4 Pillars for Effective Physics Learning in The Times of Corona

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ABSTRACT
Changing the learning process from face-to-face to online learning during the outbreak of COVID-19 raises many problems such as ineffective learning, experiments that can't be done in the laboratory, and the 4 pillars of Education are ignored. The purpose of this research is to get information how 4 pillars as a solution for the existing problems. The results of this study are project-based learning can be used as a solution for ineffective learning, and Virtual Laboratory for experiments that cannot be done in the laboratory. Therefore during the covid-19 pandemic, the Four Pillars of Education can be applied by maximizing project-based learning and virtual laboratory using 3 learning spaces like Virtual synchronous learning, self-directed asynchronous learning, and Collaborative Asynchronous learning.

INTRODUCTION
In early 2020 WHO declared the global emergency related to the coronavirus outbreak (Covid-19) which had infected almost all countries in the world (Aji, 2020). As of March 19, 2020, 214,894 people were infected, 8,732 people died and 83,313 people were cured. Whereas Indonesia issued covid-19 emergency status starting from 29 February 2020 to 29 May 2020. Covid-19 Pandemic caused disruption of all life segments including Education. Therefore, many countries including Indonesia decided to close schools, colleges, and universities (Aji, 2020).

The Ministry of Education and Culture of Indonesia appealed for the learning process to be carried out from home. Since then, the learning system in Indonesia has changed drastically from face-to-face learning to online learning. This is done to break the chain of virus spread and maintain the security and safety of students and educators. Responding to the policy, all tertiary institutions in Indonesia, including Universitas Sulawesi Barat, have learned from home by utilizing internet technology and media.
Apart from online learning as a solution to Covid-19’s emergencies, online learning also creates new problems in the learning process. Students having difficulty to understand the subject matter delivered by educators so that learning becomes ineffective. Likewise, the students’ responses to the online learning evaluation conducted by FKIP Universitas Sulawesi Barat stated that the application of online learning was less effective. From a total of 524 students in FKIP UNSULBAR as respondents, 74.6% of students obtained complaints while attending online learning because there were too many assignments and demands from lecturers. Whereas the Ministry of Education and Culture through SE No.4 of 2020 has instructed that learning from home through online / distance learning is carried out to provide meaningful learning experiences for students, without being burdened with the demands of completing all curriculum achievements for grade improvement or graduation. However, in fact, the evaluation results show that there are complaints from students about online learning that is running because of the many demands from lecturers in the form of assignments.

Another challenge of online learning is experiments. As we know that experiments is an activity that involves interaction between students, assistants, and educators. This is certainly not possible to do as it should, given the government’s call to carry out physical distancing to prevent the spread of Covid-19. Therefore, since the appeal, the implementation of experiments activities is no longer carried out in the laboratory as usual.

During the outbreak of the COVID-19 pandemic, many educational problems arose, including the problem of the ineffectiveness of the learning process due to the implementation of online learning. According to the writer, this happened because of the neglect of the foundations of Education that had been conceived by UNESCO which we often refer to as the 4 pillars of Education. If these 4 pillars of Education can be applied well not only to overcome the problem of ineffective learning, but it can create students who can work, be independent, and socialize well with the community so that they can become students' provisions to live in the community.

The purpose of this study is to obtain information on how to implement the 4 pillars of Education in learning so that online learning can run effectively. In this study, the 4 pillars of Education serve as a solution for the ineffective online learning process.

METHODOLOGY
This research uses literature review methods. Literature review is a method in research used to collect information and data from various sources of information, whether in the form of books, news, and so on. In this study, using various sources of scientific articles selected as sources of data and information. The data obtained, then collected, compiled, reviewed, analyzed, and concluded to obtain recommendations regarding this research.

RESULT AND DISCUSSION
This research is divided into several that are used as a discussion, to focus more on the results of the research, the researchers divide into several things.

4 Pillars of UNESCO Education
4 pillars of Education are pillars that were coined by the United Nations Educational, Scientific and Cultural (UNESCO) to improve the quality of education of a nation. The 4 pillars of Education include learning to know, learning to do, learning to be, and learning to live together (Jayendra, 2017). Learn to know is a principle that states that learning is an activity to know and understand something new (Juliani & Widodo, 2019). Learn to do
emphasizes the importance of interacting with the environment and solving problems that arise. Learn to be is an effort made by educators so that students can find their true identity according to their abilities. Learn to live together can lead students to understand and realize that they are part of the environment or society so that they will grow a sense of tolerance and responsibility in carrying out their roles (Juliani & Widodo, 2019).

Whereas Based on the books of learning models in (Alfiawati et al., 2019) the pillars of Education by UNESCO consist of 4 types, namely: (1) the concept of learning to know, which implies that educators must be able to act as information, organizers, motivators, initiators, transmitters, facilitators, mediators, and evaluators for their students, therefore students need to be motivated to arise the need for information, life skills, and certain attitudes that they want to master, (2) the concept of learning to do, which implies that students are trained to be aware and able to do something productive actions or actions in the cognitive, affective, and psychomotor domains. Related to this, the learning process needs to be designed appropriately so that the involvement of the participants in the education, both physical, mental, and emotional can be accommodated to achieve the expected goals, (3) the concept of learning needs to be lived out by all Education practitioners to train students to be able to have high self-confidence. Trust is the main capital for students to live in society. Development and fulfillment of whole human beings that continue to evolve, starting with self-understanding, then understanding and relating to others, (4) the concept of learning to live together is a real response to the flow of individualism and sectarianism that is increasingly prevalent today. This phenomenon is closely related to the attitude of egoism that leads to chauvinism in students so that it fades the sense of togetherness and the price of respect.

The Importance of the 4 Pillars of UNESCO Education

Learning based on the 4 pillars of Education has the aim to shape sustainable education. The learning process that is applied with the 4 pillars of Education is innovative, where each pillar can develop the abilities of educators and students. According to (Harjali, 2011) the pillar of learning to live is a very important pillar. The application of this pillar can condition students to have the ability to be tolerant of others, respect others, respect others, and have responsibilities towards themselves and others. Whereas the Educational Pillar of learning to know is an attempt to gain knowledge to be able to distinguish between good and bad things. Then the knowledge gained is then applied to solve existing problems so that the ability to solve these problems will lead students to find identity and develop their potential. Thus, the 4 pillars of Education designed by UNESCO can be interpreted as the concept of Education that optimizes the ability of students to carry out their role in the environment or society (Juliani & Widodo, 2019).

There are several studies on the 4 pillars of Education in learning. One of them is a study conducted by (Prasetyono & Trisnawati, 2018), wherein the study it was found that there was a significant influence between students who use science learning based on the 4 pillars of Education with students who use conventional learning. In addition, Science Learning based on 4 pillars of Education is also effective in improving students' critical thinking skills.

Online Learning in the Pandemic Period

Covid-19 pandemic has an impact on multidimensional life, one of which is in the field of Education. Amid the outbreak of the Covid-19 pandemic, the government restricted activities involving large groups of people such as going to school, worship and learning to prevent the spread of Covid-19. As a result of the emergence of COVID-19 pandemic
teaching and learning activities that previously were face-to-face are now learning at home through online learning. Online learning is carried out by utilizing digital technology such as Google classroom, video conference, live chat, zoom, home learning, and others (Dewi, 2020).

However, in the application of online learning, there are several obstacles such as limited internet quota and unfamiliar students and educators in applying various platforms that can be used in online learning (Abidin et al., 2020). Besides, limited internet access, especially in rural areas also becomes an obstacle to online learning (Maulana & Hamidi, 2020). Compounded by the number of assignments given to students, online lectures/learning are less effective (Widiyono, 2020).

Another problem caused by changing conventional learning methods into online learning methods is the difficulty of teachers in transferring the subject matter to students and the learning situations that are not conducive. While students also experience difficulties in understanding subject matter and quota problems as well as inadequate internet networks that require the use of messenger applications in the learning process (Napsawati, 2020). There are also problems related to lecturers who are reluctant to change their mindset to accept something new, so that it is difficult or unfamiliar with technology-based facilities and infrastructure (Mulawarman, 2020).

Based on some of the problems above, project-based online learning can be one of the solutions for effective learning, especially amid a COVID-19 pandemic. According to (Abidin et al., 2020) the project-based learning approach provides many opportunities to access teaching material by learning citizens so that it can facilitate students to learn concepts in depth. Project-based learning can be done by directing students to create or develop products that are applicable and related to daily life. The project-based learning model can also improve student life skills, namely personal skills, social skills, academic skills, and vocational skills (Sucilestari & Arizona, 2018). The research conducted (Chasanah et al., 2016) found that learning with the project-based learning model was more effective than conventional learning models in improving learning outcomes in the form of creative thinking abilities and students' science process skills.

Ineffective Physics Experiments

The outbreak of COVID-19 affected all matters relating to learning, including experiments activities. As we know that practicum activities in the laboratory involve many people, because students will be divided into groups and together with members of the group guided by an assistant. Therefore, experiments activities that have been carried out in the laboratory can no longer be carried out due to the implementation of work from home to break the chain of distribution of Covid-19. Experiments also should not be eliminated because this activity can arouse students' scientific learning motivation, develop basic skills in conducting experiments, become a vehicle for learning scientific approaches, and of course, practicum can support understanding of subject matter.

Based on the above problems, the Virtual Laboratory can be used as an alternative to continuing experiment. According to (Hermansyah et al., 2015) the use of virtual laboratories can improve students' mastery of concepts and creative thinking abilities. Virtual laboratories can also make it easier for students to do experiments wherever and whenever so that it is suitable for use in the COVID-19 pandemic period. Also the use of virtual laboratory for student, make learning outcomes better (Muzana & Hasanah, 2018).
Online Learning Based on 4 Pillars of Education

Basically, the four pillars of UNESCO Education have been applied in four learning models (problem-based learning, inquiry-based learning, project-based learning, and discovery learning). But its application in the learning process is still often overlooked. Many educators also think that the best learning process is face to face. Even though nowadays several other learning spaces are optimized and have a good impact on learning. The learning spaces in question is the modern learning spaces.

Modern learning spaces are generally divided into 2, namely synchronous learning and asynchronous learning. Synchronous learning is a learning space where students and educators occur at the same time. Meanwhile, asynchronous learning is a learning space where students and educators do not coincide both in terms of time and space. Then, synchronous learning divided into two namely learning space 1 (live-synchronous learning) is learning between students and educators happening at the same time and the same room. This learning is usually called face to face learning. Learning space 2 (Virtual synchronous learning) is learning between students and educators happening at the same time but different spaces from one another. Then the asynchronous learning space is divided into 2, namely learning space 3 (self-directed asynchronous learning) is independent learning anytime according to the learning conditions and the speed of learning respectively. Learning space 4 (Collaborative Asynchronous learning) which means learning anytime anywhere with other people.

During the COVID-19 pandemic period, the face-to-face learning process was transferred to the online learning process for an unspecified time. Based on the explanation above it is known that learning space 1 (face to face) is not the only learning space that can be used in the learning process. But there are still 3 other learning spaces that educators can and should optimize. Therefore, related to COVID-19, what must be maximized by educators so that online learning can run effectively is learning spaces 2, 3, and 4. Maximizing the use of these 3 learning spaces and implementation of the 4 pillars of Education have in the learning process. The learning process that starts through space 3 will stimulate students' curiosity when given a learning video (learning to know), then in space 4 students will collaborate with other students to discuss learning materials that have been given in the previous stage (learning to live together), and finally in space 2 students will be evaluated in terms of what they have learned in the previous stage so that in this learning space students will be trained to be more confident (learning to be), and after the whole learning process is complete this means we have train students to do (learning to do).

CONCLUSION

Based on this research, online project-based learning can be one of the solutions for effective learning, especially during COVID-19 pandemic. Then for experiments that can’t be carried out in the laboratory due to the implementation of work from home, we can use an alternative virtual laboratory so that students can still do the practicum anytime and anywhere. As for the problems of the four pillars of Education whose application in the learning process is still often overlooked, it can be overcome by optimizing and maximizing 3 other learning spaces besides face-to-face like virtual synchronous learning, self-directed asynchronous learning, and collaborative asynchronous learning, so that online learning can run effectively even during the Covid-19 pandemic.
REFERENCES


Muslimin et al: 4 Pillars for Effective Physics Learning ...


