

# Development of Learning Media Game Computer Assembly (GAPEKO) Android Based on Computer Assembly Subjects for Students TKJ SMK Negeri 1 Sukoharjo

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## ABSTRACT

Research and development is aimed to (1) make the game computer assembly (GAPEKO) android based on computer assembly subjects for students TKJ SMK Negeri 1 Sukoharjo to support the material practice of computer assembly (2) to investigate the feasibility of learning media game computer assembly (GAPEKO) android based on computer assembly subjects for students TKJ SMK Negeri 1 Sukoharjo. GAPEKO learning media is developed by Adobe Flash Professional CS6 and published as an .apk file to be installed and used on android phone. Research and development is carried out with a model of the development of DDD-E (Decide, Design, Develop, Evaluate). The results of the feasibility study and measurement of media expert obtained a percentage of 78.23% is categorized as very feasible, material expert obtained a percentage of 91.67% is categorized as very feasible, and the test results obtained by a percentage of 81.35% users categorized as very feasible. Based on the measurement results feasibility it can be concluded that the learning media game computer assembly (GAPEKO) android based on computer assembly subjects for students TKJ SMK Negeri 1 Sukoharjo included in the category of very feasible to use, both from the aspect of media, materials, and users.

**Keywords:** Development, Learning Media, Computer Assembly, GAPEKO, Android.

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## 1. INTRODUCTION

Computer assembly subjects is one of the subjects TKJ (Computer and Network Engineering) SMK (Vocational High School) majors who need the practice is expensive and amounts to much because almost all of the subject matter requires a set of computer assembly complete computer. Learning computer assembly in SMK N 1 Sukoharjo has been done with the theory and practice. However, teachers have not applied learning media as a supporter of the material before practice. This causes a lack of understanding of lstudents so that less than the maximum in practice assembly of the computer. Therefore, it is necessary to develop a media that can help students to identify computer components and understand the correct way to assemble a computer.

Interactive multimedia can be an alternative media that can be developed. Adobe Flash with Adobe Integrated Runtime (AIR) is a multifunctional software that facilitate the making of animation, web, gam in g, and multimedia applications based on Android that combines graphics with Action Script to produce interactive animations, engaging and interesting. (Komputer, 2014).

On the basis of the researchers are interested in developing learning media game computer assembly (GAPEKO) android based for students TKJ in favor of the practice material on computer assembly subjects in SMK Negeri 1 Sukoharjo.

### Literature Review

Borg and Gall (1983) suggested that research and development in an effort to develop and validate the products to be used in education. According to Gagne 'and Briggs cited [1] says that the learning media covering the tool is physically used to convey the contents of teaching materials, consisting of among other

books, tape recorders, cassettes, video camera, video recorder, films, slides (picture frame), photographs, images, graphics, televisions, and computers. Game is an activity in which participants / players follow the rules that have been established and are different from real life as they strive to achieve challenging goals [6]. While computer assembly is one of the compulsory subjects TKJ basic skills programs.

One example of research that are relevant to this research is Sarah Farhana Juhari and Nor Azan Mat Zin [2] in his research entitled "Educating Children about Internet Safety through Digital Games Based Learning". This study aims to develop a prototype game to educate children about Internet safety . The results of the effectiveness study showed a significant increase (23%,  $p < 0.5$ ), the participants are more aware of internet security. The evaluation results indicate the usefulness of this game with a decent score aspect of the game (4.04), ease of use (4.1), effectiveness (4.9), user friendly (4.25), interactive (3.61), the design of the display (4.7).

## 2. RESEARCH METHOD

This type of research is the research and development (Research and Development) with a model Decide, Design, Develop, Evaluate (DDD-E) by Ivers and Barron. Visualization stages DDD-E models are presented in the image:

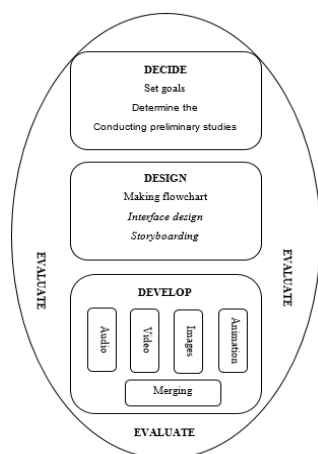


Figure 1. Model DDD-E

Research procedure with DDD-E models are as follows:

1. Decide  
Stage decide is the stage to plan learning media GAPEKO, which set goals, determine the material, and conducting preliminary studies.
2. Design  
Stage design is a visual thinking stage because it produces a blueprint for the entire GAPEKO learning media in the form of a flowchart and navigation structure, appearance, and storyboards.
3. Develop  
Phase develop a development stage media elements such as text, images, audio, video, and animation. At this stage also include the incorporation of these elements into a single learning media is ready installed and used on android phone.
4. Evaluate  
Evaluations conducted internally by the developer and externally by experts and users. Internal evaluation in DDD-E models conducted at each stage of development or formative evaluation and is done by trying GAPEKO learning media in some android phones with different specifications, both in terms of screen size, android version, RAM, and so forth.  
External evaluation is done after learning media GAPEKO, is structured as follows:
  - a. Trial product
    - 1) Design test

Trial design consists of design validation by media expert and material expert, the revised design based on suggestions and revisions to experts in the design validation phase, and trial users by students TKJ class X.

2) Subject Test

- a) Media expert by Nadia Sigi Prameswari, S. Sn, M.Sn as lecturer PTIK UNS.
- b) Material expert material by Sumanto, ST as teacher computer assembly subjects SMK N 1 Sukoharjo.
- c) Students, consist of 10 students TKJ class X.

b. Data types

The data obtained in this study is qualitative data obtained from interviews and questionnaires at conducting preliminary studies and decide stage of quantitative data obtained by questionnaire uncovered during design validation by experts and user trials by students.

c. Data Collection Instrument

In this research, the research instruments taken from the book Ashar Arsyad entitled "Media Pembelajaran" and the final project thesis Nike Dwi Noviani entitled "Pengembangan Media Pembelajaran Berbasis Game sebagai Pendukung Mata Pelajaran Teknologi Informasi Dan Komunikasi (TIK) Materi Operasi Dasar Komputer Menggunakan Adobe Flash" in 2013. The data collection instruments used modified as needed, consisting of several aspects as follows:

- 1) Aspects of the media covering the main page quality, quality slides, text quality, quality background, color quality, the quality of the navigation buttons, image quality, sound quality, video quality, the quality of animation, instructions for use, and interaction with the media
- 2) Material aspects include the content and purpose, Instructional
- 3) Aspects users include learning objectives, quality of the game, a video presentation of the material, activities, appearance, quality of text, background quality, sound quality, video quality, the quality of the animation, and the use of

d. Data analysis technique

Data analysis techniques used in this research is quantitative descriptive. Data in the form of a description at the time of interview and observation were analyzed with descriptive techniques. While quantitative data from the test experts test and analyzed with quantitative techniques. Scale in measuring the feasibility of this media using Linkert weighing scale score of 4, 3, 2, 1 [8]. The measurement scale can be seen in the following table:

*Tabel 1. Measurement Scale Linkert*

Score	Criteria
1	Very Suitable (SS)
2	Corresponding (S)
3	According Enough (CS)
4	Missmatch (TS)

According Arikunto [5], the percentage of eligibility can be formulated as follows:

$$P_{\text{feasibility}} (\%) = \frac{\text{Total scores obtained}}{\text{Total maximum score}} \times 100\%$$

*Tabel 2. Percentage Formula Feasibility Media*

Suitability aspects of learning media developed using a percentage scale tables feasibility media by Suharsimi Arikunto [5] as follows:

Percentage of achievement	Number	Category
76-100%	4	Very Decent

56-75%	3	Worthy
26-55%	2	Enough
0-25%	1	Less Worthy

Tabel 3. Percentage Scale Feasibility Media

3. RESULT AND ANALYSIS (10 PT)

3.1. RESULT

- a. Step-by-step development of learning media game computer assembly (GAPEKO) android based on computer assembly subjects for students TKJ SMK Negeri 1 Sukoharjo  
Here are the results of learning media GAPEKO by step development of Decide, Design, Develop and Evaluate:



Figure 2. Display Media Learning GAPEKO

- b. Feasibility level of learning media game computer assembly (GAPEKO) android based on computer assembly subjects for students TKJ SMK Negeri 1 Sukoharjo

After learning media GAPEKO completed, then performed a trial by media expert, material expert and users and obtained the following results:

- a. Media Expert

Results of the assessment by media expert can be seen in the following table:

Table 3. Results of the Assessment by Media Expert

Answer Questionnaire																															Score	%	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	97	78,23%	
3	3	3	4	4	4	2	4	3	3	2	3	3	2	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	4	4		

Based on the weighted using a scale of 4 Likert scale generated maximum score is 124, while the scores obtained from this study was 96. Of the data can be seen learning media GAPEKO feasibility from media expert are:

$$\text{Feasibility Percentage (\%)} = \frac{\text{Totalscores obtained}}{\text{Total maximum score}} \times 100\%$$

$$\begin{aligned} \text{Feasibility Percentage (\%)} &= \frac{96}{124} \times 100\% \\ &= 78,23\% \end{aligned}$$

Percentage of each aspect have been counted can be seen in the following charts:

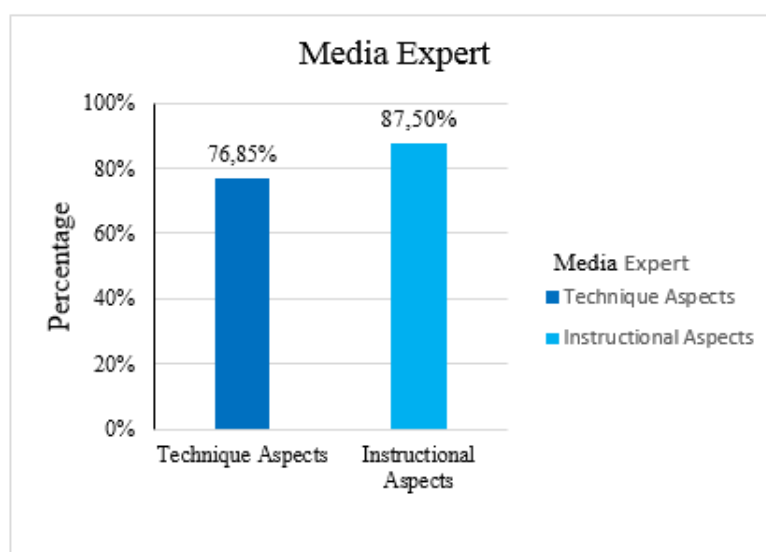


Figure 4. Percentage Charts of the Assessment Results of Media Expert Aspects

### c. Material Expert

Results of the assessment by material expert can be seen in the following table:

Table 4. Results of the assessment by material expert

Answer Questionnaire															Score	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	55	91,67%
4	4	4	4	3	4	3	4	3	4	3	4	3	4	4		

Based on the weighted using a scale of 4 Likert scale generated maximum score is 60, while the score obtained from this study was 55. Of the data can be seen learning media GAPEKO feasibility from material expert are:

$$\text{Feasibility Percentage (\%)} = \frac{\text{Totalscores obtained}}{\text{Total maximum score}} \times 100\%$$

$$\begin{aligned} \text{Feasibility Percentage (\%)} &= \frac{55}{60} \times 100\% \\ &= 91.67\% \end{aligned}$$

Percentage of each aspect have been counted can be seen in the following charts:

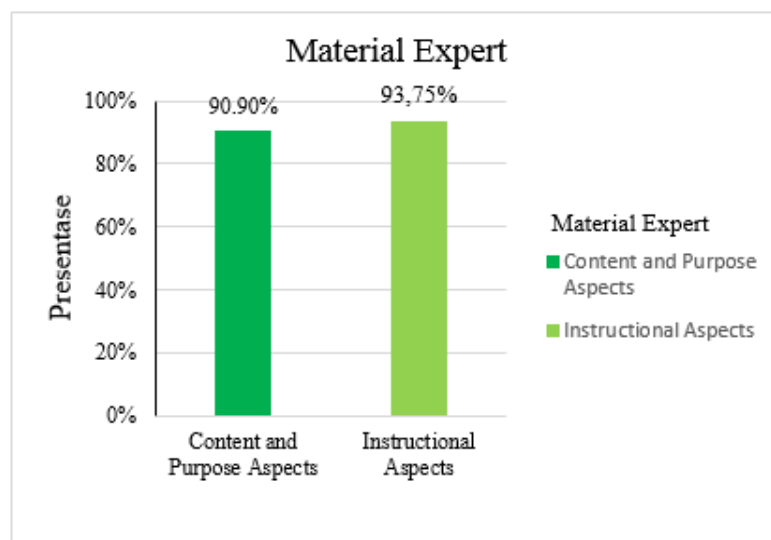


Figure 5. Percentage Charts of the Assessment Results of Material Expert Aspects

#### d. Users Test

Results of the assessment by users can be seen in the following table:

Table 5. Assessment Users Test

Students	Questionnaire items																										Score	Max Score	%	Categori
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26				
1	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	101	104	97,12%	SL
2	4	4	4	4	4	3	4	4	4	3	4	4	3	4	4	3	3	4	4	3	4	4	4	4	3	95	104	91,35%	SL	
3	4	3	4	3	4	4	4	4	4	3	4	4	4	4	4	3	4	4	4	4	4	4	4	4	3	99	104	95,19%	SL	
4	3	3	4	3	3	3	3	4	3	3	2	3	3	2	3	2	3	3	3	3	3	3	3	3	3	77	104	74,04%	L	
5	3	3	2	3	3	3	2	3	3	3	2	3	2	2	3	2	3	3	3	3	3	3	2	3	2	70	104	67,31%	L	
6	4	3	4	4	3	4	3	4	4	3	3	2	3	2	2	3	3	3	3	3	4	4	4	4	3	86	104	82,69%	SL	
7	4	3	4	3	3	3	3	4	3	3	2	2	2	3	3	3	3	3	3	3	3	4	3	3	2	77	104	74,04%	L	
8	4	2	3	3	3	2	2	3	3	3	4	3	3	2	3	2	2	3	3	3	3	4	3	3	3	75	104	72,12%	L	
9	4	4	4	4	4	3	3	4	4	4	4	3	3	3	3	3	3	4	4	4	3	4	4	3	3	93	104	89,42%	SL	
10	3	3	2	3	3	2	3	3	3	3	2	2	3	3	3	3	2	4	4	3	2	3	3	3	2	73	104	70,19%	L	

Based on the weighted using a scale of 4 Likert scale maximum score is 104, while the scores obtained from this study are:

$$\Sigma \text{ score} = (\text{number of } x \text{ score SS}) + (\text{number of } x \text{ score S}) + (\text{number of } x \text{ score CS}) + (\text{number of } x \text{ score TS})$$

$$\Sigma \text{ score} = (98 \times 4) + (130 \times 3) + (32 \times 2) + (0 \times 1)$$

$$\Sigma \text{ score} = 392 + 390 + 64 + 0$$

$$\Sigma \text{ score} = 846$$

Of the data can be known learning media GAPEKO feasibility from users are:

$$\text{Feasibility Percentage (\%)} = \frac{\text{Total scores obtained}}{\text{Total maximum score}} \times 100\%$$

$$\text{Feasibility Percentage (\%)} = \frac{846}{4 \times 26 \times 10} \times 100\%$$

$$= \frac{846}{1040} \times 100\%$$

$$= 81.35\%$$

Percentage of each aspect have been counted can be seen in the following charts:

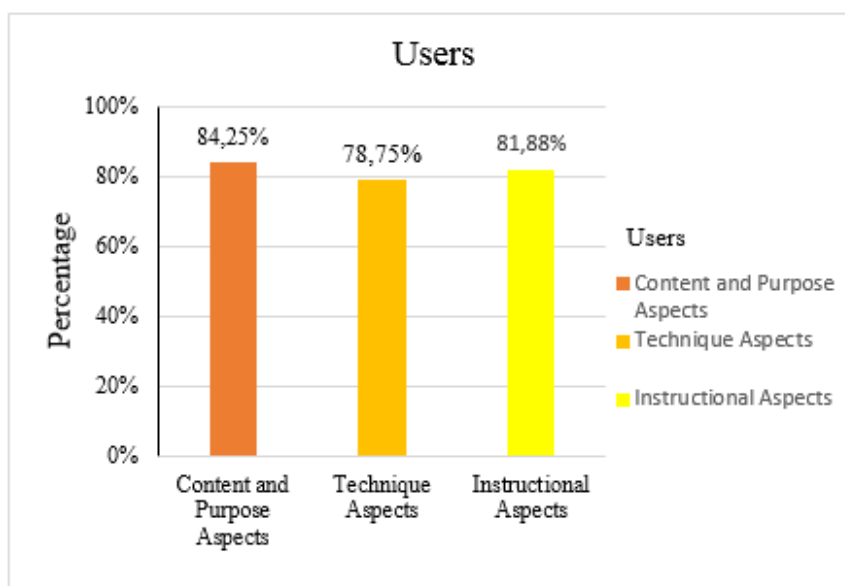


Figure 6. Percentage Charts of the Assessment Results of Users Aspects

### 3.2. ANALYSIS

With these steps development are decide, design, develop, and evaluate have produced learning media GAPEKO ready tested. After testing and calculation assessment results of learning media GAPEKO, obtained a score of 97 and a percentage of 78.23% are feasible by media expert, a score of 55 and a percentage of 91.67% are feasible by material expert, as well as a score of 846 and a percentage of 81,35% are feasible by users test. Percentage learning media GAPEKO feasibility can be seen in the following charts:

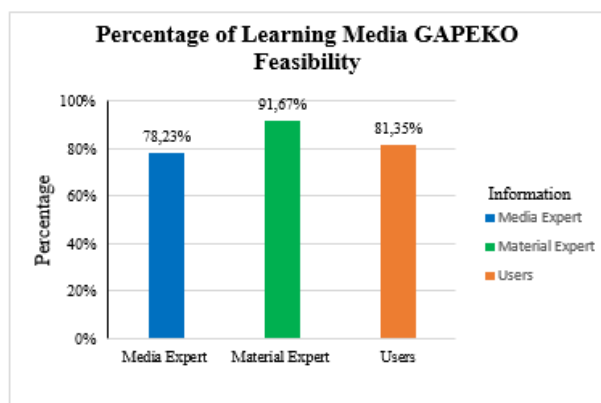


Figure 3 Percentage Charts of Learning Media GAPEKO Feasibility

### 4. CONCLUSION

Based on the results of research and discussion, we can take the conclusion that measures the development of learning media GAPEKO includes the step decide (set goals, determine the material, conducting preliminary studies), design (making flowchart, navigation structure, interface design, and storyboarding), develop (development of elements of text, images, audio, video, and animation), and evaluate (internal and external evaluation). And the measurement results feasibility states that media

GAPEKO included in the category of very feasible for use with a percentage of 78.23% media expert, 91.67% material expert, and 81.35% of users.

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