The Development of the Hybrid Learning Method with the Open Broadcaster Software (OBS) Application

A Need Analysis Review

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Abstract. Along with the progress of the 21st century which is marked by the era of the Industrial Revolution 4.0 as a century of openness and globalization, there have been many fundamental changes. In the world of education, technology is crucial in facilitating the learning process to keep up with the advancements of the fourth Industrial Revolution. This study aims to promote the understanding and need for hybrid learning using the Open Broadcaster Studio (OBS) recorder and streaming application. This research was conducted with a research and development (R&D) approach. Preliminary studies conducted on 19 respondents consisting of 12 primary teachers at PKBM Homeschooling RSI Indonesia and seven teachers at SMPIT Harapan Mulia Palembang. The results of the study show that the need for hybrid learning is necessary in overcoming problems in learning during a pandemic with limited face-to-face learning. Teachers need methods that can support hybrid learning and can present solutions if students experience obstacles during learning. The results of this research also show that recording and streaming media can help provide solutions to the aforementioned problems. So, it is concluded that it is necessary to develop a learning approach that can complement educators in the optimal application of hybrid learning practices. This research is expected to provide an overview and instruction for educators to continue to develop hybrid learning optimally and to additionally become a resource for further hybrid learning development research.

Keywords: Hybrid Learning · OBS manual book · Open Broadcaster Software

1 Introduction

The 21st century is marked by the era of the Industrial Revolution 4.0 as a century of openness and globalization, meaning that in the 21st century, there have been fundamental changes that are certainly different from the systems of the previous century. The development of technology has been experiencing rapid progress in all fields, including the world of education. Education utilizes assistance from technological tools, especially computer devices, software for games, education, photography, et al. as well as hardware including computers, tablets, notebooks and smartphones; in order to facilitate the learning process and keep up with the advancements of the fourth Industrial Revolution.

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The delivery of instructional material from educators to students can be more effective and efficient if reinforced with media. Developments in technology affect how the teacher conveys information through the use of media with the hopes of attracting more students to the learning process. Additionally, the teaching and learning processes can run smoothly while learning objectives are achieved. Media is everything that can be used to channel messages, stimulate the thoughts, feelings, attention, and will of students so as to encourage the creation of a learning process in students [1]. In general, the uses of media include: (1) clarifying the message so as not to be too verbalistic; (2) overcome the limitations of time, energy, and sensory power; (3) arouse a passion for learning; (4) allow learners to learn independently according to their visual, auditory and kinesthetic talents and abilities; (5) give the same stimuli, likens experiences and gives rise to the same perceptions [2]. In connection with the complex use of media, the researchers want to develop the hybrid learning method using recording and streaming media with the help of Open Broadcast Software (OBS) so that subsequent learning can be more enjoyable. By developing recording and streaming media assisted by Open Broadcast Software (OBS), it is hoped that this research will aid educators in delivering more interesting and innovative learning materials to students so that they will be more motivated to learn.

Some of the obstacles related to conventional learning include the delivery of material messages by educators to students who have not been effective and efficient due to their media limitations. In fact, media can be used to channel messages, stimulate thoughts, feelings, attention, and the will of students so as to encourage the learning process. The inclusion of media allows: (1) clarity of a message so that it is not too verbalistic; (2) overcoming limitations of time, energy, and sensory power; (3) arousal of a passion for learning; (4) independent learning according to students' visual, auditory and kinesthetic talents and abilities; (5) giving the same stimuli, equating experiences and giving rise to the same perceptions is not optimal in its implementation. In fact, the development of technology affects how media is used in conveying messages or information by the teacher in order to attract more students towards learning. The teaching and learning processes can run smoothly while learning objectives can be achieved. In connection with the complex use of media, the researcher wants to develop recording and streaming media with the help of Open Broadcast Software (OBS) so that subsequent learning can be more enjoyable.

The purpose of this study is to discover the teachers' classroom needs and their understanding of Hybrid Learning through Video Recording and Streaming with the Open Broadcaster Software (OBS) application. This research is development research which is defined as a systematic study of the process of designing, developing, evaluating learning programs and products, as well as meeting the criteria for internal consistency and effectiveness of the use of these programs or products [3]. In addition, it is explained that (1) development research is a study of the specific process and influence of the impact of learning design and development; (2) development research is the use and implementation of products resulting from the design, development and evaluation of learning activities and (3) development research is a complete or partial study of the process of designing, developing and evaluating learning [4]. In addition, development research is also called design research. In line with this terminology Plomp and Nieveene

explains design research as a systematic study of the process of designing, developing and evaluating "interventions" (programs, teaching and learning strategies and their devices, products and systems) as a solution to complex problems in practical education, and it also has the aim of increasing knowledge about the characteristics of "interventions" and the design and development process [5].

1.1 Hybrid Learning

Along with the development of trends and the need for information and communication technology in the world of education 4.0 today, there have been many innovations and discoveries in the form of multimedia devices as well as ideas and methods in an effort to optimize technological devices. One of these devices used in education is the Hybrid learning approach. According to [6], hybrid learning is a learner model that integrates innovations and technological advances that combine various forms of learning such as live, online, and face-to-face (conventional). Furthermore, Hendrayati explained that Hybrid learning is a model that combines innovation and technological advances in online learning with the interaction and participation of conventional or face-to-face learning models [7]. This model combines classroom and online learning by utilizing available technology. In line with this opinion, Hybrid learning is learning that is applied face-to-face and through online learning. Hybrid learning is defined as a learning method that combines two or more approaches in learning to achieve the objectives of the learning process [8].

Based on these four views, it can be concluded that hybrid learning is a learning model that integrates innovation and technological progress through an online learning system with the interaction and participation of conventional learning models that combine innovation and technological advances in online learning with the interaction and participation of conventional or face-to-face learning models.

During a pandemic, education using hybrid learning methods can provide flexibility and gives learning material access to educators and lecturers. Some materials can also be delivered in a hybrid form in order to achieve a balance between face-to-face and online learning. One of the conditions to implementing hybrid learning by an educational institution or school is that they need to have a strong online learning management system where the subjects can be given entirely online. Students with good technological skills have demonstrated that they can successfully take online classes, because this gives them flexibility in time and location, especially during a pandemic.

1.2 Streaming Video and Recorder

Kustandi stated that video is a tool that can present information, expose processes, explain complex concepts, teach the skills of shortening or slowing down time and lastly, influence attitudes [9]. Meanwhile, Sadiman stated that video is an audiovisual media that displays images and sounds [10]. The message presented can be in the form of facts (events, important events, news) or fictitious (for example stories), can be informative, educational or instructional. With the existence of learning activities through video media, video can foster students' interest and motivation to always pay attention to the lesson.

Screen Recorder is a digital recording software from a computer or mobile screen display that is often accompanied by audio narration. A screen recorder is commonly used to document activities on the screen. The result of the screen recorder itself is in the form of an mp4 video and can usually be played in various video player applications. The video size of the screen recorder also varies, depending on the length of the original recording duration. The longer the original recording is, the larger the size of the resulting video. The recordings can be used in many ways, one of which is used as material for streaming.

On the internet, streaming is a technological method that compresses or shrinks the size of audio and video files so that they are easily transferred over the internet network [11]. The transfer of audio and video files is carried out continuously. From a process point of view, streaming means a technology of sending files from the server to the client over a packet-based network. Streaming is a method of creating audio, video, and other multimedia that is available real-time on different types of networks. The data in the streaming file is divided into several small packets that are sent to a stream continuously to the end-user device or mobile phone. Streaming media is multimedia that can be received and presented to users when sent by the provider. With streaming media, users don't have to download files to play them. Because media is sent in a continuous stream of data, it can be played directly. Video streaming utilizes a streaming server to transmit digital video through a data network so that video playback can be done immediately without having to wait for the download process to finish or save it first on the PC client side.

In addition, video streaming is a multimedia service that allows a server to broadcast a video that can be accessed by its clients. Video streaming services allow users to access their videos pre-recorded or in real-time. The content of this video can be sent in three ways, 1). Live Video: The server is equipped with a video camera that allows the viewer to watch an event directly. 2). Scheduled Video: A pre-recorded video is sent from a server at a predetermined time. 3). Video-On-Demand: A service that allows users to access pre-recorded video content from a server anytime they want to view it.It can be concluded that streaming is a method for making audio, video, and other multimedia available for real-time on different networks. It is used to divide the original video into several packets that are then sent sequentially. It allows the receiver to decode and play back video based on the packet without having to wait for the entire video to be sent into a service. It allows a server to broadcast a video and allows users to access their videos in real-time or pre-recorded viewing.

1.3 Open Broadcaster Studio (OBS)

OBS stands for Open Broadcaster Software, a software used to record videos or broadcast live or live which is then connected to a website (Ramadhan et al., 2022). The features offered by this software are using H264 (x264) and AAC encoders, the output file is in the form of MP4 or FLV. GPU-based screen capture feature (Video Card) is used to improve game stream performance. Support DirectShow capture (webcam, Capture Card, etc.). Supports High Speed Monitor on Windows 8.

Open Broadcaster Software (OBS) as shown in Fig. 1 is a recorder and support application for live streaming. OBS is a free and open source software whose main function

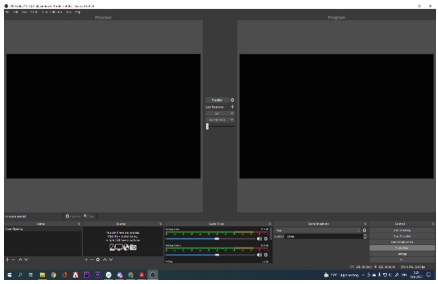

Fig. 1. Recording and Streaming Software

is to manage the various input sources available [12]. Open Broadcaster Software is a free and open-source cross-platform streaming and recording program built with Qt and maintained by the OBS Project. As of 2016, the software is now referred to as OBS Studio. OBS Studio is available for Microsoft Windows, macOS, and Linux distributions. OBS is funded by the Open Collective.

Additionally, OBS Studio is a free and open-source software suite for recording and live streaming. Written in C, C++ and Qt, OBS provides real-time sources and device capture, scene composition, coding, recording, and broadcasting capabilities. Data transmission is mainly done through the Real Time Messaging Protocol (RTMP) and can be sent to any RTMP supporting destination, including many presets for streaming websites such as YouTube, Twitch, Instagram, and Facebook.

For video encoding, OBS Studio can use the free software library x264, Intel Quick Sync Video, Nvidia NVENC and AMD Video Coding Engine to encode video streams into AVC H.264/MPEG-4 and H.265/HEVC formats. Some audio tracks can be encoded using aac codec. Advanced users can choose to use any codecs and containers available in libavcodec/libav format as well as output streams to custom ffmpeg URLs.

The OBS application is organized into five parts: scene, source, audio mixer, transitions, and controls. Scenes are groups of sources such as live video and recording, text and audio. The mixer panel allows users to mute the audio, and adjust the volume through the virtual fader, and apply effects by pressing the gear next to the mute button. The control panel has the option to start/stop streaming or recording, a button to change OBS to a more professional Studio Mode, a button to open the settings menu and a button to exit the program. The top has a live video preview, used to monitor and edit the current scene. The user interface can be switched to a variety of themes, including dark and light themes, depending on the user perferences.From some of the above opinions, it can be stated that that Open Broadcaster Software (OBS) is a free and open-source software whose main function is to manage various available input sources and free and open-source cross-platform streaming and recording programs built with Qt and managed by the Project of a series of open and free source software for real-time recording and live streaming and device retrieval, scene composition, coding, recording and broadcasting.

2 Methods

This study uses a research and development approach. The research and development of the ADDIE model used in this study has procedures that are arranged with sequences of activities at each stage of systematic development. There are five stages, namely (1) Analysis, (2) Design, (3) Development, (4) Implementation and ending with stage (5) Evaluation. The research product that will be developed in this study is the Hybrid Learning method through a video recorder and streaming device using Open Broadcaster Software (OBS).

The analysis stage is carried out to discover the teachers' classroom needs and their understanding of Hybrid Learning through Video Recording and Streaming with the Open Broadcaster Software (OBS) application. In the development of learning methods, the feasibility (validity and practicality) of the method will be developed, which will be validated by media experts and material experts. Meanwhile, the potential effects of using this method will be evaluated through the assessment of pre-test and post-test learning outcomes at the time of field tests to see an increase in learning outcomes.

There were 19 respondents who contributed to this study, consisting of 12 primary teachers at PKBM Homeschooling RSI Indonesia and seven teachers at SMPIT Harapan Mulia Palembang.Data collection is carried out by the questionnaire method. The data collected includes (1). Educators' Perceptions of the Need for Innovative Learning Models, (2). Learning Models Used During the Pandemic (3). Platforms Used During the Pandemic, (4) Educators' Knowledge of Open Broadcaster Software (OBS) Applications and (5). Features are expected to be present in applications used in hybrid learning. Data analysis was carried out using descriptive statistics and analysis techniques to reveal the results of the data.

3 Result and Discussion

A needs analysis was carried out by distributing a needs analysis questionnaire to 19 respondents consisting of 12 educators at PKBM Homeschooling RSI INDONESIA, and seven educators at SMPIT Harapan Mulia Palembang. The results of the needs analysis are as follows; (Fig. 2).

From the two needs analysis, it is concluded that 79% of educators from need innovative learning, 12 dan 5 Meanwhile, as many as 21% of educators still comfortable with conventional learning. So, we can deduce from the two schools that educators need an innovative learning model. (Fig. 3).

From the two analyses of the need for learning models used during the pandemic, it was found that 58.3% of educators carried out learning through virtual meetings, 33.95% of educators only created and sent assignments through online media such as WhatApp messages, 4.15% teachers made Flipped Classroom videos and 3.55% used text messages (Fig. 4). This means that the at the two schools, educators predominantly used virtual meetings in learning, but are supported by assignment assistance through online media and others.

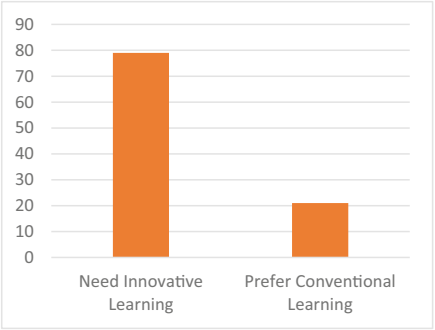

Fig. 2. Perceptions of RSI School Educators about the Need for Learning Models

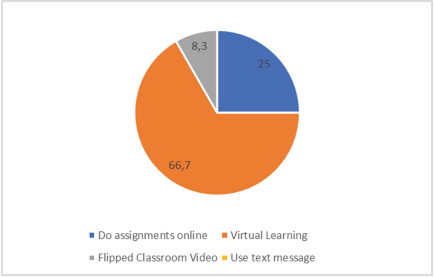

Fig. 3. Learning Models Used During the Pandemic at RSI School

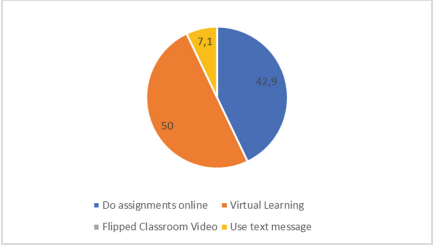

Fig. 4. Learning Models Used During the Pandemic at SMPIT Harapan Mulia

3.1 Platforms Used During the Pandemic

The results of a survey on platforms that were often used for learning during the pandemic exhibited the results that Zoom meetings were the most widely used application with an average use, between the two schools, of 67.3% of educators using this application in learning. At RSI schools, as many as 93.7% used the Zoom meeting application while the remaining 6.3% used assignments as a substitute for learning. For SMPIT Harapan Mulia, as many as 42.9% of educators each used the Zoom and Google Classroom applications while as many as 14.2% of educators used the WhatsApp Application. So,

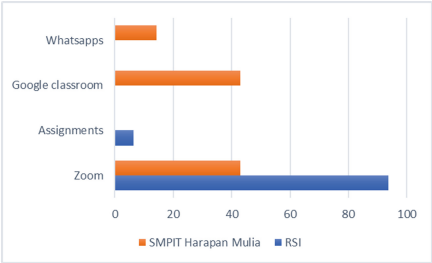

Fig. 5. Platforms Used During the Pandemic

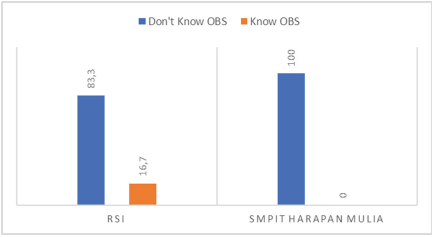

Fig. 6. Educators' Knowledge about Open Broadcaster Software (OBS) Applications

it can be stated that educators prefer the use of Zoom Meetings, and use Google Class rooms as a learning platform (Fig. 5).

The results of the above analysis can be seen in Fig. 6.

The following is the result of a survey on the extent of the knowledge of educators regarding the Open Broadcaster Software (OBS) application.

From the results of the survey presented in Fig. 6, it is shown that at RSI schools, as many as 83.3% of educators do not know about the Open Broadcaster Software (OBS) application; only about 16.7 know the existence of this application. As for SMPIT Harapan Mulia, none of the respondents knew this application (100% did not know the OBS application). From this data, as many as 91.65% of educators from all respondents do not know about the Open Broadcaster Software Application and only 7.35% of educators are interested in the Open Application Broadcaster Software.

3.2 Features that Educators Expect in OBS-Based Hybrid Learning Methods

Every application should have complete features. Applications should not only be interesting, but also help the learning process to be more effective. The features that are expected to be present in the OBS-based Hybrid learning method are presented in the following figure:

Figure 7 shows the highest answer to the question of what elements educators expect to be in the learning media developed. The needs analysis process that was carried out also found that there were several components/elements, that according to educators, were described in digital-based learning media, namely: (a). Video, (b). Image, (c). Audio and (d). Repetition (recording) feature. Based on the results of this analysis, it can be

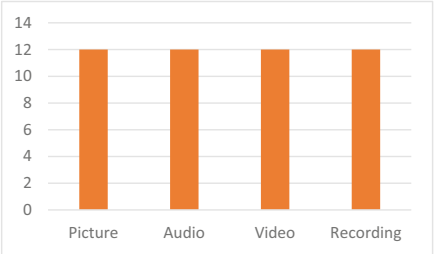

Fig. 7. Elements Expected to Be Found in Learning Media According to The Perception of Educators

stated that during the pandemic, hybrid learning has been carried out online using various digital-based platforms such as Zoom meetings and Google Classroom. In general, the results of the study show that online learning using a virtual meeting platform combined with assignment assignments and the use of social media is the main choice for educators in conducting learning. If you refer to the opinion of Thorne (2003) which explains hybrid learning as a learning model that integrates innovation and technological progress through an online learning system with interaction and participation from traditional learning models, then teachers have used the right media.

Hybrid learning is a model that combines innovation and technological advances in online learning with the interaction and participation of conventional or face-to-face learning models [7]. Learning models that can accommodate the interaction between teachers and students in a learning environment are the expectations of teachers so that the results of the study show that educators really need an innovative learning model. Overall, from the results of the questionnaire, it can also be seen that the knowledge of educators about applications that can display media in the form of images, audio, video, and recorders to support the hybrid learning process is still very limited. For this reason, it is necessary to develop media so that hybrid learning is more optimal. Based on the results of the preliminary study, a hybrid learning method that integrates the use of digital-based media is needed. One of the efforts that can be made through the use of OBS studio media.

Various elements in multimedia in the form of images, audio and video will provide many advantages including more innovative and interactive learning and create a sense of pleasure during learning. It can increase students' learning motivation. In addition, the nature of the media that combines text, images, audio, music, animation, images or videos packaged in a medium will help achieve learning objectives. This is in accordance with the research of Hapsari, et al., (2022) which states that there is a significant increase in achievement before and after using media, especially in android-based learning [13]. Furthermore, Trianggono, et al., (2022) stated the results of research that learning by utilizing multimedia based on science video projects can effectively stimulate students' creative thinking skills with an n-gain score of 0.62 with moderate improvement criteria [14].

Based on this explanation, it is important to develop hybrid learning with the help of Open Broadcast Software (OBS) with the hope that learning can be more fun and

motivate students in the learning process. In addition, this method is one of the innovative methods that present solutions if students have difficulties during online learning.

4 Conclusion

The results of the research at the needs analysis stage show that in the implementation of hybrid learning thus far, there are obstacles that need a solution. Learning limitations have been an important reason for the development of innovative learning resources. Multimedia methods can support hybrid learning and can present solutions if students experience obstacles during learning. The results have shown that recording and streaming media can help provide solutions. Thus, it is necessary to develop a learning approach that can complement educators in the optimal application of hybrid learning. This research is expected to provide an overview and instruction for educators to continue to develop hybrid learning optimally and to additionally become a resource for further hybrid learning development research.

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