Jurnal Administrare: Jurnal Pemikiran Ilmiah dan Pendidikan Administrasi Perkantoran
Vol. 8, Issue 2, July-December 2021, Pages 449-454
Homepage: http://ojs.unm.ac.id/index.php/administrare/index

Online Virtual Classroom Management using WebRTC Based Flipped Model

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ABSTRACT

Online learning has had a tremendous impact on the field of education but has the effect of lowering the quality of academic integrity compared to face-to-face learning. The purpose of this study is to produce an online learning system that uses the flipped model in an online virtual classroom with the application of WebRTC technology so that the constraints on the quality of academic integrity in these learning activities can be overcome. The research method used was an experiment with a One-Group Pretest-Posttest Design. The sampling technique used is cluster sampling. The results showed that the use of the flipped learning model in an online virtual classroom based on WebRTC was categorized as better in improving the quality of students' academic integrity when compared to the use of the Flipped learning model without WebRTC. This research can be used as a reference in managing online learning systems using the Flipped model based on WebRTC because previous research focused on the Flipped learning model in WebRTC-based online virtual classrooms that can improve the quality of student learning integrity.

Keywords: Academic integrity, Flipped, online virtual classroom, WebRTC;

INTRODUCTION

Virtual education, a type of distance education that takes place over the internet (Kessler, 2018; Hasanah et al., 2020), has grown in recent years and become more central to learning activities at Universities or Schools around the world during the Covid-19 pandemic. The Internet can provide Study Programs with a method to quickly update and revise course content (Guy et al., 2010). At the same time, the implementation of the EFL virtual class can be recommended is useful (Al-Qahtani, 2019). One strategy to increase the learning independence of physics students is through learning media based on Virtual Class assisted by Google Drive (Sohibun & Ade, 2017). Live recorded virtual classes are also a very flexible medium that allows learners to use recorded live virtual classes at times that are convenient for them (Guy et al., 2010).

A virtual classroom is an online learning environment where students and instructors interact in real-time and remotely handle all typical classroom activities (Johnston et al., 2005). Students feel that the schedule used in providing material or assignments is less scheduled so that students expect that there is a scheduled and structured assignment (Yodha et al., 2019). The use of online media influences student satisfaction and learning motivation does not have much effect on student satisfaction (Judge & Mulyapradana, 2020). The online learning system implemented during the COVID-19 pandemic was effective and inefficient. Effectively implemented due to conditions that require online study and inefficient because the costs incurred are more when compared to offline lectures (Sun & Chen, 2016). Online learning will be effective if it applies

essential components that include discursive, adaptive, interactive, and reflective aspects (Oktavian & Aldya, 2020).

Today's most advanced virtual classrooms allow instructors to practice or teach in real-time from an Internet browser. However the three most critical issues of concern are the digital division and the lack of social skills among students in virtual learning environments (Yilmaz, 2015), effective online instruction depends on 1) well-designed course content, motivating interaction between instructor and learners, well prepared and fully supported instructors; 2) the creation of a sense of online learning community; and 3) rapid technological advances (Sun & Chen, 2016). From another perspective, online learning in the form of virtual classes has an impact on decreasing the academic integrity of student learning. Integrity is the quality of the nature, or condition that shows a unified whole so that it has the potential and ability that radiates authority and honesty. In the Oxford dictionary, Integrity is defined as the quality of a person in keeping himself honest and having strong moral principles. Thus, academic integrity shows the level of students' abilities from their actual learning outcomes. A person can be said to be a person of integrity when the level of self-conflict is low or has a good self-concept and low anxiety (Baharuddin, 2020).

The focus of this research is the virtual classroom mechanism to implement the pedagogy successfully, improve students' academic integrity, through the application of WebRTC technology. The mechanism is to produce an asynchronous learning system with WebRTC technology that uses a flipped model so that the constraints on the WebRTC application can be overcome. Flipped Classroom is a lecturer strategy to minimize direct instruction and maximize interaction between students and lecturers. This strategy uses technology that can support online materials (Hasanudin et al., 2019).

WebRTC uses a JavaScript-based API to make peer-to-peer connections (Yilmaz, 2015). WebRTC is an open-source web-based application patented by Google. WebRTC is standardized by the Internet Engineering Task Force (IETF) and Request for Command (RFC) organizations. WebRTC can communicate in the form of voice, video, and data. Web RTC can run on browsers such as Firefox version 22+, Google chrome version 26+ for computers, and 29+ for android devices. WebRTC also runs on Linux, Windows, Mac OS, Android Operating Systems (OS), no special plug-ins and software are required (Loreto & Romano, 2014).

Flipped in an online virtual classroom based on WebRTC develops features in the form of video conferencing, video sharing, screen sharing (both media in the form of presentations and screen boards), file sharing, and chatting.

METHOD

The experimental method used in this study was the One-Group Pretest-Posttest Design. This research was conducted at the D3 Informatics Engineering Study Program at the Indramayu State Polytechnic in the Computer Network course. The participants were 27 students in the first semester. The sampling technique used is cluster sampling. This study consisted of the independent variable (variable X) and the dependent variable (variable Y). The independent variable in this study is the flipped learning model in an online virtual classroom based on WebRTC (X), while the dependent variable in this study is the ability of computer network engineering, the topic of discussion is Variable Length Subnet Mask IP Address (Y).

Data were collected through online virtual classroom observations and tests. In this class observation, the researcher observes and records everything that happens in the form of field notes. To obtain data about the results of computer network engineering capabilities, the topic of Variable Length Subnet Mask IP Address discussion is to use a test. The test is carried out in an online virtual classroom based on WebRTC. The data obtained were analyzed using descriptive analysis techniques and inferential statistical analysis. Descriptive analysis technique to provide an overview of the relationship between the two variables and inferential statistical analysis is for testing, whether the proposed hypothesis is accepted or rejected. Before testing the hypothesis, statistical tests were carried out to test for normality and homogeneity. Normality test was carried out by Kolgomorov Smirnov test with sig > 0.05. Homogeneity test using ANOVA test. If the value of sig <0.05 then the alternative hypothesis is accepted and if the value of sig> 0.05 then the alternative hypothesis is rejected (Sugiyono, 2016).

RESULT AND DISCUSSION

In this study, an overview of the flipped learning model in the WebRTC-based online virtual classroom will be presented to answer the research question, can the Flipped learning model in a WebRTC-based online virtual classroom improve the quality of student learning integrity? Academic integrity is the moral principles that are applied in the academic environment, especially those related to truth, justice, and honesty of students.

Online learning is an electronic-based learning process where the media used is one of them with computer network technology. In online learning, the term synchronous learning is known, namely learning-oriented interaction and facilitated by direct (real-time) and usually scheduled instructions. Web real-time communication (WebRTC) is one of the many technologies that can be used to implement synchronous learning. This WebRTC application is quite popular because it makes it easy for users to exchange data in the form of video, images, sound, and text. WebRTC works on a client-to-client basis without any additional plugins in the browser.

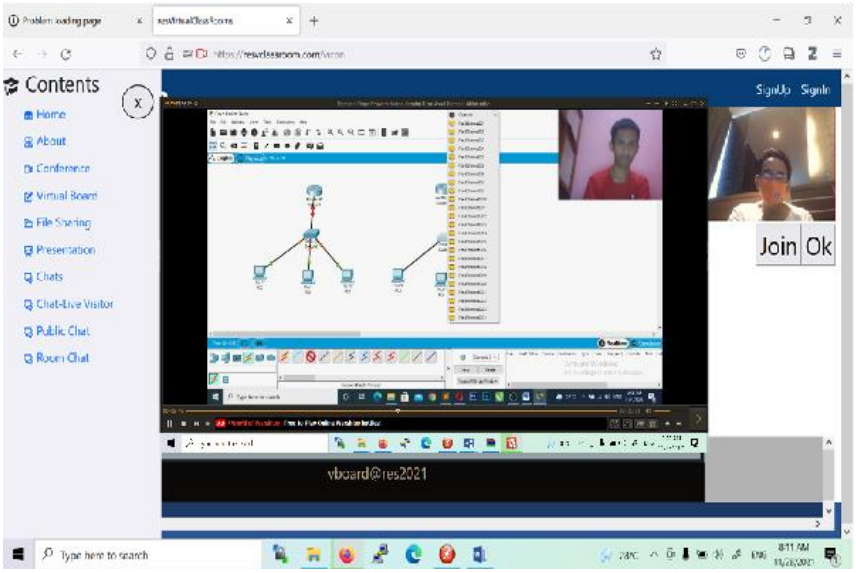

Figure. 1

However, in its application, WebRTC technology often has limitations on the number of clients at one time, especially when the client runs the video conferencing feature. This is because each client that is connected in one communication will use up resources in the form of bandwidth, random access memory (RAM), and the central processing unit (CPU) which are quite high in line with the increase in the number of connected clients.

DISCUSSION

Based on the observations of the WebRTC-based online virtual classroom using the flipped model in Computer Networking lectures. The implementation of the instruction steps in the online meeting was carried out on the first day; 2) inform about the model; 3) teaching students how to study in study groups and learning outcomes in the form of videos; 4) ask students to ask questions related to the material; 5) encourage students to help each other; 6) establish an appropriate scoring system.

Collecting data through observation sheets with predetermined indicators covering 4 observed aspects, the lowest value is 0 and the highest value is that these aspects include perspective (spiritual), autonomy (mental), social relevance, and tone (physical), which results in behavior honesty (honesty), trust (trust), fairness (fairness), respect (appreciate), and responsibility (responsibility).

Based on the results of observations, the average value (mean) is 3.910 and the median value (median) is 4.00 and the value that occurs most often (mode) is 4.00. By comparing the theoretical mean of 2 with the average value of 3.910, it can be seen that the average value is greater than the theoretical mean.

The data for the initial test (Pretest) of students were 27 people, the lowest score was 36.10 and the highest score was 77.70. The mean (mean) is 51.6037 and the median (median) is 50,0000 and the most frequently occurring value (mode) is 55.50. In the post-test results, the lowest score was 69.4 and the highest value was 91.6. On the results of the final test (posttest) the students' ability scores an average (mean) 81.6519 and a median value (median) of 83.3 and the most frequently occurring value (mode) 83.3.

The normality test is used to determine whether the sample taken is normally distributed or not on the pretest and posttest questions. The results of the normality test of the data before using the WebRTC-based flipped online virtual classroom learning model is 0.091 > 0.05, so it can be concluded that the data is normally distributed. Furthermore, the ability of students after using the flipped online virtual classroom based on WebRTC, which is 0.200 > 0.05, means that the data is normally distributed. The results of the calculation that the value of sig = 0.516, means that the value of sig> 0.05, it is concluded that the data is homogeneous.

Furthermore, the homogeneity test aims to determine whether the sample taken from the population has the same conditions when treated before using the WebRTC-based flipped online virtual classroom and after using the WebRTC-based flipped online learning model.

Hypothesis testing using t-test. The statistical hypothesis that will be tested in testing this hypothesis is as follows: Ho = Ineffectiveness of the WebRTC-based flipped online virtual classroom learning model on the academic integrity of student learning outcomes. Alternative hypothesis Ha= The effectiveness of the flipped learning model in the WebRTC-based online virtual classroom on improving the academic integrity of student learning outcomes. In testing

the hypothesis, it is proven that Ho is rejected, which means that the flipped learning model in the WebRTC-based online virtual classroom towards improving the academic integrity of student learning outcomes is effective.

CONCLUSION

WebRTC has helped make online virtual classrooms more effective and increase learning motivation in terms of problem-solving, finding solutions to problems encountered in the scope of lecture materials. The application of the WebRTC-based flipped online virtual classroom provides innovation in the mechanism of the learning and learning process in the Computer Network Engineering course. The role of the lecturer in the learning process is as a facilitator who has several positive impacts on students, namely: 1) students are motivated to learn learning materials in the form of videos made by their peers; 2) students can enjoy their free time; 3) students are happy with the learning and learning process and can respond to questions quickly; 4) students respect each other's opinion; and 5) students have more comprehensive knowledge about lecture materials. The learning style of students in taking Networking Computer Engineering lectures shows that the quality of academic integrity in learning outcomes is better than the Flipped learning model in the online virtual classroom without using WebRTC.

In connection with the development of management of WebRTC learning features that are more complete to better support online virtual reality classrooms in improving academic integrity in learning processes and outcomes. For further research, if you want to use the religiosity variable to predict the academic integrity of students, it is better to take a mixed sample, so that you can see the comparison. The application of the values of academic integrity and running according to the mechanism of the applied learning model so that there are no deviations in obtaining student learning outcomes.

REFERENCES

Al-Qahtani, H. (2019). Teachers' and Students' Perceptions of Virtual Classes and the effectiveness of Virtual Classes in Enhancing Communication Skills. *Arab World English Journal*, *1*, 223–240.

Baharuddin, A. (2020). Overview of Public Services at the One-Stop Investment and Integrated Service Office of South Sulawesi. *Jurnal Ad'ministrare*, *6*(2), 131–136.

Guy, P., Brugess, T., Eason, M., & Jones, Y. (2010). The Advantages and Disadvantages of the virtual classroom and the Role of the Teacher. *Southwest Division Science Institute Conference*, 1–15.

Hakim, M., & Mulyapradana, A. (2020). Pengaruh Penggunaan Media Daring dan Motivasi Belajar Terhadap Kepuasan Mahasiswa Pada Saat Pandemik Covid-19. *Widya Cipta: Jurnal Sekretari Dan Manajemen*, *4*(2), 154–160.

Hasanah, A., Sri Lestari, A., Rahman, A. Y., & Danil, Y. I. (2020). Analisis Aktivitas Belajar Daring Mahasiswa Pada Pandemi COVID-19. *Karya Tulis Ilmiah (KTI) Masa Work From Home (WFH) Covid-19 UIN Sunan Gunung Djati Bandung Tahun 2020*, 4–8.

Hasanudin, C., Fitrianingsih, A., & Saddhono, K. (2019). How is the Student's Negotiation Text

in Collaborative Learning of Flipped Classroom and a Cyberlink Power Director Media Apps. *Ingenierie Des Systemes d'Information*, *24*(6).

Johnston, J., Killion, J., & Oomen, J. (2005). Student Satisfaction in the Virtual Classroom. *The Internet Journal of Allied Health Sciences and Practice*.

Kessler, G. (2018). Introduction to Teaching and Technology. In *The TESOL Encyclopedia of English Language Teaching*.

Loreto, S., & Romano, S. Pietro. (2014). *Real-Time Communication with WebRTC* (Inc., 1005). O'Reilly Media.

Oktavian, R., & Aldya, R. F. (2020). Efektivitas Pembelajaran Daring Terintegrasi di Era Pendidikan 4.0. *Didaktis: Jurnal Pendidikan Dan Ilmu Pengetahuan*, *20*(2), 129–135.

Sohibun, S., & Ade, F. Y. (2017). Pengembangan Media Pembelajaran Berbasis Virtual Class Berbantuan Google Drive. *Tadris: Jurnal Keguruan Dan Ilmu Tarbiyah*, *2*(2), 121–129.

Sugiyono. (2016). Metode Penelitian dan Pengembangan (Research and Development/R&D). In *Bandung: Alfabeta*. https://doi.org/10.1016/j.drudis.2010.11.005

Sun, A., & Chen, X. (2016). Online education and its effective practice: A Research Review. *Journal of Information Technology Education: Research*, *15*, 157–190.

Yilmaz, O. (2015). The Effects of "Live Virtual Classroom" on Students' Achievement and Students' Opinions about "Live Virtual Classroom" at Distance Education. *Turkish Online Journal of Educational Technology*, *14*(1), 108–115.

Yodha, S. A., Abidin, Z., & Adi, E. P. (2019). Persepsi Mahasiswa Terhadap Pelaksanaan E-Learning Dalam Mata Kuliah Manajemen Sistem Informasi Mahasiswa Jurusan Teknologi Pendidikan Universitas Negeri Malang. *Jurnal Kajian Teknologi Pendidikan*, *2*(3), 181–187.