Development of Interactive Learning Media for Basic Concepts of 3D Objects

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Abstract: *The problem that occurs in class XI Multimedia at SMK Negeri 1 Gambut is the lack of enthusiasm and student participation in 2D and 3D Animation Engineering subjects. To answer this problem, interactive learning media was created using Articulate Storyline 360 with a focus on Basic Concepts of 3D Objects, to provide learning material more interesting and accesssible form, especially for students who have difficulty with abstract visualization in conventional learning. Simultaneously with the development process, a feasibility review was also carried out to determine whether the media was feasible for use in classroom learning. The method used is Research and Development (R&D) with the Borg and Gall model, which has been modified into five stages: (1) preliminary study, (2) planning, (3) initial product development, (4) testing and evaluation, and (5) final product and distribution. The feasibility test of the media was conducted through: content validation by two content experts, media validation by two media experts, individual trial by students, and field trials evaluation by students. The final results of the research indicate that the developed media can be accessed offline through Android and Windows devices. The validation results indicated that the material expert scored 4.59 and the media expert scored 4.85, both categorized as very good. The individual trial and field trial resulted in scores of 4.20 and 4.64, respectively, both categorized as very good. Based on the results, the learning media was declared feasible for use in learning 3D object material in vocational schools.*

Key Words*: interactive learning media; basic concepts of 3D; articulate storyline 360; media feasibility*

Introduction

Advancement in information technology have had a significant impact on the field of education, especially in the development of innovative and interactive learning media. Learning media are no longer limited to textbooks and whiteboards, but have transformed into digital tools capable of providing a more dynamic learning experience. (Arsyad, 2017) states that learning media serve as intermediaries that deliver instructional messages effectively by incorporating various forms such as text, audio, video, and animation. Similarly, (Smaldino et al., 2019) emphasize that appropriate learning media can enhance students' cognitive engagement and support the achievement of instructional objectives. The use of technology-based media is believed to improve students' understanding and learning outcomes more optimally (Clark & Mayer, 2016; Mayer, 2020).

In line with this, (Z et al., 2025) emphasizes that interactive learning media facilitate two-way communication between students and instructional content, enabling active participation in the learning process. The strength of interactive media lies in its ability to combine various multimedia elements such as animations, videos, and navigation buttons, thereby creating an enjoyable learning environment, Munir (Trimansyah, 2021). Software

that supports the development of this type of media—allowing the creation of interactive educational content and can be accessed across platforms—includes Articulate Storyline 360 and Articulate Storyline 3, as demonstrated by (Maulana et al., 2024; Sukmawati & Sari, 2024).

The results of interview with the 2D and 3D Animation Engineering teacher at SMK Negeri 1 Gambut show that the learning process still relies on conventional media such as PowerPoint and textbooks. Although videos from the internet are occasionally included, the presentation of the material is not yet not fully capable of visualizing the animation concepts in an interesting and interactive way. This has an impact on low students' enthusiasm, as seen from their passive behavior and lack of motivation during lessons. The limited visualization of the material is assumed to be an obstacle in understanding the basic concepts of 3D objects, which are an important part of the subject.

Therefore, it is necessary to develop learning media that can present material in an interactive and visual way. Learning media based on Articulate Storyline 360 serves as an alternative solution that enables the delivery of engaging multimedia content and provides space for active student involvement. In addition, this media can be published for offline use on Android and Windows devices, making it flexible and suitable for various learning conditions, including schools with limited internet access (Alessi & Trollip, 2001).

Method

The type of research used is Research and Development (R&D), which aims to develop and test the feasibility of interactive learning media based on Articulate Storyline 360 for the topic of Basic Concepts of 3D Objects. The development model used is the Borg and Gall model, which has been modified into five main stages (Wibowo & Nugroho, 2015):

1. Preliminary Study

   At this stage, a needs analysis and curriculum analysis are carried out to obtain factual information from the field regarding learning conditions and the required media. The needs analysis is conducted through interviews with the teacher to gather information related to obstacles, problems, and the media used in the learning process. Meanwhile, the curriculum analysis is conducted to identify the curriculum documents used, such as the subject syllabus, Basic Competencies (KD), Indicators of Competency Achievement, and learning objectives.

2. Planning

   Activities carried out in this stage include:

   a. Establishing development objectives, namely formulating the goals to be achieved through the learning media, such as increasing students' learning interest and facilitating interactive understanding of 3D object concepts.

   b. Selecting the material, which involves determining the learning content to be included in the media. In this case, the researcher focuses on the material "Basic Concepts of 3D Objects."

   c. Developing assessment instruments, which involves preparing instruments to evaluate the quality of the media, both through validation by material experts and media experts as well as through trials. These instruments include intructional and

content aspects for material validation, as well as display and programming aspects for media expert validation.

3. Initial Product Development

At this stage, the initial design is developed (including the material framework, concept map, and interface design) and the media is created. The media is then validated by two content experts and two media experts to assess the content, learning aspects, display, and programming.

4. Testing and Evaluation

In addition to conducting validation of the material and the media, this stage is also necessary to determine the feasibility of the developed media. The media is directly tested by students and evaluated based on their responses. This process is carried out through several steps as follows:

a. Individual trial, conducted with several students to identify obstacles and difficulties they experience when using the media.

b. Field trial evaluation, conducted in an actual classroom setting, where the teacher and researcher observe whether the learning media functions well during the learning process.

c. Media evaluation, during which students as respondents are asked to provide notes, opinions, and suggestions that the researcher will use as considerations for improving the media.

d. Final revision, in which the media is refined and perfected after all testing stages are completed and all notes, opinions, and suggestions have been collected, before moving on to the dissemination stage.

5. Final Product and Distribution

The final product is a learning media based on Articulate Storyline 360 for the topic of Basic Concepts of 3D Objects, which has been refined based on feedback from respondents and validators. The media is then distributed to students via a QR code and handed over to the teacher as a learning resource.

The scoring of each assessment aspect on the validation and trial sheets used a Likert-5 scale. Here are the media feasibility qualifications used to determine the media feasibility category:

Table 1. Media Feasibility Category

Mean	Category
$\overline{X} > 4.01$	Very Good
$3.34 < \overline{X} \leq 4.01$	Good
$2.66 < \overline{X} \leq 3.34$	Enough
$1.99 < \overline{X} \leq 2.66$	Not Enough
$\overline{X} \leq 1.99$	Very Less

The mean score is calculated using the formula:

$$\overline{X} = \frac{\sum X}{N}$$

where $\overline{X}$ = mean, $\sum X$ = number of score, N = number of indicator.

This category was created referring to Sudijono's media feasibility guidelines (Nugraha & Muhtadi, 2015). A learning medium can be considered feasible if it meets the predetermined criteria based on evaluations by experts and responses from respondents. The feasibility of learning media must be demonstrated through a validation process by experts and trials involving students, with the assessment results reaching at least the good category in order for the media to be considered feasible and usable in learning activities (Arsyad, 2017). In line with (Sadiman et al., 2010), a good medium must fulfill feasibility requirements in terms of content, instructional presentation, visual appearance, as well as ease of use and interactivity. When related to the development of interactive-based media, these four aspects can be simplified into the components of content, instruction, appearance, and programming as the basis for validation. Therefore, the media feasibility in this study refers to the results of evaluations by experts (content and media experts) and responses from respondents (students), with a minimum assessment standard of the good category across all aspects: instruction, content, display, and programming.

Results and Discussion

This study resulted in an interactive learning media based on Articulate Storyline 360 designed to support the learning process of the Basic Concepts of 3D Objects for Grade XI Multimedia students at SMK Negeri 1 Gambut. This media can be accessed offline on Android and Windows devices and features an interactive interface, attractive visuals, intuitive navigation, and built-in practice activities and automatic evaluations. The outcomes of this research and development process include several interface displays of the developed media, as follows:

Fifure 1. Login Page

Starting from the login page, users are required to enter their name and class. A pop-up message will appear if the input is invalid or incomplete.

Figure 2. Homepage

Then, users proceed to homepage, which includes an instructions button containing usage Guidelines, a Developer Profile button displaying the developer's information, and a Start button that directs users to Menu Page (Figure 3).


Figure 3. Menu Page

On the menu page, users can access the introduction page (which includes the Basic Competencies (KD), Competency Achievement Indicators, and Learning Objectives), Content Page, Practice Page, Evaluation Page, and Glossary Page.


Figure 4. Content Page

The content page not only presents the learning materials but also includes image examples that can be zoomed, offline-playable instructional videos, and sample objects that can be rotated.
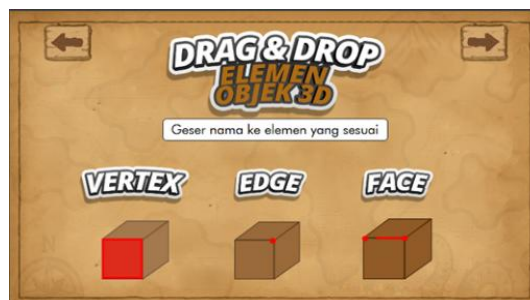
Figure 5. Practice Page

Game-based practice activities are presented on this page with the aim of reinforcing students' understanding of the material.
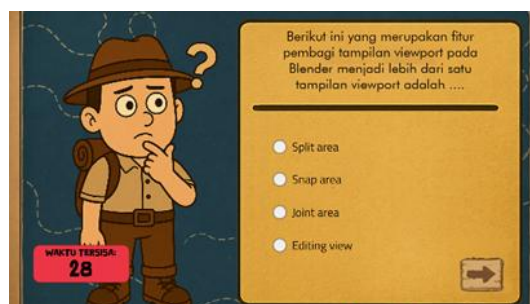
Figure 6. Evaluation Page

This page contains evaluation questions designed to assess students' understanding of the presented material. It is accompanied by instructions, pop-up notifications indicating correct or incorrect answers, and the score obtained.

The developed media were validated by two content experts and two media experts. The validation results are presented in Table 2 and Table 3 below:

Table 2. Content Expert Validation Result

Assesment Aspect	Number of Indicator	1st Validator		2nd Validator		Mean	Category
		Score	Mean	Score	Mean		
Intructional	9	40	4.44	42	4.67	4.56	Very good
Content	8	36	4.50	38	4.75	4.63	Very good
		Mean				4.59	Very good

Table 3. Media Expert Validation Result

Assesment Aspect	Number of Indicator	1st Validator		2nd Validator		Mean	Category
		Score	Mean	Score	Mean		
Display	11	54	4.91	54	4.91	4.91	Very good
Programming	12	57	4.75	58	4.83	4.79	Very good
		Mean				4.85	Very good

Furthermore, the media were tested on students through two stages. The individual trial was conducted with five students to determine ease of use and initial responses to the media. The results of the individual trial showed an average score of 4.20 (very good category). The field trial was conducted with 30 students in a real classroom learning situation. The results of the field trial showed an average score of 4.64, also in the very good category.

Table 4. Media Feasibility Result

Stage	Category
Content Expert Validation	Very good
Media Expert Validation	Very good
Individual Trial	Very good
Field Trial	Very good

Overall, the results of the validation and trials indicate that the developed interactive learning media are feasible for use in learning activities because they have met the feasibility criteria, as stated by (Arsyad, 2017; Sadiman et al., 2010).

The developed learning media are feasible for use because they contain text, audio, images, and videos that support students' understanding of the material and facilitate teachers in delivering instruction. This is in line with the study by (Rizki et al., 2023), which states that the use of learning media can assist educators in conveying learning materials, as learning media are an important component that can determine the success of delivering instructional content to students through media that present various formats (text, audio, images, and video). The media also support independent learning and increase student engagement because they are designed to be interactive and responsive to students' learning styles. As stated by Surjono, interactivity in learning media is important because it encourages active learning, makes the media more engaging, and increases students' learning motivation (Suhartini et al., 2022). In addition, the inclusion of practice and evaluation features allows students' understanding to be assessed directly and helps improve their comprehension of the material being studied. As reported in the study by (Nabilah et al., 2024), learning media

based on Articulate Storyline are valid and feasible for use because they present material in an engaging and interactive manner and are equipped with evaluations that can enhance students' understanding of the learning material.

Conclusion

This study successfully developed an interactive learning media based on Articulate Storyline 360 for the Basic Concepts of 3D Objects material for Grade XI Multimedia students at SMK Negeri 1 Gambut. The media were developed using Articulate Storyline 360 software and then converted into Android (.apk) and Windows (.exe) application formats. The development process followed five stages of the modified Borg and Gall model, starting from the preliminary study, planning, trials and evaluation, final product, and dissemination. The developed media were deemed feasible for use in learning based on the results of content expert validation, media expert validation, individual trials, and field trials.

However, this study has limitations, as it only reached the stage of feasibility testing of the media and did not include testing the effectiveness of media use. It is expected that future researchers will conduct such effectiveness testing to determine the impact of the media on students' learning outcomes and learning interest. Furthermore, considering that research and development are important for producing beneficial products in the field of education, further innovations from future researchers are highly needed.

References

Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for Learning: Methods and Development* (3rd ed.). Allyn & Bacon.

Arsyad, A. (2017). *Media Pembelajaran*. RajaGrafindo Persada.

Clark, R. C., & Mayer, R. E. (2016). *E-Learning and The Science of Instruction* (4th ed.). Wiley.

Maulana, M. R. A. A., Zulkarnain, M. R., & Afriani, D. (2024). Development of Interactive Learning Media Based on Articulate Storyline 3 on Computer Network Hardware Materials. *Proceeding of the 2nd International Seminar on Education, Technology and Art*, 117–125.

Mayer, R. E. (2020). *Multimedia Learning* (3rd ed.). Cambridge University Press.

Nabilah, C. H., Sesrita, A., & Suherman, I. (2024). Pengembangan Media Pembelajaran Berbasis Articulate Storyline pada Materi Gaya Kelas IV SDN Bojong Rangkas 02. *AL - KAFF: Jurnal Sosial Huaniora*, *2*(1).

Nugraha, A. N. C., & Muhtadi, A. (2015). Pengembangan Multimedia Pembelajaran Matematika pada Materi Bangun Ruang Sisi Datar untuk Siswa SMP Kelas VIII. *Jurnal Inovasi Teknologi Pendidikan*, *2*(1), 16–31.

Rizki, M., Wijayanti, R., & Faulina, R. (2023). Pengembangan Media Pembelajaran Berbasis Android dengan Menggunakan Articulate Storyline 3 pada Materi Trigonometri di SMKN 3 Bangkalan. *Kontruktivisme: Jurnal Pendidikan Dan Pembelajaran*, *15*(2), 278–288.

Sadiman, A. S., Rahardjo, R., Haryono, A., & Rahardjito. (2010). *Media Pendidikan: Pengertian, Pengembangan, dan Pemanfaatannya*. Rajawali Pers.

Smaldino, S. E., Lowther, D. L., & Russell, J. D. (2019). *Instructional Technology and Media for Learning* (12th ed.). Pearson.

Suhartini, E., Ayu, W. I., & Ramli, B. M. (2022). Pengembangan Media Pembelajaran Berbasis Articulate Storyline 3 Materi Gaya pada Siswa Kelas IV SDN 009 Sungai Kunjang. *Kompetensi: Jurnal Pendidikan Dan Humaniora*, *15*(2), 225–232.

Sukmawati, D. M., & Sari, E. F. (2024). Pengembangan Media Pembelajaran Interaktif Articulate Storyline 360 untuk Meningkatkan Hasil Belajar Siswa pada Muatan Pembelajaran IPS Kelas VI SD Negeri Polaman. *Edulnovasi: Journal of Basic Educational Studies*, *4*(3), 932–942.

Trimansyah. (2021). Kecenderungan Media Pembelajaran Interaktif. *Jurnal Studi Pendidikan*, *11*(2), 13–27.

Wibowo, Z. A., & Nugroho, M. A. (2015). Pengembangan Media Pembelajaran Gametax Administration Millionaire Quiz untuk Mata Pelajaran Administrasi Pajak. *Jurnal Pendidikan Akuntansi Indonesia*, *XIII*(1), 85–98.

Z, I. W., Mayasari, I., & Sumayyah, L. (2025). Pengaruh Penggunaan Media Pembelajaran Interaktif Terhadap Prestasi Belajar Siswa di SMK Tritech Medan. *Cemara Journal*, *III*(II). https://doi.org/https://doi.org/10.62145/ces.v3i2.144