

Explanation of Measurement Teaching Materials in Flipbook Packaging for Grade V Elementary School Students

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ABSTRACT

There are many teaching materials about Measurement that can be learned by grade V elementary school students in the form of Flipbooks. This is seen to provide suitable learning facilities and is an alternative solution to be easily found on the *website*. However, the quality of these teaching materials still needs to be reviewed further. Are all the teaching materials representative and suitable for use? It is necessary to conduct an analysis first so that the next can develop and evaluate. Analysis uses the Miles & Huberman model cyclically through data reduction, data presentation, and verification to find conclusions. The results of the analysis of teaching materials Measurements in the form of Flipbooks for grade V elementary school students, on average are categorized as high in aspects of content accuracy, coverage determination, language use, face and packaging, illustrations, interest interest, consistency. However, medium and low category components were found in some components in the aspects of digestibility, completeness of components and conformity with writing guidelines. While Flipbook is categorized high in content and language aspects, there are still some components that are medium and low in terms of format and characteristics.

Keywords: Teaching Materials, Measurements, Flipbooks

1. INTRODUCTION

Mathematics subjects are one of the subjects that contribute to making society ingenious and prestigious through critical attitudes and rational thinking and can increase creativity, productivity and power in solving problems in everyday life. However, the *Trends in International Mathematics and Science Study* (TIMSS) in 2015 showed that the development of mathematics and science in Indonesia ranked 44th out of 49 countries [1]. Meanwhile, PISA shows that the achievement of students' mathematical abilities in Indonesia in 2022 is ranked 75 out of 81 participating countries. Of the 6 classified ability levels, students in Indonesia have level 2 abilities of 29% and shrink at levels 5 and 6 which is only 1% [2].

The way that teachers can improve the quality of learning is to use interesting teaching materials. According to Dick & Carey (2009: 242) Teaching materials are a set of materials used by students in learning activities that are arranged regularly according to the system and visualized as a whole from the competencies that will be mastered by students [3]. Teaching materials can be printed or non-printed. Based on its use, it can be for individuals, classicals and groups. Its availability plays an important role for educators as well as students. For this reason, teaching materials should not only imply *Critical Thinking, Communicaiton, Creativism and Collaboration Skills* (4C's Skills), but also utilize digital technology with suitable and interesting media in packaging teaching materials so that they become things that students like. One of the teaching materials in question is an electronic book (*Flipbook*) which provides facilities for delivering material and exercises.

Flipbook is an interactive digital book where each page opens as if you were opening the book in the usual way, a printed book with many features. Flipbook's functions are perfect, as is the ability to easily add images digitally, create illusions or animations in books[4] [5]. A full-featured flipbook can be used as a tool to present a topic in an interesting way. In developing *flipbooks* there are several aspects that must be considered including (a) format, (b) content and (c) language [6]. The aspects that must be fulfilled in the flip book are the characteristics of *the flipbook* including (a) *flipping experience* (b) *able to be consolidated with video files* (c) *able to be consolidated with animated files* (d) *containing search facilities* (e) *able to be consolidated with illustrations and sound or music* [7].

Teaching materials are a set of materials that are arranged regularly according to the system used by teachers and students in learning activities. The teaching materials applied can be printed or non-printed. The role of teaching materials for teachers is to be able to (a) shorten the teacher's time in guiding students in learning activities, (b) make teachers as facilitators, and (c) accommodate learning activities to be more effective and efficient. While the role of teaching materials for students is able to (a) accommodate students learning independently (b) accommodate students to learn flexibly (c) accommodate students to learn according to their capacity (d) increase the capacity of students to become independent learners. Therefore, teaching materials must meet several aspects including (a) accuracy of content (b) determination of coverage (c) digestibility of teaching materials (d) use of language (e) face and packaging (f) illustrations (g) completeness of components and (h) student interest [8]. The components that must be met in teaching materials are (a) consistency or consistency and (b) conformity with teaching material writing guidelines [9].

One of the teaching materials used in elementary schools and considered difficult for students is the Measurement material. Interpretative and representative material exposure is required using a combination of several previous material concepts. Measurement learning is usually given to introduce formulas and procedures without facts, principles, and concepts in achieving learning objectives. This is the wrong old way, because it requires correct math learning experience and can teach conceptual understanding before procedural skills. For this reason, completeness is needed in the form of teaching materials that support the study of material and measurement technology in a structured and systematic manner. With the existence of Flipbook which provides features that can provide facilities for delivering teaching materials that are coherent and interesting and fun for students to learn themselves. However, we need to know in advance such as measurement teaching materials packaged in Flipbook for grade V elementary school students that exist today.

1. METHOD

The research method used interactive model data analysis from Miles and Huberman (1984: 23). Analysis began to be carried out when the process of collecting data on Measurement teaching materials was packaged in the form of a flipbook. Analysis is carried out continuously and is carried out in a cyclical form by comparing all data obtained with other data on an ongoing basis. This research cycle is working on data presentation, data reduction, and verification to draw conclusions. Here's the image of the analysis in question.

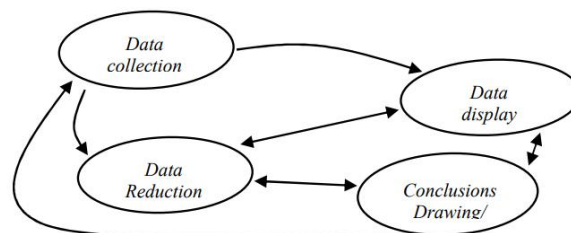


Figure 1 Miles and Huberman Interactive Model Data Analysis

Teaching materials in the form of a Flipbook on Measurements for grade V elementary school are analyzed from the aspect of meeting the criteria for teaching materials and flipbooks. There are nine Measurement teaching materials in flipbook packaging compiled from the *website*. Eight teaching materials were obtained from individual accounts and one teaching material had an ISBN from the Ministry of Education and Culture published in 2022.

Furthermore, teaching material and flipbook instruments are used in analyzing teaching materials Measurements in flipbook packaging. The components used in analyzing teaching materials are, accuracy of content, determination of coverage, digestibility of teaching materials, use of language, face and packaging, illustrations, completeness of components, attractiveness of interest, consistency of teaching materials, and conformity with writing guidelines [8] [9]. Also used components in analyzing flipbooks are, format, content, language, and characteristics of flipbooks [6], [7].

Table 1. Research Instrument Grille

No	Aspects	Component
1	Teaching material	Content accuracy
		Determination of coverage
		Coverage Provisions
		Digestibility of Teaching Materials

No	Aspects	Component
		Language Use
		Faceting or Packaging
		Illustration
		Completeness of Components
		Interest
		Consistency
		Compliance with Teaching Material Writing Guidelines
2	Flipbooks	Format Flipbook
		Isi Flipbook
		Language
		Characteristics of Flipbook

Assessment of teaching materials Measurements in flipbook packaging will be determined using assessment criteria as in the following table.

Table 2. Assessment Criteria for Teaching Materials Measurement in Flipbook Packaging [11]

No.	Criterion	Interval
1.	High	66,67% - 100%
2.	Midle	33,34% - 66,66%
3.	Low	< 33,33%

2. RESULTS AND DISCUSSION

The results of the observation of Nine Flipbooks using instruments for measurment teaching materials and Flipbooks obtained the following facts:

Table 3. Content Accuracy on Measurement Teaching Materials Analysis Analysis

No	Indicator	Result	Category
1	Content alignment with KI/KD	74,07 %	High
2	The validity or correctness of the material in teaching materials is true based on theory	100 %	High
3	The validity of the material in teaching materials is correct based on facts in the field	100 %	High

The results of the content accuracy analysis on teaching materials with three different indicators, each of which has a high category with different results. The results on the content alignment indicator with KI / KD get a percentage of 74.07% showing that there are still teaching materials that do not include KI / KD, this will make the content gap contained in teaching materials appropriate or not with KI / KD.

Table 4. Analysis of Coverage Provisions in Measurement Teaching Materials

No	Indicator	Result	Category
1	Depth of content or material	92,59 %	High
2	Breadth of content or material	92, 59 %	High

The results of the analysis of the components of the coverage determination on measuring teaching materials, regarding the depth of content and breadth of content in the material get the same percentage of 92.59%, and are included in the high category, meaning that each teaching material analyzed has met the criteria for teaching materials.

Table 5. Digestibility of Measurement Teaching Materials Analysis

No	Indicator	Result	Category
1	The material is delivered straightforwardly starting from easy to difficult	96,29%	High
2	The material is delivered in a sequential or systematic manner.	100%	High
3	The material is presented using examples and illustrations that can facilitate the understanding of learners.	96,29%	High
4	The availability of tools that can make it easier for students to understand teaching materials	92,59%	High
5	Writing teaching materials uses an orderly and consistent format in the use of language or terms to make it easier for students to recognize and review the material learned by students	100%	High
6	Teaching materials contain explanations of benefits and uses in learning.	46,14%	Sedang

The results of the analysis of the digestibility component of teaching materials on indicators containing explanations of benefits and uses in learning received a percentage of 46.14% or categorized as moderate, meaning that there are still many teaching materials that do not contain explanations of benefits and uses in learning. This indicator is our shot to be followed up in developing Measurement teaching materials.

Table 6. Analysis of Language Use in Measurement Teaching Materials

No	Indicator	Result	Category
1	Selection of language varieties (standard or formal and non-formal or communicative)	100%	High
2	Word selection (short and straightforward)	100%	High
3	Use of effective sentences	96,29%	High
4	Meaningful paragraph organization	96,29%	High

The results of the analysis of the components of language use in teaching materials Measurements show varying results. Regarding the selection of various languages and words get a percentage of 100% or high categories. In addition, the use of effective sentences and the preparation of meaningful paragraphs get a percentage of 96.29%, still a high category. All indicators are included in the high category, meaning that the use of language in the analyzed teaching materials has met the criteria for teaching materials.

Table 7. Face and Packaging in Measurement Teaching Materials Analysis

No	Indicator	Result	Category
1	The text on the teaching material can be seen short, concise, clear and easy to understand.	88,88%	High
2	Easy to read paragraph system	96,29%	High
3	Use a correct and consistent numbering system	96,29%	High
4	Use interesting and varied font types and sizes	66,66%	High
5	Use meaningful images and graphics.	96,29%	High

The results of facial analysis and packaging in teaching materials with several different indicators get high categories with different results. The results on the indicators of interesting and varied types and letters get a percentage of 66.66%, this is because there are still teaching materials that are not consistent in using interesting and varied types and font sizes so that development is needed because the use of types and font sizes is very influential to attract the interest of students and to increase maximum measurement results.

Table 8. Illustrative in Measurement Teaching Materials Analysis

No	Indicator	Result	Category
1	The images used clarify the material or information conveyed.	92,59%	High
2	The images used are interesting, motivating and aid student retention and understanding.	81,48%	High
3	The images used are appropriate and meaningful	92,59%	High
4	The colors used correspond to the content of the material presented.	96,29%	High

The results of the analysis of the illustration component of teaching materials show that several indicators have a varied percentage. The image indicators used clarify the material or information conveyed, the images used are appropriate and meaningful and the colors used in accordance with the content of the material presented get a percentage of 96.29% or all three indicators are included in the high category. While the second indicator, namely the images used are interesting, motivating and helping student retention and understanding get a percentage of 81.48% even though it is categorized as high, but this second indicator must be paid more attention to by developers to be able to produce teaching materials using attractive images that can motivate and help student retention and understanding.

Table 9. Completeness of Teaching Material Components Analysis

No.	Indicator	Result	Category
1.	The availability of the main component contains information or material that will be delivered to students.	100%	High
2.	The availability of complementary components that contain additional information that supports integration with the main teaching materials.	66,66%	Midle
3.	The availability of a learning outcome evaluation component consisting of questions that can be used for student formative tests.	85,18%	High

The results of the analysis on the indicator of the availability of complementary components got a percentage of 66.66% so that it can be categorized as medium, meaning that there are still shortcomings in some additional information that supports integration with the main teaching materials. For example, there is no syllabus, reading, and other print and non-print complementary components.

Table 10. Analysis of Interest in Teaching Materials

N o.	Indicator	Result	Category
1.	The material is presented attractively to attract student motivation in learning further.	74,07 %	High
2.	The material presented is able to cultivate curiosity.	74,07 %	High
3.	The material presented can develop the abilities possessed by learners	74,07 %	High

The results of the analysis of interest in teaching materials with three different indicators obtained the same percentage result, which was 74.07% with the high category. Thus, students' interest in teaching materials is considered good, but there still needs to be development to further increase the attractiveness of teaching materials.

Table 11. Consistency in Teaching Materials Analysis

No.	Indicator	Result	Category
1.	Aspects of content are consistent with facts, concepts, principles and procedures.	92,59%	Tinggi
2.	Aspects of consistency structure with systematic presentation order.	85,18%	Tinggi
3.	Aspect of language consistency with word choice and adjusted to KBBI	92,59%	Tinggi
4	The illustrative aspect is consistent with the pattern of presentation of the image, selection of type, size and color of letters.	74,07%	Tinggi

The results of consistency on teaching materials analysis with four different indicators get high categories with different results. The results of the analysis of the illustration aspect of consistency with the pattern of presentation of images, the selection of type, size and color of letters get a percentage of 74.07% shows that there are still teaching materials that are inconsistent in the selection of type, size, and color of letters so that development is needed to get maximum score results. Similarly, in arranging the order of material presentation, it needs to be developed in the preparation of structured and systematic material.

Table 12. Compliance with Teaching Material Writing Guidelines

No.	Indicator	Result	Category
1.	Theoretical as well as practical value.	96,29%	High
2.	Interactive and encourages active learning.	70,37%	High
3.	Adaptif and relevant to current development.	100%	High
4.	Fostering literacy capacity for students.	85,18%	High
5.	Strengthening Character Education.	55,55%	Midle
6.	Develop higher-order thinking skills.	74,07%	High
7.	Developing 21st century prowess	59,25%	Midle
8.	Reflects the learner-centered learning model.	66,66%	Midle
9.	Equipping skills related to the industrial revolution 4.0.	33,33%	Low
10.	Develop the competence and creativity of teachers and students.	77,77%	High
11.	Contains illustrations that make it easier for students to understand difficult concepts	77,77%	High

The results of the analysis on the aspect of conformity with the teaching material writing guide showed three medium category indicators and one low category indicator. The indicator of equipping skills related to the industrial revolution 4.0 received a percentage of 33.33% (low), meaning that there is no availability of debriefing related to the industrial revolution 4.0. Thus, there is a need for development to provide provision for the industrial revolution 4.0 in teaching materials. In addition, it is necessary to develop 21st century skills, reflecting a learner-centered learning model and character strengthening.

Table 13. Flipbook Format

No.	Indicator	Result	Category
1.	Harmony of colors, text, and images on flipbooks	74,07%	High
2.	Font size selection on flipbooks	77,77%	High
3.	Flipbook layout fit	81,48%	High
4.	Ease of use of navigation buttons on flipbooks	100%	High

5.	Sound flipbook animation effects	44,44%	Midle
6.	The page move effect works fine	100%	High
7.	Sound clarity on videos inside flipbooks	33,33%	Low
8.	Image quality on flipbooks	96,29%	High

The results of the analysis on the voice clarity indicator on the video in Flipbook got a percentage of 33.33% so that it can be categorized as low. This is shown because there is no integrated feature to present videos in flipbooks. So there needs to be a development that presents videos to increase motivation and make flipbooks more interactive. Sound animation effects flipbooks are also considered to consider susra that is suitable for students so as to provide interesting and fun learning facilities.

Table 14. Flipbook Contents

No.	Indicator	Result	Category
1.	Compatibility of material on flipbook media with Core Competencies	74,07%	High
2.	Compatibility of material on flipbook media with Basic Competencies	85,18%	High
3.	Compatibility of material on flipbook media with Competency Achievement Indicators	81,48%	High
4.	Suitability of material on flipbook media with learning objectives	92,59%	High
5.	Material demands on flipbook media	88,88%	High
6.	Presenting examples of daily problems according to the material	74,07%	High

The results of Flipbook content analysis with six different indicators get a high category with different results. The results on the material conformity indicator on the flipbook media with Core Competencies and examples of daily problems according to the material get a percentage of 74.07% show that there are still teaching materials that are not in accordance with the Core Competencies and have not included examples of daily problems so that development is needed to get maximum measurement results.

Table 15. Flipbook Language

No.	Indicator	Result	Category
1.	The language used is easy to understand.	88,88%	High
2.	Language used communicatively	85,18%	High
3.	Grammar used as PUEBI	92,59%	High

The results of the analysis of the language aspects of Flipbook with three different indicators get a high category with different results. Shows that the language aspect of the flipbook is well analyzed so that what needs to be considered is to maintain the language aspect of the flipbook.

Table 16. Characteristics of Flipbook

No.	Indicator	Result	Category
1.	Acquired a sense like actually opening a book (flipping experience).	100%	High
2.	Can be combined with video files	37,03%	Midle
3.	Can be combined with animation files (SWF).	33,33%	Low
4.	Search facility	100%	High
5.	It can also be combined with pictures and music.	66,66%	Midle

Analysis of the characteristics of Flipbook shows varied results. The indicator can be combined with an animation file (SWF) gets a percentage of 33.33% (low). This low indicator is indicated by the absence of combination with animation files (SWF) so there is a need for development in combining with video and animation files on Flipbook. Also pay attention to the use of a combination of images and music.

3. CONCLUSION

Based on data and discussion of the results of the analysis of measurement teaching materials in flipbook packaging, in terms of the availability and suitability of the types of mathematics teaching materials measurement materials in grade V elementary schools. The material in the analyzed teaching materials is completely delivered and delivered to students in a structured manner, both conceptually, procedurally, and contextually. Likewise, the language used in teaching materials is communicative and informative. However, there are still indicators in teaching materials regarding equipping skills related to the industrial revolution 4.0 which is included in the low category with a result of 33.33%. The data shows that there is no provision related to the industrial revolution 4.0 in teaching materials to complete the conformity component with the teaching material writing guidelines. While the analyzed flipbook can be used practically. However, there is still an indicator about the clarity of sound on the video in the flipbook and the indicator combining with the animation file (SWF) on the flipbook is included in the low category with the same result of 33.33%. The data shows that there are no video and animation features available on existing flipbooks to complement the format components and characteristics of flipbooks. Thus, there are indicators that need to be considered in developing measurement teaching materials in flipbook packaging, then it is to provide skills related to the industrial revolution 4.0 in teaching materials and complete video and animation features on the flipbook used so that it can produce better measurement teaching material products in flipbook packaging.

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