# Developing ISpring Suite 8 Based Qmath Learning Media on Polyhedron Lesson for Junior High School Students

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*Abstract--This study aims to develop the ISpring Suite 8 based Qmath learning media on polyhedron lesson for junior high school students that is valid, practical, and effective. This type of research was Research & Development. The development model used in this study was ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The population of this study was eight grade students in Al-Huda IT Junior High School with the study sample was students of VIII A class in Al-Huda IT Junior High School. The research trials were carried out twice, namely small-scale and large-scale trials. The research instruments used were expert validation sheet, student questionnaire response, and learning achievement test. The results showed that the average score of the validation result of ISpring Suite 8 based Qmath learning media was 3 in the valid category, the average score obtained from the student questionnaire response was 3.41, indicated that this learning media was practical to use, and the average score of learning outcome of students who became the study sample was 78,02 and it fulfilled the effective criteria. It can be concluded that, ISpring Suite 8 based Qmath learning media on polyhedron lesson fulfilled the criteria of validity, practicality, and effectiveness.*

*Key words--Qmath, ISpring Suite 8, Polyhedron.*

## I. INTRODUCTION

Education is defined as a process that can change or mature someone because with education someone who previously did not understand will become understood about something. Education is used as an investment for someone to bring benefits, both in the form of social and personal benefits. One of the knowledge in education that is used as a media for developing human thought is mathematics (Pendidikan et al., n.d.).

In mathematics, learning media is needed to support the learning process. This is because mathematics is one of the most difficult and tedious lesson when it taught with techniques that tend to be monotonous. Most students claim to have difficulty in learning mathematics. This is in line with one of the results of research which states that mathematics study is difficult subject according to students (Anggraeni, 2016). Therefore, to facilitate students in learning mathematics, a learning media is needed, both in the form of ease of understanding and ease of obtaining material.

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Media comes from the word medium, which means a tool of communication (Sharon, 2011). The media functions as a source of information recipient. Medium can also mean something that helps the process of delivering message and information to the message recipient or communicant (Pribadi, 2017). Meanwhile, the definition of learning according to Sanaky, learning is a process of communication between learning, teaching, and teaching material (Nunuk, 2018). Learning media has several functions. According to Asyhar the function of instructional media is the semantic function to give clarity to something for students. Other functions are manipulative, fixative, distributive, sociocultural, and psychological (Nunuk, 2018). Learning media has developed rapidly along with the times. The use of media such as blackboard and manual textbook can no longer guarantee the quality of learning process caused by the development in the digital world that is changing the education world. Determination of instructional media is not only based on the pleasure of educator towards a particular media or just because the media in school are limit and educators are not trying to find suitable media. As a result, there are obstacles in learning communication so learning activity does not take place optimally. This is also strengthened by the results of field observations conducted by researcher. Teachers who teach in schools and who are the observation object still used mediocre learning media such as manual text book and blackboard as learning media. The learning media used should be able to attract the interest and students' attention in learning. Interesting learning media generally follow the development of technology.

Lately, most students tend to use smartphone and laptop in their daily life. A 2003 survey at the University of Birmingham found that 43% of students had laptop and smartphone. This number covers large gap in technology around the world (Sharples et al., 2007). The widespread use of technology devices such as smartphone or laptop among students proves that the use of technology in making instructional media has great opportunity and needs to be optimized to improve the quality of education, especially making it easier for students to understand various branches of science.

In her research Titik Haryati said that students were more interested in learning the material with the illustrations in every passage, it make easier for students to understand (Buchori & Setyawati, 2015). Where, students will feel very helped by the learning model as said by Titik that an illustration in teaching material will make it easier for students to understand. From the explanation above, it can be concluded that learning media is something that is used to help the teaching and learning process. Many learning theories have advanced for 2500 years until this day, but almost all have been based on the assumption that learning takes place in the classroom(Sharples et al., 2007). A study by Vavoula found that 51% of learning took place at home (indoor) or workplace, the rest of study occurred outside the workplace (21%), outdoor (21%) and at friend's house (2%)(Crompton, 2015). So, the determination of learning media must be done appropriately in order it can be used both inside and outside of the room. Specifically, there are four rational reasons why learning media is important to be used for learning, namely: improving the quality of learning, the demand of new paradigm, market need, vision of global education (Yaumi, 2018). Etymologically, the word technology (technology) is divided into two, namely techne which means art, craft, or skill and meaningful logic of word, study, or the body of science. In terminology, technology is a science about creating a thing. The availability of technology is fundamental but it is not enough for an effective learning environment (Merlin et al., 2017).

According to Association for Educational Communications Technology (AECT,1977) stated that "Educational technology is a complex" (Januszewski & Molenda, 2008). The definition emphasizes a complex integrated process. It means connecting various things, it can be people, idea, tool and others to analyze the problem found in all learning aspects of human (Yaumi, 2017). While according to Commission on Instruction Technology (CIT) 1970 stated that "Learning technology is defined as a media that was born as a result of a communication revolution that can be used for learning purposes besides teacher, textbook, and blackboard. The parts that make learning technology are television, film, OHP, computer and hardware parts that can be used as another aid" (Hutchison & Mitchell, 1973). From this definition, it is known that technology was born because of a revolution related to communication (Warsita, 2008). As with other technology development, recently there has been considerable interest in the availability of mobile devices (Kearney & Maher, 2013). In some countries, mobile devices are far more widely used than computer (Keskin & Metcalf, 2011).

Mobile learning is a field emerging and rapidly developing in educational research, practices in school, college, and in the workplace (Cook, 2010). The foundation in mobile learning was laid more than thirty years ago (The, 2000). A reference said that mobile learning is a harbinger of the future of learning or a sign of the future learning (Park, 2011). The basic elements of mobile learning are student, teacher, environment, and assessment (Ozdamli & Cavus, 2011). The classification of mobile learning is based on several things, including the type of equipment and communication technology used, the type of information, the type of access and location as well as M-Learning standard support (Darmawan, 2017). Stage in developing computer-based learning program is included in developing mobile learning program (Darmawan, 2016). One of free applications that can be used to change Ms. PowerPoint files is iSpring Suite 8 application. This application can be downloaded legally and for free on the official website which is located at http://www.ispringaolutions.com/ispring-free. ISpring Suite 8 is a software that can make PowerPoint appearance more attractive and interactive. ISpring Suite 8 can easily be integrated with PowerPoint and contains many interesting features, including creating quiz with various types of questions.

Based on the explanation above, the researcher will develop Qmath learning media based on ISpring Suite 8 software on polyhedron material for junior high school students. This learning media as a tool of learning mathematics can be used by educators to facilitate the teaching and learning process as well as facilitate students to access and to learn the material, both inside and outside of the learning process. The learning media based on ISpring Suite 8 software was tested on students of VIII A class in Al-Huda IT Junior High School with the aim to find out the process of developing Qmath learning media based on ISpring Suite 8 software, to find out whether the developed media is feasible to use, and to know how the result of the implementation of media developed towards learning mathematics.

## II. METHODOLOGY

This type of research was development research that used the ADDIE model. This development model consisted of five stages, namely: (1) the analysis stage, where the researcher collected data related to students' problems in learning mathematics and the teacher's needs for learning media. (2) design stage, namely researcher did media design started from the main menu and others according to the needs of students and teacher. (3) development

stage, where the researcher combined the results of the design with pre-existing media. (4) implementation stage is carried out trial of learning media developed for the object of research that was junior high school students especially eight grade students. (5) evaluation stage, which is the evaluation process of the developed media (Nunuk, 2018).

The learning media developed by researcher was tested by selecting one of the junior high school institutions. The school which was the testing ground for this learning media was Al Huda IT Junior High School. The target of this study were eight grade students at the school. The instruments used in this study were expert validation sheet, student questionnaire response, and learning achievement test

## III. RESULTS

The learning media developed by researcher was android-based application that was named Qmath and can be installed on every smartphone or android of students or teachers. This application was developed with the ADDIE development model. Each menu of the Qmath application is created from the ISpring Suite 8 software. Qmath provides menus including material, sample question, multiple choice quiz, and matching quiz. The stages of development are explained as follows:

**1. Analysis Stage**

The analysis stage was the initial stage of this research, namely by collecting data related to the problem of Al-Huda Junior High School students in mathematics learning. In addition, researcher also collected data related to instructional media needed by teacher. From the result of the analysis conducted, researcher found that students felt that mathematics was a very difficult subject. Another problem was that students could only study material within the scope of the school due to the lack of learning media that could support the learning process outside the classroom. Therefore, researcher concluded that teacher should utilize Android-based learning media.

**2. Design Stage**

At the design stage, researcher began to design media that will be developed in accordance with the problem found at early stage. This stage began by determining the media to be created and designing application started from the main menu to the content of the media.

**3. Development Stage**

At the development stage, the researcher made and designed the background according to the theme of the application which was polyhedron. Then the researcher arranged the geometry material that will be included in the application. The next stage was the researcher made quiz in the form of multiple choices consisted of 40 numbers and matching questions consisted of 10 numbers. The elements above are then incorporated into application or media that are designed by using ISpring Suite 8 software.

### 4. Implementation Stage

The form or result of the implementation of this learning media can be seen in the following figure:



**Figure 1.** Initial Menu Display

Figure 1 displayed the main menu shape of the application designed by the researcher. When opening the application, the main menu would appear as shown above. On the main menu there was a black "play" button that has the function to enter the next menu. In addition, the main menu also displayed the logo of the application designed by the researcher. After pressed the "play" button, it would automatically enter the next display which contained several items, namely the theory button that contained the full material of the polyhedron, then there was a multiple choice button that contained a multiple choice quiz, and the last was a matching button which contained matching or pairing quiz.
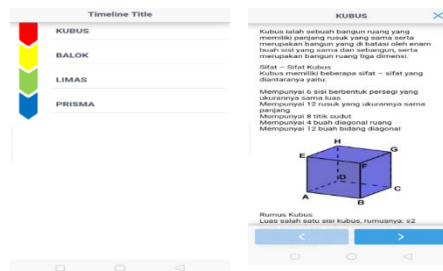


**Figure 2.** Material Display

Figure 2 was a timeline title that contained cube, block, pyramid and prism material. The material discussed is included definition, picture, property and formula used to solve problem related to the four structures. The steps to bring up the timeline title were: (1) Open the Qmath application, (2) On the start menu, click Theory, (3) Choose geometry material that you want to learn, for example you want to learn about the cube, then click the cube, (4) When you want to proceed to the next page, click the larger symbol (>) found in the lower right corner. Meanwhile, to return to the previous page, click the smaller symbol (<) in the lower left corner.
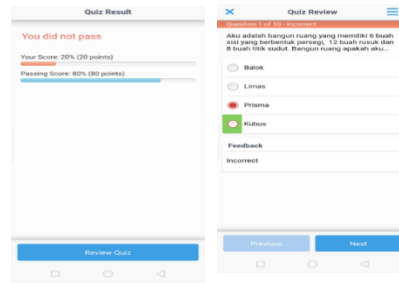
**Figure 3.** Multiple Choice Quiz Display

Figure 3 was the initial display that we encountered if we clicked on Multiple Choice on the initial menu. The multiple choice contained questions related to cube, block, pyramid and prism. There were 10 questions in the form of multiple choice. To answer a Multiple Choice question, user simply clicked on the answer that is considered correct, then clicked submit to save the answer. After all questions have been answered, a Quiz Result would appear. In this Result Quiz, we could see the number of correct answers and wrong answers. To see which questions were incorrect, just clicked Review Quiz, then the incorrect question would appear with the correct answer.
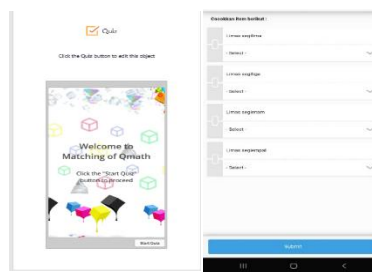


**Figure 4.** Matching Quiz Display

Figure 4 was a matching quiz display. Matching was a quiz in the form of pairing. How to use this quiz was to click on Matching that is displayed on the main menu (picture 1). After that, the "Welcome to Matching of Qmath" display (picture 4) is appeared. After that click "Start Quiz", then a command would appear to match both the formula and items related to the polyhedron material. This Matching Quiz consisted of 10 questions. Each question consisted of 4 pairs. After all questions have been paired, the score will be displayed. If you wanted to see the wrong answer complete with correction or the correct answer, then click "Review". To be able to open this application on an Android or smartphone, researcher needed a software called Website 2 apk builder which can be seen in the following image:



**Figure 5.** Display on Android or Smartphone

### 5. Assessment stage

The assessment stage consisted of 3 stages, namely validation, practicality test, and product effectiveness test.

### a. Validation stage

The criteria for the validity of the media can be seen in the following table 1:

**Table 1**. Validity Criteria

| Value | Criteria |
|---|---|
| $0 \leq X < 1{,}5$ | Invalid |
| $1{,}5 \leq X < 3$ | Valid Enough |
| $3 \leq X < 4{,}5$ | Valid |
| $4{,}5 \leq X \leq 5$ | Very Valid |

Table 1 above was a criterion that became a reference in determining whether or not learning media was valid, where X was the average value of the assessment aspect by the validator. The validation results filled in by the validator are:

**Table 2.** Validation Result

| Assessment Aspect | Rating result | Category |
|---|---|---|
| Background | 3.5 | Valid |
| Menu display design | 3 | Valid |
| Material completeness | 2.5 | Valid enough |
| Quiz Quality | 3 | Valid |

Based on table 2, it can be seen that the average assessment from the validator toward Qmath application was 3. Then, it can be concluded that the learning media was in the valid category or was feasible to use. The feasibility is known from the criteria that have been made previously.

### b. Practicality test stage

The criteria for the practicality of the media can be seen in table 3. below:

**Table 3**. Practical Criteria

| Value | Criteria |
|---|---|
| $0 \leq P < 1{,}5$ | Inpractical |
| $1{,}5 \leq P < 3$ | Practical enough |
| $3 \leq P < 4{,}5$ | Practical |
| $4{,}5 \leq P \leq 5$ | Very Practical |

Table 3 above was a criterion that became a reference in determining the practicality of learning media, where P was the average value of the assessment aspect conducted by students. The response data of eight grade students in Al Huda IT Junior High School as many as 30 students through questionnaires distributed by researchers is shown in table 4.

**Table 4**. Practicality Level Trial Result

| Student | Total Score | Practical Score | Criteria |
|---------|-------------|-----------------|----------|
| 1 | 42 | 3.2 | Practical |
| 2 | 45 | 3.5 | Practical |
| 3 | 44 | 3.4 | Practical |
| 4 | 40 | 3 | Practical |
| 5 | 40 | 3. | Practical |
| 6 | 45 | 3.5 | Practical |
| 7 | 45 | 3.5 | Practical |
| 8 | 46 | 3.6 | Practical |
| 9 | 48 | 3.8 | Practical |
| 10 | 45 | 3.5 | Practical |
| 11 | 45 | 3.5 | Practical |
| 12 | 43 | 3.3 | Practical |
| 13 | 46 | 3.6 | Practical |
| 14 | 44 | 3.4 | Practical |
| 15 | 43 | 3.3 | Practical |
| 16 | 46 | 3.6 | Practical |
| 17 | 46 | 3.6 | Practical |
| 18 | 45 | 3.5 | Practical |
| 19 | 42 | 3.2 | Practical |
| 20 | 43 | 3.3 | Practical |
| 21 | 45 | 3.5 | Practical |
| 22 | 45 | 3.5 | Practical |
| 23 | 49 | 3.9 | Practical |
| 24 | 40 | 3 | Practical |
| 25 | 47 | 3.7 | Practical |
| 26 | 42 | 3.2 | Practical |
| 27 | 41 | 3.1 | Practical |
| 28 | 45 | 3.5 | Practical |
| 29 | 46 | 3.6 | Practical |
| 30 | 40 | 3 | Practical |
| **Rata-rata** | 3.41 | | |

Based on table 4, the average value of the respons of the 30 students to the Qmath application was 3.41. It can be concluded that this learning media is practically used by both students and teachers.

**c. Effectiveness Test Stage**

Testing the effectiveness of Qmath media is carried out by taking test scores from 30 eight grade students in Al-Huda IT Junior High School. Descriptive analysis of student learning outcome of test score after using Qmath showed that the average score of students learning outcome in eight grade students in AL Huda IT Junior High School on mathematics learning was 78,02 of the ideal score of 100. The minimum score obtained by students was 55 and the maximum score was 93. If student learning outcomes are grouped into 5 categories, then there were 10% of students in the low category, 9% of students in the medium category, 65% of students in the high category, and 16% of students in the very high category. The results obtained are indicated that this learning media was effective to use by both students and educators.

After the researcher conducted trial, it found several advantages of Qmath learning media, namely, Qmath can be accessed easily by students and teachers in all types of android. In addition, Qmath could help students practice their knowledge through quizzes provided and found out how much learning outcomes obtained by students. Qmath also helped educators in giving quizzes to students. In addition to the above advantages, researchers also found the disadvantages of this media, namely the material need to be completed and made as attractive as possible. In addition, in providing material must be accompanied by examples of questions so students easily understand the material.

## IV. CONCLUSION

In this study, the Qmath application used the ADDIE development model with 4 stages, namely the analysis stage, the design stage, the development stage, the implementation stage, and the evaluation stage. Qmath contained material and quizzes about polyhedron. Quiz available were of two types, namely multiple choice and matching quizzes. Based on the results of the study, the Qmath application created by using ISpring suite 8 software is fulfilled the valid, practical and effective criteria so this Android-based learning media was appropriate to use by students and teachers.

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