



## Website-based learning media with instrumental music features to increase concentration and student learning outcomes on optical instrument material

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### Abstract

This research aims to develop a physics website "Fun Physics" featuring musical instruments (classical music) on the subject of Optical Instruments as a learning medium that students can use to improve their concentration and physics learning outcomes. The research and development method uses the ADDIE model which consists of 5 stages, namely Analysis Design, Development, Implementation, and Evaluation. However, this research is limited only to the development stage. Product feasibility testers are carried out by expert lecturers in Physics and high school Physics teachers. The results obtained on the website feasibility test show that the percentage value in all aspects is included in the decent category. Based on the results of the analysis obtained, the physics website product "Fun Physics" with musical instrument features (classical music) on the subject of Optical Tools is said to be feasible to improve concentration and learning outcomes.

**Keywords:** Website · Music Instruments · Concentration and Learning Outcomes · Optical Tools

### INTRODUCTION

Education plays a vital role in creating an intelligent nation, both emotionally, spiritually and intellectually, so that improving the quality of education can positively impact Indonesia's development process (Sari et al., 2019). The government has made efforts to develop and perfect the education system in Indonesia by perfecting the curriculum from the KTSP curriculum to the 2013 curriculum. In the implementation of education in the 2013 curriculum, there have been many changes and improvements to the learning process which aim to improve the quality of learning and innovation in learning (Purnadi & Surjono, 2016). One of these changes is the implementation of learning which is no longer teacher centered but has changed to student centered.

On the other hand, the rapid development of science and technology has had a positive impact on human life without exception. One of them is the use in education. The field of

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education must have great importance to be able to keep up with technological developments (Asyhari & Diani, 2017). This is because the use of technology really helps students in maximizing independent learning. According to Savitri (2017), the positive impact on the learning process is from the development of Science and Technology (Science and Technology), namely producing lots of learning resources and media, including modules, books, overhead transparency, film, video, audio, television, slides, hypertext, web, etc. Learning media that keep up with the times will be more effectively used in learning at school (Kurniasari et al., 2020).

One of the efforts to utilize science and technology that can be done to optimize student centered learning is to use website-based learning media. According to Asyhari & Diani (2017), web-based learning media is very well used in implementing physics learning. Irwandani (2014) states that website media is believed to attract students' interest in physics subjects, so that it can be used as an alternative as a medium in implementing physics learning. Web-based learning media is said to be interesting when students feel comfortable using the media website. Besides being interesting, web media can also make it easier for students to access various learning materials because it contains two or more content in the form of text, images, sound, animation, video, and so on (Purnadi & Surjono, 2016). If the learning media used is effective and interesting, the learning message will be conveyed properly according to the learning objectives (Kurniasari et al., 2020).

Teacher-centered to student-centered which places demands on teachers to be more creative in applying learning methods so that student learning outcomes can be achieved as expected. This is because student learning outcomes in physics subjects are still low. Based on the results of the 2012 PISA survey conducted on Indonesian students aged 15 years, it was found that Indonesia was ranked 64th out of 65 countries in both the mathematics and science fields (Imaniyah et al., 2015). Because the physics material contains mathematics and science, in general the PISA survey results represent physics learning outcomes (Imaniyah et al., 2015).

Factors that influence student learning outcomes are student participation in the learning process. If students are active in the learning process, it will affect the achievement of cognitive aspects, affective aspects, psychomotor aspects and social aspects (Kalsum et al., 2015). In addition, student learning outcomes are also influenced by concentration factors. Concentration is a person's effort in order to focus attention on an object in order to understand and understand the object being observed (Andita & Desyandri, 2019). While the concentration of learning is the concentration of attention shown in the form of use, mastery, and evaluation of attitudes and values, basic knowledge and skills in various fields of study as a process of changing behavior (Aviana & Hidayah, 2015). In the learning process concentration is needed because the ability of students to concentrate can affect the speed in understanding the material provided by the teacher (Andita & Desyandri, 2019). Thus, we need a method that can make students feel happy and comfortable in learning and can focus their concentration on ongoing learning (Apriyani et al., 2019).

One technique to make students feel comfortable in learning is to use music (Lehmann & Seufert, 2017). One of the music that can increase students' concentration in learning is classical instrumental music. Instrumental music has a slower tempo so it can provide peace and tranquility (Andita & Desyandri, 2019). Convenience in learning and mental conditions are influenced by music and concentration in learning because there is a connection between music



and a person's emotions or mentality (Janah et al., 2016). The type of music that can influence learning concentration is Baroque String Concert music. Baroque music is very effective for reading and concentration (Andita & Desyandri, 2019).

By connecting music in learning, it can encourage students to be more enthusiastic about learning and be able to stimulate the brain to work. This is in accordance with the results of research conducted (Prakoso et al., 2017) which shows that music can affect student learning outcomes. This is also in line with the opinion of Monti Satiadarma (2002) in (Janah et al., 2016) that classical music can stimulate students to increase emotional intelligence (emotional intelligence) and intellectual intelligence because the tones found in classical music tend to provide calm, a sense of security, and generate energy. Imagination.

Based on the problems above, researchers will develop learning media that are varied and in accordance with the needs of student learning styles. With the influence of technology in the world of education, a website-based learning media is designed which is equipped with instrumental music in it. This is because the website is one of the digital media that is able to attract students' interest in learning (Irwandani, 2014). In this study, the control variable used was Geometry Optics material on the Optical Instruments sub-topic with the research subjects being high school students. The reason for the topic used is geometric optics because the concept in the topic of geometric optics is physics material which students find difficult to understand (Widiyatmoko & Shimizu, 2018). Even though the material is close to everyday phenomena, there are still many high school students who experience misconceptions. One of the material concepts that is often misconstrued is the concept of refraction in the lens contained in an optical material.

With this learning media, it is hoped that it can increase the concentration of students in learning. By increasing the concentration of learning, it is expected to improve student learning outcomes. The purpose of the research conducted was to develop and determine the feasibility of a website equipped with instrumental music on the topic of Optical Devices as a learning medium.

## **METHODS**

### **Types of research**

This research is a type of quantitative research with data collection in the form of numbers that can be counted and in numerical form. In research conducted using research and development methods (research and development) with the ADDIE model.

### **Research procedure**

The research procedure in the ADDIE model consists of 5 stages which include the Analysis, Design, Development, Implementation, and Evaluation stages. However, researchers limit it to the development stage due to limited time and opportunities available to conduct research. At the analysis stage, what is done is to analyze learning methods, appropriate teaching materials and development requirements. At the design stage, drafting and display design are carried out on the developed media. At the development stage, the activity carried out is to test the learning media that has been developed.

### Data Collection Instruments

The data collection instrument used in this study was a validation sheet with an assessment using a Likert scale that was given to the validator for the developed website media. The input and suggestions obtained from the examiners are taken into account and then improvements are made. The results of the test or assessment are then analyzed to obtain conclusions from the feasibility of the website that has been developed.

There are five aspects that are measured in the questionnaire. The first aspect is the presentation aspect. The presentation aspect is related to the attractiveness of the design and writing on the website. The second aspect is the content aspect of the website media. The content aspect relates to the suitability of the formulation of the material on the website media with the learning indicators in the syllabus and the clarity of the material presented. The third aspect is the media aspect. The media aspect relates to the menus and layout found on the website media. The fourth aspect is the audio aspect found on the website media. The audio aspect is related to musical instruments or classical music contained in the website media. The fifth aspect relates to language. The language aspect relates to language suitability based on the Indonesian General Spelling Guidelines (PUEBI) and the use of simple and easy-to-understand language. The questionnaire instrument used as a feasibility test is presented in Table 1.

**Table 1.** Feasibility Test Questionnaire Instrument

Aspect	Indicator
Presentation	The attractiveness of the typeface (font) used on the media website fun physics
	The color selection on the fun physics media website is generally good
	The suitability of the images presented on the fun physics website media with optical device learning materials
Fill	the fun physics website learning media is simple or easy to understand
	The suitability of the optical device material in the fun physics media website with the learning indicators in the syllabus
	The material in the fun physics website learning media is given in a coherent manner
	Complete material about optical devices on the fun physics media website
	The feasibility of sample questions and discussion of optical instrument material presented on the fun physics media website
Media/ Websites	Appropriateness of the practice questions and evaluation questions with the optical device material presented on the fun physics media website
	The menus on the fun physics website are easy to understand.
	The choice of navigation menu layout on the fun physics website is good
	The menu in the selected fun physics website media can display the page quickly
	The content contained in the fun physics media website is informative
Audios	The fun physics website can be accessed easily
	The clarity of the sound of classical music instruments found on the fun physics media website
Language	Classical music instruments found on the fun physics media website can increase learning concentration
	Clarity of sentence structure used on the fun physics media website
	The suitability of the language used on the fun physics website media with PUEBI rules (General Indonesian Spelling Guidelines)
	The suitability of the language used on the fun physics website media with the level of development of students

**Data analysis technique**

Assessment of the feasibility test by examiners is carried out using a Likert scale. Response questionnaires to the feasibility of learning media are carried out by providing 4 score options according to the contents of the question. The scoring rules for product feasibility assessment are shown in Table 2.

**Table 2.** Scoring Rules

Category	Score
SB (Very Good)	4
B (Good)	3
K (Less)	2
SK (Very Less)	1

The formula for calculating the percentage is as follows (Sugiyono, 2013):

$$P = \frac{f}{n} \times 100\% \tag{1}$$

Information :  $P$ = percentage (%);  $f$  = score; and  $n$  = total score.

The results of calculating the percentage of scores obtained are then interpreted in the criteria (Damayanti et al., 2018) based on Table 3 below.

**Table 3.** Criteria for assessing the percentage of scores (Damayanti, et. al, 2018 )

Percentage	Criteria
81%-100%	Very Worth it
61%-80%	Worthy
41%-60%	Decent Enough
21%-40%	Less Eligible
0%-20%	Very Inadequate

**Analysis Phase (Analysis)**

At the analysis stage, what is done is to analyze learning methods, appropriate teaching materials and development requirements. The stages of analysis carried out are analyzing the state of teaching materials as the main reference in learning. Curriculum analysis is carried out by taking into account the characteristics of the curriculum being used. This has the goal that development is carried out in accordance with the applicable curriculum. Then analyze the basic competencies to formulate indicators of learning achievement.

**Design Stage**

At the design stage, material preparation and display design on the website are carried out. In website design, the things that are done are determining the name of the website, setting the final goals or competencies that must be achieved after learning to use the website, and developing material that has been designed on the website. Meanwhile, on the appearance of the website, the display design is carried out on the main page (dashboard), content page, and evaluation page. On the material content page, there is instrument music in the form of classical music which can be listened to when studying independently using the website.

RESULT AND DISCUSSION

The results of the development that has been carried out produce a product in the form of a Google Site-based learning website for class XI Physics on the topic of Optical Instruments. The target users are class XI high school students. In Figure 1 is a display of the main page (dashboard) which is presented in order to attract readers' interest and is accompanied by a design related to the topic of optical instruments to make it look attractive. On the main page (dashboard) there is information about core competencies, basic competencies, concept maps, material descriptions, and a table of contents.

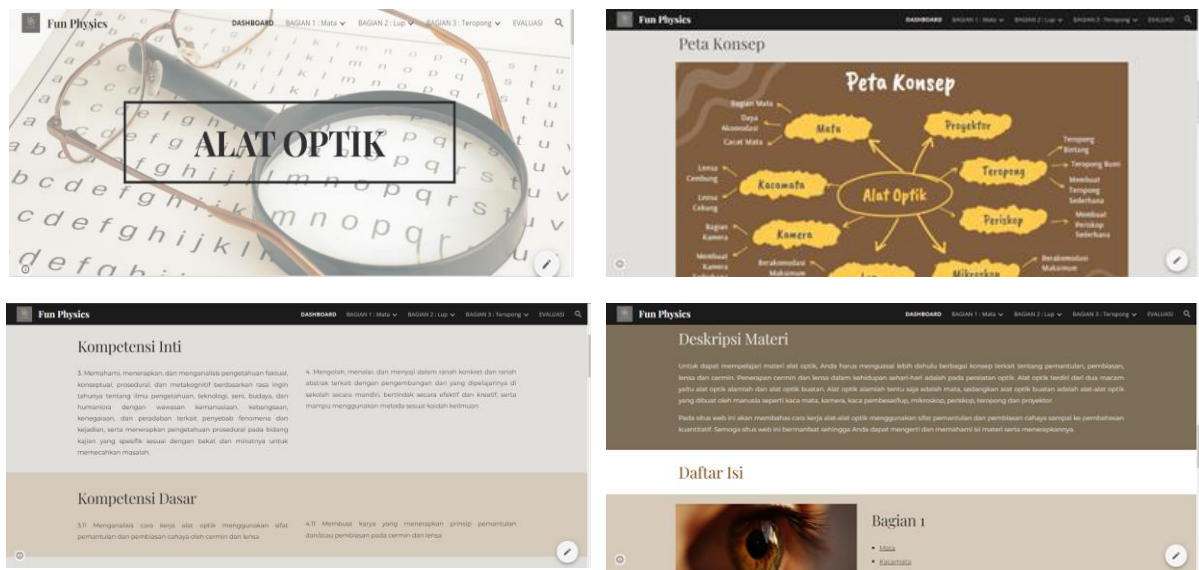


Figure 1. Main Page (Dashboard)

The presentation of material on this website is packaged in a complete and clear manner to make it easier for students or readers to understand the material. The use of a simple design so that students or readers don't get bored studying the material on the website. After the material is presented, it is also followed by examples of questions aimed at making students better understand the application of the material in the form of questions. Figure 2 shows the contents of the material and examples of questions on the physics learning media website as a result of the research.

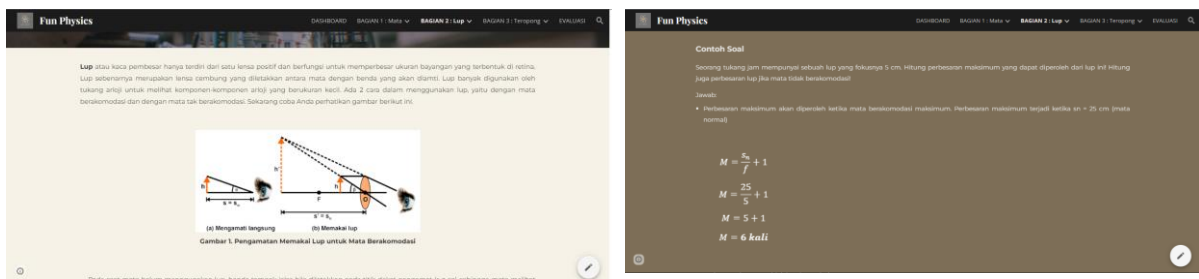


Figure 2. Material and Example Questions

On the material page there is instrument music that can be heard while studying the material. The existence of musical instruments on the website aims to increase student learning concentration when reading material through the website. Figure 3 shows a place to turn on music instruments on the Physics learning media website as a result of the research.

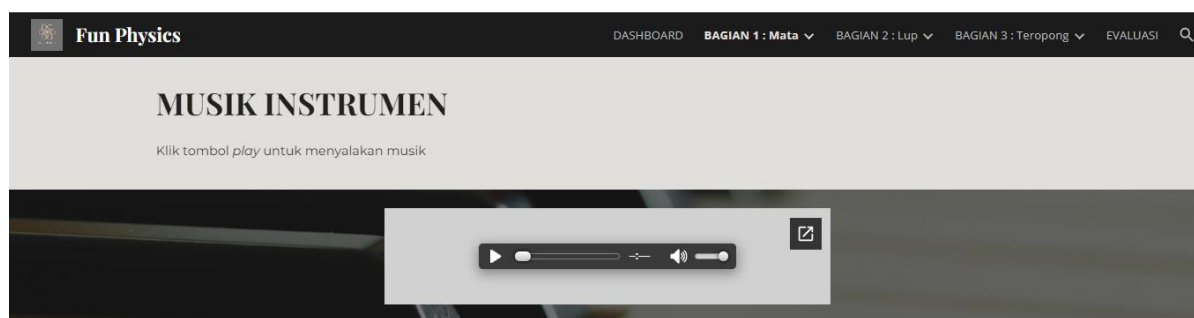


Figure 3. Musical Instruments

In the developed website media there is also a summary of the material presented in each section. Presenting a summary of the material aims to enable students or readers to review the main ideas of the material that has been presented. So that there is an opportunity for readers to recall important ideas from a text presented. Figure 4 shows the material summary page on the Physics learning media website as a result of the research.



Figure 4. Material Summary Page

Figure 5 shows the appearance of the independent assignment presented on the media website. The contents of the independent assignment are steps to carry out experiments or make teaching aids related to sub-topics on optical instrument material. The existence of independent assignments with experimental activities aims to enable students to apply the material they have learned in everyday life.



Figure 5. Self Assignment Page

Website media developed is also equipped with practice questions and evaluation questions that can be done independently. The form of the practice questions is in the form of description questions, while the evaluation questions are in the form of multiple choices with five answer choices. Practice questions in the website media are presented in each sub-topic section of the

material. Evaluation questions cover all material discussion about optical devices found on the media website. Thus, a matter of evaluation aims to determine the understanding ability of students in solving problems about optical instrument material. Figure 6 shows the practice questions page and Figure 7 shows the evaluation page.



Figure 6. Question Practice Page

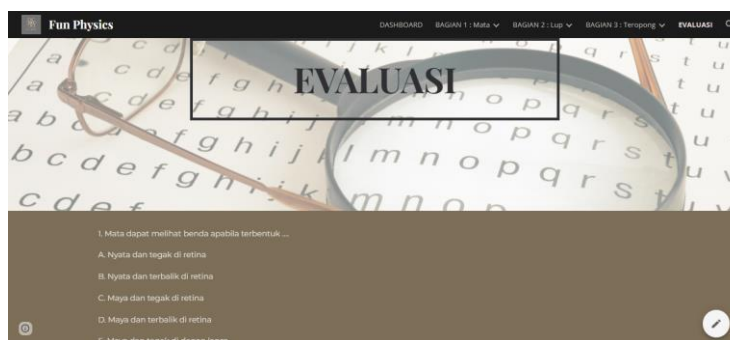


Figure 7. Evaluation

Developed media website is also equipped with a guidebook. The existence of a guidebook aims to make it easier for users to access the website. The guidebook that was created is in the form of a guidebook for accessing the fun physics website using a smartphone and a guide to using a laptop. Figure 8 shows the display of the manual.

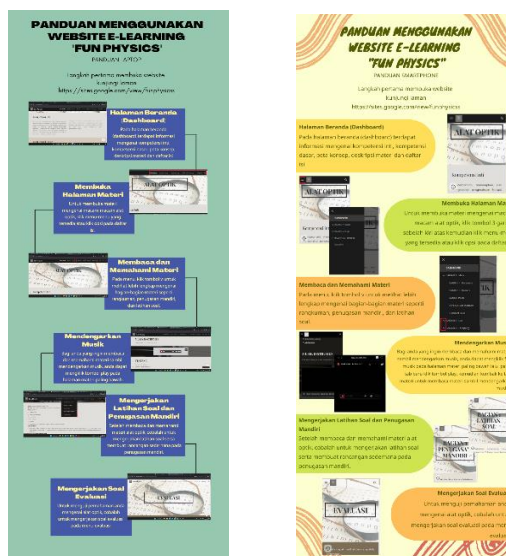


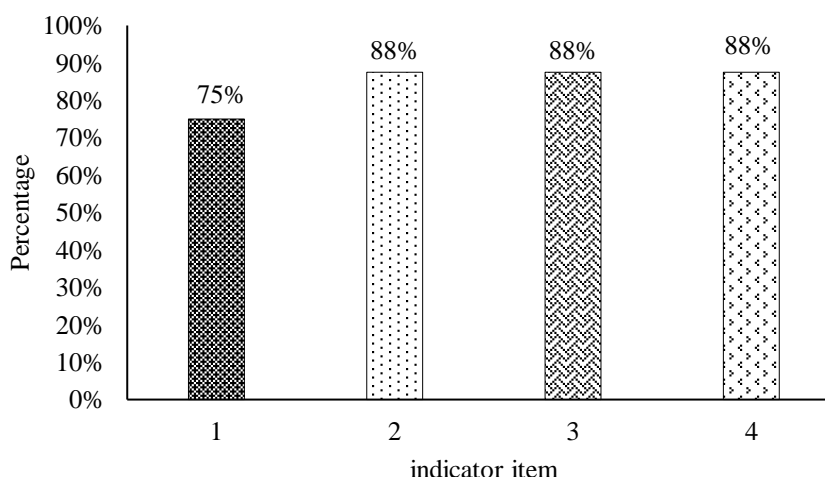
Figure 8. Guidebook



### Stage Development

At the development stage, the activities carried out are conducting a feasibility test or validation of the website media that has been developed. A validation test was carried out to test the feasibility of a website with classical music features as a learning medium. There are two expert validators who test the feasibility of website media which are developed using the instruments that have been compiled. The results of the analysis of the feasibility test for websites with musical instrument features (classical music) are shown in Figure 9, Figure 10, Figure 11, Figure 12 and Figure 13. Based on the results of the feasibility test analysis of websites with classical music features in the image, it can be concluded that all aspects of Website media is feasible and can be used as a learning medium. This is indicated by the percentage value which shows a value above 60%. Based on table 3, this percentage value is included in the feasible category.

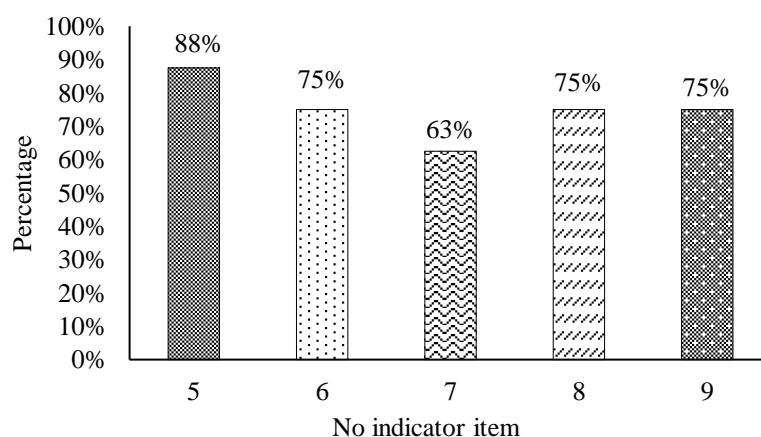
The results of the due diligence on each aspect are presented in graphical form. Figure 9 shows the scale of each statement item contained in the presentation aspect indicator.



**Figure 9.** Graph of Presentation Aspects Feasibility Test Results

In general, the results on the presentation aspect show that the Physics learning website media with musical instrument features as a result of the development is very feasible. These results are indicated by the average percentage obtained in the presentation aspect which is worth 84.75%. Respondents' answers to the due diligence questionnaire on the presentation aspect show that the presentation and design of the physics website learning media can be categorized as interesting and in accordance with the contents of the optical instrument material.

In statement number 1 contained in the presentation aspect has the lowest percentage value. However, the percentage value in statement number 1 is still included in the feasible category. Statement number 1 contains "The attractiveness of the typeface ( font ) used on the website media fun physics ". The lack of attractiveness of fonts on website media is because the fonts used on website media are not consistent. Furthermore, in Figure 10 shows the percentage value of each statement item on the content aspect.

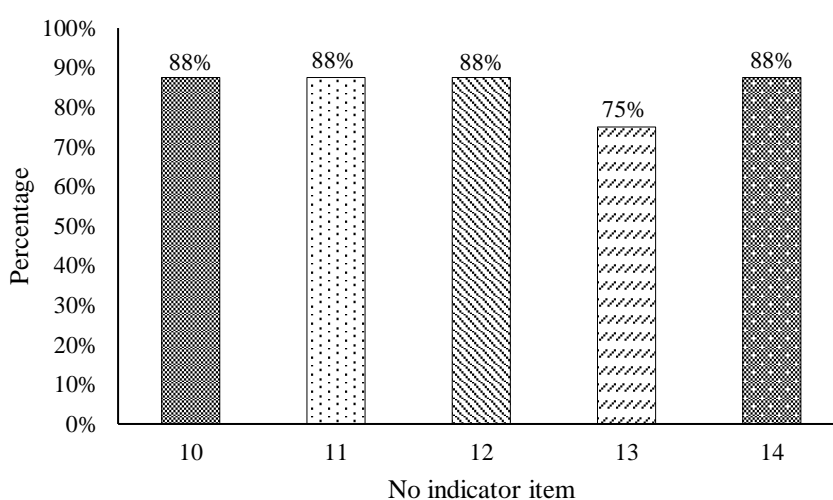


**Figure 10.** Graph of Content Aspect Feasibility Test Results

Figure 10 shows the feasibility of the content on the physics website learning media. Based on the results in Figure 10, all statement items contained in the content aspect are included in the appropriate category. This shows that the contents of the material, sample questions, independent assignments, practice questions and evaluation questions on the physics website are appropriate for use. The subject matter contained in the physics website is packaged in a complex manner and there are practice questions so that students can practice independently.

Statement item number 7 on the content aspect has the lowest percentage value. The contents of statement item number 7 are " Complete material about optical devices on the fun physics media website ". This is because on the Physics media website with musical instrument features on the subject of Optical Instruments there is still an incomplete explanation of the material. However, the percentage value obtained is still included in the feasible category.

Furthermore, Figure 11 shows a graph of the percentage value of each statement item on the media/website aspect.

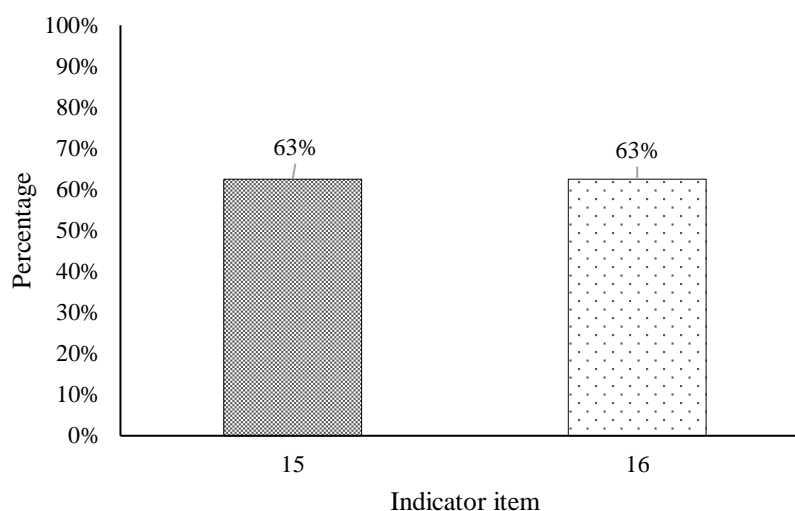


**Figure 11.** Graph of Due Diligence Test Results for Media/Website Aspects

From the results of the analysis in Figure 11, all statement items contained in the media/website aspect are included in the feasible category. This shows that the developed

website media is suitable for use as a physics learning medium. This is in line with the research conducted, (Arsi & Febrianti, 2014) it was found that the media website can be utilized in learning physics in class X high school on the subject of dynamic electricity. The website can be used as a learning resource by students independently, and provides access for students to share new knowledge.

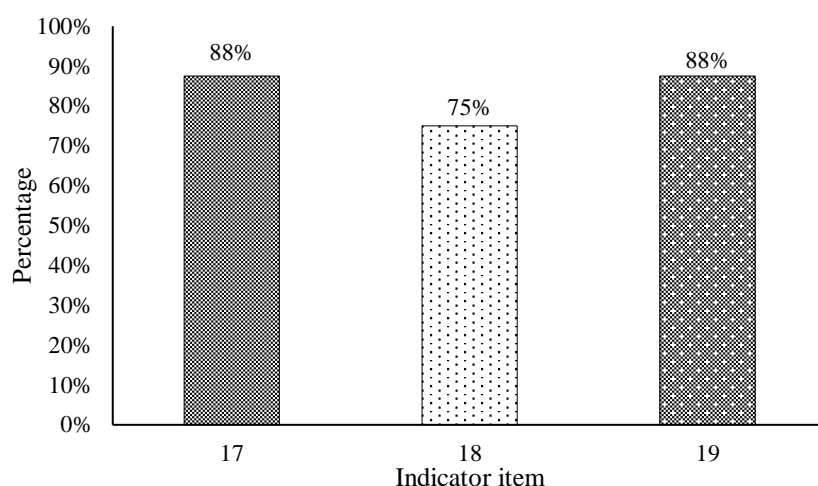
The indicator statement number 13 which is found in the media/ website aspect has the lowest percentage value. Statement number 13 contains "The content contained in the fun physics media website is informative". However, the percentage value in statement number 13 is still in the proper category. Furthermore, Figure 12 shows a graph of the percentage value of each statement item on the audio aspect.



**Figure 12.** Graph of Audio Aspect Feasibility Test Results

Figure 12 shows the feasibility of audio on the physics website learning media. Based on the results in Figure 12, all statement items contained in the audio aspect are included in the appropriate category. This shows that the features of musical instruments (classical music) found on the physics website are appropriate to use and can increase learning concentration. In line with the research conducted (Andita & Desyandri, 2019), classical music has a significant effect on increasing concentration endurance, with a t-count of 3.100 which is greater than the t-table of 2.145. Based on the literature review conducted (Andita & Desyandri, 2019) it can be stated that music can be used in relaxation to gain concentration in receiving learning.

Furthermore, Figure 13 shows a graph of the percentage value of each statement item on the language aspect. In the aspect of language there are 3 indicators. The results in Figure 13 show that the language used on the Physics media website with musical instrument features is feasible. This is shown in the average percentage value obtained in the language aspect which has a value of 83.7%. Respondents' answers to the due diligence questionnaire on the language aspect show that the language used on the physics website media can be categorized as appropriate and in accordance with the General Guidelines for Indonesian Spelling (PUEBI) and in accordance with the level of development of students. In the development of learning media must consider the level of development of students, the potential of students, developments in the world and relevance to the needs of students (Wulandari & Lepiyanto, 2016).



**Figure 13.** Graph of Language Aspect Feasibility Test Results

There are several suggestions and comments provided by the validator which can be taken into consideration to improve aspects of the developed website media so that it becomes even better. There are suggestions and comments on the audio aspect which includes musical instruments or classical music contained in the media website. The suggestion stated that a place to play instrument music should be provided with a link or a YouTube display that can be played directly. This is because the musical instruments cannot be accessed directly and you need to log in to your Gmail account first. Furthermore, the content aspect contains the suitability of the problem formulation, content and completeness of the material, sample questions and practice questions, and evaluation questions. There are comments on the content aspect which states that in the evaluation section it is better to use the Google Form link or other methods so that students can directly monitor the results of their work and can evaluate them. This was done because in the evaluation section there was no access to work on it. Another suggestion on the content aspect is that the material should be added with more interesting illustrations and the formulas contained in the website media are made clearer so that it makes it easier for students to remember the material. The existence of several suggestions and input provided by the validator provides other alternatives to be able to develop this website as a better learning medium.

The product obtained from the research is in the form of a physics media website "Fun Physics" featuring instrument music (classical music) on the subject of Optical Instruments and usage guidelines. The developed media website has the advantage of being able to take advantage of current technological developments. Currently, almost everyone has used a cell phone or smartphone that can access the internet at any time. Thus, students can easily access website media as learning media anytime and anywhere.

The results of the entire development research process carried out show that media with musical instrument features (classical music) on the subject of Optical Instruments is appropriate and capable of being developed further to facilitate students to be able to study independently and be able to improve their mastery of physics concepts so as to improve their learning outcomes. This is because the website can train students to find and relate concepts to subject matter independently so that learning activities run well (Kurniawan, 2017). In addition, this website media also displays interesting content that has been presented in a coherent

manner and is complemented by musical instruments that can support the learning process of students. The existence of musical instruments (classical music) can increase the concentration of students when studying the material contained in the media website. By increasing the concentration of learning can also improve student learning outcomes. In line with the results of research conducted (Mayasari, 2017) that increasing student learning concentration can optimize their ability to respond and interpret the lessons being studied so that it will affect student learning outcomes

## CONCLUSION

Based on the results of the research that has been done, physics learning media in the form of a physics website "Fun Physics" featuring musical instruments (classical music) on the subject of Optical Instruments is said to be suitable for use in learning to increase learning concentration and learning outcomes. The results of the product feasibility test from the presentation aspect, content aspect, media aspect, audio aspect and language aspect obtained the percentage of all indicators included in the very feasible category. Recommendations for further research are needed to develop a physics media website with musical instrument features (classical music) so that it can be used to increase learning concentration and student learning outcomes.

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