Dissemination of GOOPI (Game Open Online Physics Instructional) to Sparking Innovation in Education

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Abstract. This study of dissemination of GOOPI (Game Open Online Physics Instructional) on page https://goopi.id/ (use UC browser) to sparking innovation in education. The method of the study is the Interactive Lecture Demonstration (ILD) approach, the ILD stages are carried out with three stages of activities, namely preparation, implementation, and evaluation. Dissemination with training for physics teachers who are members of the Physics Subject Teacher Meeting (PSTM) from a province in the west of Indonesia and Malaysian Teacher Association. The participants of this dissemination were 120 physics teachers for the first meeting and 86 teachers for a second meeting with GOOPI. The results of the study in the form of this dissemination were obtained information that physics teachers experienced in accessing and developing physics learning media. The results of the questionnaire responses to GOOPI with average 2.90 very good category of dissemination obtained information that GOOPI is effective for media for learning physics during the Covid-19 epidemic. The suggestion in this study is that dissemination training should be done frequently in order can provide skills or expertise that are not too complicated but are widely applied and needed by physics teachers.

1. Introduction

Higher education should make Independent Learning in the face of social change, the world of work and technological advances, in accordance with the needs of the industrial revolution era 4.0 [1] [2]; a link and match between researchers and the community or the world of work is necessary. University is required to innovate and develop innovative learning at the same age as DUDI demands. This demand is in line with the target of achieving the learning achievement of the Higher education merdeka campus curriculum [3] and problem-solving abilities [4]. Merdeka Belajar or Independent Learning (IL) is a tangible form of interesting learning challenges to create an innovative learning culture, and according to student needs [5].
Learning through the listening process without doing other things such as taking notes, it only contributes to the mastery of the material by 5%. If followed by reading, it contributes 10% mastery of concepts and when learning with audio-visual assistance, it will contribute to mastering the material by 30% [6]. The results of these studies indicate that if students can see the physical material visually, students will find it easier to understand and will avoid the construction of wrong conceptions. Evidence that not many games have been developed for learning Physics is obtained based on a survey conducted that at Bekasi district, the Information obtained that physics teachers who actively develop physics learning media are 27%, while physics teachers who are not actively developing learning media are 73%. So, it can be concluded that there are still many physics teachers in Physics Subject Teacher Meeting (PSTM) from a province in the west of Indonesia has not developed much physics learning media.

Based on information obtained from partners from the School of Education Studies, Universiti Sains Malaysia, that the School of Education Studies collaborates with the Malaysian Teacher Association for assistance. However, the science learning that has been trained has not yet combined learning science with online games. So that this becomes an opportunity to collaborate in community service in terms of improving teacher quality in the use of digital learning media.

Efforts that have been made in empowering PSTM have been carried out by the government through the relevant agencies, namely the District Education Office. Bekasi through relevant programs, but still the impact is not too significant in increasing the ability of physics teachers in developing learning media, especially learning media. The effort to empower PSTM teachers is not only the responsibility of the government alone, but also the responsibility of all components of the nation. UNJ as a tertiary institution that has the role of Tri Dharma, one of which is the task of Community Service, should have contributed to community empowerment programs in accordance with the scientific fields developed in each unit at UNJ. The Physics Education Study Program as a unit under UNJ must also strive to achieve the vision and mission of UNJ, especially those related to the third Dharma, namely Community Service by increasing studies on the application of research results in the field of Physics to help overcome various problems that occur in society. Physics education in meeting the demands of the 4.0 industrial revolution, one of which is the Development of Media, is very relevant to issues related to the development of learning media.

In the last two years, the expertise group of lecturers in the Department of Physics Education, Faculty of Mathematics and Natural Sciences, UNJ who are members of Physics Education Research (PER) has conducted a series of studies to study the working principles of GOOPI (Open Online Physics Instructional Game) as a medium for learning physics and can be accessed for free on the following page: https://goopi.id/ (with UC Browser) developed by researchers [8] [9]. In addition, GOOPI’s research results have also obtained Intellectual Property Rights (IPR) on the following page: https://s.id/IPR.GOOPPI. Several researchers have published the results of their investigations related to use, including: enabling students to apply their previous strategies and knowledge to solve problems through online games [10]; Online games can involve student activeness, motivation and learning outcomes [11] [12]; educational games increase student interest in continuous motivation [13]; training certain behaviors that might be a critical strategy [14]. In addition, online games for learning can solve problems [15] and Instructional Games for Challenges & Motivation [12].

The show that on the one hand physics teachers are low in the ability to develop media and the number of teachers who are not actively developing media is also high, and it is suspected that it causes many negative excesses, on the other hand learning around the area is still lecturing and using media. Because the conditions are in accordance with the objectives and targets of this ICCS activity, this area was chosen as the location for the ICCS activities to be carried out. Although the area is limited in PSTM Physics in the City of East Jakarta, it is hoped that it will be able to provide simulation and animation training for physics learning in other areas around it. The ICCS activity is entitled "International Collaborative Community Services (ICCS): “Dissemination of GOOPI (Open Online Physics Instructional Game) to Sparking Innovation in Education in Universitas Negeri Jakarta and Universiti Sains Malaysia”. 
2. Method
The audience in the Community Service Program for the ICCS Faculty Community Partnership Program is Physics teachers who are members of the Physics Subject Teacher Meeting (PSTM) from a province in the west of Indonesia. As for the number of teachers of participant is 120 for the first meeting and 86 teachers for a second meeting and implemented in 2 forms face to face and face to face of online meetings. For face-to-face plans are planned for 2 times and for virtual meetings it is done through zoom meetings and the result meeting at the YouTube at URL: http://www.youtube.com/watch?v=wUkaon9MZM4. The community service system owned by the physics education study program on the page: https://p2mfisika.smart-unj.id/. The method used to introduce work principles and important parts of GOOPI (Open Online Physics Instructional Game) Media Training is a combination of informative and using the Interactive Lecture Demonstration (ILD) method. The informative method is used to provide a brief explanation of the working principles of the Online Game and its main parts. The demonstration method is used to demonstrate modelling how virtual simulation can be applied to training [16]. Other things that can be done to solve partner problems in the GOOPI training, as well as improve the skills they already have through. Training on designing GOOPI for learning in other forms Mentoring as GOOPI for independent learning. The Figure 1. ICCS activity program implementation of GOOPI.

3. Result
The GOOPI media used in this study is the result of the development by researchers for approximately 2 years in the multimedia laboratory of the State University of Jakarta, Indonesia. Researchers who are members of Physics Education Research (PER) have conducted a series of studies to examine the working principles of GOOPI (Open Online Physics Instructional Game) as a physics learning medium and can be accessed for free on the following page: https://goopi.id/ (UC Browser) developed by researchers [8] and has been published [9]. The characteristics of GOOPI are shown in Figure 2.

![Diagram](https://example.com/diagram.png)
Figure 2 shows the start page of GOOPI, this page can be accessed on the https://goopi.id/ page to make it more optimal to use UC Browser. To be able to Sing In you can enter a user and password, the user and password are "physics" and the user is "123". The GOOPI user and password are intentionally given so that students and teachers can optimize it for learning, especially during the Covid-19 pandemic. After entering the user and password, click login to enter. On this home page there is also a sound button if you want to mute the sound. If students can answer, the finish button will appear, and they can continue to the Mission 3 menu. Mission 3 This GOOPI menu is the last menu, and this menu contains an online game on the topic of radiation. For more details, menu 1, menu 2 and menu 3 are shown in Figure 3.

Based on Figure 3. Information obtained that the GOOPI process in facilitating physics learning the concept of heat transfer. The advantage of GOOPI is that it can visualize microscopic physical material or phenomena. Characteristics of physics learning that is oriented to conception construction is physics learning in which there is a process of building a physics conception from the initial state of not understanding the concept to understanding the concept. Therefore, real steps are needed in the process that can construct knowledge and correct (reconstruct) concepts if they are not in accordance with the
The teacher's response to the implementation of this ICCS is as shown in Figure 4.

Based on Figure 4, information is obtained that the GOOPI Dissemination Program is carried out according to the needs of the Teacher in the Class, the results of the teacher's responses to GOOPI are obtained with an average result of 2.90, this is a very good category. GOOPI media is easy to use and emphasizes microscopic aspects (unobservable) the results of the teacher's responses to GOOPI are obtained with an average result of 2.86, this is a very good category. Meanwhile, the implementation of GOOPI Dissemination to support community learning in dealing with 21st century skills, one of which is Creative Thinking Skills, obtained teacher responses to GOOPI with an average result of 2.93, this is a very good category. Meanwhile, the GOOPI material presented facilitated me to study during the COVID-19 (Corona Virus) pandemic, the results of the teacher's response to GOOPI with an average result of 2.93, the category is very good. Another response, Benefit from implementing GOOPI Media, the results obtained from teachers' responses to GOOPI with an average result of 2.94, the category is very good.

The results of the study show that learning with media can reduce the quantity of students who have misconceptions on optical material; The results of the research [17] stated that learning physics using magnetic electricity media can change the concept of students who are not scientific to a scientific one; The results of the study [18] show that the use of light media and colour dispersion is effective in helping students construct their conceptions so that their understanding ability can be improved; The results of the study [7] show that the use of virtual simulation media on the concept of light waves can improve understanding of the concept of waves and the process of changing the conception. If in the past lecture learning was the prima donna, now it has shifted to learning using media. This is because the media has the potential to improve conceptual understanding and more effective learning experiences. Students can give virtual responses and will get feedback. Opportunities as a form of real devotion are quite encouraging if physics teachers have the skills to develop media for learning. If the media produced is effectively in use and easy to manufacture, it will be a special attraction for PSTM teachers. The physics PSTM teacher community will tend to use the media for learning as a demand as professional educators who have skills in the Development of Media. With the aim that teachers are confident in facing the 21st century skills so that they can get along in industry 4.0.
4. Conclusion
Having the skills to develop learning media is a teacher's demands and needs in teaching. The conclusion of this dissemination is the results of the questionnaire responses to GOOPI with the very good category of dissemination obtained information that GOOPI is effective for media for learning physics during the Covid-19 epidemic. The suggestion in this study is that dissemination of training should be done frequently in order can provide skills or expertise that are not too complicated but are widely applied and needed by physics teachers. GOOPI is a medium that can show microscopic or unobservable physical concepts. Of course, teachers must be carefully trained in this training so that the skills and knowledge are obtained completely. Suggestions in this ICCS activity were based on input and during the question-and-answer session, information was obtained that the teacher was still weak in developing learning media. So, the recommended suggestion is that this kind of activity should be carried out more often with training or dissemination so that teachers can improve their skills.

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