

*Development of Web Based Mathematics Learning Media
On Geometric Solids*

**Pengembangan Media Pembelajaran Matematika Berbasis Web
Pada Bangun Ruang Sisi Datar**

Tika Septia
tikaseptia2589@gmail.com
IAI Al-Qolam, Malang

Abstrak

Media pembelajaran berbasis web ini dibuat karena siswa sulit dalam mempelajari materi bangun ruang sisi datar. Tidak adanya media pembelajaran tentang materi bangun ruang sisi datar yang efektif yang mampu memfasilitasi siswa dalam belajar juga menjadi penyebab lainnya. Buku referensi yang ada belum mampu membantu siswa memahami konsep karena hanya menyampaikan informasi. Tujuan penelitian ini adalah mengembangkan media pembelajaran yang valid dan praktis pada materi bangun ruang sisi datar untuk siswa kelas VIII. Model pengembangan yang digunakan adalah SDLC (*System Development Life Cycle*). Model pengembangan terdiri dari 5 tahap yang meliputi : perencanaan, analisis, perancangan, implementasi, pengujian, dan pemeliharaan. Penelitian ini hanya dilakukan sampai pada tahap pengujian. Validasi dilakukan oleh 2 orang dosen matematika/TI dan 1 orang guru matematika. Data praktikalitas diambil dengan menggunakan angket dan wawancara. Data dianalisis dengan teknik persentase dan diolah secara deskriptif. Hasil validasi menunjukkan bahwa media pembelajaran berbasis web valid yaitu dengan persentase 86,19 %. Media ini juga sangat praktis bagi siswa dan guru yaitu 87,73 % dan 80,95 %. Jadi disimpulkan bahwa media pembelajaran berbasis web pada materi bangun ruang sisi datar sangat valid dan sangat praktis

Kata kunci: pembelajaran online, geometri, web

Abstract

Students' problems in expertise geometry are one of the causes for growing developng web-based gaining knowledge of media. Another element remains confined internet-primarily based on gaining knowledge of media to facilitate college students' gaining knowledge. The reference book has now no longer been capable of assisting college students in recognizing the concept. This study aims to expand valid and practical web-based gaining knowledge of media for the geometry issue. This research used an SLDC design. The SLDC includes five phases: planning, analyzing, design, testing, and maintenance. These studies are most effective till the trying out stage. The designed web-based media was validated by two mathematic lecturers/IT and one mathematic teacher. The data had been collected through a validation form, interview, and questionnaire. The data was then analyzed qualitatively and quantitatively. The result of this study suggests that the web-based gaining knowledge of media is legitimate in case of content material and production with the 86,19%. In contrast, students' and trainers' practicalities show that web-based gaining knowledge of media is realistic with the 87,96% for students and 80,95% for trainers. So It can be inferred that web-based learning media on geometric solids is valid and practical.

Keywords: e-learning, geometry, website

INTRODUCTION

As one of the largest media in the world, the internet can be used as a driving force for the advancement of educational technology in Indonesia. The internet is beneficial in education, especially as a learning medium in the form of a website (Habiburrahim, 2016). The internet has great potential to improve the quality of learning in schools, especially in learning mathematics (Loong & White, 2003). Based on the results of observations made at MTs. Khairuddin, it is known that the available student learning resources are limited to textbooks, student worksheets, and materials presented by the teacher in class. Lack of learning resources limits students' competence and knowledge.

MTs. Khairuddin already has a computer laboratory. It is connected to the internet network has wifi network facilities that teachers and students can access. Based on observations, it is known that the use of the internet as a medium for learning mathematics has not been optimally utilized. Computer labor facilities and wifi are only used for learning the field of ICT (Information and Communication Technology) studies. From the interviews with students, it is known that mathematics lessons still seem complicated and not fun. The causes include the lack of available learning media so that learning seems uninteresting. One of the components that affect the effectiveness of learning mathematics is the selection of suitable learning media. (Daryanto, 2010; Lin et al., 2017; Widodo & Wahyudin, 2018).

Viewed from the side of the learning process, the geometric solids is a material whose concepts are complex for students to understand. Space geometry material is one of the abstract mathematics subject matter. Students' difficulty in understanding this material is because, in the learning process, they only find numbers, formulas, graphs, and still images. Hence, students feel less interested and feel the material is boring. Based on the description above, it is necessary to develop web-based learning media to help students understand mathematics lessons. The web will expand on the geometric solid. For this reason, research was carried out to create Web-Based Mathematics Learning Media with the Help of Building Materials for geometric solid for Class VIII MTs. Khairuddin.

METHOD

This type of research is research and development (Research & Development). The product developed is a web-based learning media geometric solid materials. The web-based learning media development model in this study uses the SDLC development model. The SDLC model design steps are planning, analyzing, design, testing, and maintenance (Adrianto et al., 2017). This research was conducted only at the testing stage. The instruments used in this study were validation sheets, questionnaires, and interview guidelines.

FINDINGS AND DISCUSSION

The web-based learning media has been developed through five stages, namely planning, analyzing, design, testing, and maintenance. After doing the research, it was found that the web-based learning media on geometric solid material was valid and practical. The development of web-based learning media on geometric solid material using the SDLC model results.

1. Planning. The processes carried out at the planning stage were identification of student characteristics, identification of syllabus, identification of textbooks/references, identification of literature, and planning of system requirements.

2. Analyzing. The process carried out at the analysis stage is as follows.

Syllabus Analysis: The syllabus analysis results of SMP/MTs class VIII semester 2 show that the core competencies, basic competencies, and learning indicators are the expected.

Textbook Analysis; The textbooks analyzed were the Mathematics Book for SMP/MTs for class VIII semester 2 of the Ministry of Education and Culture and the Mathematics Teacher's Book for SMP/MTs for class VIII of the Ministry of Education and Culture and other written books. The analysis results show that the textbooks used to follow the competencies.

Reference Book Analysis; The reference books observed were the SMP/MTs Mathematics book for class VIII semester 2 of the Ministry of Education and Culture, Mathematics Teacher's Book for SMP/MTs for class VIII of the Ministry of Education and Culture, and other written books. Each part of the

textbook containing material of the geometric solid is used to reference drafting concepts and examples of questions and exercises on web-based learning media.

Literature Analysis; at this stage, the literature related to the development of web-based learning media had been analyzed, namely research method books related to development research.

3. Designing. The planning stage aims to design web-based learning media. The following web-based learning media were developed. In summary, the composition of the material can be seen in figure 1.

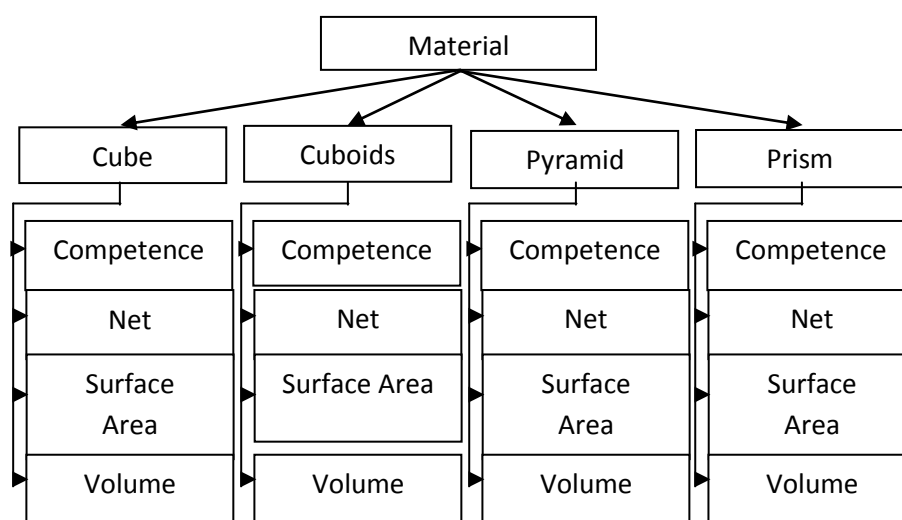


Figure 1. The Composition of The Material.

After compiling the materials, the next step was to prepare the website components needed to develop web-based learning media, namely domains, website hosting, plugins, and theme design.

4. Implementing

The implementation stage is implementing the system design made at the design stage into a product. At this stage, the actions taken were creating a web-based learning media (directing the domain to the hosting address that has been prepared, installing the WordPress CMS on the hosting site, installing the necessary plugins, create a web-based on a design that has been designed), and Validation (validation activities). This is done by filling out a web-based learning media validation sheet to obtain a valid web. The validation of this web-based learning media was carried out by three people,

they were two Mathematics/IT lecturers and one math teacher). The results of the validation by the validator for all aspects can be seen in Table 1.

Table 1. The Result of Validation

Aspect	Total	Percentage
Content	86	89.58%
Presentation	94	84.04%
Language	67	79.76%
Graphics	115	87.12%
Total	362	86.19%

The results of the overall data analysis showed that the percentage of web-based learning media from the three validators was categorized as very valid, with the value of 86.19%. On the validation sheet, the validator also provides notes, including adding Core Competencies, Basic Competencies, and Learning Objectives, adding animations to the explanation of the geometric solid space webs, fixing the HyperText Markup Language (HTML) code to display images, adding a time limit practice work and evaluation, adjust the web display for different monitor screen sizes, increase the loading speed when accessing the web.

5. Testing

Valid web-based learning media was then tested on mathematics teachers and six students in MTs. Khairuddin. The students are selected based on their academic ability in mathematics, two students with high skills, two students with moderate skills, and two students with low skills. The trial was limited to seeing the practicality of web-based learning media on the developed geometric solids material.

The students' practicality questionnaire showed that the percentage of the practicality of web-based learning media was 87.96%. Based on the criteria put forward by Riduwan (2010: 89), the results of the practicality questionnaire by students on web-based learning media are categorized as very practical. The teacher's practicality questionnaire data showed that the percentage of the practicality of web-based learning media was 80.95%. Based on the criteria put forward by Riduwan (2010: 89), web-based learning media was categorized as very practical.

The results of interviews with the students about the practicality obtained the following description: Web-based learning media is easy to use because there are clear instructions, Students can use web-based learning media independently, The language used in web-based learning media is easy to understand, Web-based learning media motivates students to learn because of the ease of use, and there are pictures/animations that are easy to understand. There are still shortcomings and obstacles that must be corrected; learning media can be used in mathematics or other materials.

CONCLUSION AND SUGGESTIONS

Based on the results of research and data analysis, it can be concluded that the web-based learning media on geometric solids for class VIII SMP students is very valid and practical

REFERENCES

- Adrianto, D., Martani, M., Indriani, D., & Susanti, R. (2017). Development of Online Learning System for Software Laboratory Center in Bina Nusantara University. *ComTech: Computer, Mathematics and Engineering Applications*, 8(2), 83. <https://doi.org/10.21512/comtech.v8i2.3752>
- Darma, Jarot S, dkk. 2009. *Buku Pintar Menguasai Internet*. Jakarta: Mediakita.
- Daryanto. 2010. *Media Pembelajaran*. Yogyakarta: Gava Media.
- Habiburrahim, H. (2016). The Internet and ICT: Opportunities or Threats to the Education World? *Englisia Journal*, 3(1), 1. <https://doi.org/10.22373/ej.v3i1.533>
- Lin, Y. W., Tseng, C. L., & Chiang, P. J. (2017). The effect of blended learning in mathematics course. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(3), 741–770. <https://doi.org/10.12973/eurasia.2017.00641a>
- Loong, E., & White, B. (2003). Teaching Mathematics Using the Internet. *26th Conference of the Mathematics Education Research Group of Australasia, 1999*, 492–498.
- Nugroho, Adi. 2010. *Rekayasa Perangkat Lunak Berorientasi Objek dengan Metode USDP*. Yogyakarta: Andi Offset

- Prastowo, Andi. 2014. *Pengembangan Bahan Ajar Tematik*. Jakarta: Prenadamedia Group
- Riduwan, M.B.A. 2010. *Belajar Mudah Penelitian Untuk Guru, Karyawan Dan Peneliti Pemula*. Bandung: Alfabeta.
- Situmorang, Robinson. 2007. *GBPP Teknik Pengembangan Dan Pemanfaatannya Untuk Mencapai Kompetensi Dalam Pembelajaran*. Jakarta: Departemen Pendidikan Nasional.
- Sugiyono. 2012. *Metode Penelitian Administrasi*. Bandung: Alfabeta.
- Sugiyono. 2011. *Metode Penelitian Pendidikan (Pendekatan, Kuantitatif, Kualitatif, Dan R&D)*. Bandung: Alfabeta.
- Surjono, Herman Dwi. 2010. *Membangun Course E-Learning Berbasis Moodle*. Yogyakarta: 2010.
- Widodo, S. A., & Wahyudin. (2018). Selection of learning media mathematics for Junior School Students. *Turkish Online Journal of Educational Technology - TOJET*, 17(1), 154–160. <http://www.tojet.net/>