



## Development of interactive multimedia on learning geometry to improve understanding of elementary school children

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### ARTICLE INFO

#### Article history:

Received Feb 02, 2023

Revised Feb 16, 2023

Accepted Feb 28, 2023

#### Keywords:

Elementary School;  
Learning geometry;  
Multimedia Learning;

### ABSTRACT

The function of interactive multimedia in learning facilitates teachers' application of technology to the teaching and learning process and facilitates students' active and interactive learning with the aid of visualization media. Geometry is one of the hardest elementary school courses. There is a need for media that can represent complex material for easier comprehension, so that the research to build interactive multimedia on geometry learning can aid children in comprehending geometry material and boost student enthusiasm in learning geometry. The interactive multimedia development technique employs the ADDIE model because extremely useful for utilizing interactive multimedia to promote the growth of student comprehension and attainment of learning objectives. The results indicated that interactive multimedia learning geometry in elementary school can be an alternative learning medium can aid teachers in the teaching and learning process, particularly in simplifying the explanation of complex learning materials, and students can learn various forms of geometry visually and interactively, making it easier to comprehend and remember the material. Recommendations for additional study based on the questionnaire that can add to the sort of shape of the building space's geometry and can add personality and sound as a narrative of the provided material.

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### 1. INTRODUCTION

Technology plays a significant part in the modern learning environment. The advancement of technology in education enables teachers and students to acquire

information more efficiently and effectively (Fauzi et al., 2023). Interactive multimedia is one of the most beneficial technologies in the field of education. Multimedia is a collection of different types of media, including text, images, sounds, animation, and video. Multimedia that is interactive enables students to study in a more dynamic and participatory manner. Students are able to visualize the application of the subject matter in real-world scenarios. In addition, interactive multimedia assists students in better comprehending and remembering the material. Teachers and students can communicate and learn online due to technological advancements in the field of interactive multimedia. Students can access course materials at any time and from any location, and teachers can track student progress and provide feedback (Handayani et al., 2021; Pudjiarti et al., 2022). Additionally, technical advancements make interactive multimedia more accessible and inexpensive for all individuals. Using cloud computing technologies, students and teachers can readily access learning applications that are user-friendly and aligned with the learning curriculum (Sudipa et al., 2022).

Geometry is a subject taught in primary education, particularly at the fifth grade level. Geometry is one of the most challenging subjects for pupils to master in elementary school. Students frequently feel bored and disinterested in this class, which hinders their comprehension (Afifah et al., 2022; Pramana, 2021). There is a demand for media that can depict complex information to facilitate comprehension (Hikmah, 2022; Sulistiyowati et al., 2022). In order to boost children's interest and comprehension in learning geometry, a solution is required. Using interactive multimedia for the study of geometry is one option that can be implemented.

Multimedia is a collection of different types of media, including text, images, sounds, animation, and video. Using interactive multimedia makes learning geometry more engaging and enjoyable for children (Puspitarini & Hanif, 2019). Students can engage in more active and engaging learning, which facilitates their comprehension of geometry subject. By utilizing interactive multimedia, children may see the practical applications of geometric shapes. Students can learn numerous geometric shapes visually and interactively, making the content easier to comprehend and remember (Yuniara, 2022). Moreover, interactive multimedia can aid youngsters in seeing geometric forms and comprehending how these shapes might be applied in the actual world (Udayana et al., 2022; Werdiningsih & Nursanty, 2021).

Moreover, by utilizing interactive multimedia, teachers may make learning geometry more enjoyable and motivate students. This is supported by study by (Martika & Irawan, 2022; Masitoh et al., 2022), which demonstrates that the development of interactive multimedia in geometry learning can assist students in learning geometry that is difficult in terms of comprehension and visualization of intriguing material. In addition, research by (Firmansyah et al., 2020; Sriningsih et al., 2018) demonstrates that teachers can construct a range of interactive activities that increase students' enthusiasm and interest in learning geometry. Interactive activities such as games, chores, and exercises can also assist children (Yuniara & Abidin, 2020) comprehend and learn geometric material (Udin, 2022) with improved problem-solving abilities (Aini et al., 2020; Arsyad et al., 2022). Previous research has demonstrated that interactive multimedia can be an alternative learning medium for the teaching and learning process. Consistency in the material and tasks on interactive media is one of the focuses of the current study, so that materials that specialize in learning geometry can assist students in comprehending difficult material due to a visualization of the shape and an evaluation of the material.

Based on the results of a literature review, the purpose of this study is to design interactive learning materials for geometry that will assist children better comprehend geometry material and boost student enthusiasm in learning geometry. This interactive multimedia will be a solution that teachers may use to enhance their students' understanding of geometry and make geometry easier for them to grasp.

## 2. RESEARCH METHOD

Addie is the development paradigm that was utilized in the process of creating an interactive multimedia learning environment for primary school geometry (Ranuharja et al., 2021). Because it is able to apply the level of design and development of learning materials, which has been realized in many methodological practices for the design of text development, audiovisual materials, and computer-based learning materials (Arifin et al., 2023; Irawan & Windarti, 2023), this model is considered to be one of the systematic learning design models. The application of the ADDIE paradigm to the utilization of interactive multimedia is extremely helpful in promoting the growth of student comprehension and the accomplishment of learning objectives. This ADDIE paradigm includes the following steps: analyze, design, develop, implement, and evaluate. (Spatioti et al., 2022) These are the stages in the model. The data for this study was collected by giving out questionnaires in the form of google forms (Sugiyono, 2017) to students attending random elementary schools in the Purwokerto area. The questions on the questionnaires were about the students' level of comprehension of the geometry education they received at the elementary school level. This is done so that it can be determined how well students grasp the subject, and it allows for input relating to the aspects of the topic that can be exhibited on interactive media applications that have been built (Abidin et al., 2023).

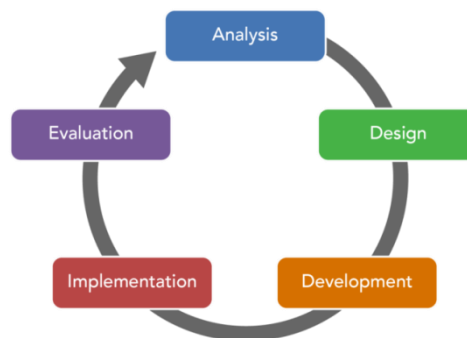


Figure 1. ADDIE Model (Spatioti et al., 2022)

Interactive multimedia can use ADDIE model stages. The ADDIE model's interactive multimedia development stages are: Analysis: Determine the interactive multimedia's goals and needs. The target audience, learning situation, and topic content are also examined. Design: This step includes scenario conceptualization, multimedia specs, and visual design. Development: Putting the interactive multimedia design into a product. It requires animations, audio, and interactivity. Implementation: End consumers receive interactive multimedia and the product is easy to use. Evaluation: This stage checks the interactive multimedia for quality and purpose. It also requires testing the product to ensure it works and satisfies consumer expectations (Spatioti et al., 2022).

## 3. RESULTS AND DISCUSSIONS

### **Analysis and Design Stage of Interactive Multimedia Menu Flow**

At this point in the process, we know that difficulties with visualizing the geometry of building space are a significant barrier to students' ability to grasp the concepts being taught in elementary school geometry classes, particularly with regard to the identification of the building space object. At the outset of the design process, we create the menu flow for the interactive multimedia. This helps the users to easily figure out

how to navigate the media. Figure 2 shows the overall navigational structure of the menu.

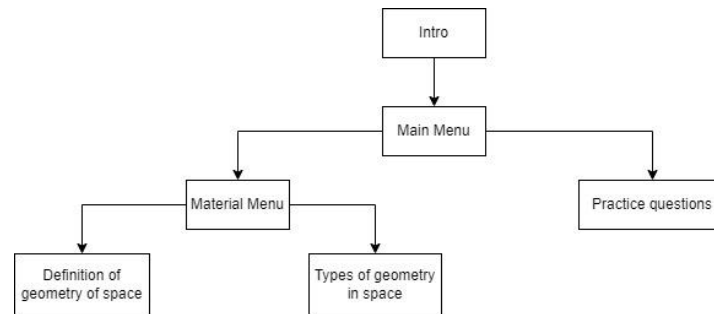


Figure 2. Geometry Interactive Multimedia Menu Flow

Figure 2 illustrates the flow of the multimedia menu, which consists of an intro button as the initial flash screen of the media, followed by a main menu and an exercise questions menu when the start button is pressed. There is content on the main menu pertaining to the concept of geometry, particularly space and varieties of geometry. On the practice questions menu, there are practice questions that students can use to assess their comprehension of the geometry subject covered on the material menu.

### Interactive Multimedia Implementation and Development Phase

At the stage of development for interactive multimedia, mainly the display design, animation, and programming in Adobe Flash. Implementation begins with a software requirements analysis for supporting the creation of interactive multimedia utilizing Adobe animate, Adobe illustrator, and Adobe premier. The objective of design is to create an appealing and user-friendly appearance. To enhance the study of geometry, a menu of materials and practice problems is developed for students through implementation. Figure 3 below illustrates the appearance of the application.



Gambar 3. Display of Materials and Practice Questions from Interactive Multimedia

### Interactive Multimedia Testing Stage

Students and primary school teachers participated as subject matter experts in the application evaluation procedure. Based on the results of a survey administered to 32 students, it can be deduced that 74% of students agree that this interactive multimedia

is generally simple to use in terms of comprehending the navigation flow and clarity of each functional menu in interactive multimedia apps. 26% of respondents stated that the menu structure must be reinstated, including the addition of a video for the visualization of building space and the audio narration of content explanation. Assessment of respondents pertaining to geometry material reveals that as many as 81% of students stated that they comprehend geometry material through the use of these interactive multimedia applications, and as many as 19% responded that they would prefer to directly shape the geometry of the building space. From the results of testing to teachers, 11 teachers were identified as material experts, 71% of teachers stated that the material of the learning media application is in accordance with the learning syllabus, and 29% of material experts provided input related to the material that can add knowledge about the type of shape of the geometry of space. The overall test results indicate that interactive multimedia learning geometry in elementary school can be an alternative learning medium that can aid teachers in the teaching and learning process, particularly in simplifying the explanation of complex learning materials, and that students can learn various forms of geometry visually and interactively, making it easier to comprehend and retain the material. Interactive multimedia can also assist youngsters in seeing geometric forms and comprehending how these shapes can be applied in the real world, so enhancing their comprehension and aptitude.

#### 4. CONCLUSION

The conclusion of the research is based on the use of technology in the field of education so that technology-based learning media can be created to facilitate the transfer of knowledge from teachers to students, particularly for complex material that requires visualization related to the geometry of space building using interactive multimedia. 74% of students agreed that this interactive multimedia is relatively easy to use in terms of comprehending the flow of navigation and clarity of each functional menu on interactive multimedia applications, according to the results of an evaluation of interactive multimedia obtained through questionnaires. Using interactive multimedia tools, 81% of students indicated that they comprehended geometry curriculum. 71% of teachers claimed that the content of the learning media application is in accordance with the learning curriculum, and 29% of material experts provide input related to the content that can add the type of shape of the geometry of building space so as to increase students' knowledge. The overall test results indicate that interactive multimedia learning geometry in elementary school can be an alternative learning medium that can aid teachers in the teaching and learning process, particularly in simplifying the explanation of complex learning materials, and that students can learn various forms of geometry visually and interactively, making it easier to comprehend and retain the material. Recommendations for additional study based on the questionnaire that can add to the sort of shape of the building space's geometry and can add personality and sound as a narrative of the provided material.

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