Animated media design based on visual basic application microsoft powerpoint on the material build flat side spaces

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Abstract. Students still have difficulty in understanding the material to build flat side spaces, so it needs innovative learning designs as a solution. One of the innovative learning designs is animation media based on microsoft powerpoint basic visual application. This research method is research and development through the stages of determining the potential and problems, data collection, animation media design, animation media initial design, animation media design validation, animation media trial, animation media revision, and final animation media. The research subjects were students of one class in one of the junior high schools in Cimahi. The research instrument used validation sheets and student response sheets. Validation was carried out by 3 experts namely a mathematics education lecturer who understood the visual basic application and 2 mathematics teachers who were experienced teaching. The results of expert validation from a lecturer on animation media obtained good criteria on the effectiveness indicators of the use of animated media, language, sound, and visuals, while on the consistency indicators the use of symbols obtained very good criteria. Validation of two mathematics teachers to the presentation of material in the overall animation media obtained criteria both on the indicators of relevance of learning objectives, the truth of the concept, and the presentation of the material. Student responses to the use, appearance, and presentation of animation media material as a whole are in good criteria.

1. Introduction
Students at one of the state junior high schools in Cimahi city have a test score that is far from completeness criteria in the material of flat side space. This information was obtained from the results of discussions with two mathematics teachers who taught this material at the school. One of the mathematical materials that are difficult for students is to build flat side spaces [1,2]. According to [3] students have difficulty in understanding the material to build flat side spaces because the learning method still tends to lecture and only focus on one textbook. In addition, the cognitive stage of students also needs to be considered by the teacher before delivering the material so that it is easy to understand [4].

As a result of the inappropriate learning methods many students are wrong in solving the problems of building a flat side space. Among these errors, students stated that the cube is a beam with the same length of ribs, even though the beam does not have the same length of ribs. Another mistake of the students believe is the beam is a rectangular prism. Whereas quadrilateral has various forms, such as parallelogram, kite laying, trapezium, etc. which do not form a beam.

Efforts to overcome the difficulties of students in understanding the material to build a flat side space, one of them by making animation media design based on microsoft visual basic application. Through this animation media design, learning to build flat side spaces can be packaged more interestingly by
displaying a variety of images and colors, so students can understand the material to build flat side spaces correctly and fun. The advantages of animation media based on visual basic applications include the language used is very simple, this application is found on microsoft powerpoint which is generally installed on computers and laptops, and animation designs can be made as desired.

Marchovitz [5] states that programming of visual basic applications on powerpoint will provide effective media results and interactivity of teaching materials so that students more easily understand mathematical concepts. According to [6], microsoft powerpoint's visual basic application has an attraction in the form of images and sounds in the animation design, making it easy for students to use and understand. Based on the problems raised, it is necessary to design a visual basic application animation design microsoft powerpoint to help students understand the material to build flat side spaces. Through this animation design, it is hoped that the students' difficulties will be overcome optimally.

2. Method
This research uses the Research and Development method. The research subjects consisted of 2, namely subjects for testing in one class of students in one junior high school in Cimahi. The procedure of research and development of animation media based on microsoft powerpoint basic visual application on the material of flat side space consists of the steps as in Figure 1 below.

![Figure 1. Research stages](image)

Figure 1 shows the stages of compiling animation media design based on microsoft visual basic application. The initial stage is finding a potential problem that is the difficulty of students in understanding the material to build flat side spaces. Information about this issue was collected and reviewed from research articles in various journals. The solution obtained in the form of animation media design based on microsoft powerpoint basic visual application. This animation media design was validated by 3 experts namely a mathematics education lecturer and two experienced teaching teachers. A valid animated media design was tested on a class of students in one of the Cimahi Public Middle Schools. The results of the trial design of teaching materials outside provide the final design of animation media.

The research instrument used validation sheets and student response sheets. The expert validation sheet consists of an animation media validation sheet and a validation sheet in the material of a flat side space. In the animation media validation sheet there are 20 statement items which are assessed with 5 options. The indicators contained in the validation sheet are shown in the following Table 1.
Table 1. Indicators on the animation media validation sheet

| Indicators                              | Item Number statements |
|-----------------------------------------|------------------------|
| The effectiveness of the use of media animation | 1, 2, 3, 4, 7, 13, 14, 15, 17 |
| The use of language in animated media    | 5, 6, 8                |
| Sound on animated media                 | 9, 10                  |
| Visuals on animated media               | 16, 18, 19, 20         |
| Consistent use of symbols               | 11, 12                 |

Partial display of the expert validation sheet on animation media based on microsoft visual basic application as shown in Table 2.

Table 2. Partial display of the animation media validation sheet

| No | Statements                                                                 | Score |
|----|---------------------------------------------------------------------------|-------|
| 1  | Animation media can be used easily                                        |       |
| 2  | The language used in animated media can be understood                     |       |
| 3  | Sound effects that appear on animation media are very good                |       |
| 4  | Movement on interesting animation media                                   |       |
| 5  | Symbols and terms about the material on animation media are consistent   |       |

The material validation sheet builds a flat sided space on the animation media consisting of 10 statements and 5 options. The indicators on the material validation sheet are displayed in Table 3.

Table 3. Indicators on the material validation sheet

| Indicators                                       | Item Number statement |
|-------------------------------------------------|-----------------------|
| The relevance of learning objectives            | 1, 4, 5               |
| The truth of concepts and theories              | 2, 3, 6, 9            |
| Presentation of material on animation media     | 7, 8, 10              |

A partial display of the material validation sheet as in Table 4.

Table 4. Partial display of animation media validation sheets

| No | Statements                                                                 | Score |
|----|---------------------------------------------------------------------------|-------|
| 1  | The relevance of learning objectives to competency standards             |       |
| 2  | The truth of the theory on the material in the media animation            |       |
| 3  | Presentation of material in animated media facilitates student understanding|       |

The next instrument is the student response sheet. on the student response sheet there are 10 statements with 5 options. The indicators on the student response sheet are shown in the following Table 5.

Table 5. Indicators on the student response sheet

| Indicators                                    | Item Number statements |
|-----------------------------------------------|------------------------|
| Use of animation media                        | 2, 4, 8, 10            |
| Display of animated media                     | 1, 3, 5                |
| Presentation of material on animation media   | 6, 7, 9                |
A partial display of the student response sheets is shown in Table 6.

Table 6. Partial display of student response sheets

| No | Statements                                                | Score |
|----|-----------------------------------------------------------|-------|
| 1  | Animation media can be used easily                       |       |
| 2  | Media animation is very interesting and not boring       |       |
| 3  | The material presented in the animation media is easy to understand |       |

The scoring criteria for animation media validation sheets are a score of 5 (very good), a score of 4 (good), a score of 3 (good enough), a score of 2 (not very good), and a score of 1 (very poor). Scores obtained from an expert on the animated media validation sheet are averaged. The average results are adjusted to the animation media validation criteria. Scores obtained from the two experts on the material validation sheet are combined and averaged. The results of the average material validation sheets are adjusted with animation media validation criteria.

3. Result and Discussion
3.1. Animated media design
In designing animation media based on microsoft powerpoint application needs to be made in advance the storyboard as a whole picture of the animation media. Storyboards include titles, main menus, material, exercises, and evaluations. The main application in designing this animation media is microsoft powerpoint. In microsoft powerpoint the "view" then "macros" section has a "visual basic for application" feature. In these features can be made animation media design on the material to build a flat side space. The microsoft powerpoint display in Figure 2 (left side) and the coding in the visual basic application in Figure 2 (right side).

Figure 2. Microsoft powerpoint display and visual basic application coding

Initial display of animation design media based on visual basic applications as in Figure 3.
Figure 3. Initial display of animation media design

Figure 3 (left side) shows various shapes of flat side spaces at the top of the box. To make up this space are the triangular prism, the triangular pyramid, the quadrilateral pyramid, the quadrilateral prism, the pentagonal prism, the pentagonal pyramid, the hexagon prism, and the hexagon pyramid. In Figure 3 (right side) the various shapes of flat sided space can be moved to the desired box based on the similarity of patterns, namely triangular prisms, rectangular prisms, pentagonal prisms, and hexagon prisms are in the same box. Likewise, with the triangular pyramid, the quadrilateral pyramid, the pentagonal pyramid, and the hexagon pyramid are also in the same box. If students are unable to place the right flat side plan, a warning will appear.

After students identify the similarities in the construction of flat side spaces, namely prisms and pyramid, they make the conclusions as in Figure 4 below:

Figure 4. Identify the characteristics of a flat side chamber

Figure 4 presents the concluding section about the characteristics of the prism, pyramid, cube, and block that students write directly in the column provided. The teacher can check student answers on the screen if there are errors that can be corrected together. The design of animation media based on visual basic application on the material shown in the flat side space is only a small part of the overall design.

3.2. Expert validation of animation media

Expert assessment of animation media design was provided by a mathematics education lecturer who understood the visual basic application. The results of the assessment are shown in Table 7.
Table 7. Expert validation of animation media

| Indicators                        | Score | Criteria   |
|----------------------------------|-------|------------|
| Effective use of animation media | 4.67  | Good       |
| The use of language in animated media | 4.67  | Good       |
| Sound on animated media          | 4     | Good       |
| Visuals on animated media        | 4.75  | Good       |
| Consistent use of symbols        | 5     | Very good  |

Table 7 shows that lecturers' evaluation of animation media on indicators of effectiveness in use, language, sound, and visual has good criteria. In the indicator consistency the symbol is in very good criteria. Expert assessment of the material in animated media was provided by two mathematics teachers who had teaching experience. The results of the assessment are shown in Table 8 below:

Table 8. Expert validation of material on animation media

| Indicators                                  | Expert 1 | Expert 2 | Mean ($\bar{x}$) | Criteria  |
|---------------------------------------------|----------|----------|------------------|-----------|
| The relevance of learning objectives        | 4.67     | 4.67     | 4.67             | Good      |
| The truth of concepts and theories          | 4.25     | 4.50     | 4.38             | Good      |
| Presentation of material on animation media | 4.67     | 4.67     | 4.67             | Good      |

Table 8 shows that the assessment of the two experts on the material in animation media as a whole has good criteria for indicators of relevance of learning objectives, the truth of concepts and theories, as well as the presentation of material. The research conducted by [7] in designing instructional media gained expert judgment on very good criteria.

3.3. Student responses to animation media

Students who have used animation media based on microsoft visual basic application provides an opinion on the student response sheet. Students' opinions on animation media are shown in Table 9.

Table 9. Student responses to animation media

| Indicators                                  | Score   | Criteria |
|---------------------------------------------|---------|----------|
| Use of animation media                      | 4.45    | Baik     |
| Display of animated media                   | 4.40    | Baik     |
| Presentation of material on animation media | 4.60    | Baik     |

Table 9 shows that students' responses to animation media based on microsoft visual basic application as a whole have good criteria. The highest score on the indicator of the presentation of material in the animation media. Students feel happy and are not easily bored learning the material to build flat side spaces using this animated media. The design of teaching materials that are designed by the teacher can improve students' abilities on medium criteria (good) [8-15].

4. Conclusion

Animated media design based on visual basic application microsoft powerpoint is designed to help students understand the material to build flat side spaces. The validation test results of an expert that is a mathematics education lecturer who understands the visual basic application of animation media obtained good criteria. Likewise, with the results of the validation of two experienced mathematics teachers teaching the animation media obtained good criteria. Based on the validation test of the three experts obtained a valid visual media design based on microsoft powerpoint application that is valid. At the time of testing on students obtained a good student response to the use of animated media based on microsoft visual basic application powerpoint. Students feel happy, not bored, and easy to understand the material in learning the material to build flat side spaces through this animated media.
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