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IJIE (Indonesian Journal of Informatics Education) is is a scientific journal promoting the study of, and interest in, informatics education. The journal publishes empirical papers on information systems, informatics, the use of technology learning, and distance learning. It is an international journal published by the Informatics Education Department, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Indonesia bi-annually on June and December.

AUTHOR GUIDELINES

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The manuscript is written on white paper of A4 (210x297 mm2) size, in a single column, single spaced, 12-point (12 pt) Times New Roman font. The margin text is 3 cm from the top, 2 cm from the bottom, and 1.8 cm from the left and right. Smaller lettering size can be applied in presenting table and figure (9 pt). Word processing program or additional software can be used; however, it must be PC compatible and Microsoft Word-based (.doc or .rtf; or .docx). The metric measurement uses IS denomination; usage another system should follow equivalent with IS first mentioning. Abbreviations set off, like g, mg, mL, etc. do not follow by a dot. Minus index (m-2, L-1, h-1) suggested being used, except in things like "per-plant" or "per-plot". Equation of mathematics does not always can be written down in one column with text, in that case, can be written separately. Number one to ten is expressed with words, except if it relates to measurement, while values above them written in number, except in early sentence. The fraction should be expressed in decimal. In the text, it should be used "%" rather than "percent". Avoid expressing ideas with a complicated sentence and colloquial words, and keep concise and clear sentence. With the following systematic:

(1) **Title of the article** should be written in a compact, clear, and informative sentence, preferably not more than 20 words. Name of author(s) should be completely written, especially for the first and the last name. Name and institution address should also be completely written. We choose local names in Bahasa Indonesia for universities in Indonesia. The mention of "graduate program", "undergraduate program", "post-graduate program", "master program", "doctoral program" should be avoided in the name of institution. Manuscript written by a group, author for correspondence along with address is required. The title page (first page) should include the title of the article, full name(s), institution(s) and address(es) of the author(s); the corresponding author mentions the detail email addresses.

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(3) **Keywords** is about five words, covering scientific and local name (if any), research theme, and special methods which used; and sorted from A to Z.

(4) **Abbreviations** (if any): All important abbreviations must be defined at their first mention there. Ensure consistency of abbreviations

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(5) **The introduction** is about 400-600 words, covering the aims of the research and provide an adequate background derived from the gap analysis of the literature, avoiding a detailed literature survey or a summary of the results. It is the opportunity to justify state of the art for the research.

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examples are for guidance.

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- Article by DOI:
  Jerrentrup, A., Mueller, T., Glowalla, U., Herder, M., Henrichs, N., Neubauer, A., & Schaefer, J. R. (2018). Teaching medicine with the help of "Dr. House." PLoS ONE, 13(3), Article e0193972. https://doi.org/10.1371/journal.pone.0193972
- Book:
  Rai MK, Carpinella C. 2006. Naturally Occurring Bioactive Compounds. Elsevier, Amsterdam.
- Book Chapter:
  Webb CO, Cannon CH, Davies SJ. 2008. Ecological organization, biogeography, and the phylogenetic structure of rainforest tree communities. In: Carson W, Schnitzer S (eds). Tropical Forest Community Ecology. Wiley-Blackwell, New York.
- Abstract:
  Assaeed AM. 2007. Seed production and dispersal of Rhazya stricta. The 50th Annual Symposium of the International Association for Vegetation Science, Swansea, UK, 23-27 July 2007.
- Proceeding:
  Duckworth, A. L., Quirk, A., Gallop, R., Hoyle, R. H., Kelly, D. R., & Matthews, M. D. (2019). Cognitive and noncognitive predictors of success. Proceedings of the National Academy of Sciences, USA, 116(47), 23499–23504. https://doi.org/10.1073/pnas.1910510116
- Thesis, Dissertation:
  Sugiyarto. 2004. Soil Macro-invertebrates Diversity and Inter-cropping Plants Productivity in Agroforestry System based on Sengon. [Dissertation]. Brawijaya University, Malang. [Indonesian]
- Online document:
  Balagadde FK, Song H, Ozaki J, Collins CH, Barnet M, Arnold FH, Quake SR, You L. 2008. A synthetic Escherichia coli predator-prey ecosystem. Mol Syst Biol 4: 187. DOI: 10.1038/msb.2008.24

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Research Paper ISSN: 2549-0389

The Effectiveness and effect of Project-Based Blended Learning on Student Achievement in Online Learning

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Abstract:

Educational technology has a role in the education era 4.0, one of which is by utilizing technology-based learning in learning activities in the form of learning applications based on project tasks, namely the project-based blended learning method. This article aims to get the influence of the project-based blended learning use on the achievement of students. This study was quantitative research using a pretest-posttest control design. The sample of the research were 72 students. The data were collected by cluster random sampling divided into groups or classes. The hypothesis tests were the Independent Sample t-Test and the gain normalization test based on significant grade 0, 05. The result showed that there was significant differences and improvement on students'achievement when using the project-based blended learning from the use of conventional methods in pandemic Covid-19. The result was proven by the hypothesis tests using the T-test that the post-test was 0,000 (0,000<0,05), so there was found the differences in students' outcomes between experimental class from control class. The gain normalization showed that the experimental class got 0,49 and the control class got 0,16. It can be concluded that there is an improvement in students'achievement in the experimental and control classes, therefore the use of the project-based blended learning contributes more influence to the achievement of students

Keywords: Project Based Learning; Blended Learning; Achievement of students.

Introduction

The highly development of informatics technology and internet has important aspect in education (Alsalhi, Eltahir, & Al-Qatawneh, 2019). The use of technology can increase the students' achievement in term of understanding new knowledge or cognitive performance and skill for the future (Wahyudi & Winanto, 2018).The optimilization of technology in education has influenced the students for being more active to have more skills like critical thinking and problem solving (Swart, 2017).

The existence of technology is very important in this education 4.0 era, as the use of technology like e-learning, edmodo, and other learning application, self study platform can be found as well based on the situation. Educational technology is a platform that has goal for enabling learning process and improving the work management by planning, developing, producing, using, and managing human source and technology properly (Surani, 2019).

In this pandemic Covid-19, the government changes the management of teaching and learning processes into online learning or technology-based learning. Covid-19 (*Corona Virus Disease*) has decreased all aspects especially education in all countries. The conventional learning by face to face in the classroom was moved to online learning by using digital technology. In the new normal era, the usage of technology-based learning can give effective and innovative service (Krishnamurthy, 2020). Online platforms are chosen for actualizing the learning process at the high school level to college. These platforms provide many functions in live or streaming learning or creating small groups for discussion. Here, *blended learning* is one of the integrations of technology and learning platforms that can interpret the small discussion groups, deliver the interactive materials and show the short quiz (Lockdown, Hall & Border, 2020).

Based on the observation and interview on graphic design subject consisting of the essential materials and basic competence, vector using *Corel Draw* application is more difficult than the others. The data showed that the result of competence test on unit "Vector" by 35 students was low where only 28 % of students pass the exam and 72 % get the score below 78 or minimal criteria (KKM), it is found that classes with the different material cant get the maximal scores as it is not appropriate with their skills.

For those cases, a conventional learning strategy should be combined with technology-based learning for adapting the era. By the integration of the modern learning model that uses technology can produce a positive effect on students' achievement as students can understand the subjects well. Volchenkova in Alsalhi et al (2019) stated that *blended learning* is the teaching-learning process by using the internet that uses many applications by combining direct learning in the classroom and online learning. Dziuban et al in Alsalhi et al (2019) defined that *blended learning* is a program that utilizes more than one method for communicating information to maximize the learning outcome and interaction between students and teachers (Alsalhi et al., 2019).

The use of *blended learning* is usually correlated with the use of *a learning management system* (LMS). Here, *Schoology* is chosen as the one of LMS which is suitable for graphic design subject on vector material. Schoology is a website that integrates E-Learning with social media (Mahfoud, Moummi & Moummi, 2015). Schoology brings a positive impact on attitudes (Cepik, Gonen, & Sazak, 2016), helps the students to exercise autonomy in EAP class (Ardi, 2017) and enhance the college students' proficiency in Bussiness Writing (Sicat, 2015). There are many features inside. First, *Courses* is modified for uploading materials, *job sheet*, and *assignment* were consist of *Gravit Designer* for online design application that can be used by the student to have practice in design. Second, *Group* is modified for discussion or class meetings where students and teachers can interact with each other. The last, *Resource* is applicated for sharing and having learning sources between students and teachers or teachers and teachers (Dwianto, Wilujeng, Prasetyo, & Suryadarma, 2017).

The reason why choose this case is Schoology correlates with the subject basic graphic design, where vector material needs Corel Draw application for practice. It is matched with the Schoology features that students can have a self-practice online design with Gravit Designer. Based on the score of test on vector material, the students' result is low, only 28 % can pass the test and get KKM score, 78.

Many researchers identified that *blended learning* is a new learning strategy that combines traditional learning and e-learning for improving the motivation and achievement of students (Alsalhi et al., 2019). Here, the teachers can apply the integration of *blended learning* with *project-based learning,* called *project-based blended learning.* Kemendikbud Rosiyanah & Wijayati (2019) defined that *project-based learning* is

a learning model suggested in curriculum 2013 for developing student's skill in producing the qualified product.

In this 4.0 industry era, education is concerned for creating professional graduation that mastering skills and competences. Therefore, the teaching-learning process should be innovative for providing work, one of them by utilizing technology-based learning which applies learning applications based on the projects (Nurbekova et al., 2020).

Project-based learning can stimulate innovative thought by designing a creative course that supports students' creativity, critical thinking, and learning competences. The use of the appropriate learning strategy by applying technology can increase the skill of students for their future, so that can be produced competences to solve problems and think innovatively (Wu & Wu, 2020).

Here is the evidence of the relevant researches about *project-based blended learning*. First, Taufiq, Wijayanti, & Yanitama, (2020) explained that the use of *project-based blended learning* for analyzing critical thinking competencies for candidates of science teachers in astronomy subjects integrated with Moodle LMS can improve the students' critical thinking after completing the project. Then, Nurbekova et al, (2020) showed that utilizing *project-based blended learning* has a big influence on IT students in developing mobile apps like project-based technology, programming, teamwork, and the use of digital for learning content. Through this method, students can create some phone apps so that they have high skill and motivation. Next, Plank & Neimann, (2020) informed that the users of *project-based blended learning* can help students in 6 universities in German for actualizing online teaching in terms of study UE about aboard. The students can work in a group for finishing the project, having discussions, and presentation. This method represents innovative character on the subject, creates an active learning process and produce flexible learning.

The effect of the Covid-19 pandemic, many schools and universities apply distancing learning, so that the actualization of online research use the Virtual Sincronous method. The virtual synchronous method is a type of distancing learning which is focused on online modus where students share and meet together virtually through an audiocassette, videocassette, meeting chat, voice note in social media, e-mail or print out (Anwar, 2018).

Research methods

The research used the true experimental quantitative research because the sample was got randomly divided into two groups, the experimental class, and the control class. Quantitative research has a surplus of objectivity. The research design used pretest-posttest control design, in this study, subjects were divided into two groups: the experimental class and control class. The treatment given to the experimental group is the use of *project-based blended learning* while the control group used virtual synchronous learning. The population in this study were 107 students. The sampling technique in the study used cluster random sampling because of the very large number of populations then it was randomly divided into classes or groups. With the existence of a very large total population, the sample was taken from two classes of 72 students, each of which was a group of 36 students, and the remaining 35 students as a class for the test instrument test (trial). In this study, the data collection technique was through the test, namely the pretest and posttest by giving 30 questions in the form of multiple-choice questions in the experimental class and control class each. Through this test, students can see the results of the initial and final abilities.

Results and Discussion

Before distributing the test in the control and experimental classes, the test instrument was tried in the try-out class consisting of 35 students who have studied the basic graphic design material. The result of try out was found 51 questions, 25 questions for *pretest*, and 26 questions for *posttest*. To balance the pretest and posttest, there were 10 questions chosen. The reliability test was from score 0,881 for *pretest* and 0.843 for *the posttest* so that it can be concluded the high-reliability score.

Below was the result of the average score of pretest-posttest:

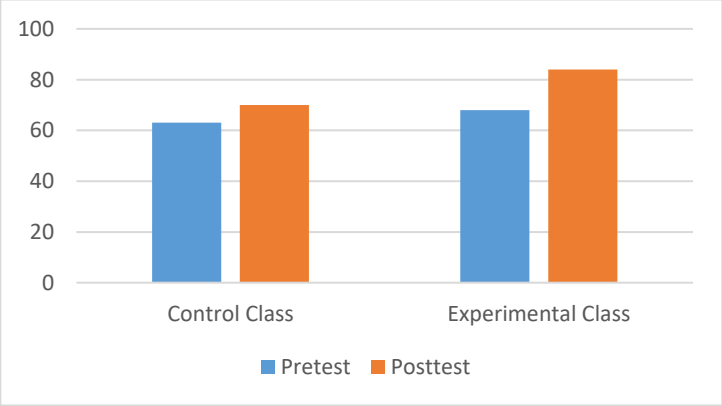
Table 1. Result of the First Hypothesis Analysis

Variable	Sig. (2-tailed)
Cognitive performances	0,000

Table 2. Result of Average Score of Pretest Posttest

	Learning Outcome
Control *Pretest*	63,00
Control *Posttest*	70,00
Eksperimental *Pretest*	68,00
Eksperimental *Posttest*	84,00

Figure 1. Histogram of Students Achievement



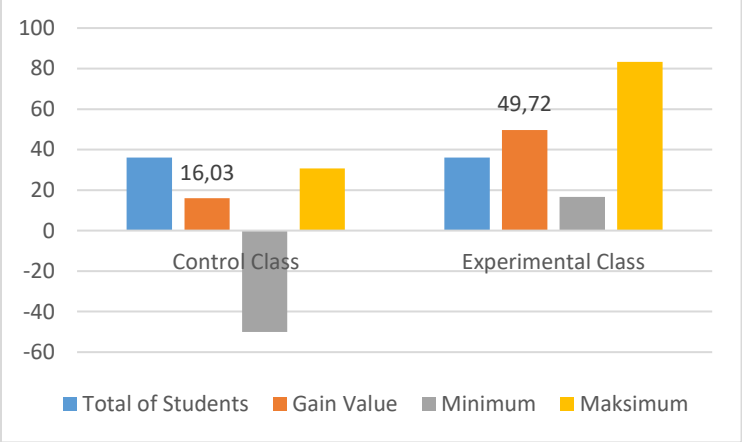
Based on Table 1 the result of the hypothesis test using independent sample t-test in significance 2-tailed was 0,000. It is less than the significance standard (0,000<0,05). It showed that there were differences in students' outcomes in the experimental class and control class significantly so that h0 declined and h1 received. Therefore, there were differences in students' outcomes by using project-based blended learning from the virtual synchronous method.

Based on Table 2 the result of the average score for the Control pretest was 63 and Control posttest was 70, it increases by 7%. While the average score for the Experimental pretest was 68 and the Experimental posttest was 84, it increases 16%. In conclusion, there was found the difference of learning outcome between control class and experimental class so that h0 declined and h1 received.

Table 3. Result of the Second Hypothesis Analysis

Variables	Control Class	Experimental Class
Students Total (N)	36	36
Average Score(g)%	16,03	49,72
Minimum Score	-50.00	16,67
Maksimum Score	30.77	83.33

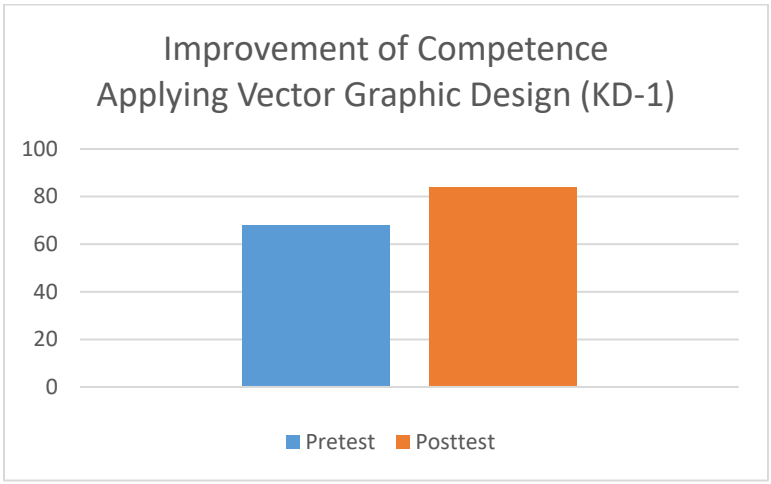
Figure 2. Histogram of Result Gain-Test



Based on Table 3 can be showed that Gain standard value in the Experimental class is more than the control class (0,49 > 0,16), there is an improvement so h0 declined and h1 received. In conclusion, the effectiveness of the use of Project-Based Blended Learning in the experimental class is higher than the Control class using the virtual synchronous method.

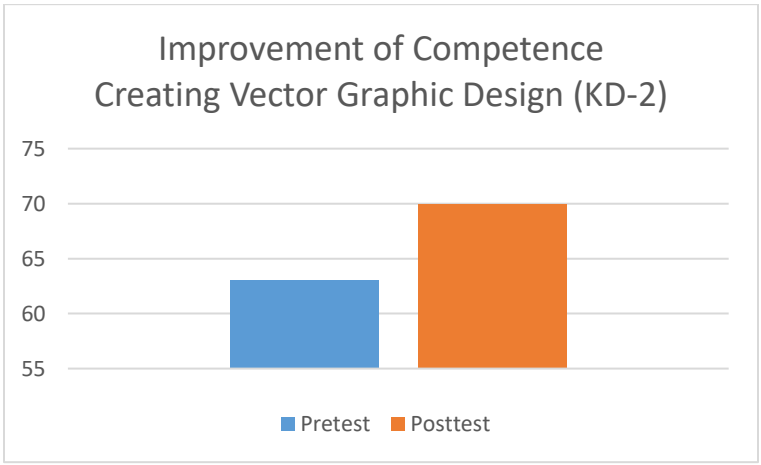
Based on figure 2 Histogram of Result Gain-Test can be analyzed that the gain-test score, minimum score, and maximum score increase significantly. The improvement of the Gain test is 16,03 on the control class become 49,72 on experimental class with 36 students in every class. The minimum score on the control class is -50,00 and 16,67 in the experimental class. The maximum score on the control class is 30,77 and 83,33 on the experimental class.

Figure 3. Histogram of Improvement of The first Basic Competence



Based on figure 3 Histogram of Improvement of The first Basic Competence can be showed that study in the first competence test about applying the basic graphic design on vector increases. It is proven by the result of the test before and after *project-based blended learning* applied. Here, the students introduce about types of tool in Corel Draw application and the use to design vector.

Figure 4. Histogram of Improvement of the Second Basic Competence



Based on figure 4 histogram of improvement on the second basic competence can be showed that study in the second competence test about making the vector-based graphic design increases. It is proven by the result of the test before and after *project-based blended learning* applied. Here, the students create a logo and banner creatively and edit design using the tool in Corel draw.

Based on the result of hypothesis analysis and explanation above can be concluded that there is a difference in student's achievement in applying Project-Based Blended Learning conducting from the Virtual Sincronous method. The use of Project-Based Blended Learning is more effective than the Virtual Sincronous method based on the result of pretest and posttest in the experimental and control class.

This study is supported by the statement that Project Based Learning shows the learning process where students can do the authentic project and developing products. The result strengthens that project-based learning has a positive influence on students'achievement. The project-Based Learning method can improve

cognitive performances, students' skills, and motivation for collaboration, and negotiation in teamwork and motivation increases better (Guo, Saab, Post, & Admiraal, 2020).

The project-based blended learning model is conducted for finishing the project designed as the industry need which uses learning applications as media. The application can be used by teachers to observe the student's project. It is also used to have discussions solving some problems faced by students during the learning process. By giving the project to the students, it can support the students' skill in term of problem-solving and doing simple design (Saputra, 2019).

The use of *project-based blended learning* can stimulate students for doing the simple into the complex project so that their passion and motivation increase (Nurbekova et al., 2020). The case shows that *project-based blended learning* is more effective to improve practical competences, independent study, curiosity, and teamwork motivation for students (Tong, Kinshuk, & Wei, 2020). Applying *project-based blended learning* can support critical thinking after doing a project (Taufiq et al., 2020).

Based on all previous data analyses, the result of this study show that both classes use online learning with a different method. The experimental class uses the Project-Based Blended Learning method which is suitable for the curriculum for SMK integrated with LMS Schoology. Here, all steps of the learning process used Schoology from identifying problems, discussion, teamwork, or group for project, design logo and banner, monitoring the student's work until evaluation or test after project. The students also practice creating online design with Gravit Designer easily. While the learning process in the control class is also based on online learning where teacher shared materials in form of video through Whatsapp, Messenger without project assignment, and the last test was modified through a google form.

In the control class, students got materials without self-practice by project and it didn't integrate with LMS so that no skill improved. The materials in some videos do not attract all students well. However, in experimental class uses Schoology and a chance for upgrading self-competence to have practiced the online design using Gravit Designer and Corel draw. The existence of LMS Schoology can persuade the students to be more active in the learning process.

Conclusion

Based on the results of testing the first hypothesis using the independent sample t-test with the results of the pretest and posttest values, it is known that there are differences in learning outcomes between the use of the Project-Based Blended Learning model and the Synchronous Virtual method. The difference in learning outcomes is obtained from research data in the experimental class using the model Project-Based Blended Learning with a control class using the Virtual Synchronous method. And based on the results of testing the second hypothesis with the Gain test there is an increase in student learning outcomes and has high effectiveness using the Project-Based Blended Learning model compared to the Synchronous Virtual method. Based on the results of the pretest and posttest mean scores of the experimental and control classes. So, it can be concluded that the increase in learning outcomes using the Project-Based Blended Learning model is higher than the Virtual Synchronous method.

Suggestion

For further researchers, it can expand and multiply the scope of material and variables. In addition, researchers are able to develop other platforms that are more effective and set the right time for the use of project-based learning.

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The Effectiveness of Problem-Based Learning Assisted by Edpuzzle on Students' Critical Thinking Skills

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Abstract:

Applying critical thinking skills is one of the important things in the learning process. This research aims to determine the differences in students' critical thinking skills between the class that applies the problem-based learning model through Edpuzzle and the class that applies the expository learning model. The method used is a quantitative quasi-experimental design using pretest and posttest control. The sample of this research was participated by 66 students. They were selected by applying the technique of cluster random sampling. The data was obtained from the result of pretest and posttest based on the indicator of critical thinking skills. The result showed that there were differences and an increase in the critical thinking skills of students who applied the problem-based learning model assisted by Edpuzzle compared to the expository model. It is proven by the result of the 1st hypothesis test through t-test which the posttest result shows the score of 0,014, which means the score is less than the error level of 0,05. Therefore, it can be concluded that both of the classes have significant differences (H_0 is rejected). On the other, the 2nd hypothesis test that used the gain test indicates the score of 0,41 for the experimental class and the score of 0,28 for the control class, which means an increase in critical thinking in the experimental class.

Keywords: Critical Thinking Skills; Edpuzzle; Problem-Based Learning

Introduction

Along with the development of information technology and the internet, it is growing rapidly in various sectors of life, one of which is in the field of education. Students are easier in accepting and exploring learning material by using the internet. Therefore, teachers and students are demanded to improve their mastery of technology through computers or gadgets (Susilaningsih & Sumarti, 2019).

In the education era 4.0, the government asked educational institutions to carry out many learning innovations to supports the development era. Applying critical thinking skills is one of the important things in the learning process (Cahyani & Putri, 2019). According to Facione et al. (2016), critical thinking is an ability that allows students to analyze, evaluate, and do reasoning, which enables students to respond responsively to information from their thinking with logical reasons. So that students can think critically and get maximum learning results, the teacher needs to create strategies to stimulate student's critical thinking skills.

The problem of low critical thinking skills is caused by the difficulty of students in solving problems. It can be seen when the teacher gives a question or opinion to the students, but they do not answer it and passive. Meanwhile, when carrying out group presentations, the questions given by other students were only basic questions that were only limited to the knowledge that had been previously presented. This question makes the presenter group only answer questions by delivering the previous material. This way makes the students cannot develop their critical thinking maximally.

The indicator of critical thinking skills used in this research are indicators of critical thinking skills from Facione's theory (2011), including interpretation, analysis, evaluation, inference, explanation, and self-regulation. Interpretation is the ability to interpret the meaning of data, activity, experience, process, or condition. Interpretation includes three things, namely skills, interpreting the important things, and explaining a meaning. The analysis is the ability to identify a definition, idea, description that aims to express something in a statement which is it can be represented in many forms, namely information, argument, opinion, or conclusion. The evaluation is the ability to make a judgment of statement integrity that can be from an experience, argument, information, or opinion of a person to relate its validity with the actual data. The inference is the ability to identify and select important components to make a conclusion, a hypothesis, and predicting the relevant sources to relieve the consequence. The explanation is the ability to present the result and explain the conclusion in detail with the supporting arguments that make other people believe. Self-regulation is the ability to self-correct related to cognitive aspects, thinking components, creativity, analysis skill, giving an opinion, and make a conclusion.

The appropriate learning model that can improve the student's critical thinking is problem-based learning. Problem-based learning is learning that involves students in solving problems in real life. The purpose of problem-based learning is to be able to find solutions and finish a problem is given by the teacher so that it can develop a student's critical thinking skills. One of the advantages of the problem-based learning model is that it can change the student's mindset and stimulate the student's participation in positive debates such as debating a problem they face so that it can improve their Higher Order Thinking Skill (HOTS) (Ismail et al., 2018).

In the Covid-19 pandemic condition that has attacked countries in the world, including Indonesia, the government has decided to make a new policy to modify the education system from direct meeting to indirect (online) meeting. Online learning is implemented as an effective way to replace the learning meeting at school. The use of online learning platforms is being alternative for vocational high school to fulfilling online learning needs. The teacher is expected to give some innovative learning in the learning implementation so that it can produce effective and successful teaching and learning process (Mishra, Gupta, & Shree, 2020).

Media is one of the important components in the learning process. Internet is the media that can help teachers or students in conducting efficient learning. The teacher can introduce the digital environment to the students through the internet. Edpuzzle is one of the video conferencing software platforms. It is useful in education because it can help the teacher to deliver the material through video, which is free to be accessed. Also, the teacher can add audio, note, and quiz to the video. Edpuzzle facilitates the students to learn the material through the video first before the learning meeting begins so that learning can run efficiently and can train student's abilities to learn independently (Abou Afach, Kiwan, & Semaan, 2018).

One use of the Edpuzzle platforms is to integrate it with problem-based learning. The students can learn the material and do a quiz through Edpuzzle out of the learning meeting. Meanwhile, the teacher is applying problem-based learning in a direct meeting.

The research that linked to the problem-based learning model for improving the students' critical thinking skills is research conducted by Susanti (2016), who explained the problem-based learning makes a problem as the students' motivation to solve the learning problems. Also, the research of Silverajah & Govindaraj (2018) explained Edpuzzle provides a student-centred learning environment that appropriates the problem-based learning and student-centred approach. Liu et al. (2019) added that the problem-based learning model is active learning that uses real-life problems as the main learning topic, then students encourage to think critically in solving these problems. Furthermore, Silbermans' research (2020) emphasized that group-based learning is the appropriate learning strategy to stimulate the students to think critically in problem-solving.

Method

This research uses quantitative research. Research quantitative is used to examine data that can be processed. It can be defined that research based on the positivism philosophy that is used for certain populations or samples, the instrument is used to collect the research data, which is statically analyzed to prove the predetermined hypothesis (Sugiyono, 2012). The method in this research used a quasi-experimental design. The research design used to pretest and posttest control. The research was conducted in two-class as the experimental class and the control class. The experimental class was given the treatment of applying the problem-based learning model assisted by the Edpuzzle, while the control class was given the treatment of applying the expository model.

Table 1. Research Design

Class	Pretest	Treatment	Posttest
Experimental	O1	X	O2
Control	O1	X	O2

The sampling technique used in this study was random cluster sampling. The population in this study was 96 students. Samples taken were two classes with a total of 66 students, and the remaining 30 students were used to test the instrument. In this study, the data collection techniques were taken by essay tests and observation sheets. At first, this research began with making an instrument consisting of a lesson plan, job sheet, and essay test based on indicators of critical thinking. The second, the implementation of the pretest. Third, the treatment of each class, the control class uses the expository learning model, and the experimental class uses the problem-based learning model assisted by Edpuzzle. Fourth, the implementation of the posttest. Then, the data analysis and finally the conclusion. The research procedures can be seen in Figure 1.

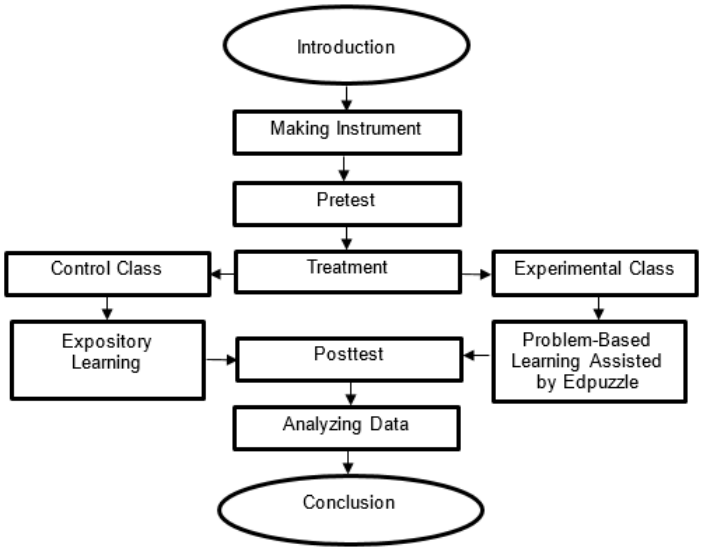

Figure 1. Research Procedure

Research Finding and Discussion

Before the research was conducted in both classes of experimental and control classes, tryout has distributed to verify the instruments properly or not to be used for collecting the research data. The tests are including the validity test, reliability test, difficulty level test, and power difference test. The instrument test was participated by 30 students who are not research subjects and have already got related material. Based on the tryout result, it can be seen that r-table = 0.361. From the result, it is obtained the number of questions that 12 questions which is passed the validity test (six pretest questions and six posttest questions) and eight questions which is discarded. The reliability test result has a score of 0.720 for the pretest and 0.649 for the posttest, and then it can be categorized as a high-reliability score.

Based on the posttest result, it shows that the student's critical thinking skills in the experimental class have a higher average percentage than the control class. In this study, there are six indicators measured by using the essay test in this study. The first indicator of critical thinking skills is interpretation. According to Facione (2011), interpretation includes three things, namely skills, interpreting important meanings, and explaining a meaning. The results of the achievement of critical thinking skills interpretation in the control class got an average percentage of 77,2% with a good category, while the experimental class got an average percentage of 84,8% with an excellent category. The second indicator of critical thinking skills is analysis. Hayudiyani et al. (2017) suggested that analysis relates to the skills of recognizing a concept, description, or another form that aims to reveal a matter in the form of a statement. The result of the achievement of critical thinking analysis in the control class got an average percentage of 81,0% with an excellent category, while the experimental class got an average percentage of 82,5% with an excellent category. The third indicator of critical thinking skills is evaluation. Hayudiyani et al. (2017) emphasized that evaluation is the skills to describe the relationship among definitions, statements, and concepts on a problem. The results of the achievement of critical thinking skills evaluation in the control class got an average percentage of 81,8% with an excellent category, while the experimental class got an average percentage of 91,6% with an excellent category.

The fourth indicator of critical thinking skills is the conclusion. According to Facione (2011), the conclusion is the ability to identify and recognize the important components for concluding. The result of the achievement of critical thinking skills conclusion in the control class got an average percentage of 75,0% with a good category while the experimental class got an average percentage of 82,5% with an excellent category. The fifth indicator of critical thinking skills is the explanation. The explanation is the ability of students to explain the solution of the problems described through some questions, in line with the opinion of Ullynuha et al. (2015) in his research, which states explaining skills can be seen when the students can express and explain their opinions to find out the solution for a problem. The result of the achievement of critical thinking skill explanation in the control class got an average percentage of 59,0% with a fair category, while the experimental class got an average percentage of 66,6% with a good category. The sixth indicator of critical thinking skills is self-regulation. According to Facione (2011), self-regulation is the ability to self-correction. In this context, it is linked to the cognitive aspect of thinking skills. The result of the achievement of critical thinking skills self-regulation in the control class got an average percentage of 54,5% with a fair category while the experimental class got an average percentage of 65,1% with a good category.

The table below describes the analysis data result of the student's critical thinking skills based on the essay test indicator.

Table 2. The Result of Pretest of Students' Critical Thinking Skills

No	The Indicator of Critical Thinking Skills	Control Class		Experimental Class	
		%	Category	%	Category
1.	Interpretation	39,3	Poor	37,8	Poor
2.	Analysis	76,5	Good	78,7	Good
3.	Evaluation	78,0	Good	77,2	Good
4.	Conclusion	60,6	Fair	75,0	Good
5.	Explanation	56,8	Fair	55,3	Fair
6.	Self-regulation	43,9	Poor	52,2	Fair
	Average	**59,18**	**Medium**	**62,70**	**Good**

Table 3. The Result of Post-test of Students' Critical Thinking Skills

No	The Indicator of Critical Thinking Skills	Control Class		Experimental Class	
		%	Category	%	Category
1.	Interpretation	77,2	Good	84,8	Excellent
2.	Analysis	81,0	Excellent	82,5	Excellent
3.	Evaluation	81,8	Excellent	91,6	Excellent
4.	Conclusion	75,0	Good	82,5	Excellent
5.	Explanation	59,0	Fair	66,6	Good
6.	Self-regulation	54,5	Fair	65,1	Good
	Average	**71,41**	**Good**	**78,85**	**Good**

Table 2 shows the result of the average percentage of the critical thinking skills indicator. In the control class, the average percentage of students' critical thinking skills indicators was 59,18% in the medium category. In the experimental class, the average percentage of students' critical thinking skills indicators was 62,70%, in the good category. When viewed from each indicator, the highest score in the control class is the evaluation indicator at 78,0%, and the lowest score is the interpretation indicator at 39,3%. Meanwhile, the highest score in the experimental class was the analysis indicator at 78.7%, and the lowest score was the interpretation indicator at 37,8%.

Table 3 shows the result of the average percentage of the critical thinking skills indicator. In the control class, the average percentage of student's critical thinking skills indicators was 71,41% in the good category. In the experimental class, the average percentage of student's critical thinking skills indicators was 78,85% in the good category. When viewed from each indicator, the highest score in the control class is the evaluation indicator at 81,8%, and the lowest score is the self-regulation indicator at 54,5%. Meanwhile, the highest score in the experimental class was the evaluation indicator at 91,6%, and the lowest score was the self-regulation at 65,1%. For more details, it can be seen in Figure 2.

Figure 2. Graph of Critical Thinking Skills

Table 4. The Result of First Hypothesis

Test	Sig. (2-tailed)
Critical Thinking	0,014

Table 4 shows the t-test result is 0,014, which means the score is less than the error level of 0,05. It can be concluded that the two classes have a significant difference (H_0 is rejected). Therefore, it can be concluded that there are differences in students' critical thinking skills between the class that applies problem-based learning assisted by Edpuzzle and the class that applies the expository learning model.

Table 5. The Result of Second Hypothesis

Class	Gain Standard	Information
Experimental	0,41	Medium
Control	0,28	Poor

Table 5 shows that the standard gain results in the experimental class are greater than the control class (0,41> 0,28), so there is an increase in the critical thinking skills, which is H_1 is accepted and H_0 is rejected. So, it can be concluded the class that applies the problem-based learning model assisted by Edpuzzle is more effective to improve the students' critical thinking skills than the class that applies the expository learning model.

Susanti (2016) argued that problem-based learning is a learning model that can develop the students' critical thinking skills through discussion in solving the problems presented. The result of the research explains that there is an increase in the students' critical thinking skills both in asking, answering, analyzing, and solving problems. The research was conducted by Liu et al. (2019) explained that the problem-based learning model is more effective than the conventional lecture-based learning model in increasing students' learning interest, independence, and problem-solving. Furthermore, the research was conducted by Silberman's research (2020) explained that group-based learning could increase the students' critical thinking. It means the problem-based learning model, which used group-based learning, is affecting the students' critical thinking skills. Also, the research result of Silverajah & Govindaraj (2018) showed Edpuzzle as the learning media that can support the development of student learning skills and students' independence training.

Based on the results of this research, the control and experimental classes use online-based learning even though they are using different learning models. In the experimental class is using the problem-based learning model assisted by Edpuzzle, the students can get information to solve some problems and look for some ideas through the material that has been uploaded on the Edpuzzle. It is different from the control class, which only received the soft file material from the teacher. Also, in the experimental class, the students can discuss with their friends to discuss the progress related to the problem presented, which discussion can trigger critical thinking skills between one student and another. In contrast to the control class, which only discussed progress without presenting problems as a trigger for students' critical thinking skills. The results of this research indicate that the problem-based learning model assisted by Edpuzzle is effective to improve the students' critical thinking skills.

Conclusion

Based on the analysis of research data, it can be concluded that there are differences in the students' critical thinking skills between the problem-based learning model assisted by Edpuzzle and the conventional learning model. The differences can be seen from the calculation by using the t-test that shows sig of $<\alpha$ is 0,014 <0,05 at the 5% significance level so that H_0 is rejected and H_1 is accepted. The test result shows that the experimental class average percentage was higher (78,85%) than the control class (71,41%). Also, there is a significant increase in the students' critical thinking skills in the class that applies the problem-based learning model assisted by Edpuzzle so that they have a higher effectiveness than the class that applies the expository learning model. The statement is supported by the calculation result of the gain test, which indicates the score of 0,41 with medium criteria for the experimental class and the score of 0,28 with low criteria for the control class. Therefore, it can be concluded that the class that applies the problem-based learning model assisted by Edpuzzle has increased the students' critical thinking skills and is more effective than the class that applies the expository learning model.

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Student's Self Efficacy Differences Review From The Use of Android-Based Media and Powerpoint to Overcome Anxiety in Online Learning

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Abstract:

Online learning that is not accompanied by innovation in teaching causes anxiety in students. This anxiety can be overcome by increasing self efficacy. Developing learning media can be an effort to increase student self efficacy. So, this Study was intended to find out: (1) whether there was a significant difference between the use of android-based learning and powerpoint on students's self efficacy in Computer and This study used post-test only control design method and t-test to compare 1st experimental group (teaching with powerpoint) and 2nd experimental group (teaching with android media). A total of 71 students of 1st grade RPL at one of vocational school in Karanganyar were randomly selected as samples. The results of self-efficacy were measured by a questionnaire that was validated by 4 expert judgments. Based on statistical results, shows a significant difference between 1st experimental group (teaching with powerpoint) and 2nd experimental group (teaching with android media) on their self-efficacy questionnaire. The 1st experimental group got a lower score than the 2nd experimental group with a gap score of 9.71. The t-test value for df = 69 is 3,439 which is higher than t_{table} = 1,994. The effectiveness of android media is relatively high based on d Cohen's calculations with a score of 0.945. The results of this study indicate that there is a significant difference between the use of android-based learning and powerpoint on students self-efficacy in basic computer network subjects, moreover android-based learning might be an effective medium to increase students self-efficacy in overcoming online learning anxiety.

Keywords: android-based learning, online learning, powerpoint, self efficacy.

Introduction

Online learning during the pandemic has many impacts on the learning process. Dr. H. Nizamuddin et al. (2021: 68) explain that the grand tour of a study can be done by examining 3 objects in order to sharpen the study's direction. The object could be reviewed by interview and observation. This observations and interviews showed that students were less active in class and less independent in completing their assignments. This is proven by infrequent questions from students during lessons and similar answers between students on assignments. Even in providing online teaching, teachers unable to maximize the application of learning media and internet as learning resource. The presentation of Computer and Basic Networking subject matter is less attractive without utilizing technology in teaching induces students difficult to understand the subject matter. Especially for 1st grade students who still need attention in understanding the basic material to prepare them for next 2nd and 3rd grade.

These problems indicates that effective ways are needed to promote students self-efficacy. Because high self-efficacy can improve students achievement and self-welfare (Kristiyani, 2016: 83). By increasing these aspects, it will boost their self-confidence and abilities, so consequently they will be more enthusiastic to achieve target. On the other hand, students with low self-efficacy will have difficulty in learning. Innovation in teaching is one of the efforts to overcome low self-efficacy of students (Triswanto & Laksmiwati, 2020). One of innovations in teaching is application of android-based learning media.

Research by Sugiyarto et al. (2020) showed that android media with educational games support learning process and are able to increase students' attention, present an interactive teaching process as well as provide innovation in teaching. Android-based learning media is also able to improve self-confidence in their abilities because android learning media can be a source of independent learning for students. Permana et al. (2016: 9) argued that the more attractive the appearance and the ease of accessing media will foster student interest in learning. Thus, it will increase students self-efficacy and learning process becomes more varied.

The objective of this study was to determine: (1) whether there was a significant difference between the use of learning media based on android and powerpoint towards students self-efficacy in Computer and Basic Network subjects; (2) which learning media was more effective between android-based and powerpoint-based learning media.

Research Method

This study applied quantitative method with experimental research design and t-test. In this study, certain treatments are given to determine their effect on something in uncontrolled conditions (Sugiyono, 2018: 72). The application of android-based learning media and powerpoint media as independent variables, while students self-efficacy as dependent variable. The experimental design used in this study was true-experimental with the posttest-only control design method. The posttest-only control design paradigm is shown in Figure 1 below:

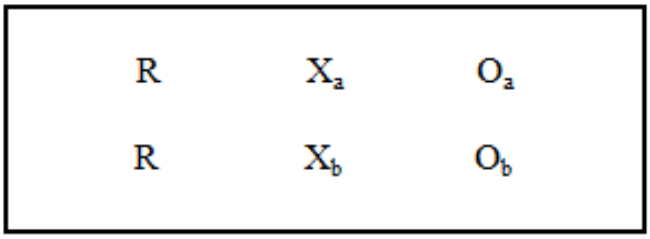

Figure 1. Posttest-only control design

The design in this experimental study requires two groups of experimental classes selected randomly. The 1st experimental group was given teaching treatment with powerpoint media while the 2nd experimental group was given teaching treatment with android-based media.

This study was carried out at SMK N 2 Karanganyar from April 5 to May 3, 2021 using simple random sampling technique to determine the research sample in 1st grade students majoring in RPL. A total of 71 students of 1st grade RPL were randomly selected as sample. Questionnaires, interviews and observations were used for data collection. The validity of instrument was obtained through consultation with four expert judgments: Basori, S.Pd., M.Pd, Dr. Agus Efendi, M.Pd., Yusfia Hafid Arisyagama, S.T.,

M.T. and Arief Kurniawan, ST. The classification of instrument validity is as follows: (1) the instrument can be used directly without changes; (2) the instrument needs to be repaired; (3) all instruments must be changed (Sugiyono, 2018: 125). The self-efficacy questionnaire was tested once outside the experimental class and then tested for validity and reliability. The independent sample t-test was used as data analysis in this study with the conditions of normality and homogeneity tests (Santoso, 2020: 298).

Result and Analysis

The result of the self efficacy's trial questionnaire by testing the validity of the *Correlation Between Items and Total* using SPSS 26 for windows showed 5 items were invalid from the 42 items tested.

Table 1. Summary of Validity and Reliability Testing Result of Self Efficacy Questionnaire Trial

Conclusion	Item number	Amount
Invalid	3,6,15,28,29	5
Valid	1,2,4,5,7,9,10,11,12,13,14, 16,17,18,19,20,21,22,23,24, 25,26,27,28,30,3132,33,34, 35,36,37,38,39,40,41,42	37
Total		42

This invalid item questionnaires were then dropped because the self-efficacy indicator was sufficiently described with 37 valid questionnaire items. Results of reliability test using Cronbach's Alpha showed the reliability of 37 items with an Alpha value of 0.938. After the validity and reliability of instrument was proven, the following research data were obtained:

Differences in self efficacy between android-based learning and learning with powerpoint

After the treatment was carried out for two weeks, self-efficacy questionnaires were distributed and the following results were obtained:

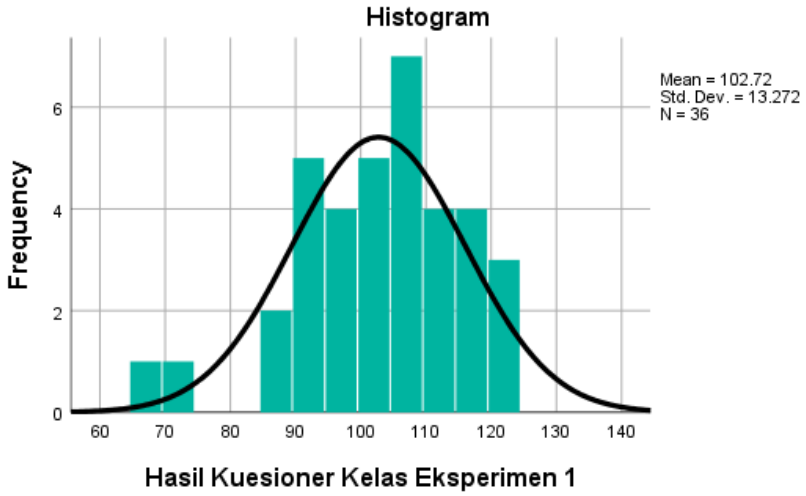

Figure 2. Histogram Frequency Distribution of Self Efficacy Questionnaire Data for 1st Experimental Group

The graph in Figure 2 shows that the highest frequency is 11 in the interval class 105-114 with class limits of 104,5 (lower edge) and 114,5 (upper edge). While the lowest frequency is 0 in the interval class 75-84 with class limits of 74,5 (lower edge) and 84,5 (upper edge). Thus, from the description of 1st experimental group (learning with powerpoint) shows that students in XRB class have varied assessments of the statements on the self efficacy's questionnaire.

Various assessments of statements on self-efficacy questionnaire can also be seen in the 2nd experimental group. From the graph in Figure 3, it is shown that the highest frequency is 10 in the interval class 106-112 with class limits of 105.5 (lower edge) and 112.5 (top edge). While the lowest frequency is 4 in the interval class 92-98 with class limits of 91.5 (lower edge) and 98.5 (upper edge), interval class 99-105 with class limits of 98.5 (lower edge) and 105.5 (top edge), interval class 120-126 with class boundaries 119.5 (lower edge) and 126.5 (upper edge) and interval class 127-133 with class boundaries 126.5 (lower edge) and 133.5 (bottom edge).

The average results of self-efficacy questionnaire in two experimental groups have a difference in score of 9.71 as shown in Table 2 below:

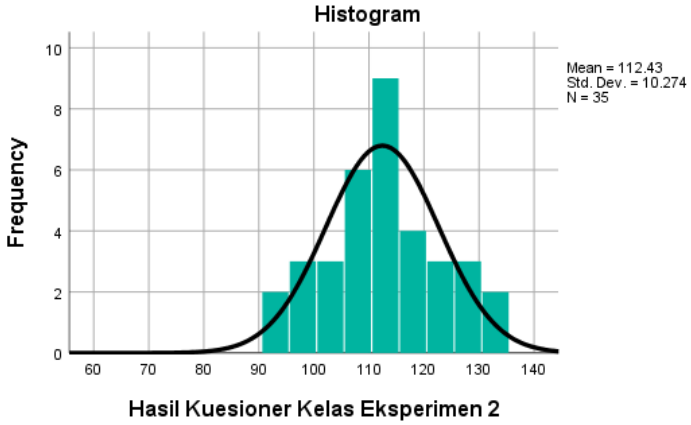

Figure 3. Histogram Frequency Distribution of Self Efficacy Questionnaire Data for 2nd Experimental Group

Table 2. Results of Statistical Analysis of Self Efficacy's Questionnaire Data

Statistical Analysis	1st Experimental Group (XRA)	2nd Experimental Group (XRB)
N	36	35
Mean	102,72	112,43

The result above show that the 2nd experimental group has better score than 1st experimental group. The mean difference of two experimental group then tested using the t-test hypothesis as follows:

H_1 ; There is a significant difference in self-efficacy between students who learn subjects of local network installation (LAN) by using android-based learning media and powerpoint media.

H_0 ; There is no significant difference in self-efficacy between students who learn subjects of local network installation (LAN) by using android-based learning media and powerpoint media.

Table 3. Results of Student's Self Efficacy T-test

Student Self Efficacy Questionnaire Results	Levene's Test for Equality of Variances		T-test for Equality of Means		
Equal variances assumed	1,654	0,203	-3,439	69	0,001
Equal variances not assumed			-3,451	65,733	0,001

The result of independent sample t-test hypothesis test show that the t_{value} = 3,439 is higher than t_{table} = 1,994 which means H_1 is accepted and H_0 is rejected. The calculation above answers the 1st hypothesis in this study with statement "there is a significant difference in self efficacy between students who learn with

android-based learning media and students who learn with powerpoint media on local network installation (LAN) subject matter" as conclucion.

Android-based learning vs powerpoint : which one is effective

After observing the significant difference in self-efficacy between two experimental groups, then measured effect size from android-based media. This measurement was carried out using d Cohen calculation described by (Morissan, 2016: 183).

$$d\ Cohen = \frac{\text{The average difference of 2 experimental class}}{\text{Standard deviation}}$$

There are three categories for classify the effect sizes: (1) categorized as large effect if value of d Cohen is greater than 0.8; (2) moderate effect if value of d Cohen is between 0.2 to 0.8; (3) has low effect if value of d Cohen is less than 0.2. The following is the result of effect size calculation:

Table 4. Results of Effect Size Calculation

d Cohen Score	Classification
0,945	High

From the above result, d Cohen value = 0,945 higher than 0,8 also can be classified as high effect. The conclusion based on these calculations is learning process using android-based media could give large effect in improving student's self efficacy in local network installation (LAN) subject matter. The calculation above answers the 2nd hypothesis in this study with statement "android media is more effective than powerpoint in improving student's self efficacy".

Changes that occur after the experiment is carried out

The differences in students self-efficacy in two experimental groups is caused by several conditions. Based on the results of interviews with several students in 2nd experimental group, android-based media is considered to have a dynamic and attractive display, therefore students are easily understand the concept of local network installation (LAN) subject matter.

Figure 4. Android-based media appearance

From observations, it also shows that there was enthusiasm and active interaction between teachers and students in responding to or answering questions. This condition is similar with the characteristics of someone with high self-efficacy proposed by Permana et al. (2016: 9), which is someone who has an active tendency and directly involved in an activity.

Learning media with this new innovation can also trigger more enthusiasm and motivation. This app also allows students to access their classrooms on Microsoft Teams. Indirectly, this android media presents

subject matter in creative and innovative way. This condition strengthens the opinion of (McQuiggan, McQuiggan et al. (2015) mentioned that mobile learning-based development has an impact on students, namely getting an extraordinarily worthwhile experience in their education.

Android-based media also be an alternative to overcome student anxiety or stress during online learning because it can increase students self-efficacy. This supports the opinion of Debora (2020) where self-efficacy is one of the factors that can affect student anxiety and an important factor in the implementation of online learning.

Conclusion

Referring to the results of this Study and discussion, the use of android-based learning media on local network installation (LAN) subject matter increases student's self efficacy much better than the use of powerpoint media. The android based media also assessed as an effective media in improving student's self efficacy. The enthusiasm and activeness of studens in class such as answering questions from teacher, motivation in studying and exploring the subject matter, daring to express opinions are the response after experimental teaching is done using android media. Thus, it can be concluded that the application of android-based media can provide a stimulus for students to increase their self-efficacy. As a result, anxiety in online learning activities can be minimized.

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The Impact of Disruptive Technologies on Higher Education in Indonesia

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Abstract:

This paper will analyze the extent of predictions to what extent the disruption predicted by Christensen has influenced the dynamics of universities in Indonesia and whether we have readiness in facing the disruption era, and what strategies need to be taken so that universities can survive and carry out their role as critical educational institutions in National development. The method used in this study is to study literature and collect quantitative data from various official sources, including official reports from the Indonesian Ministry of Research and Technology and Higher Education and then process the data. The study results show that disruptive technology negatively impacts learning institutions closely related to specific professions. However, the impact not so much shown in general.

Keywords: technology, the disruption era, education, government

Introduction

Clayton Christensen first coined the term disruptive technology in 1995 in the Harvard Business Review journal (Bower & Christensen, 1995). Christensen states: "No matter the industry, a corporation consists of business units with finite life spans: the technological and market bases of any business will eventually disappear." Later this term became very well known, and Christensen used it in some of his works, such as The Innovator's Dilemma in 2014 (Christensen, 1997). In his book The Innovative University (Christensen & Eyring, 2011), Christensen also predicted that this disruptive impact would affect the world of higher education. The conventional education model will slowly be abandoned, and people will turn to online learning. He predicts that by 2029, half of the 4000 higher learning institutions in the United States will go bankrupt and close. (Kitcharern, 2019) This is caused by disruption due to online learning technology and the Massive Online Open Courses (MOOC'S). In addition to these impacts, 65% of students will get a job that does not yet exist when they study in college. For example, in an accounting firm, students who are studying in an accounting study program will face new software tools and technologies that they might not have found in college (Brown-Liburd & Vasarhelyi, 2015). This means that new types of work are growing very fast without being accompanied by changes in curriculum in learning institutions. Around 42% of current jobs will be replaced by Artificial Intelligence technology in 2022. All the effects of this disruption will affect universities, including in Indonesia. Richard and Daniel Susskind, in their book, also predicted that this explosion of information technology would also affect the way humans learn. The shifting from conventional education to online learning is inevitable (Susskind & Susskind, 2015).

So far, there are no actual data available and sufficient studies on the effects of disruption on higher education institutions in Indonesia that show the integrity and accuracy of Christensen's predictions has also occurred in Indonesia. The closure of study programs or learning institutions in Indonesia was caused by several factors, namely: unable to fulfil the minimum requirements for study program accreditation, the decline of enrollment, and illegal higher learning institutions. The effect of disruptive information technology in particular on the closure of a study program has not been much studied. This paper is a preliminary study to see the impact of disruption on higher learning institutions in Indonesia. In short, did Christensen's prediction in 2014 also impact universities or study programs in Indonesia?

This research aims to observe the impact of disruptive technology on higher educational institutions in Indonesia and anticipate the negative consequences of disruptive technologies.

Research Method

Data obtained from the Center for Data and Information on Science, "Higher Education Statistical Year Book 2018" is analyzed to receive an overview of: first, is there any impact on the development of information technology on the number of universities or study programs in Indonesia? Second, does it also have any effect on the number of national college applicants? Third, from several universities in Indonesia that have conducted distance education, does it influence new students? The method used in this study is to study literature and collect quantitative data from various official sources, including official reports from the Indonesian Ministry of Research and Technology and Higher Education and then process the data.

Result and Analysis

Hitherto the Christensen Prediction, despite showing signs, is not fully reaching the corresponding number. In America, according to the Forbes report, in general, there are 25% of educational institutions have been closed, merged, or declared bankrupt. But at the same time, there will be 200 universities that will undoubtedly survive while the rest will find a way to overcome this disruption problem (Horn, 2018). Disruptive technology has indeed had an impact on learning institutions in America. Since 2010 students choosing online education have continued to increase to 20% and continue to rise each year. Roughly 10% of students in 2003 took one online course, and it grew to 25% in 2008, up to 30% in 2009 and expected to increase to 50% in 2014 (Allen & Seaman, 2010). But a sizable cause for the closure of this study program is the inability of the institution to finance its enormous operational costs (Horn, 2018).

Not yet fully known how many Higher Education Study Programs in Indonesia were closed due to the era of disruption of information technology. However, some closed study programs were caused by other things such as reduced interest due to changes in employment needs and administrative matters. Referring to cases of study program closure in the United States, study programs that are affected more are those that offer efficient disciplines and offer particular expertise. Disruption is a less negative impact on study

programs that provide basic sciences. This can be understood because study programs closely related to information technology are required to adapt to changes in information technology that are too fast.

In Indonesia, study programs that have been reported have been closed, for example, secretarial study programs at 58 Private Universities, banking study programs at 90 Private Universities, and study tour travel programs at 35 Private Universities. The closure of this study program is due to the lack of interested people in these disciplines in the surrounding area. However, no studies show whether the lack of interest is mainly due to the influence of the emergence of information technology or other things (Supingah, 2020). The closure of the study program was an old phenomenon before the era of disruptive technology. For example, during 2007, there were 113 study programs from 64 private universities (PTS) in West Java that were closed, 20% of 244 private universities in Central Java collapsed during 2009 due to financial difficulties and were unable to compete with financially strong state universities, and only 20% of private universities can compete (Soegoto, 2014). Therefore it cannot be ensured that the emergence of online learning causes the closure of several study programs in Indonesia.

Although some study programs were closed due to a lack of interest in some discipline areas, on the contrary, official data released by the Ministry of Research, Technology and Higher Education from 2012 to 2018 show different results. Instead, there is an increase in the Gross Enrollment Ratio (GER), new students, and the number of study programs offered at both public and private learning institutions. Statistical data shows that from 2012 to 2018, the number of higher learning institutions even tend to increase slightly from 3189 in 2012/2013 to 3293 in 2017/2018, as shown in Figure 1 below (Ministry of Research & Education, 2018).

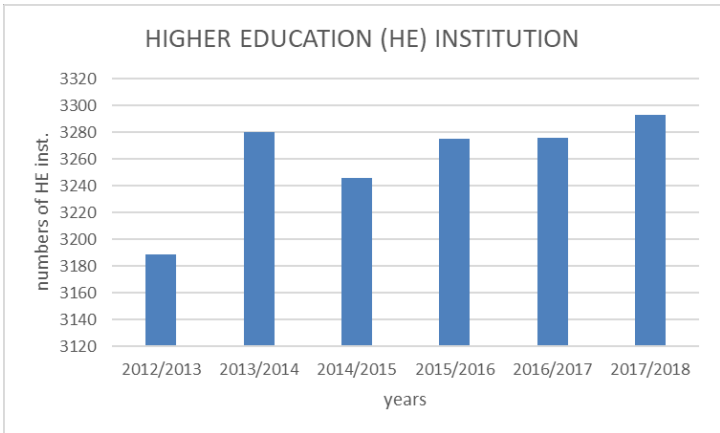

Figure 1. Number of Higher Education Institutions in Indonesia from 2012-2018

The number of new students and students enrolled from 2012/2013 to 2017/2018 also tends not to be affected by the emergence of online learning media and the administration of distance education. Instead, it has increased, as shown in Figure 2.

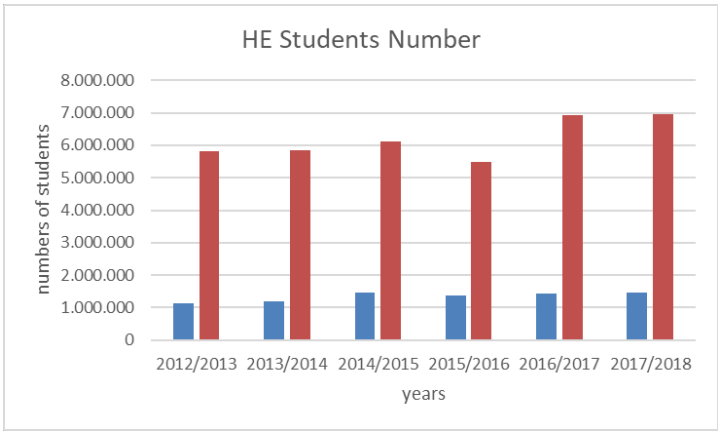

Figure 2. Number of New Students (Left) and Registered Students (Right) Every Year From 2012-2018

Whereas the Gross Enrollment Ratio (GER), which compares the number of undergraduate students (diploma and bachelor) with the population aged 19-23 years, actually experienced growth, as shown in Figure 3 below.

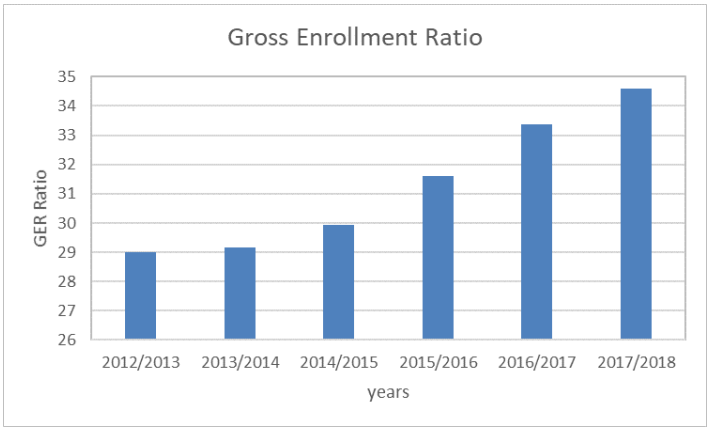

Figure 3. Gross Enrollment Ratio (GER) from 2012-2018

From the three graphs above, it can be seen that there is no significant effect of disruptive technology on the number of higher education enthusiasts in Indonesia as predicted by Christensen in the United States. This is indicated by the number of new students enrolled in public and private universities, which tends to be stable or even slightly increased. Likewise, the participation rate of young people continues to grow over the years, and the growth of study programs has also increased, albeit slightly.

Until now, there are more than 15 public and private universities that have held distance education, namely: Bina Nusantara University, Amikom University, Surabaya State Electronics Polytechnic (PENS), Mercu Buana University, Pelita Harapan University, University of Indonesia, Bogor Agricultural University, Sumatra Institute of Technology, Yogyakarta State University, Semarang State University, Makassar State University, Malang State University, Ganesha Education University, Madiun State Polytechnic, and Bandung State Polytechnic. Telkom University, YARSI University. The Ministry of Research and Technology has also launched the Indonesian Online Learning System (SPADA) to provide opportunities for Indonesians to get education remotely without having to register with an official educational institution. The emergence of many distance education providers and various online learning platforms does not have a negative impact but rather complements conventional learning.

Regarding the impact of disruptive technology on the suitability of work with the field of study taken by students to date, the Ministry of Research, Technology and Higher Education (RISTEKDIKTI) does not yet have complete data. Still, efforts to build a database centre have been carried out centrally through the website http://pkts.belmawa.ristekdikti.go.id/; because of that, until now it has not been able to conclude in full whether disruptive technology has significantly influenced the world of work or not.

Conclusion

Disruptive technology can explore the negative impact on learning institutions, especially those closely related to professions that are very specific and related to information technology. This needs to be anticipated through a more flexible curriculum design. But Christensen's prediction seems to date not generally felt by higher learning institutions. The phenomenon of closing study programs is caused by the effects of disruptive technology and other factors such as financial management. On the other hand, disruptive technology should be used to increase the Gross Enrollment Ratio (GER). The increase in student participation in online learning does not necessarily mean a decrease in students taking conventional courses. Instead, it provides opportunities for people who have been unable to participate in formal and traditional education. More detailed and complete data is needed to anticipate the disruptive effects of technology in Indonesian higher learning institutions.

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Twitting the Public Sentiment on the Jakarta Online Zoning System

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Abstract:

In 2018, the zoning system policy began to be rolled out in Indonesia's New Student Admissions system. Until now, it is still a topic of heated debate. The Jakarta Online Zoning System, for example, is one of the issues. This study used qualitative research methods. And the process of data collection investigates and analyzes the Jakarta Online Zoning System policy 2020 using the Noorderhaven theory of eight steps in the decision-making process. The goal is to observe and evaluate in-depth an approach. The data taken came from tweets on Twitter for the period of June-July 2020. Twitter was chosen because the public always discussed the latest topics. In addition, Twitter has an advanced search that serves as a means to retrace these topics. Data were analyzed through content analysis. The results found that the series of policies for the Jakarta Online Zoning System 2020 had applied the eight steps in the decision-making process technique. In addition, the internet has become a virtual community building medium that has significant power to evaluate policy performance.

Keywords: equity, jakarta, strategic decision making, twitter.

Introduction

Education is a conscious and planned effort to create an atmosphere of learning and the learning process to actively develop their potential as part of sustainable development (Loughran, 2014; Kopnina, 2020). Through Education, students are expected to have religious-spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state (Korthagen, 2017). As a conscious effort, Education should be carried out with good planning and structure as a form of full awareness to develop the potential that exists in every child without exception (Santos, Maes, Justino, & Mendes, 2020).

In line with this, in Indonesia, the Regulation of the Minister of Education and Culture Number 14 of 2018 concerning the Student Admission in Kindergartens, Elementary Schools, Junior High Schools, Senior High Schools, Vocational High Schools, or other equivalent forms applies. Article 12 regulates the existence of new prerequisites for the admission of new students, namely the age and distance of residence to school following the zoning stipulated by the regional government according to their authority. According to the area of residence, the zoning system is a regulatory policy that determines the student admission system to the closest schools to their residence (Keall et al., 2020). The zoning system is applied to state schools managed by the government or public schools (Gasella & Damayanti, 2019).

The zoning system imposed by the Provincial Government of Jakarta caused by the increasing number of students that cannot reserve a seat in the nearby public schools due to limited quota. It was mainly due to parents perception over the preferable schools over the others, both TV, radio and social media. The heated debate related to the Jakarta Online Zoning System issue is viral on social media. This research uses data from public tweets on Twitter regarding the zoning mechanism.

Researchers used data from social media Twitter to capture public sentiment or opinion regarding the Jakarta Online Zoning System 2020 because it cannot be denied that the delivery of public opinion does not go through formal channels. Although not through formal channels, this opinion reflects what is happening in society as a result of an existing policy.

This research is expected to be useful for the government related to the mechanism for evaluating a policy and increasing knowledge for the public as well as further material or introduction to new scientific studies for further researchers with the same substance by using various formal and non-formal media. This research focuses on tweets with the Jakarta Online Zoning System issue with several indicators, including cognitive, affective and cognitive as a tool of analysis in dissecting writing or tweets written on Twitter in the span of June-July 2020. In addition, this study also uses official data in the form of policy rules in the Jakarta Online Zoning System 2020 process. It distributes questionnaires to parents of students who participate in the process as data in processing.

In this research, the theory used as an analysis tool is Noorderhaven's opinion about the eight stages in the formulation of a policy (Noorderhaven, 1995), namely:

1. *Recognition* is the stage to identify or determine the real problem, not just fixated on the wild issue that develops in the community;
2. *The formulation* is the process of formulating a problem that will produce what steps should be taken and who will help in the following decision-making process;
3. *Goal* setting is the stage where individual interests must be put aside, and a common interest or organizational interest is born;
4. *Generating options* is the stage of alternative policy choices to achieve common interests;
5. *Evaluation options* are the stage when the authorities have determined policy options, and then each alternative policy option must be analyzed or evaluated;
6. *The act of choice* is the stage of determining the best policy choice from the various alternatives that exist as a way to realize common interests;
7. *Implementation* is the official implementation stage of a policy in the community;
8. Control is the stage where the process of monitoring the implementation of a policy must be carried out.

Related Work

The zoning system is expected to answer the problems of Education in Indonesia (Riyanti, Ayatina, Astuti, & Rahmah, 2020). Because the aim of implementing the zoning system is to ensure equitable access to Education, eliminating exclusivity and discrimination in public schools, assisting in the analysis of the

calculation of teacher needs and distribution, encouraging local governments in educational equality, and to prevent the accumulation of quality human resources in one area (Putra, Hadiansah, & Prianggandinie, 2020). The zoning system is not new because it has been implemented in countries such as the United States, Canada, Japan, and Australia (Broccolichi & Van Zanten, 2000; Keall et al., 2020; McCulloch, 1991; Põder, Lauri, & Veski, 2017; Thrupp, 2007; Wanat, 2010).

However, the zoning system in various regions in Indonesia has caused polemics in the community (Riyanti et al., 2020). Regarding data from the Indonesian Child Protection Commission, 2020, New Student Admissions have seen a sharp increase in public complaints compared to the previous year (Widayati & Sudrajat, 2020). Indonesian Child Protection Commissioner for Education, Retno Listyarti, said that in 2019 his party only received a total of 95 complaints from 37 regions related to the Jakarta Online Zoning System. However, in 2020 there were 224 complaints received by the Indonesian Child Protection Commission. The most complaints occurred in Jakarta, namely 89% or 200 complaints; the remaining 24 or 11% came from outside the Jakarta area (CNN Indonesia, 2020).

As released by *We Are Social*, in 2020, it was stated that there were 175.4 million internet users in Indonesia when compared with Indonesia's total population of 272.1 million, which means that 64% of Indonesia's population has experienced access to cyberspace (Haryanto, 2020). According to *We Are Social*, internet users in Indonesia in 2020 experienced a very sharp increase compared to the previous year. There are 10 million Indonesians who are active on social media. The social media sequences most often used by internet users are YouTube, WhatsApp, Facebook, Instagram, Twitter, Line, FB Messenger, LinkedIn, Pinterest, We Chat, Snapchat, Skype, Tik Tok, Tumblr, Reddit, and Sina Weibo (Widyananda, 2020).

In this study, Twitter is considered the most appropriate social media because hot topics are always the conversation. There is also interaction with policymakers because many government agencies have official Twitter accounts (Gayatri, 2011). In addition, Twitter also has a *search-advanced* which serves as a means to retrace these topics (twitter.com, 2020). Then, how does the Jakarta Government respond to the polemic of many students who do not get a quota to attend school at the Jakarta Online Zoning System 2020?

Research Method

In this paper, the author uses qualitative research with content analysis techniques used to process the data obtained so that a conclusion can be drawn that can answer the existing questions (Holstri, 1969). Content analysis is a technique that discusses in-depth content or information written in mass media or social media. In summary, content analysis is a research technique for making objective inferences and systematic identification of message characteristics (Holstri, 1969).

The primary purpose of content analysis is to describe the characteristics of a message or information. Content analysis can also be used to analyze the background of a message. Content analysis is divided into two groups, namely descriptive and comparison. Descriptive content analysis is a content analysis intended to describe a letter or a particular text in detail. The descriptive approach defines a statement or text (Baxter, 2020; Holstri, 1969).

The data was retrieved from more than 100 tweets on Twitter using the advanced search engine twitter advanced search with themes "the Jakarta Online Zoning System" and filters on 10 June-10 July 2020. However, the data will be analyzed as many as 100 tweets and processed into the data coding. Data were analyzed through three streams simultaneously: data reduction, data presentation, and concluding/verification. So that, the stages of data analysis carried out by researchers are, first: data collection where the data in this study are collected through the results of a questionnaire followed by interviews, observation and documentation of media data, and the consequences of public policies related to the Jakarta Online Zoning System 2020.

Second, data reduction, namely the process of selecting, simplifying, abstracting, and transforming raw data. And continuous data reduction continuously throughout the project until the report is compiled (Huberman & Miles, 1985). We do data coding to keep the data measurable. Encoding is a short word or phrase that symbolically summarizes, accentuates messages, captures the essence of a portion of data, be it language-based data or visual data (Saldana, 2009). So, code is a word or short phrase that contains the essence of a data segment that is being studied.

Third, the data presentation stage, which is a significant flow in a study. The process of presenting data is collecting several structured information to provide the possibility of a conclusion or taking action. And fourth, namely, the stage of drawing conclusions or verification, where at this stage the researcher tries to test,

recheck or understand the meaning or meaning, regularity, patterns, explanations, and flow of those in the Twitter media and the birth of a public policy related to the Jakarta Online Zoning System 2020.

Interview with parents of students who take part in the Jakarta Online Zoning System is taken from Twitter about the issue of the Jakarta Online Zoning System June-July 2020. Twit is processed with advanced search with the filter word "the Jakarta Online Zoning System", 10 June-10 July 2020. The tweet was then coded in excel. Coding is done by grouping words or short phrases that contain the essence of a data segment in excel. Simple coding can be done by dividing a narrative sentence into three groups, namely one column for raw data, one column for the initial code, and one column for the final code.

Result and Analysis

There are many tweets related to the Jakarta Online Zoning System. Because this theme is one of the hot themes in various regions in Indonesia. The complexity of the problem is enormous because it cannot be denied that Education is now a primary need, where a good education is expected to be a bridge to change a better life for a family. Of the hundreds of tweets related to the Jakarta Online Zoning System, the researchers filtered the tweets on the advanced search engine twitter advanced search with the keyword "the Jakarta Online Zoning System 2020".

Based on the Decree of the Head of the Jakarta Education Office Number 501 of 2020 concerning Technical Instructions for Admission of New Students for the 2020/2021 Academic Year, the pre-registration stage is open from June 11 to July 3, 2020, online, except for Sundays and national holidays, where parents must register to get a token by attaching an administrative file according to the level of Education. Administrative files for the elementary school level, namely birth certificates, family cards and a statement of absolute responsibility regarding the validity of documents from parents or guardians of students with a stamp of Rp. 6,000.

Meanwhile, prospective junior high and high school students, the document requirements for the Jakarta Online Zoning System 2020 pre-registration are birth certificates, family cards, grade 4, grade 5 and grade 6 semester one report cards, grade 7, grade 8 and 9, semester one report cards. Another requirement is an accreditation certificate school of origin and a statement of absolute responsibility regarding the validity of documents from the parents or guardians of the student with a stamp of 6000 IDR. The document requirements for prospective vocational students are birth certificates, family cards, grade 7, grade 8 and grade 9 semester 1 report cards, original school accreditation certification and a statement of absolute responsibility regarding the validity of documents from the student's parents or guardians with a stamp of Rp. 6,000.

The Jakarta Online Zoning System 2020 registration stages consist of six lines, namely:

1. Inclusion Pathway on 15-18 June, 2020;
2. Affirmation Pathways for Orphanages and Children of Health Workers Who Died amidst Covid-19 on June 15-18, 2020;
3. Affirmation Pathways for Children from Jakarta Worker Cardholders and Jak Lingko Drivers and Children Registered in the DTKS on 19-24 June, 2020;
4. Parent and Teacher Transfer Pathway on 15 June-6 July, 2020;
5. Village-Based Zoning Route on June 25-30, 2020; and
6. Provincial and Outer Jakarta-Based Zoning Pathways on July 1-6, 2020.

As the Jakarta Online Zoning System registration process progresses, the polemic regarding zoning and selection rules based on the age of students is getting heats up. Data reduction is carried out to obtain appropriate tweet content, which reflects the thoughts and conditions in the field related to the Jakarta Online Zoning System implementation process. In accordance with the qualitative method of content analysis using an inductive blade of analysis, the researcher's ability to interpret a particular context, theme, or model. There were 100 tweets obtained and analyzed (Table 1).

This method is also carried out in previous research related to qualitative content analysis research on twitter texts. For example, Rumata chose 50 out of 368 tweets that discussed the topic of user opinion tweets "#amnestipajak" and "#taxamnesty" (Rumata, 2017).

Table 1. Coding datasheet

Raw Data	Preliminary Codes	Final Code
Hai #sahabat disdik, Admission of Affirmation Pathway Students for SD, SMP, SMA, and SMK,	Admission of Affirmation Pathway Students for SD, SMP,	Registration mechanism

starts on Friday, June 19 2020, at 08.00. Let's look at the registration flow!	SMA, and SMK starts on Friday, June 19, 2020 at 08.00.	
The Indonesian Child Protection Commission is still receiving over the Jakarta Online Zoning System. There needs to be an improvement so that the Zoning System does not harm the parents of students as age rules are more important than grades. Should age restrictions be removed?	The Indonesian Child Protection Commission received the Jakarta Online Zoning System complaints regarding an age-based zoning system	The Jakarta Online Zoning System problems
The Jakarta Education Agency has opened the New Student Admissions stage for the 2020/2021 school year. Want to know how and what are the requirements to register for the Jakarta Online Zoning System? Check out the following article https://smartcity.jakarta.go.id/blog/523/cara-mendaftar-ppdb-online-di-tengah-pandemi-korona	Explanation from the Education Office regarding the Jakarta Online Zoning System registration	Registration Mechanism
New student registration in Jakarta has reached more than 100 thousand: The Jakarta Education Office noted that 100,000 people have registered for the new student admission process until 10.30 WIB today. Registration is done online.	Number of the Jakarta Online Zoning System registrants	The Jakarta Online Zoning System phenomenon
#SahabatDisdik, the following is the Jakarta Online registration mechanism. This online registration will be carried out simultaneously for all levels of education, starting from 11 June-10 July 2020. Let's support the Jakarta Online Zoning System by staying at home.	This online registration information will be carried out simultaneously for all levels of education, starting from June 11 to July 10 2020.	Registration mechanism
Please answer it. How about this, huh? As far as I understand, the numbers I have input are correct. When I was in school, I read like that. I don't know if the web is wrong. Really, will my younger brother go to high school, gap-year?	Website error	The Jakarta Online Zoning System problems
This is not just slow, is there a problem with the new student admission system or not, admin? There is a notification "Currently it is not a registration schedule"???? The Jakarta Online Zoning System is not just this year, but it's not like this.	System problem	The Jakarta Online Zoning System problems
New Student Admissions in Kepulauan Seribu began to be implemented by a number of schools from elementary, junior high to high school levels online or by coming directly to schools while still paying attention to health protocols.	Registration in Kepulauan Seribu is online, or you can come directly to schools while still paying attention to health protocols.	Registration Mechanism
The server of Jakarta Junior High School admission has an error, so people want to register online that can't be fixed @aniesbaswedan, @DKIJakarta, @Disdik_DKI	The Jakarta Online Zoning System server error	The Jakarta Online Zoning System problems
Dozens of parents came to the Jakarta city hall to protest the implementation of the Jakarta online zoning system. They demanded that the zoning phase be carried out the day after tomorrow was selected based on distance, not age. #CariBeritaditvOne #diRumahNontontvOne #PPDBOnline	Parents' protests with the age-based the Jakarta Online Zoning System mechanism	The Jakarta Online Zoning System problems
Mimin would like to share this Frequently Ask Questions related to the Jakarta Online Zoning	Mimin wants to share Frequently Asked Questions	Registration Mechanism

System Pre-Registration, which will be held from June 11, 2020 to July 3, 2020. Come on, take a moment to read.		
Because there are children at a young age who have good grades and who really learn to lose competing in the Jakarta Online Zoning System with older children, it becomes hopeless for the value they get because learning is really not used in The Jakarta Online Zoning System competition.	Parents protest with a zoning system based on age	The Jakarta Online Zoning System problems
Residents complained about the difficulty of accessing the Jakarta Online Zoning System DKI Jakarta. Complaints came from residents who were conveyed via Twitter social media regarding the difficulty of accessing the Jakarta Online Zoning System site.	The Jakarta Online Zoning System website is difficult to access	The Jakarta Online Zoning System problems
Easy to do via cellphone! The following is the official Jakarta New Student Admissions page for the 2020/2021 school year https://ppdb.jakarta.go.id/#/	Registration is easier because it can be via cellphone	Registration Mechanism
Private schools take advantage of the minimum age requirements in the Jakarta Online Zoning System to attract new students with achievements. Several private schools, such as SMA Muhamadiyah 4 Cawang, East Jakarta, have begun to increase the number of classrooms for new student enrollments.	Private schools take advantage of the minimum age requirements in The Jakarta Online Zoning System to attract new students with achievements	The Jakarta Online Zoning System phenomenon
This afternoon, the PDI-P Faction received complaints from students' parents regarding the Jakarta Online Zoning System. This aspiration was accepted by the councils as well as several boards from Commission E, such as Mr Jhonny Simanjuntak and Mrs Waode Herlina.	The PDI-P faction received complaints from students' parents regarding the Jakarta Online Zoning System	The Jakarta Online Zoning System problems
Hai #SahabatDisdik, the following information for #SahabatDisdik who have pre-registered or submitted a token, please listen to it.	Information for those who have pre-registered or submitted tokens	Registration Mechanism
KLIK http://ppdb.jakarta.go.id, these are the ways and conditions for registering the Jakarta Online Zoning System SD for the Outer DKI Jakarta route	The official website of the Jakarta Office and the requirements for registering The Jakarta Online Zoning System outside Jakarta	Registration Mechanism
The Jakarta Online Zoning system @DKIJakarta drains electability energy	The Jakarta Online Zoning System is energy draining	The Jakarta Online Zoning System phenomenon
The Jakarta Education Agency adds the Jakarta Online Zoning System Pathway to Bina RW, Crying Private School https://suara.com/news/2020/07/15/110041/disdik-dki-tambah-ppdb-jalur-zonasi-bina-rw-sekolah-swasta-menjerit?utm_source=twitter.dlvrit&utm_medium=twitter&utm_campaign=suaradotcom…	Private schools are screaming because of the addition of the 2020 Jakarta Online Zoning System quota	The Jakarta Online Zoning System phenomenon
The chaos about the New Student Admissions in Jakarta is still ongoing. Nahdiana, Head of Jakarta Education Agency, said that his party added a new route for the Jakarta Online Zoning System, namely the School RW Community Development Zoning route. #TopNewsMetroTV	Addition of the Jakarta Online Zoning System route with the Bina RW Zoning	The Jakarta Online Zoning System phenomenon

There are still people who try to extortion even though all the mechanisms are all online. Please the Jakarta provincial government to respond to residents' reports of extortion attempts in The Jakarta Online Zoning System, route RW.	Person who tries to extortion at the Jakarta Online System Zone Bina RW	The Jakarta Online Zoning System phenomenon
Hallo #sahabatdisdik, Student acceptance based on grades was socioeconomic bias. If received based on zoning and date of birth, students from wealthy (rich) and poor (poor) families have the same opportunity to go to school. Why? because from kindergarten to high school level is Education for all. If you want to enter Higher Education, then it is a privilege: it can be values based. Come on, see the following video that describes the opinion above https://facebook.com/801289353407025/posts/1448071568728797/	The reason for the Jakarta Online Zoning System philosophy is age-based, according to the Jakarta Education Office	The Jakarta Online Zoning System phenomenon

Of the 100 types of tweets selected from the data reduction process based on the Jakarta *Online Zoning System* keyword, and after coding the table according to Saldana, the researcher then categorized the tweets into three types of narration. This can be seen in Table 2. The aim is to make it easier for researchers to see the aspirations of the community and the steps taken by the Jakarta Education Office regarding the 2020 DKI Jakarta new student admission Online policy.

Table 2. Twitting category

Types of Twitting	Definition	Example
Registration mechanism	A narrative that contains tweets about the time, website and also the registration requirements and methods	"*The Jakarta Education Agency has opened the New Student Admissions stage for the 2020/2021 school year. Want to know how and what are the requirements to register for the Jakarta Online zoning system? Check out the following article. https://smartcity.jakarta.go.id/blog/523/cara-mendaftar-ppdb-online-di-tengah-pandemi-korona…*"
Registration problems	A narrative that contains tweets about website errors or various types of zoning protests based on age	*"because there are children at a young age who have good grades and really in learning have to lose competing in the Jakarta Online Zoning System with older children, it becomes hopeless for the value they get because learning is not used in the Jakarta Online Zoning System competition."*
Phenomenon	A narrative that contains tweets about other than the Jakarta Online Zoning mechanisms or problems, examples of zoning reasons based on age or private school policies due to the zoning system.	*"Hallo #sahabatdisdik. Student admissions based on grades was socioeconomic bias. If it is accepted based on zoning and date of birth, students from wealthy (rich) and low-income families have the same opportunity to go to school."* *"The application of the minimum age requirement in the Jakarta Online Zoning System is used by private schools to attract new students with achievements. Several private schools, such as SMA Muhamadiyah 4 Cawang, East Jakarta, have begun to increase the number of classrooms for new student enrollments."*

Source: The data processed by the authors, 2021

Based on Table 2, after being analyzed based on the 100 tweets categorized by the researcher, the results are that forty-nine (49) tweets are included in the registration mechanism category, thirty-two (32) tweets are included in the Jakarta Online Zoning System problem category and nineteen (19) incoming tweets in the Jakarta Online Zoning System phenomenon category. This categorization makes it easier for researchers to analyze the contents of the narrative written on Twitter about the implementation of the

Jakarta Online Zoning System. Suppose tweets are analyzed based on problem categories. In that case, there are two problems in implementing the Jakarta Online Zoning System, namely websites that often have issues and age-based zoning, which causes many students who cannot enter public schools because of their young age though they are academically capable.
This is also similar to the results of interviews with the parents of the Jakarta Online Zoning System participants; here are examples of student parents' opinions as follows:

"Nia Budiyanti (42 years old) a housewife who participates in the Jakarta Online Zoning System, SMP (secondary) grade: Age as a benchmark for students to be accepted into school makes no sense so that children who are diligent and who have tried to get the best grades are mentally down as if the children's efforts and work are not appreciated".

"Yuanika (38 years old), a teacher who participated in the Jakarta Online Zoning System, SMP grade: The zoning area can be expanded, not only based on the village but also the basis of the sub-district, the value of school accreditation also needs to be considered, because those who have high scores are bona fide private schools".

"Yulianti Ratna Puspita (49 years old), a housewife who participates in the Jakarta Online Zoning System, SMA grade: Remove the age requirements for junior high and high school levels. You have passed the elementary level. At SD (elementary) grade, it's ok, and we use age".

"Rina Ernawaty (43 years old), a civil servant who participated in the Jakarta Online Zoning System, SD grade: Hopefully related to the system is more practical and system-free".

"Andry (39 years old) ASN who participated in the Jakarta Online Zoning System, SMP grade: To make a favourite school route."

From the analysis based on tweets and the results of interviews, the zoning policy based on age is a policy that needs to be evaluated because, in the field, it causes many polemics. This is also realized by the Jakarta Provincial Government so that through the Education Office considering the the Jakarta Online Zoning System implementation policy. According to researchers, the steps taken by the Jakarta Provincial Education Office have applied five of the eight steps in the decision-making process by Noorderhaven. This research does not examine all eight stages in evaluating public policies related to the implementation of the Jakarta Online Zoning System in 2020 so that it can be reviewed by other research.
According to researchers, the Provincial Government of Jakarta has conducted the Jakarta Online Zoning System policy evaluation process, when viewed from the eight steps in the decision-making process by Niels Noorderhaven as follows:

1. *Recognition* is a stage to recognize a problem that is not just fixated on the wild issues that develop in society. This is reflected in the 100 tweets for the categorization of the issues that found the existing issues were website errors and age-based zoning policies;
2. *The formulation* is the stage of formulating the problem. According to researchers, the Jakarta Education Agency has prepared that the age-based zoning policy polemic is the most urgent problem that must be resolved;
3. Goal setting, for this stage, the important thing is to find the common interest. According to researchers, the Jakarta Education Agency sees the critical issue "to accept more students".
4. Generating options is to collect alternatives solutions for the common interest. According to researchers, the Jakarta Education Agency tries to find the best solution "to accept more students" with a public school capacity.
5. *Evaluation options* are done by evaluating a situation. At this stage, according to researchers, the Education Office has evaluated "whether it still maintains the current Online Zoning System policy, namely Decree of the Head of Education Agency Number 501 regarding the Jakarta Online Zoning System Guidelines or to change them";
6. *The act of choice* is determining the best policy choice as a way to realize common interests. At this stage, the Jakarta Education Agency decided to change the rules but still use the age philosophy in the Jakarta Online Zoning System admission process, such as official tweets @Disdik_DKI:

   "Juni 21, 2020: Hello #sahabatdisdik. Student admission based on grades was socioeconomic bias. If accepted based on zoning and date of birth, students from wealthy (rich) and poor (poor) families have the same opportunity to go to school. Why? Because from kindergarten to high school level is Education for all. If you want to enter Higher Education, it is a privilege: it can be based on values. Come on, check out the following video that describes the above opinion https://facebook.com/801289353407025/posts/1448071568728797/.";

7. *Implementation* is the formal implementation stage of a policy in the community. On June 30, 2020, the Jakarta Education Office issued the Decree of the Head of the Jakarta Education Office Number 670 of 2020 concerning Amendments to the Decree of the Head of the Education Office Number 501 concerning Technical Guidelines for Admission of Students for the 2020/2021 Academic Year with the addition of RW development pathways and an extension of time. Based on the amendment to the Decree of the Head of the Jakarta Education Office year 2020, there will be additional community development pathways on July 7-9, 2020, as well as another student quota. Changes in the Technical Guidelines for the Students Admission for the 2020/2021 Academic Year cannot be denied due to pressure from the community. This is also reflected in the content of tweets on Twitter regarding the Jakarta Online Zoning System. As also written on the official website of the Jakarta Education Agency,

   "June 30, 2020: Confusion over the admission of new students in Jakarta is still rolling. Head of the Jakarta Education Agency Nahdiana said that his party added a new route for the Jakarta Online Zoning System, namely the Zoning route for School Community Development. #TopNewsMetroTV"

8. Controlling is the last stage of public policy. According to the researchers, society has done holding for this policy.

Conclusion

The old concept of thinking considers data through social media, one of which is Twitter, which is still not considered a basis for evaluating a public policy evaluation process. However, as the times have changed, there has been a substantial change in the way people participate and express opinions in a public policy evaluation process. Nowadays, the internet can be considered a new medium that considerably influences the policy evaluation process.

And now, this virtual community also has a big drive to change an issue as a real community. This is in line with this research that the internet has become a medium for the growth of virtual communities that actively participate in evaluating public policies. This research can be an alternative perspective for government where individual opinion can influence public opinion and work. However, crosschecks must also be carried out in data results and findings in the virtual world.

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