



# Development of Interactive Multimedia Based on Adobe Flash CS6 to Improve Learning Outcomes

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**Abstract:** This study aims to create an interactive multimedia based on Adobe Flash CS6 application in learning in elementary school. This type of research is research and development (R&D) with the ADDIE development model, starting from the analysis and design stages. The next stage is the development stage, where data collection is done through interviews and questionnaires. Data analysis was conducted to assess the validity of interactive multimedia in three aspects, namely media, material, and language. Validators provided quantitative and qualitative feedback. Results the validity test showed a validation score of 92% from the material expert, the language validation results obtained a score of 81%, and the media validation obtained a score of 80% with a very valid category. This shows that each specification of interactive multimedia is considered valid and is included in the high category. Thus, it can be concluded that interactive multimedia is very good and feasible to use as learning media for elementary school students, so that it can be used in the learning process.

**Keywords:** ADDIE; Adobe flash; Interactive multimedia

## Introduction

The era of industrial revolution 4.0 which has emerged in the 21st century has an impact on various aspects of life, especially the world of education (Darmaji et al., 2019; Dewi et al., 2021). As a century of openness wherever and whenever humans can easily obtain and disseminate information. The world of education needs to respond all technological sophistication in the era of revolution 4.0 is a challenge at the same time opportunities for better education (Trisna, 2019).

In the era of revolution 4.0, teachers need digital skills. Previous research shows that teachers' basic skills in designing digital learning are 40% low (Bentri et al., 2022). With increasingly advanced developments, the curriculum has been updated. Currently, apart from using the 2013 curriculum, education also uses the independent curriculum. According to Nugraha (2022), an independent curriculum is a curriculum that

emphasizes the needs and focuses more on students than on teachers.

The advances in technology, the learning process will also develop, this developing technology can be used by teachers in delivering learning material to students. The innovations developed must be in line with the characteristics of elementary school students, technological developments and learning in elementary schools (Miaz et al., 2019).

Students currently in elementary school (SD) are included in the alpha generation. *Alpha* generation are children born after 2010 to 2025 (Novianti & Maria, 2019). This generation is very familiar with renewable technology such as smartphones. Even from the age of toddlers, we often see this generation being able to use this technology. So it is not surprising that this generation is categorized as the generation that is most literate with digital technology compared to previous generations.

This generation's life is very close to mobile technology devices and applications to fulfill their daily

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lives (Kuswandi et al., 2021). The characteristics of the alpha generation according to Wijoyo et al. (2020) are: they are dependent on existing technology such as smartphones and the internet; their mindset is more open; and they are more creative. In line with this opinion, according to Gupta et al. (2022) and Sholichah (2020), the characteristics of the alpha generation are more intelligent, critical, independent, creative, faster at doing work, and tend to think instantaneously. Seeing the characteristics of the alpha generation which has a tendency to like renewable technology such as smartphones with digital applications. So the use of digital-based learning media is in accordance with their characteristics.

However, what happens in the field is that there are still many educators who carry out the learning process conventionally, namely the learning process is mostly carried out by means of lectures by teachers and have not used a variety of learning media. In general implementation learning is still teacher-centered and the learning process is still dominated by lectures (Amini et al., 2019; Fandini et al., 2021; Mulyadi et al., 2020).

In determining the use of media for the learning process, educators need to pay attention to the interesting elements of the learning media, the suitability of the media to the subject matter, and the characteristics of the students. Learning media must be attractive in terms of appearance. Because basically one of the functions of learning media according to Oktiana et al. (2022) is as attention, namely media can attract and direct students' attention so they concentrate on the content of the lesson. The content that will be conveyed in learning media must be in accordance with the material being taught so that students do not feel confused in using learning media. Learning media must also be appropriate to student characteristics so that the media meets student needs. The choice of learning media must be appropriate to the subject matter and student characteristics (Marlina et al., 2021).

Furthermore, researchers conducted observations and interviews in various elementary schools in class IV as initial research data, namely SD Negeri 015/XI Lawang Agung, and SD Negeri 77/III Mukai Tinggi, Kerinci Regency, Jambi. Both schools are located in Kerinci/Jambi Regency. The researcher's preliminary study carried out on September 4 to 5 2023 found that in implementing learning, the use of learning media by applying the Adobe Flash CS6 application had never been implemented in classes at the school. The learning process carried out does not fully utilize digital or computer advances and is limited to using Infocus to play learning videos from YouTube. In the previous learning process, teachers were only limited to using image and text-based learning media from textbooks.

In an effort to overcome this problem, it is necessary to develop appropriate learning media can make students active in the learning process and according to their characteristics, namely alpha generation. The media that suits this situation is interactive multimedia. Multimedia Interactive is a combination of several types of digital media such as text, graphics, video, animation and sound used to convey information and has interactive properties to users (Sukarini et al., 2021).

Then, the software used to develop this interactive multimedia is Adobe Flash CS6. Adobe Flash CS6 provides various features that are able to create and process text and objects, combining images, audio and video so that the results look more attractive (Miaz et al., 2019). This research uses Adobe Flash CS6 software because it is capable produces digital products with good image quality, clear sound, and product size the output is not very large.

## Method

This type of research is development research. Research and development (Research and Development) or usually abbreviated as R&D. This research refers to the ADDIE development model. The research stages carried out refer to the ADDIE development model developed by Dick & Carry, including Analysis, Design, Development, Implementation and Evaluation (Safitri & Aziz, 2022). The ADDIE model is a learning design model that is based on an effective and efficient systems approach and an interactive process, namely the evaluation results of each stage take learning to the next stage (Sukariasih et al., 2019).

The aim of this method is to provide solutions, solve problems, or generate useful new knowledge (Yolanda & Wahyuni, 2020), this method is a systematic approach for researching, designing, producing, and validating the products that have been developed (Kristanto, 2018). The ADDIE model remains highly relevant for several reasons. Firstly, it demonstrates excellent adaptability in various conditions. Secondly, it exhibits a high level of flexibility in addressing problems and proves to be effective. Thirdly, the ADDIE model offers a structured general framework with the provision for revisions at each stage (Angko & Mustaji, 2017).

The stages of this development model begin with analysis and design stage, followed by development and implementation stages (Nurhayati et al., 2022; Yulia et al., 2023). Last stage is the evaluation stage. The whole purpose of this research is to assess the feasibility of being developed product. In this context, feasibility

means that the product developed meets the specified criteria.

Feasibility also refers to indicators of validity with aims to produce a product that is suitable for use based on the analysis of the needs of the research subjects carried out previously. Feasibility testing is carried out through validity testing. Before carrying out the validity test, interactive multimedia was developed through a needs analysis followed by design phase that includes scripting and storyboard for interactive multimedia. To collect validity test data, the media developed is validated by experts, including media experts, material and language experts.

The purpose of validation is to analyze validity of the product being developed. The following is research flow and explanation of each stage development in more detail.

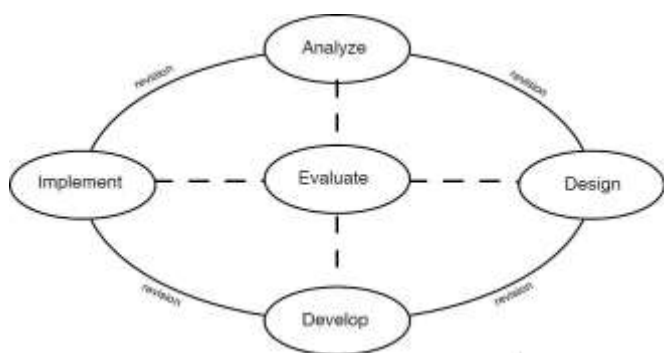


Figure 1. ADDIE model development procedure chart

The subjects in this research were class IV students at SDN 015/XI Lawang Agung and SDN 77/III Mukai Tinggi, Kerinci, Jambi for the 2023-2024 academic year.

## Result and Discussion

Development of interactive multimedia based on Adobe Flash CS6 to improve learning outcomes for fourth grade elementary school students through several stages, namely:

### Analysis Stage

The analysis stage explains the basic problems needed in developing interactive multimedia based on Adobe Flash CS6, namely carrying out curriculum analysis and student analysis.

### Curriculum Analysis

At the curriculum analysis stage there are several steps taken as follows: determining learning outcomes; analyzing learning objectives and developing them; creating interactive multimedia based on adobe flash cs6; calculate the time allocation required to apply the product to the independent learning curriculum; and

develop a class iv teaching module for the pancasila education subject chapter 4 my country, Indonesia.

### Analysis of Student Characteristics

This research was carried out in class IV of SDN 015/XI Lawang Agung, and SDN 77/III Mukai Tinggi, Kerinci Regency in the 2023/2024 academic year. There are 36 students from the two schools. The source of information that the researchers obtained was from the fourth grade teachers of each school.

The results that researchers obtained through observation, interviews, teacher questionnaires and student questionnaires: student books and worksheets are used as the main learning resources; there is no use of interactive multimedia based on Adobe Flash CS6 as a medium for learning; and lack of use of varied learning media according to learning developments in the 4.0 era, causing the learning process to become less interesting and less active.

Based on the statement above, innovative steps are needed from a teacher to produce interactive multimedia according to learning developments in the 4.0 era. So we need interactive multimedia that can be displayed/used via technology such as laptops, cellphones or infocus so that it can help teachers in delivering learning material and can be a companion to the material so that learning becomes more memorable (Setiawan et al., 2023; Tanwir et al., 2023).

### Design Stage

After determining and analyzing the problem at the definition stage. The next stage is to design learning tools in the form of Interactive Multimedia Based on Adobe Flash CS6. What is designed is as follows.

Create flowcharts and storyboards from the interactive multimedia developed. Arranging Interactive Multimedia Based on Adobe Flash CS6 Applications according to flowcharts and storyboards. The material contained in Adobe Flash CS6 Application-Based Interactive Multimedia is class IV material with Theme 7 Events in Life.

### Development Stage

At this development stage, the prototype of interactive multimedia based on Adobe Flash CS6 was tested for validity. The aim of carrying out a validity test is to determine the suitability and quality of the product. Validity testing of the Adobe Flash CS6 based interactive multimedia prototype was carried out on the material or content aspect, on the language aspect, and on the media design aspect.

The results of validation by material expert validators for Interactive Multimedia Based on the Adobe Flash CS6 Application can be seen in the Table 1. Based on the validation results by material or content experts, an average validity percentage of 92% was

obtained with a very valid category and can be tested with revisions according to suggestions from the validator.

**Table 1.** Validation Results by Material or Content Expert Validators

Aspect	Obtained Score
Validity 1	92
Validity 2	95
Validity 3	88
Validity Score	92 %
Category	Very Valid

The results of the validation of language aspects in Interactive Multimedia Based on the Adobe Flash CS6 Application that the researchers developed were carried out by an expert in the field of language, namely Mrs. Dra. Elfia Sukma, M.Pd., Ph.D. He is a lecturer in elementary school teacher education (PGSD) as well as a lecturer in the postgraduate basic education program at Padang State University. The language validation results as seen in Table 2.

**Table 2.** Validation by Linguist Experts

Aspect	Obtained Score
Readability of text in Interactive Multimedia Based on Adobe Flash CS6 Applications.	16
Simple	17
Conformity to language rules.	16
Use of language effectively and efficiently.	16
Validity score	81 %
Category	Very Valid

Based on the validation results by language experts, an average validity percentage value of 81% was obtained with a very valid category and could be tested with revisions according to suggestions from the validator.

The validation results of the media expert who validated this learning multimedia were Mr. Prof. Dr. Darmansyah, S.T, M.Pd. He is an expert in Educational Technology at Padang State University. The media expert validation results can be seen in Table 3.

**Table 3.** Validation by Media Design Experts

Aspect	Obtained Score
Appearance	13
Legibility	6
Ease of use	6
Clarity in Adobe Flash CS6 based Media	7
Validity Score	80 %
Category	Valid

Based on the validation results by media experts, an average validity percentage value of 80% was obtained.

The validation results which are in the range of 60% - 80% are in the valid category, this means that the interactive multimedia being developed can be tested with revisions according to suggestions from the validator.

*Implementation Stage*

After being declared valid, the next stage is the implementation stage (Hasri et al., 2023; Rostyawati et al., 2021). At this stage, researchers conducted limited trials of interactive multimedia products based on Adobe Flash CS6 on teachers and students. This limited trial consisted of 1 teacher and 20 class IV students at SDN 015/XI Lawang Agung, 1 teacher and 15 class IV students at SDN 77/III Mukai Tinggi, Kerinci Regency, Jambi. The intended trial was to see the level of practicality and effectiveness of the interactive multimedia being developed in improving student learning outcomes.

Before and after testing the product, researchers conducted tests on students. Then, what the researchers did was distribute practical instruments for teachers and students in the form of questionnaires. Then, researchers carried out data analysis on the test instruments that had been given to students. This test instrument was used to show the effectiveness of the interactive multimedia product based on Adobe Flash CS6 that the researcher developed. The following is a further explanation regarding the implementation stages that researchers have carried out:

*Practicality Test*

Practicality testing is carried out after testing the product being developed. The instrument that researchers used was in the form of a questionnaire. The practicality of the interactive multimedia product based on Adobe Flash CS6 that was developed can be seen from the results of the practicality analysis by teachers and students.

*Product Practicality Test Results by the Teacher*

To determine the level of practicality of the product being developed, a practicality test was carried out on teachers. At the practicality testing stage, teachers are carried out by asking teachers to fill out a practicality questionnaire for the product being developed. The results of the practicality test carried out on teachers can be seen in Table 4.

Based on the results of practicality by teachers, an average of 96.87% was obtained in the very practical category. This shows that the interactive multimedia product based on Adobe Flash CS6 that was developed is stated to be very practical to use and easy to operate independently and suitable for application in the learning process in class IV elementary schools.

**Table 4.** Practicality Test Results by Teachers

Name	School	Score
Adriadi, S.Pd	SDN 077/III Mukai Tinggi	47
Depi, S.Pd	SDN 015/XI Lawang Agung	46
Practicality score		96.87%
Category		Very Praktis

*Product Practicality Test Results by Students*

The results of student responses were used to determine students' opinions regarding the practicality of interactive multimedia based on the Adobe Flash CS6 application which has been tested on students. This assessment is carried out by asking students to fill out a

**Table 5.** Product Practicality Results by Students

Total Student	School	Practicality score (%)	Category
20	SDN 015/XI Lawang Agung	83.95	Very Practies
16	SDN 077/III Mukai Tinggi	88.02	Very Practies
Practicality Score		85.98	Very Practies

*Effectiveness Test*

After carrying out a practicality test, it is continued with an effectiveness test whose data source is obtained from student learning outcomes. The effectiveness of the prouduk being developed can be seen from student learning outcomes. These learning outcomes are obtained from test results which are assessed from the aspects of knowledge, skills and attitudes.

*Assessment of Knowledge Aspects*

In the knowledge aspect, a pre-test and post-test are carried out in the form of objective questions to

**Table 6.** Student Effectiveness Test Results

Total student	School	Average value <i>pre-test</i>	Predicate	Average value <i>post-test</i>	Category
20	SDN 015/XI Lawang Agung	57.2	D	89.2	B
16	SDN 077/III Mukai Tinggi	47.5	D	89.0	B
Total		104.7		178.2	
Average		52.35	D (Not enough)	89.1	B (Good)

Then, the average post-test score for learning outcomes at SDN 015 Lawang Agung was 89.2 with the predicate B (Good). The average post-test score for learning outcomes at SDN 077 Mukai Tinggi is 89 with the predicate B (Good). Thus, the average post-test learning outcomes in both schools is 89.1 with the predicate B (Good).

Based on the learning results that have been achieved, it can be seen that learning using Interactive Multimedia Based on Adobe Flash CS6 can help students understand the material so as to obtain excellent results.

*Evaluation Stage (Evaluation)*

The evaluation stage is the final stage of interactive multimedia development. Data obtained at the

practicality questionnaire sheet regarding the multimedia developed after carrying out learning using the product the researcher developed. The results of the interactive multimedia based on Adobe Flash CS6 by students can be seen in the Table 5.

Based on the table 5, it can be seen that the percentage of practicality by students is 85.98% in the "Very Practical" category. Based on the criteria contained in the practicality test on students, the resulting Interactive Multimedia Based on Adobe Flash CS6 is easy to use (practical), has an attractive appearance, and all elements in interactive multimedia can be operated.

determine the level of success of the product being developed in improving student learning outcomes. Based on the results of students' answers, the results of the recapitulation of pretest and posttest scores are obtained which are presented in the Table 6.

Based on the table 6, the average pre-test score for learning outcomes at SDN 015 Lawang Agung is 57.2 with the predicate D (Poor). The average pre-test score for learning outcomes at SDN 077 Mukai Tinggi is 47.5 with the predicate D (Poor). So, the average pre-test learning outcomes carried out in both schools was 52.35 with the predicate D (Poor).

implementation stage, such as teacher and student response questionnaires, student activity sheets and question sheets related to interactive multimedia, were evaluated. The use of products in the field by teachers and the results of evaluations by students can be used as tools to evaluate the interactive multimedia being developed. Also, learning outcomes can also be used to measure the level of effectiveness of interactive multimedia using evaluation tests that have been carried out (Pratiwi & Alim, 2022; Wati et al., 2020).

**Conclusion**

This research is development research that produces Interactive Multimedia Based on Adobe Flash CS6 in class IV elementary schools. Based on the results

of this research, researchers can conclude several things as follows. The interactive multimedia based on the Adobe Flash CS6 application produced in this research is very valid from the material or content aspect with an average validity percentage of 92%. Very valid from the language aspect with an average validity percentage of 81%. Valid from the media aspect with an average validity percentage of 80%. These results illustrate that the Adobe Flash CS6 Based Interactive Multimedia developed is valid and can be used in the learning process. The results of the analysis of teacher and student responses (Practicality) show that the Interactive Multimedia Based on Adobe Flash CS6 produced in this research has very practical criteria. The results obtained were teacher responses with an average of 96.87% and student responses with an average of 85.98%. These results illustrate that Interactive Multimedia Based on Adobe Flash CS6 is practical to use and can help in implementing the learning process in class IV elementary schools. Adobe Flash CS6 Based Interactive Multimedia produced in this research is effective for improving student learning outcomes.

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#### Conflicts of Interest

The authors declare no conflict of interest.

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