The fifth stage is evaluation, the researcher gives a test to students then evaluates student learning outcomes.

Data collection used to determine the validity of interactive learning media is through expert validation. Data to determine the practicality of interactive learning media in the form of questionnaires, while data to determine the effectiveness of interactive learning media in the form of test questions.

The subjects in this study were students of class VIII B MTsN 7 Kediri in the 2019/2020 school year. Researchers make observations, provide questionnaires responses to learning media to students and tests to collect data related to the media used.

3. Results and Discussion
MySql based interactive learning media that can work on the web are developed on straight line equation material, for students in VIII Junior High School. The developed media contains media usage instructions icons for students, material icons for students, game icons for students, test icons for students, teacher icons for teachers, admin icons for administrators. This media facilitates students to increase understanding by studying material and playing games and evaluation tests. Products can be seen in Figure 1, Figure 2, and Figure 3.
Figure 1. Beginning Display

Figure 2. Theory Display

Figure 3. Test Login Display for Students
3.1 Validity of Interactive Learning Media
Validation is done to produce a valid product or not [9], researchers validate by giving questionnaire sheets to three validators. Validation results can be seen in Table 1.

| Aspect of Assessment | Validator 1 (%) | Validator 2 (%) | Validator 3 (%) | Average (%) | Category |
|----------------------|-----------------|-----------------|-----------------|-------------|----------|
| Writing              | 83.33           | 91.67           | 87.50           | 87.50       | Very Valid |
| Presentation         | 85.00           | 95.00           | 85.00           | 88.33       | Very Valid |
| Visual               | 80.00           | 85.00           | 80.00           | 81.67       | Very Valid |
| Audio                | 75.00           | 87.50           | 87.50           | 83.33       | Very Valid |
| Average              | 80.83           | 89.79           | 85.00           | 85.21       | Very Valid |

Based on Table 1, it can be seen that the results of each validator's assessment are 80.83%, 89.79%, and 85.00% with an average value of 85.21% which is included in the very valid category. The average value for interactive learning media in each aspect of the Assessment can be seen in Figure 4. This interactive learning media has a very valid category in the learning aspect, with an average value of 87.50%. Means in this learning media following the clarity and accuracy in words, so students can understand what is asked in writing. This interactive learning media has a very valid category in the aspect of presentation, with an average value of 88.33%. This means that learning media has met the systematic suitability in presenting the material and concepts provided in full. This interactive learning media has a very valid category in the visual aspect, with an average value of 81.67%. This means that in this learning media has fulfilled the suitability of the picture, the choice of background color and design. This interactive learning media has a very valid category in the audio aspect, with an average value of 83.33%. Means that in this learning media has met the suitability of back sound selection and quality

3.2 Practicality of Interactive Learning Media
Practicality of learning media is obtained from the results of student responses to interactive learning media. The results of student responses can be seen in Table 2.
Table 2. Results of student responses to the questionnaire of interactive learning media

| Aspect of Assessment | Average (%) | Category       |
|----------------------|-------------|----------------|
| Benefit and Function | 81.67       | Very Practical |
| Presentation         | 81.67       | Very Practical |
| Language             | 84.58       | Very Practical |
|                      | Average     | 82.64          | Very Practical |

Figure 5. The assessment average practical of interactive learning media

Based on Table 2 it can be seen that the aspects of benefits and functions have an average value of 81.67% which is included in the very practical category. This shows that the media developed are very capable of providing convenience for students in understanding the material, practicing student independence, and increasing student motivation in learning mathematics, especially in the subject of straight-line equations. In the presentation aspect, it can be seen that the average value is 81.67% which has the same value as the aspects of benefits and functions, which are included in the very practical category. This shows that the developed media shows clarity of appearance, buttons, and sound, so students can easily use this interactive learning media. In the language aspect, it can be seen that the average value obtained is 84.58%, which is included in the very practical category. This shows that the language and writing used can be understood by students well. Based on the aspects that have been discussed shows that the development of interactive learning media based on MySQL is very practical for use by students in improving the quality of students and the learning process.

3.3 Effectiveness of Interactive Learning Media

The effectiveness of learning media that has been developed obtained data from learning outcomes in the form of tests. Based on the results of data analysis obtained that the percentage of completeness was 83% (25 out of 30 students) and included in the category of very good, so it can be concluded that the learning media based on MySQL technology meets the level of effectiveness.

4. Conclusion

Based on the results and discussion, it was concluded that the interactive learning media based on MySQL technology developed in mathematics meets validity, practicality, and effectiveness. So interactive learning media based on MySQL technology in mathematics is appropriate to be used to help students understand straight-line equations. Therefore, it is hoped that there will be other learning
media developments to improve students’ ability to learn, especially in mathematics. Besides, it is a provision to face the 4.0 Industrial Revolution.

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