

Challenges of Vocational Teachers in Student-Teacher Interaction in Synchronous Online Learning in Indonesia

Maulana Noor Fajri Al Hajar*, Ade Gafar Abdullah

Pendidikan Teknologi dan Kejuruan

Universitas Pendidikan Indonesia

Bandung, Indonesia

*maulana_noor@upi.edu

Abstract—The COVID-19 pandemic has hit the world, and it has made learning to switch to distance learning. One type of distance learning is online learning. Indeed, when students and teachers conduct learning connected via the internet, it becomes difficult to interact, especially synchronously. The interaction of students and teachers is inevitable in learning. Therefore, this paper investigates the challenges confronted by vocational high school teachers when interacting with students through synchronous online learning. A qualitative approach and In-depth interview techniques were used on five teachers in the Agribusiness Processing Agricultural Products program. One of the challenges confronted by teachers in interacting synchronously is when students close their video cameras. There are various arguments and attitudes of teachers regarding this phenomenon. Teachers were astonished, concerned, and miffed. It is a form of disrespect for the teachers. Generally, teachers tolerate this phenomenon because of technical problems encountered by students, for example, weak signals and unsupported devices. Finally, one alternative to deal with this phenomenon is to implement varied platforms outside synchronous.

Keywords—*student-teacher interaction, synchronous online learning, vocational teacher, challenges, covid-19*

I. INTRODUCTION

Student and teacher interaction can be crucial in online learning. This type of interaction is a way to engage students in the study provided by teachers and instructors [1]. This engagement becomes essential because it is a way for students to promote quality learning [2]. Indeed, they can manifest themselves to maintain relationships between individuals, and that is to help the continuity of the study [3]. In addition, this interaction is to make sure that the students have correctly carried out the explanations and instructions provided by the teachers and instructors, then ensure the application has been done extensively, intensively, or adjusted to the needs of the students [4].

Related to the current learning conditions, there is an outbreak of a virus that attacks the human respiratory system

that spreads throughout the world, namely Coronavirus disease, otherwise known as Covid-19. Pandemic makes learning stop for a while, even changing from the generally face-to-face in the classroom, switching to face-to-face virtually/online. Student and teacher interactions are undertaken at a distance with the help of technology, including communication technology and the internet. Unfortunately, distance learning is still not commonly applied in Indonesia, especially in vocational education. Unlike the developed countries, one of which is the United States which has made the most contribution in distance education [5].

Then, learning in vocational education at the beginning of the pandemic period, there is feedback from vocational students, they give the impression that online learning is no more interesting than face-to-face learning [6]. Thus far, there are obstacles faced by teachers in using new technology in online classrooms [7,8]. In addition, other research results show that in online learning, students have a poor attitude, low self-discipline, and a bad learning environment [9–11]. Also, there are indications of failure in the student learning process and decreased student learning interest [12]. One of them is the failure of teachers in creating an online learning atmosphere, thus directing students out of online learning, it is caused by negative feelings when interacting with others [13]. Therefore, the separation of instructors or teachers with students makes involvement in online learning very important, and they can manifest the extent to which they maintain interpersonal relationships, and build an environment that allows students to share, feel safe, and respected [1,3,14].

Based on the background, the problem of the difficulty of student and teacher interaction based on student perspective has been done by previous research, one of the phenomena is that students during synchronous online learning still close many videos [15]. Unfortunately, there hasn't been much explored from a teacher's perspective, and even a teacher's challenges face his students remotely, especially online. Thus, this study will investigate the challenges that teachers face when interacting with their students in synchronous online learning. Selection of synchronous online learning based on

previous research that explains it is necessary to explore synchronous methods beyond text-based chat interactions, and participatory instructional delivery modes (asynchronous) [16]. This research contributes to providing an overview of the challenges vocational teachers face when interacting with students online in sync, and also understands the phenomenon of students closing video cameras based on the teacher's perspective.

II. LITERATURE REVIEW

A. Student-Teacher Interaction

Most studies use the term learner-instructor interaction to refer to the interaction between students and teachers. It is a form of two-way communication or dialogue or another type in helping the continuity of learning in a subject [17–20]. The interaction can be in the form of asking questions or communicating with teachers related to learning activities [21]. Some studies describe these interactions as teacher efforts to convey information (clarify the content of the material), encourage (direct interest, motivation, and support) students in learning, and provide feedback to minimize the impact of this distance learning [20–25].

B. Characteristics of Vocational Learning

Although the learning process in vocational education is not much different from general education in the form of theory and practice, the delivery of practice tends to be emphasized in vocational education rather than a theory [26–28]. Some studies reveal that the proportion of theory and practice in vocational education in percentage numbers is 30% for theory and 70% for practice [29,30]. This larger proportion of practical learning will influence learning approaches that will tend to lead more to skill mastery. Mastery of these skills is necessary to develop the potential and meet the needs of students who will face the corporate world and the industrial world, following the objectives of vocational education that prepare students' competence to face global competition in an innovative, creative and productive manner [27,28,31–33].

The achievement of optimal potential of students by vocational education objectives needs to prepare learning with clear and measurable goals [27], as well as learning materials that follow the development of the industry to always be able to achieve the competencies needed by the industry. Thus, the role of teachers also needs to master pedagogy specifically for vocational education or can be called vocational pedagogy [33]. Therefore, it is also necessary to pay attention to the balance of mastery of theory and practice of students to simultaneously achieve the target of mastery of theory and practice [34]. Silvana's opinion leads more to methods, strategies, or approaches that need to be developed. Thus, students are optimal in mastering theory and practice. One of the approaches that can be used can be problem-based in the hope that students can provide solutions to problems faced later in the business world and the industrial world (DU/DI) [33]. This problem-based approach can be done in online learning.

III. RESEARCH METHODS

This research uses a qualitative approach to understanding the challenges teachers experience when interacting with students in online learning. Naturally, this qualitative approach describes a particular phenomenon, process, or point of view from the perspective of the participant to understand his or her experience [35,36]. Thus, this study understands the challenges of teachers based on their experience when interacting with students online, and also online learning is still not well known in Indonesia, especially in vocational high schools.

A. Research Subject

The subject of this research is a teacher in Agribusiness Processing Agricultural Products (APHP) at SMK Pertanian Pembangunan Negeri Lembang. This field is one of the research subjects that can represent other vocational fields, this field emphasizes many parts of practice, especially with the use of industrial-scale tools. Then, the number of teachers in the field is as many as five people. Also, the subject criteria in this study are teachers who teach the subjects of vocational specialization C2 (basic skill program) and or C3 (skill competency program). These subjects become a characteristic in vocational education because they emphasize practical learning. However, there remains a theoretical learning section with a lower proportion. Also, this study further traces the interactions that may occur based on the composition of the learning.

B. Data Collection Techniques

To gain vocational teachers experience, data collection uses interviews conducted in semi-structured techniques to vocational teachers. Then, the interviews are conducted one by one directly by adhering to health protocols such as using masks and keeping a distance. Then, this type of semi-structured interview allows flexibility to find emerging concepts [20]. Also, research questions can be predefined and can be changed as the interview progresses [35]. The main question in the interview is "What are the challenges teachers experience when interacting with students online?". In addition, before conducting the interview, researchers provide an informed consent form. The form includes explaining the intent of the research, the duration of the interview, informing the plan for the use of interview results, and providing a summary of interview results [37]. Then, the length of the interview time to each vocational teacher is about 50-60 minutes. Then, the interview was recorded, and finally, a transcript was made after the interview was over. Finally, the research was stopped when there was no more new information [35]. As the Guest et al. study noted that there was no new information after interviewing twelve people out of sixty predefined information [38].

C. Data Analysis

Analysis of interview data refers to the steps expressed by Creswell [39] for validation of the accuracy of information consisting of 6 hierarchical steps from the bottom up as follows

[39]. First, sort and compile data from the field, and create interview transcripts; Second, read and give special notes to build the overall meaning of the field data; Third, the labeling (coding) of the segmentation of sentences and paragraphs into a category; Fourth, form smaller categories (category reduction); Fifth, a restatement with a narrative approach; and provide views from researchers and compare with theories to refute or support previous information.

Furthermore, credibility and consistency in this study are carried out to ensure the accuracy of data takes place during data analysis. There are various strategies applied to find out the credibility and consistency of the findings [39]. The strategies used in this study are peer debriefing and member checks. First, peer-debriefing conducted a raw data assessment and the results of the researcher's research analysis to another research colleague, a research associate reviewed that the data had made sense in the presence of evidence [35], and can also provide other interpretations to increase the credibility of research results [39]. Second, member checks are an examination of the initial analysis of researchers to informants who have been interviewed and ask the results of the preliminary analysis of the researcher is "rings true" [36].

IV. RESULTS

In times of pandemic, vocational high school teachers face new challenges as they do distance learning. One of them, they have to interact with students online in synchronous. In addition, various other challenges found in the field are described as follows.

A. Learning Facilities

Generally, vocational teachers at SMK Pertanian Negeri Lembang use the Zoom Meeting platform to conduct synchronous online learning. Then, the number of students is about 25-30 people in one class. Sometimes, the class is combined with other classes. Thus, synchronous online learning can be done simultaneously with the number of classes two to four classes.

Furthermore, the biggest challenge found in this study is the means to conduct online learning. Teachers feel that the implementation of learning is less than optimal when trying to provide learning materials, even to interact with those students when the internet signal owned by students is weak and the devices are less compatible. These two things also caused many students to choose to close their cameras. The closure of this camera has an impact on the smoothness of students when listening to learning materials from teachers through their devices, it makes the students' devices can be controlled when synchronous online learning takes place. Also, based on the results of the interview, the teachers explained that the students use many types of smartphone gadgets to do this synchronous online learning. Some teachers illustrate one of the reasons students close the camera when doing synchronous online learning, teacher D illustrates

"...While studying, try 'please open the camera (said teacher)', sometimes students open at the beginning and the end of the lecture, during lecture there is many reasons, 'if open the phone (it means camera phone) sometimes the phone turns off (said student)' and so forth. Many reasons like that. However, we try not to stop continuing until the appointed time." translated from Indonesia

Then, teacher E illustrated

"...But, there are times when the students had various conditions, whether it is the signal or his/her phone is not supported when they turn it on sometimes blank, there is also like that because I experienced from my class. If me, it is okay, it is understandable." translated from Indonesia

Then, teacher C illustrated

"...that's if we try to convey the material learning, usually is constrained by signal, whether it is signal (weak) from students, or me. If the weak signal from students, I have to explained again. Then, when I asked a question, some students still unclear the question, they were not heard, or the Powerpoint was not running or his/her voice was not heard. Then, I have to explain again, that is what constrains the learning process..." translated from Indonesia

Then, teacher B illustrated

"...yeah, that is the weakness, when (students) off cam, but when there are students on cam, it can be greeted and interact, and when students off cam, it is usually difficult because of the signal condition, 'ma'am! It is lagged (said student)', 'ma'am! The voice is unclear (said student)', just like that the condition." translated from Indonesia

Then, teacher A illustrated

"...But overall, in the end after that (after the lecture) there is a private chat (from student) for example. It is clear, 'ma'am! I can only listen to you because my phone there is the problem with the audio (microphone), and the camera (said student)', he/she said so, 'Oh, okay (said teacher)' I said..." translated from Indonesia

In addition, the study was able to describe the various feelings teachers felt when they saw their students close the camera. Teachers feel astonished, upset, worried, and feel ignored, and unappreciated when their students close the camera. Positively, the teacher feels that when doing this synchronous online learning, there are teachers who want to meet their students even online, and it is shown by opening the video cameras of their students. Here are some expressions of teacher feelings regarding students closing the video camera. Teacher B explained that

"...But on the other hand, there is a lot of concern like 'Ouch?! He/she follow my lecture? Does he/she understand

(the lecture), is it?' a... and the control can be seen from the assignment. Usually, late submission of the assignment can be seen. Maybe, not following (the lecture), not paying attention when video conference when learning...." translated from Indonesia

Then, teacher E explained that

"miffed (said teacher), It is has been informed. Usually, in the beginning, each of the classroom guardians has provided instruction from the Curriculum. in here, there is a learning contract when Zoom held, it is not allowed to off cam ..." translated from Indonesia

Then, teacher D explained that

"If students do not open the camera, we are like, especially me, my feelings are like talking to myself...." translated from Indonesia

Then, teacher A explained that

"... Anyway, I want to meet the kids (students). Sometimes, when i am on the way (laugh) so, sometimes I'm at a meeting where (somewhere)... like that. I keep Zoom with the kids (students). I think those are the challenges...." translated from Indonesia

Finally, the teachers respond to this by providing understanding and giving confidence to the students. As stated by teacher A who explained that

"...But, as much as possible, we can also find the reason why they (students) close their video camera... not to make excuses, I need to trust my students. Maybe from off cam there is a reason in itself that makes him/her can not be on cam, right?...." translated from Indonesia

Also, teachers give focus to students who do open video cameras, and that is one form of respecting a teacher.

B. Classroom Management and Instructional

Firmly, vocational teachers find it difficult to manage the time that has undergone reductions when online learning is synchronous. That is, vocational teachers have limited time when doing online learning. Initially, vocational teacher lesson hours when studying in the classroom range from four to ten hours of lessons with one hour of lessons equal to forty-five minutes. Meanwhile, during this synchronous online learning, teachers were only given two hours of lessons. Thus, teachers must prepare learning materials that are adjusted to the number of hours of the lesson. Finally, teachers provide the most important subject matter to learn when doing synchronous online learning, or teachers call it essential material.

In addition, during this pandemic. Teachers assign assignments to students with less burden and more collection time. Just like teacher B did.

"Then, the assignments are not excessive because the condition is online. Thus, for the delivery of the lecture, it is very minimum, the time is limited, also the assignment loosened so that they do not feel burdened, not too difficult. Thus, the quality of the assignment was slightly lowered because of adjusting their conditions as well...." translated from Indonesia

Also, with this limited time, the teacher is difficult to be able to provide material understanding to his students. Teachers agree that the time allotted to study online is lacking.

Furthermore, it was clear, teachers had to build engagement with their students, and maintain attention to their students. As stated by teacher A

"...when students and teacher have enthusiasm in learning, it tends to be able to maintain attention, the vigor during the learning process. That is the first thing I think would be ideal. Next, it maintains (the attention) well. First, it started engagement. Second, maintain its engagement. Ideally, it means that an hour-long activity, an hour and a half is not monotonous, it does not just explained continuously... and explain the answer...." translated from Indonesia

Then, the number of teachers interact with their students through discussion and question and answer (Q&A) between students and teachers. Unfortunately, the teachers explained the condition of the classroom when online learning was synchronized that the students when they entered the question and answer session they immediately silent and became silent. Finally, the teachers make an appoints with one of the students to answer the questions made by the teacher. As stated by teacher C

"...Maybe this is because the students are too long at home, less interacting with others. Thus, there are still some students when lecturing on Zoom Meeting, they silent, if we do not appoint (the students) to answer or ask a question" translated from Indonesia

Not only that, teacher A gives assumptions to his students who do not want to answer the question. *"...Sometimes, they do not want to answer or do not want to or do not to explain because they did not know, but sometimes because they are reluctant or they are afraid..."* (translated from Indonesia). Thus, during synchronous online learning, student and teacher interaction is more inclined to the teacher, the teacher as a start to liven up the atmosphere of discussion, and the nature of one-way from teacher to student.

C. Distraction

Vocational teachers feel distractions from outside create challenges when interacting with students in synchronous online learning. Teachers are disturbed when there is a meeting during learning hours. Then, the implementation of student practice exams, other assignments (teacher have to presentation

assignments outside of school). In addition, sometimes some teachers feel shifted focus when people are passing by in the room, even if there are people who have an appointment with the teacher. Also, explained by teacher E, “*Suddenly (laugh) meeting. Suddenly the meeting when online hours (teaching)... That's when I'm online, when else (give instruction with students), but I have to attend in meetings....*” (translated from Indonesia). Internally, the teacher feels uncomfortable when the preparation has not been good and feels that learning will not go well. As stated by teacher A, that is.

“...When I am not preparing well. Thus, there is a time, this is already Zoom but there are no media, for example. It is quiet (have to prepare). I need to be able to go on the spot for asking... finally, I looking for... ‘Okay, anyway today’s the lecture will be discussed about this (said teacher)’... Yeah, finally, I have to accept the risk if the student does not have activeness. It is from my internals, that is. If I am not preparing myself....” translated from Indonesia

V. DISCUSSION AND CONCLUSION

The biggest challenge for vocational teachers in interaction is the learning facilities used by students to perform synchronous online learning. Teachers illustrate a lot such as weak signals and incompatible student gadgets that make the interaction process restrained. As it turns out, previous research also gave the results that weak internet signals are one of the reasons students close video cameras [15]. Then, the teachers have tried to make the learning atmosphere feel active by involving students to participate in discussions after the learning material session has been delivered. Unfortunately, the teachers have not felt connected to their students. Thus, teachers need to build an environment that allows students to share, feel safe, and respected and ask probing questions [14]. Also, teachers have feelings that are no different from students when interacting in online classes, especially the need for mutual respect. In addition, teachers are more worried about students who cannot understand the subject matter. Thus far, teachers assume that their students are afraid to answer, as is the possibility of interaction between teachers and students in the classroom according to Keaton and Gilbert, namely interactions in the classroom make some people (students) help create connections, and others are afraid to interact [20]. Finally, teachers use alternatives other than synchronous online to do learning. Teachers use asynchronous methods to help the weaknesses of online synchronous.

Furthermore, the teachers feel that the reduced lesson time makes the teachers have to give priority to the subject matter that needs to be conveyed to their students. Indeed, previous research also explained that the importance of teachers organize learning materials that can be done remotely/distance, and students can be realized the potential of every application in every subject matter delivered by the teacher [4]. Also, some activities that make teachers distracted in doing synchronous online learning that can make the lecture not sufficient, and there is no class for that day.

Finally, the challenges confront by teacher in interacting with students in synchronous online learning is learning facilities provided by students, one of the challenges is when students close their camera videos. There are various arguments and attitudes of teachers related to the phenomenon. The teacher felt astonished and miffed. Also, the teacher regards it as a form of disrespect for the teacher. Generally, teachers give tolerance related to that phenomenon because of technical obstacles confront by students such as weak signals, and unsupported devices. Then, in terms of classroom management and instruction, teachers need to manage the subject matter adapted to the needs of the students, and the time has been provided. Then, an outside distraction that kept the teachers distracted for a while and even absence of learning. For example, teachers meeting and people passing by. In the end, one alternative to dealing with the phenomenon is that various platforms out of the synchronous need to be applied.

REFERENCES

- [1] F. Martin, T. Sun, and C. D. Westine, “A systematic review of research on online teaching and learning from 2009 to 2018,” *Comput. Educ.*, vol. 159, no. April, p. 104009, 2020.
- [2] K. L. Krause and H. Coates, “Students’ engagement in first-year university,” *Assess. Eval. High. Educ.*, vol. 33, no. 5, pp. 493–505, 2008.
- [3] P. Kahn, L. Everington, K. Kelm, I. Reid, and F. Watkins, “Understanding student engagement in online learning environments: the role of reflexivity,” *Educ. Technol. Res. Dev.*, vol. 65, no. 1, pp. 203–218, 2017.
- [4] M. G. Moore, “Editorial: Three Types of Interaction,” *Am. J. Distance Educ.*, vol. 3, no. 2, pp. 1–7, 1989.
- [5] S. Kocdar, A. Bozkurt, and T. Goru Dogan, “Engineering through distance education in the time of the fourth industrial revolution: Reflections from three decades of peer reviewed studies,” *Comput. Appl. Eng. Educ.*, no. November, 2020.
- [6] B. Mulyanti, W. Purnama, and R. E. Pawinanto, “Distance learning in vocational high schools during the covid-19 pandemic in West Java province, Indonesia,” *Indones. J. Sci. Technol.*, vol. 5, no. 2, pp. 271–282, 2020.
- [7] V. J. Callan, M. A. Johnston, and A. L. Poulsen, “How organisations are using blended e-learning to deliver more flexible approaches to trade training,” *J. Vocat. Educ. Train.*, vol. 67, no. 3, pp. 294–309, 2015.
- [8] B. Azhari and I. Fajri, “Distance learning during the COVID-19 pandemic: School closure in Indonesia,” *Int. J. Math. Educ. Sci. Technol.*, pp. 1–21, Feb. 2021.
- [9] W. Bao, “COVID -19 and online teaching in higher education: A case study of Peking University,” *Hum. Behav. Emerg. Technol.*, vol. 2, no. 2, pp. 113–115, 2020.
- [10] C. L. Chang and M. Fang, “E-Learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic,” *J. Phys. Conf. Ser.*, vol. 1574, no. 1, pp. 0–5, 2020.
- [11] Y. Wang, J. Ma, G. E. Kremer, and K. L. Jackson, “An investigation of effectiveness differences between in-class and online learning: an engineering drawing case study,” *Int. J. Interact. Des. Manuf.*, vol. 13, no. 1, pp. 89–98, 2019.
- [12] A. H. Arribathi, Suwanto, A. Miftakhu Rosyad, M. Budiarto, D. Supriyanti, and Mulyati, “An Analysis of Student Learning Anxiety During the COVID-19 Pandemic: A Study in Higher Education,” *J. Contin. High. Educ.*, vol. 0, no. 0, pp. 1–14, 2021.

- [13] K. Phirangee, "Students' perceptions of learner-learner interactions that weaken a sense of community in an online learning environment," *Online Learn. J.*, vol. 20, no. 4, pp. 13–33, 2016.
- [14] J. Thormann and P. Fidalgo, "Guidelines for Online Course Moderation and Community Building from a Student's Perspective," *MERLOT J. Online Learn. Teach.*, vol. 10, no. 3, pp. 374–388, 2014.
- [15] F. R. Castelli and M. A. Sarvary, "Why students do not turn on their video cameras during online classes and an equitable and inclusive plan to encourage them to do so," *Ecol. Evol.*, vol. 11, no. 8, pp. 3565–3576, 2021.
- [16] L. C. Yamagata-Lynch, "Blending online asynchronous and synchronous learning," *Int. Rev. Res. Open Distrib. Learn.*, vol. 15, no. 2, Apr. 2014.
- [17] P. F. O'Leary and T. J. Quinlan, "Learner-instructor telephone interaction: Effects on satisfaction and achievement of online students," *Int. J. Phytoremediation*, vol. 21, no. 1, pp. 133–143, 2007.
- [18] Y. Kuo, A. E. Walker, B. R. Belland, and K. E. E. Schroder, "A predictive study of student satisfaction in online education programs," *Int. Rev. Res. Open Distrib. Learn.*, vol. 14, no. 1, p. 16, Jan. 2013.
- [19] W. N. T. W. Hussin, J. Harun, and N. A. Shukor, "A Review on the Classification of Students' Interaction in Online Social Collaborative Problem-based Learning Environment: How can we enhance the students' online interaction?," *Univers. J. Educ. Res.*, vol. 7, no. 9A, pp. 125–134, 2019.
- [20] W. Keaton and A. Gilbert, "Successful Online Learning: What Does Learner Interaction with Peers, Instructors and Parents Look Like?," *J. Online Learn. Res.*, vol. 6, no. 2, pp. 129–154, 2020.
- [21] A. Sher, "Assessing the relationship of student-instructor and student-student interaction to student learning and satisfaction in Web-based Online Learning Environment," *J. Interact. Online Learn.*, vol. 8, no. 2, pp. 102–120, 2009.
- [22] Y. C. Kuo, "Accelerated Online Learning: Perceptions of Interaction and Learning Outcomes Among African American Students," *Am. J. Distance Educ.*, vol. 28, no. 4, pp. 241–252, 2014.
- [23] D. F. Martin, F. Parker, M.A., & Deale, "Examining interactivity in synchronous virtual classrooms. The International Review of Research in Open and Distance Learning," *Int. Rev. Res. Open Distance Learn.*, vol. 13, no. 3, pp. 227–260, 2012.
- [24] E. Strachota, "The Use of Survey Research to Measure Student Satisfaction in Online Courses," *Midwest Res. Conf. Adult. Contin. Community Educ.*, no. 2000, p. 6, 2006, [Online]. Available: http://www.umsl.edu/continuingeducation/mwr2p06/pdfs/D/Strachota_Use_of_Survey_Research.pdf.
- [25] E. Alqurashi, "Predicting student satisfaction and perceived learning within online learning environments," *Distance Educ.*, vol. 40, no. 1, pp. 133–148, 2019.
- [26] E. Çolak and D. Kaya, "Learning Approaches of Vocational High School Students: Grade Level and School Type Influences," *Procedia - Soc. Behav. Sci.*, vol. 116, pp. 1556–1561, 2014.
- [27] M. B. Triyono, "The Indicators of Instructional Design for E-learning in Indonesian Vocational High Schools," *Procedia - Soc. Behav. Sci.*, vol. 204, no. November 2014, pp. 54–61, 2015.
- [28] Suharno, N. A. Pambudi, and B. Harjanto, "Vocational education in Indonesia: History, development, opportunities, and challenges," *Child. Youth Serv. Rev.*, vol. 115, no. September 2020, p. 105092, 2020.
- [29] S. Supriyati, D. Antoni, and M. Akbar, "The Feasibility of Information Technology Infrastructure according to the Regulation of the Minister of National Education No.40 of 2008: A Case Study at SMK Palembang City," *Int. J. Inf. Syst. Informatics*, vol. 1, no. 1, pp. 50–60, 2020.
- [30] M. S. Wati and I. W. Djabatmiko, "Analysis stage in the development of a virtual laboratory electric motor installation for vocational high schools," *J. Phys. Conf. Ser.*, vol. 1833, no. 1, 2021.
- [31] D. Sutrisna and M. S. Barliana, "Readiness of Vocational School Students to Facing Global Competition," vol. 299, no. February 2018, pp. 550–556, 2019.
- [32] S. Astarina, M. S. Barliana, and D. C. Permana, "Implementation of project-based learning method to increase transferable skills of vocational high school students," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 830, no. 2, 2020.
- [33] I. Widiaty and A. Ana, "Vocational Pedagogy in Perspective Vocational High School Curriculum," *Proc. 3rd UPI Int. Conf. Tech. Vocat. Educ. Train.*, vol. 14, pp. 97–100, 2015.
- [34] T. S. Silvana, Ekohariadi, I. G. P. Buditjahjanto, T. Rijanto, Munoto, and L. Nurlaela, "Study of the implementation of online learning models in vocational schools," *J. Phys. Conf. Ser.*, vol. 1810, no. 1, 2021.
- [35] D. Ary, L. C. Jacobs, and C. K. Sorensen, *Introduction to Research in Education*. Cengage Learning, 2018.
- [36] S. B. Merriam, *Qualitative Research A Guide to Design and Implementation*. San Francisco: John Wiley & Sons, 2009.
- [37] J. Creswell, *Riset Pendidikan Perencanaan, Pelaksanaan, dan Evaluasi Riset Kualitatif & Kuantitatif*, 5th ed. Yogyakarta: Pustaka Pelajar, 2015.
- [38] G. Guest, A. Bunce, and L. Johnson, "How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability," *Field methods*, vol. 18, no. 1, pp. 59–82, 2006.
- [39] J. Creswell, *Research Design Qualitative, Quantitative, and Mixed Method Approaches*, Third Edit. Sage Publications, 2013.