

Validity And Practicality Of Infographic Teaching Media In The Basic Science Concepts Course

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Abstract. Based on the observations made by the researchers, the average UAS score for the Basic Science Concepts course in the 2019/2020 odd semester only reached 61.13 out of 46 students. There are as many as 13 students whose grades are below B. The low average value of the final semester examinations is due to the low understanding of students' concepts of lecture material. Learning media is a means to transfer knowledge from educators to students. Today's technological developments have an impact on improving the quality of human resource educators in making learning media, coupled with the demands of the current situation, namely the Covid-19 pandemic that was felt by Indonesia in early 2020, which has had an impact on massive technological needs. Digital learning media is something that must and must be mastered by educators. Based on the problems above, the researchers are interested in conducting development research with the title of developing infographic-based teaching media to improve students' understanding of concepts. The purpose of this research is to develop valid and practical infographic-based teaching media. The method used is research and development (Research and Development) borg and gall. This paper specifically discusses the quality of the developed infographic media. Quantitative description is an analysis of the data used. The results of this study are: 1) the resulting infographic media has a very valid category, 2) the resulting infographic media has a very practical category.

Keywords: Infographic, learning media, Canva, Science

INTRODUCTION

Physics is one of the branches of Natural Sciences (IPA) that is very important to study, because physics studies natural phenomena and discusses how these phenomena occur as well as the most fundamental science. Based on the results of the pre-study, the researcher concluded that the problem obtained was the low understanding of physics concepts for students of basic science concepts, this was evidenced by the average UAS score for the Science Basic Concepts course in the odd semester of 2019/2020 only reaching 61.13 out of 46 students. . There are as many as 13 students whose grades are below B. The low average value of the final semester examinations is due to the low understanding of students' concepts of lecture material. Another factor that causes a lack of understanding of learning concepts is that students lack interest and participation in physics lessons. Low interest in reading causes activity and learning outcomes to be low. Overcoming these problems, researchers are interested in developing learning media in the form of infographics to improve students' understanding of the concept of physics. Based on the results of research conducted by Muliani (2019), the student attitude scale states that almost all students agree that media-assisted learning can motivate students to understand learning materials, can facilitate improving the ability to compare, interpret, explain, and conclude and can be applied to further physics learning. Based on relevant research, conducted by Sari (2018) with the title "Development of Infographic Media as Supporting Physics Learning", shows that infographic media is feasible to use, as evidenced by the assessment by material experts who get an average score of 88.4% in the very good category, assessment by media experts who get an average score of 87.9% with a very decent category. The small group trial got an average score of 87.8% and 85.6% in the field trial. The physics teacher's response got an average score of 97.4% in the good category. By using infographics as teaching aids, it is as if we are telling a visual story to students. This innovation of learning media in the field of physics is carried out to familiarize students to be more interested in reading. Infographics are graphic information visual representations of a collection of data, information and designs (Susetyo Hendri Rahman, Muh. Bahruddin, 2015). Infographics require a number of information in the form of writing or numbers and then converted into a simpler form, namely a combination of images and text that allows the reader to quickly understand the meaning of the message or image itself. In addition, the form of a diagram or map itself will make it easier for students because in principle, the human brain tends to store data in the form of images more easily than writing that is very boring. In addition, the use of language or sentences accompanied by more interesting pictures is also very influential, so that students will more easily understand the learning material presented.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT (QUANTITATIVE) OR LITERATURE REVIEW (QUALITATIVE)

PGSD students can complete their undergraduate program on condition that they complete 144 credits which have been presented in eight semesters. Elementary science basic concept courses are compulsory subjects with a weight of 3 credits. Natural science basic concept courses are very useful for PGSD students, as prospective elementary school teachers are required to have the ability in various subjects (Surya, 2017). Therefore, it is important for students to understand the concept of understanding the concept. The characteristics of the Basic Science Concepts course lead to the basic concepts of Physics. Understanding the concept of physics according to Sutadi (2014) is the ability to capture and master more than a number of facts that have links with certain meanings. Understanding the concept itself is one in the cognitive realm.

The cognitive domain according to Anderson & Krathwolh (in Kusumawati, 2016) groups it into 7 dimensions of cognitive processes as follows: 1. Interpret Interpreting is changing one image form into another. Interpreting indicators include: clarifying, paraphrasing, representing, and translating 2. Exemplify Exemplifying is finding case examples, or illustrations of a concept or principle, exemplary indicators include illustrating and giving examples. 3. Clarifying To clarify is to define something in a category. Indicators classify, include categorizing, and classifying. 4. Summarize Summarizing is abstracting, general themes or main points. Indicators summarize, among others, abstract and generalize. 5. Concluding To conclude is to make a logical conclusion from the information received. The comparing indicators include predicting, extrapolating and extracting. 6. Comparing To compare is to determine the relationship between two ideas, two objects and the like. Compare indicators include mapping, matching and contrasting. 7. Explain Explaining is making a cause-and-effect model in a system.

Indicators explain include making models. Each teaching and learning process must use a certain media in order to run effectively and smoothly. The existence of learning media is very important so that the teaching and learning process can be conveyed properly, from teacher to student. The word media comes from Latin and is the plural form of the word medium, which means intermediary or introduction. Media is an intermediary or delivery of messages from the sender to the recipient in an ongoing communication process. Meanwhile, according to the KBBI, media can be interpreted as intermediaries, liaisons, communication tools such as newspapers, magazines, radio, television, films, posters, and banners, which are located between two parties (people, groups, and so on).

So, in general it can be interpreted that learning media is a tool for the teaching and learning process, namely everything that can be used to stimulate the thoughts, feelings, attention and abilities or skills of students so that it can encourage the learning process in students. Nana Sujana and Ahmad Rivai (2010) suggest that there are several types of teaching media commonly used in the teaching and learning process, namely: 1) Graphic Media. Graphic media, including visual media, as well as other media, graphic media serves to channel messages from the source to the recipient of the message. The channel used concerns the sense of sight and the message to be conveyed is poured into visual communication symbols. Examples of graphic media are pictures, photos and graphics. 2) Three-Dimensional Media. Three-dimensional media are media in the form of models such as: cross-sectional models and stacking models. Projection models such as: slides, film strips and the use of OHP.

Using the environment as a teaching medium Infographics itself comes from the word Infographics in English which stands for Information + Graphics is a form of data visualization that conveys complex information to readers so that they can be understood more easily and quickly (Damyanov & Tsankov, 2018). We know that today's technology is revolutionizing the way people communicate and learn. The rapid shift from teacher-centred to student-centered teaching in the classroom has contributed to the widespread use of technology to improve teaching and learning in higher education institutions.

Infographics are considered as an effective tool for communication and information transfer. Because of this, infographics have emerged as a popular visual approach and efficiently provide abstract and complex instructional content to support student learning. Infographics have become a new trend in current learning approaches because they include many components used in knowledge visualization and allow knowledge to be presented in different visual forms (Netty, 2020). Infographics are a form of data presentation with visual concepts consisting of text with the addition of iconic and informative illustrations.

The process of creating infographics is commonly referred to by several different terms such as data visualization, information design and information architecture. In general, the final result of an infographic has a better percentage of visual images than text information. Infographics is a general concept of presenting information which in its application is based on creativity, beauty (attractiveness), accuracy of content with illustrations, and the effectiveness of the time needed to interpret information. The use of infographics has been widely used in presenting information, this is because infographics can simplify information that is so complex into information that can be easily understood, infographics are also able to attract the attention of various kinds of people, the application of information in the form of infographics also has the advantage of being able to easily remembered (Miftah, Rizal, & Anwar, 2016).

Usually the use of the term infographic is used as a freelance image in newspapers and other print media. A detached image from the news section occurs when it is not possible to carry out narrative reporting, due to the lack of available space on the pages of newspapers or magazines or it is also seen that narrative reporting does not take into account the level of readers' understanding of an event. Therefore, this infographic can be a visual news or pictorial data (Wicandra, 2001). From the above understanding, it can be concluded that infographics are a form of information that presents data with visual concepts consisting of images and text, and are usually used in print media, such as magazines and letters. The statement above is supported by several studies, namely, research conducted by Hidayah Mohd Fadzil (2018). The findings show that when students are involved in the learning process, they generally express positive feelings towards infographics. In this study, I tried to use Canva and Piktochart to compare the two tools and decided to use Canva because it is easy to use and has a large selection of free templates.

Another study conducted by Apriyanti, Netti et al (2020). The results showed that based on experience, student learning styles, and the principle of necessity, it was stated that Physics teachers in Sambas Regency needed innovation, especially in choosing and using learning media. All the teachers said they really needed and were interested in using infographics. They hope to use it to facilitate students in understanding Physics concepts. Steps to Create Infographics Here are the steps in creating an infographic by (Kurniasih 2016): 1. Prepare the data/information to be presented in the infographic. Understand well the meaning that is in each data/information so that you can properly illustrate the data/information in a graphic. 2. Determine the purpose of the infographic. As with communication in general, the purpose of making infographics can be for the purpose of conveying information, changing perceptions, persuading or taking an action. Goal setting will affect the presentation of the infographic that will be made. 3. Conduct a preliminary study on the need for data visualization, identify who the audience is and read some references. 4. Discuss the findings, choose the type of infographic and discuss the process of making infographics. 5. Create an infographic design and select infographic tools. 6. Define the information structure clearly, based on the selected information architecture. 7. Discuss the results of the infographic design. 8. Start creating infographics. Make a graphic according to the existing data/information, don't trying to cover the weakness of data/information with interesting data visualization. 9. Design infographics as attractive as possible by paying attention to: a.) The right size, so it can be displayed in one complete view. b.) Don't add too many attributes that can distract the graphics focus. c.) Use appropriate icons to describe data/information. Photos and illustrations others can be added to make the infographic more attractive and easy to understand. d.) Add sound or motion pictures if needed. e.) Combining types of visualizations can be done to make infographics more attractive. f.) Include a full text link so that it can be accessed by those who want to see the data/information presented in the infographic in its entirety. g.) Include the source of the quote, if the data/information included is a quote. h.) List copyright ownership clearly. 10.) Provide an assessment of the infographic that has been made. An effective infographic is one that can visualize data/information with clearly. Give an assessment of the infographic that has been made. An effective infographic is one that can visualize data/information quickly, easy to understand and attractive. 11. Improved infographics. 12. Share infographics with related parties through appropriate platforms.

In making infographic media in this study, researchers chose to use the Canva application. The Canva application is an application for graphic design that bridges users so that they can easily design various types of creative designs online. Canva is accessible online and has free features with a variety of very attractive templates. Canva is easy to use even for beginners, requiring no special design skills. Its features are so many that it reaches more than 8000 icons.

Advantages of Canva (Tanjung & Faiza, 2019) 1. Has a variety of graphic designs, animations, templates, and attractive page numbers. 2. Can increase teacher creativity in designing learning media because many features have been provided, and include drag and drop features. 3. Can save time in designing practical learning media. 4. Students can re-learn the material through the Canva learning media that has been given by the teacher. 5. It has a good image resolution and canva media slides can be printed by automatically setting the

print size. 6. Can collaborate with other teachers in designing media and create a Canva design team to share learning media with each other. 7. Can design learning media at any time, not only using a laptop but also being able to use a cellphone. 8. To add animation, user must make payment via credit card. However, Canva media can be downloaded in various storage formats such as pdf and jpg. So to implement offline presentations, it can be collaborated with other media such as powerpoint

RESEARCH METHOD

In this study, media in the form of infographics was developed, which was used to assist the learning process which acted as a supporter of teaching and learning activities carried out by the teacher. The subject of the experiment in this study was carried out on a trial of physics education students in the thermodynamics course. This study uses a qualitative and quantitative approach, this is based on the formulation of the problems that arise in this study so that the researcher conducts an exploration that is the focus of this research problem, then collects various data and information through observation, distributing questionnaires and studying documentation of the data sources used. needed. The method used is research and development (Research and Development), is a research method used to examine in an effort to develop existing products (innovation) and to create tested new products (creations) (Sugiyono, 2014). The development research procedure is guided by the research design for the development of instructional materials by Borg and Gall, which consists of 10 stages. However, the researcher limits the development of this infographic media to only 5 stages because of the five steps that have answered the problem formulation that the researcher wants.

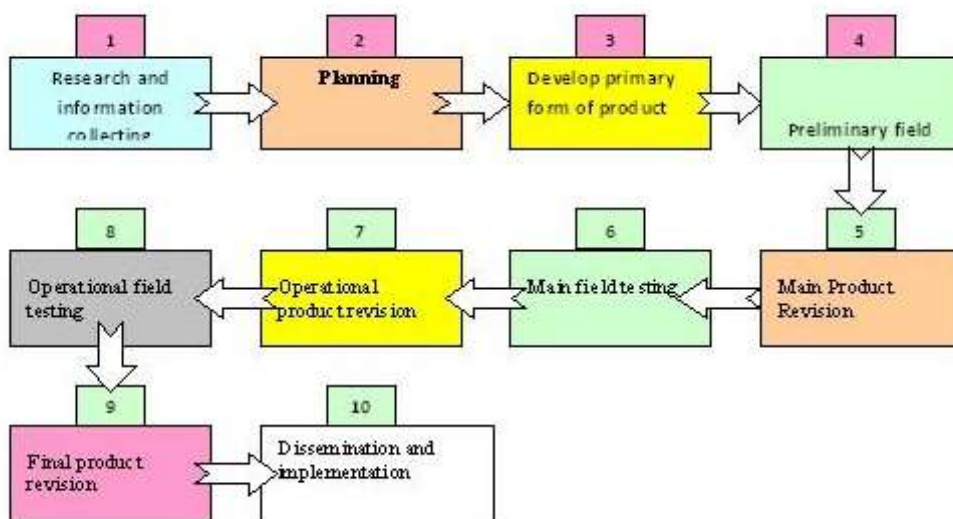


FIGURE 1: Schematic of the development procedure of the adaptation of the Borg & Gall development procedure (Source: Borg & Gall, in Sari (2018))

The Borg & Gall Development Procedure that the researchers carried out in this study can be seen in the fishbone below:

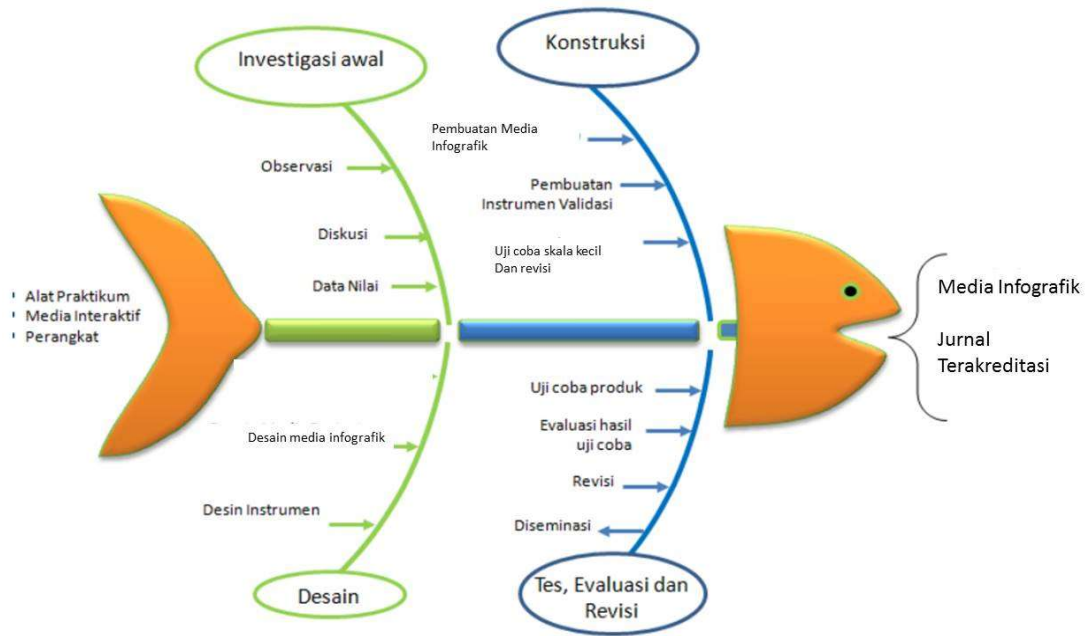


FIGURE 2. Fishbone Research Development

The initial step, namely the initial investigation or research and information collection, is included in this step, including field observations, discussions and value data obtained in the field. Next, planning will be carried out, namely design planning, both infographic media design and the design of the required instrument. The next step is to construct or develop a preliminary form of product, which is to develop the initial form of the product to be produced. Included in this step are the preparation of supporting components, preparing product validation instruments, and evaluating the feasibility of supporting tools; Preliminary field testing, namely conducting initial field trials on a limited scale. by involving as many as 6-12 subjects.

In this step data collection and analysis can be done by means of interviews, observations or questionnaires; Main product revision, namely making improvements to the initial product produced based on the results of the initial trial. This improvement is very likely to be carried out more than once, in accordance with the results shown in a limited trial, so that the main product (model) draft is ready to be tested more widely; Main field testing, the main test involving all students. Operational product revision, namely making improvements/improvements to the results of a wider trial, so that the product developed is already an operational model design that is ready to be validated.

Data analysis uses a Likert scale that is converted according to the following equation :

$$P = \frac{X}{Y} \cdot 100\% (1)$$

P = level of validity or practicality

X = score

Y = maximum score

The validity / practicality values obtained can be converted into the following categories (Widya, 2020):

TABLE 1. Category of Validity and Practicality

Interval Category	Category
0-20	Invalid/unpractice
21-40	Less valid/practice
41-60	Enough valid/practice
61-80	Valid/practice
81-100	Very valid/ Very practice

RESULT AND DISCUSSION

Validity

Media validation is carried out on several aspects that are assessed by 3 validators. The validation results for each aspect can be seen in Table 2 below:

TABLE 2. Result of Validity

Component for Validation	Validator			AVERAGE
	WD	YM	YN	
1 Content	82,86	74,29	80	79,05
2 Construction	73,33	93,33	80	82,22
3 Language	80	80	90	83,33
	Final Average			84,87

Based on the validation results in the table above, it can be seen that the infographic teaching media developed are in the very valid category, namely 84.87. During the validation stage, there were several suggestions from the validator regarding media, among others, increase the font size, pay attention to the background color and text writing, make images more clear, add images that are relevant to the material. Based on these suggestions, improvements were made to the infographic teaching media.

The development of infographic learning media so that it can be used optimally requires validation by experts. Expert validation is an assessment made by an expert on the product that has been produced. According to Sugiyono (2012), validity is the degree of determination between the data consisting of the object of research and the actual data. The results obtained from the validity test state that the developed infographic media is declared very valid

Practicality

After the infographic media was validated and revised based on input and suggestions from each validator, then a practical test was carried out. Practicality test was conducted to determine the level of practicality of the developed product. The practicality of infographic media can be identified based on a practicality questionnaire instrument filled out by 15 students.

The assessment of infographic media by students is done by asking students to fill out a questionnaire that has been given by the researcher. The following table shows the results of the practical test of 15 students.

TABLE 3. Result of Practicality

Indicator of Practicality	Religious Character Education Factor	
	Value	Category
Easy to use	85,4	Very Practice
Time efficiency	85	Very Practice
Benefit	84	Very Practice
attractiveness	87,5	Very Practice
average	85,5	Very practice

Based on the table above, the summary of the results of practical trials on 15 students. Getting the results of the questionnaire assessment on infographic media obtained 85.5 results with very practical criteria. So it can be concluded that infographic media in learning basic science concepts is very practical.

CONCLUSION

this infographic media development research uses the Research and Development (R&D) model and is adapted from the 4D model by Thiagarajan (in Mulyatiningsih, 2014:195). The results of the validation in each aspect were obtained, among others, the material aspect with a value of 79.05 (valid), in the design aspect with an average of 82.22 (very valid) in the language aspect with an average of 83.33 (very valid). so that it is concluded as a whole that infographic media is said to be valid for use in learning Basic Science Concepts.

The practicality of infographic media can be known based on the practicality instrument filled out by 15 students. The results of the practicality test obtained results on each indicator namely, ease of use with a value of 85.4. The time effectiveness indicator with a value of 85, the usefulness indicator with a value of 84. Finally, the interest indicator with a value of 87.5 with very practical criteria and educators getting 93.37% results with very practical criteria. Obtained an average value of 85.5 which means it is included in the very practical category.

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