Digital Storytelling of Physics (DiS-Phy): Learning Physics from Home Through Stories

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Abstract. This study aims to develop a product such as "Digital storytelling of Physics (DiS-Phy)" that can be used as a physics’ educational media for distance learning (PJJ) on magnetic field material. DiS-Phy developed as a digital storytelling media which is able to combine several learning media such as writing, pictures and learning videos in one medium. The developed DiS-Phy also equipped with scientific literacy questions. DiS-Phy can be accessed on all types of distance learning devices such as smartphones, laptops and tablets that are connected to the internet. DiS-Phy including the type of research and development (Research & Development) which refers to the ASSURE model. The result of validation test shows the percentages of 91.07%, according to subject-matter expert, 93.16%, according to media expert and 87.50% according to learning expert. DiS-Phy also tested by 4 physics teachers at senior high school in Jakarta that achieved 92.57% points that make this product has been qualified as a worthy physics’ distance learning device. Also of 35 as respondents in this study shows the percentages of 87.48% points that make this product worthy to use as an educational media. Based on the results, it can be concluded that the DiS-Phy has been qualified as a worthy physics’ distance learning device for teachers and students.

1. Introduction
The emergence of the Covid-19 virus has an impact not only in the health sector, but on various sectors of life, one of which is education [1, 2]. In Indonesia, the emergence of this pandemic has changed the face-to-face learning process to distance learning [3, 4]. The role of learning media during the distance learning process is very important because through the use of learning media educators can connect with students so that the learning process can take place [5]. However, many educators have not been able to use technology properly to make variations in learning media [6]. As a result, the use of learning media during distance learning (PJJ) tends to be less varied and has an impact on the difficulty of students understanding the material and the emergence of boredom during the PJJ. Digital storytelling is an art of storytelling using digital technology [7]. The use of digital storytelling in learning can increase...
students' motivation during learning and students' interest in physics [8, 9]. Digital storytelling can unite various kinds of learning media such as writing, pictures and learning videos into one medium [10, 11]. To access digital storytelling, students only need an internet connection on their distance learning device [12].

By utilizing the internet, digital storytelling can be accessed anytime, anywhere by students easily [13]. Therefore, digital storytelling can be a practical and easy-to-use learning medium. Educators can also modify the questions that will be included in digital storytelling with a specific purpose, such as adding scientific literacy questions to familiarize students with scientific literacy. Based on this background, this research was conducted to develop digital storytelling of physics (DiS-Phy) which is equipped with scientific literacy questions on the magnetic field material. The purpose of this research is to produce a digital storytelling of physics (DiS-Phy) equipped with scientific literacy questions on magnetic field material that is suitable for use as a physics distance learning medium.

2. Method
This study used a research and development (R&D) methods with the ASSURE model. This research model was chosen because this research model contains steps to integrate technology development into learning [14]. The research steps based on the ASSURE model are:

1) Analyze learner. At this stage, a questionnaire is distributed to analyze students from aspects of general characteristics and initial competencies that students have.

2) State standards and objective. The learning objectives in DiS-Phy are formulated based on the 2020 emergency curriculum.

3) Select strategies, technology, media and materials. The learning strategy used is student centered-learning. The technology that will be integrated into the learning process is a multimodal technology. The learning material in DiS-Phy is a magnetic field.

4) Utilize technology, media and materials. At this stage, researchers used an application program from Microsoft 365, namely Microsoft sway as the main application for making DiS-Phy, while Photoshop and movie maker were chosen as supporting applications for making DiS-Phy.

5) Require learner participation. In the DiS-Phy, student participation is obtained by making quizzes and exercises using Microsoft forms that students can fill out as feedback during the learning process.

6) Evaluate and revise. At this stage DiS-Phy is evaluated to identify deficiencies and improvements that need to be made. The results of the DiS-Phy evaluation are used to produce DiS-Phy which is feasible as a learning medium that can be used in distance learning.

3. Result
The development of digital storytelling of physics named "DiS-Phy". DiS-Phy was created using the Microsoft sway application as a digital storytelling application provided by Microsoft 365. In DiS-Phy physics material is presented through writing, pictures and learning videos accompanied by facts about everyday phenomena that are explained in physics. At the end of learning using DiS-Phy there is an evaluation in the form of scientific literacy questions.
Figure 1. (a) DiS-Phy initial display and (b) Instructions for using DiS-Phy in DiS-Phy

The initial display of DiS-Phy contains the name of the product, namely "Digital Storytelling of Physics (DiS-Phy)" and there is the logo of the State University of Jakarta on the top right. On DiS-Phy there are instructions for use. This provides information to students on how to use DiS-Phy during learning.

Figure 2. (a) Title of material, KD and indicators in DiS-Phy (b) Concept Map (c) Learning activities for basic competencies (KD) and indicators contained in DiS-Phy are adjusted to the applicable curriculum.

There is a title of the material to be studied using DiS-Phy (Magnetic Field). The background of the material is the aurora phenomenon which symbolizes the magnetic field phenomenon in real life. The concept map serves to briefly show the material that will be studied by students. The Basic Competencies used are adapted to the emergency curriculum on magnetic fields. DiS-Phy also has a concept map for the material to be studied. The concept map serves to show briefly the material that students will learn. Learning activities show the sequence of material that students will learn in sequence. Learning materials in DiS-Phy are presented in various formats, such as writing, pictures, and learning videos.

Figure 3. (a) Learning material in text format in DiS-Phy (b) Learning material in text and picture formats in DiS-Phy (c) Learning material in video format in DiS-Phy.

The existence of variations in the delivery of learning materials aims so that students do not feel bored during learning using DiS-Phy. The magnetic field material in DiS-Phy is also equipped with explanations of real-life phenomena related to magnetic fields. The explanation is presented in the form...
of fun facts. To measure students' understanding of the learning material, questions are given for each sub-discussion of the material. The questions given are in the form of scientific literacy questions that are adapted to the material being studied.

![Fun facts](image1)

![Evaluation of learning materials](image2)

**Figure 4.** (a) Funfact in DiS-Phy relates to everyday phenomena (b) Evaluation of learning materials.

| No. | Aspect                          | Interpretation |
|-----|---------------------------------|----------------|
| 1   | Learning function and effectiveness | Very feasible |
| 2   | Advantage                       | Very feasible |
| 3   | Usability and interactivity      | Very feasible |
| 4   | Efficiency                      | Very feasible |
| 5   | Probability                     | Very feasible |

**Table 1.** Assessment of media expert.

| No. | Aspect                          | Interpretation |
|-----|---------------------------------|----------------|
| 1   | Suitability of material content  | Very feasible |
| 2   | Language                        | Very feasible |
| 3   | Presentation technique          | Very feasible |

**Table 2.** Assessment of material expert

| No. | Aspect                          | Interpretation |
|-----|---------------------------------|----------------|
| 1   | Use of media in learning        | Very feasible |
| 2   | Science literacy                | Very feasible |

**Table 3.** Assessment of learning expert

When compared with previous studies [9, 15] both have not been equipped with scientific literacy questions. Therefore, the researchers developed a digital storytelling of physics (DiS-Phy) on magnetic field material equipped with scientific literacy questions to be used as distance learning media. The development of digital storytelling of physics (DiS-Phy) should be helping students understood the physics material. The material contained in DiS-Phy is presented in various formats such as text, pictures, and learning videos. The final DiS-Phy results created using the Microsoft Sway application can be easily shared with students. To access DiS-Phy students only need to be connected to the internet, so students have the convenience to access it anywhere and anytime [16].
4. Conclusion
Based on the results of the feasibility test of materials, media and learning from experts, it can be concluded that the digital storytelling of physics (DiS-Phy) magnetic field material equipped with scientific literacy questions for distance learning that was developed is suitable for use as a distance learning medium.

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