Chapter 13

Technology-Based Teaching-Learning to Support Education Facing Post-Pandemic Era

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A. The New Era of Teaching-Learning Processn

COVID-19 is no longer something new to talk about. It has disrupted every sector, including education (Wiyono et al., 2021). Since the beginning of pandemics, Work from Home (WFH) and Study from Home (SFH) has become the norm, especially for service organizations. Following government instructions, the learning process cannot be done face-to-face to meet the health protocol, affecting academic delivery. All levels of education, from elementary to tertiary institutions, were forced to adopt "a new era" to continue the teaching-learning process. Therefore, they had to find new ways of academic delivery, and virtual classes were the method the government chose to proceed with.

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Teachers use Information and Communication Technology (ICT) to deliver lectures. ICT in education is closely related to the learning methods used by teachers by using technology that processes information so that it becomes something meaningful when given to students (Dewi et al., 2020). The information conveyed by the teacher can be presented in the form of teaching materials. Teachers try to offer educational information in such a way so that students can easily accept it.

The role of ICT is crucial in processing teaching materials as a form of information so that it is attractive, easy to accept, and easily accessible. The goal is that every student has the same opportunity to receive and understand the information. Not only students but teachers also found using ICT in teaching pleasurable. For instance, teaching English is very suitable to be combined with ICT. ICT can also make learning more enjoyable, encouraging teachers to innovate knowledge delivery (Dewi et al., 2019).

As the situation began to improve, teaching gradually returned offline. Schools can conduct face-to-face learning as long as a strict health protocol is followed. This protocol includes a temperature checking routine for students and teachers upon arrival, a strongly recommended vaccination program, a mask within the school premises, a limited number of students per class, and a limited instruction time of approximately 4.5 hours per class per day. This protocol strongly affects how teachers plan a lesson, especially in choosing the best strategies to maximize the brief instruction time. Even though schools worldwide are ready to provide face-to-face learning, ICT can still be used in online and blended learning regarding its benefits in teaching-learning.

However, can all teachers and students be able to use ICT properly? Can all schools afford internet access to support the use of ICT? Do teachers have adequate teaching strategies to face teaching-learning in the post-pandemic era? Therefore, it is worth investigating the benefits and challenges of ICT use in teaching-learning, the effectiveness, the

continuation, and the suggestion to support education facing the post-pandemic era in Indonesia.

B. Technology-Based Teaching Learning

Studies on technology-based teaching-learning have been increasing since the COVID-19 pandemic forced schools to provide online learning. Scholars found its benefits and challenges to teachers and students, its effectiveness, and the continuation of tech-based teaching-learning. Moreover, this section also discusses the current education situation in Indonesia and its relation to tech-based teaching-learning.

1. The Evaluation of Tech-Based Teaching-Learning

This section discusses technology-based teaching-learning in the COVID-19 pandemic and post-pandemic era. Research that narrates COVID-19 is rapidly growing in SCOPUS indexed online database. The title search term "COVID-19" or "Coronavirus" with the topic field has been used as a keyword and limited to South Asian Countries. A total of 4,236 publications from January 2020 to September 2020 have been downloaded and analyzed under various categories (Yernagula, 2020).

The research areas mentioned in the study are medical, science, engineering, and education. The finding shows that scholars have kept investigating the issues related to the COVID-19 pandemic in every aspect. Moreover, the number of research publications is increasing because people worldwide believe it is time to prepare for the post-pandemic era. Currently, the trend in the education area is "post-pandemic education," where there are 76 publications regarding that topic in Scopus indexed online from December 2020 to January 2022.

If we talk about technology-based teaching-learning, what mainly comes to mind is ICT use in classrooms. ICT use in the classroom is significant for providing attractive, accessible, and acceptable teaching-learning materials in the information age. The latest technologies give the perspective to support education through the curriculum and offer

effective interactions between students and teachers (Dawes, 2001). Not only that, the COVID-19 pandemic crisis eventually made it no choice for educators but to leverage online education technologies and applications. That information at the fingertips needs to be utilized thoroughly but carefully to ensure that although students cannot attend school to seek knowledge, the knowledge can still be adequately conveyed to them via various mediums or platforms (Christopher & Weng, 2020).

Regarding various platforms, Wiyono et al. (2021) showed that lecturers in study programs used multiple kinds of online communication media, with the highest frequency of use is WhatsApp, and then Email, Sipejar-Assignment, Google Meet, Google Classroom, Zoom, and Quizizz. At the same time, the lowest used are BigBlue Button, Schoology, Team Viewer, Kahoot, and Nearpod.

During the lockdown, schools were forced to conduct online distance teaching-learning. Conventional teachers were also urged to use technology-based in their virtual classes. Students learned how to perform on various platforms. ICT can be beneficial on one side but challenging on the other, before or during the COVID-19 pandemic. On the one hand, Dewi et al. (2019) found that ICT use in teaching-learning helped teachers innovate in knowledge delivery, ease them in preparing teaching materials and make learning very enjoyable. It was added by Samorodova et al. (2021) that teachers recognize training in video creation as the most effective method to shape students' creative skills. According to the students' opinion, that activity also has the most significant learning effect and stimulates creative abilities, allowing the educative process to be more exciting and efficient.

On the other hand, tech-based teaching-learning seemed challenging to several teachers. Incorporating ICT into teaching and learning is a complicated process, and anyone might experience several difficulties, commonly known as "barriers" (Schoepp, 2005).

A study found that the fundamental barriers faced by the teachers occurred due to the lack of teachers' competency in operating comput-

ers, which eventually led to having negative experiences in teaching English using ICT. The negative experiences include the failure to adapt software in teaching materials, students' reactions toward the ICT materials, such as violating copyrights, and lesson time loss due to technical problems. Moreover, the barriers were also found at the institutional level, where were occurred due to a lack of effective ICT training and Internet access speed (Dewi et al., 2020).

2. The Effectiveness and the Continuation of Tech-Based Teaching-Learning

Besides evaluating the benefits and challenges of tech-based teaching-learning, we need to investigate its effectiveness, especially during the COVID-19 pandemic and the continuation of the ICT use implementation in the post-pandemic era. The purpose of investigating the efficacy and the tech-based teaching-learning continues to measure how helpful the ICT is in education, figure out how teachers and students accomplish teaching-learning differently during the pandemic and see how schools intend to prefer the teaching-learning method in the future post-pandemic era.

An analysis of the most used teaching method in a foreign language and its effectiveness showed that most teachers believe that training video creation is most effective for shaping students' creative abilities. Based on the students' opinion, that learning activity has the most significant learning effect and stimulates their creative skills, representing the educative process as more exciting and efficient (Samorodova et al., 2021). The research proves how the ICT use could help teachers and students meet the teaching-learning goals and give a creative space for both to make the learning experience more stimulating.

Besides teachers' perspectives, there is also essential to investigate the effectiveness from students' point of view since the significant challenge for virtual learning is learner engagement. Yalagi et al. (2021) found that most feedback from a survey involving 73 students is satisfactory. More than 83% of the learners have given positive

feedback towards this technological teaching change. Learner's engagement has improved to 30%. This encourages both students and teachers to better delivery and learning. It shows how virtual learning enlightens self-directed learning and participative learning. Even though the teacher is satisfied with this mode, preparing the learning material takes considerable time.

Also, Sukiman et al. (2021), analyzing the effectiveness of on-line learning at bachelor's, master's, and doctoral degrees of Islamic Religious Education as a reference to develop a learning pattern post-COVID-19 pandemic, found that online learning at doctoral degrees was the most effective. However, bachelor's and master's students tend to have face-to-face or hybrid learning. Therefore, the hybrid learning model is the most appropriate for the students post-COVID-19 pandemic. Meanwhile, the proportion for each mode in the hybrid learning model should be adjusted to the students' characteristics, direction, educational orientation, ability, readiness, and autonomy at each level. However, his study is limited at the school, which does not require a lot of practical activities in the laboratory. The result may be different if the investigation is conducted at the programs requiring many laboratory practices, such as schools of Chemistry, Biology, and Physics for the bachelor's, master's, and doctoral degrees.

Al Fodeh et al. (2021) evaluated the quality and effectiveness of online dental education and students' perceptions and experiences of blended learning. In the pandemic era, blended learning should become the preferred method of education whereby theoretical knowledge is delivered through online tutorials, and clinical training is resumed on-site to ensure dental graduates' competency while maintaining the dental team's safety. Current facilities and course designs should be improved to improve students' experiences with blended learning.

Two decades ago, blended learning was relatively new in higher education and corporate settings. In higher education, the term "hybrid course" was often used before the emergence of "blended learning." However, the most held position is that blended learning

environments combine face-to-face and technology-mediated instruction (Graham, 2005; Graham et al., 2003, cited in Graham, 2009). This definition highlights the ongoing convergence of two archetypal learning environments: the traditional face-to-face (F2F) and the distributed (or technology-mediated) environments.

Regarding the continuation of implementing tech-based teaching-learning, there are several investigations. Dolenc et al. (2022) investigated a qualitative and quantitative difference in the use of ICT programs and applications before and after the distance learning due to the pandemic and examined the continuance intentions of teachers in terms of using the resources tested in Forced Online Distance Teaching after reopening of the universities. He found that most teachers understood asynchronous teaching as providing teaching materials and instruction to be completed outside the lecture period. Only a minority filmed their lectures or accompanied their teaching materials with recorded explanations. The pattern is the opposite of that in synchronous teaching. Also, several ICT applications used for communication (e.g., email and Moodle) were used continuously during the lockdown and will continue to be used by lecturers in the future. On the other hand, specialized software items (e.g., Padlet, Kahoot) that had not previously been used were not used during the crisis and probably will not be used in the future.

In addition, at a global level, Garcia et al. (2021) studied the factors that influence the implementation of distance education in the pandemic context. There is difficulty in internet connectivity, access to technological and digital equipment and infrastructure, and student-teacher relationships. The incapability to establish appropriate technology for distance education eventually created weak digital literacies in education and socio-economic contexts. It is concluded that the trend has been increasing in using ICT to support educational activities. However, at the same time, access to these media is limited, leading to complex educational processes under the distance mode, which requires expanding the search for strategies to minimize the

difficulties imposed by reality. The hybrid model was then found as the best alternative.

We can say that virtual or online learning is like the two sides of a coin, one side is that ICT use in learning is beneficial, but the other side is the issues that teachers face. Teachers need considerable time to prepare learning materials and competency to perform well in tech-based teaching-learning.

3. Education in Indonesia

The Republic of Indonesia, with a wide geographically and hetero-geneous socio-cultural area, requires reasonable efforts to overcome various problems, including education issues in the Foremost, Out-ermost, and Disadvantaged Regions (Terdepan, Terluar, Tertinggal) known as the 3T Area. Since independence, education has been one of the national goals mentioned in the preamble to the 1945 Constitution (Undang-Undang Dasar 1945). The existence of national education is stated in the body of the 1945 Constitution, namely article 31, paragraph 1, which states that every citizen has the right to receive a proper education.

Moreover, Sustainable Development Goals, stated in "Transform-ing Our World: The 2030 Agenda", are set to create justice and peace worldwide. Indonesia, among 193 nations, signed the Sustainable Development Goals (SDG) at United Nations General Assembly in September 2015. The SDG has a "No One Left Behind" philosophy with 5P ideologies of People, Planet, Prosperity, Peace, and Partner-ship. To achieve the SDGs goals in Indonesia, Presidential Regulations Number 59 the Year 2017 was issued (Muharikah, 2021).

SDGs are an essential reference in the Medium-Term National Development Plan (Rencana Pembangunan Jangka Menengah Na-sional) 2020–2024, in which the education sector is one of the plans. Indonesia plans to (a) improve the quality of teaching-learning, (b) provide equitable access to education services and implement of 12-year Mandatory school (Wajib Belajar 12 Tahun), (c) improve teachers' professionalism, quality, management, and placement, (d) develop

education quality between regions and school levels, and (e) improve education management and funding.

Indonesia is an archipelagic country; many challenges still need to be tackled to achieve equal distribution of education. Although this country guarantees that all citizens can receive a formal education, the 3T area still would be the last priority from the government to receive proper education, both physical and non-physical services (Arkiang, 2021). Improvements in facilities, teaching staff, and remote areas access must be taken with comprehensive steps (Sulfasyah & Nur, 2016 cited in Arkiang, 2021). Since the pandemic struck, formal education should be inclusive, and the public has become a private sector exclusive to 3T areas that must implement distance education. Concerning distance learning, how do teachers in the 3T area survive to deliver knowledge to students? A study showed that early in the pandemic period, in East Nusa Tenggara (NTT), 71% of students used offline learning such as books and student worksheets, 4% had online learning that required an internet connection, and 25% did not have any learning materials provided by the teachers (Arsendy, 2020).

Online learning is one of the solutions to activate teaching and learning, considering that face-to-face meeting is at risk during the pandemic. However, this mode of teaching-learning became important issues in several areas in Indonesia, especially in the 3T area. Suppose the problems are not solved shortly. In that case, one of the plans from the Medium-Term National Development Plan (Rencana Pembangunan Jangka Menengah Nasional) 2020-2024 cannot be achieved.

C. Teachers' Perspectives and Needs

It is significant to evaluate the teaching-learning in Indonesia during the COVID-19 pandemic and toward the post-pandemic period. The instruments used to collect data were systematic reviews, questionnaires, and interviews. First, a systematic review was made of the scientific productivity around the study variable in Scopus and Web of Science databases. The inclusion criteria were research articles

published in scientific journals with the keywords "education in the COVID-19 pandemic" from December 2020 to January 2022. Second, the questionnaires aimed to see the teacher's perspective on online and blended learning and the teaching-learning needs in post-pandemic time. Last, a structured interview with teachers in the 3T area is titled to remoted areas in Indonesia. The interview was organized to get valid data from respondents who chose "Never run online teaching-learning" and "No internet connection at all." Chats or phone calls were used to conduct the interview.

The object of the survey is for teachers who teach all levels of education in Indonesia, from early childhood until higher education, to see their perspectives on their experiences using ICT in online learning. The questionnaires were shared via several social media platforms: WhatsApp, Instagram, and Facebook. The respondents are from Aceh, Jakarta, Depok, Bekasi, Serang, Kolaka, Katingan, NTT, Alor, and Flores. Proper responses were taken from 33 respondents working as teachers and lecturers in Indonesia. The improper response was considered when the respondents gave different information with related questions, such as saying "Yes" for teaching in the 3T area but wrote, "Teaching in Bekasi" (Bekasi city is not one of 3T regions). The interview participants were five teachers who teach in the 3T area.

The participants are teachers and lecturers with various levels of educational background from bachelor's, master's, and doctoral graduates. Based on the data, most respondents work in primary schools (39.4%) and universities (36.4%). Meanwhile, the minority participants work at a kindergarten, private courses, and vocational schools. Even though the characteristics for each level of education are different, it does not matter because the survey is merely to measure the effectiveness of ICT in online learning during the pandemic and teachers' reference towards the post-pandemic chapter.

Globally, due to lockdown, schools were forced to provide distance learning. Teachers were also urged to use technology-based in their virtual classes. ICT use in teaching-learning became a trend. Several platforms and mediums, such as Zoom and Google Meet,

have been used widely to support teaching-learning. The data showed that Zoom, WhatsApp, and Google Meet were platforms used by Indonesian teachers with the highest frequency with 66%, 62%, and 48%, respectively.

Table 13.1 The Frequency of Mediums or Platforms Used by Teachers

| Media/ Platform	Frequency of use
Zoom	66%
WhatsApp	62%
Google Meet	48%
Google Classroom	31%
Email	24%
School e-learning system	21%
Quiz	17%
Kahoot	3%
Google Forms	3%

Source: Author

The diagram below shows that 35.3% of survey respondents were teachers in the 3T area.
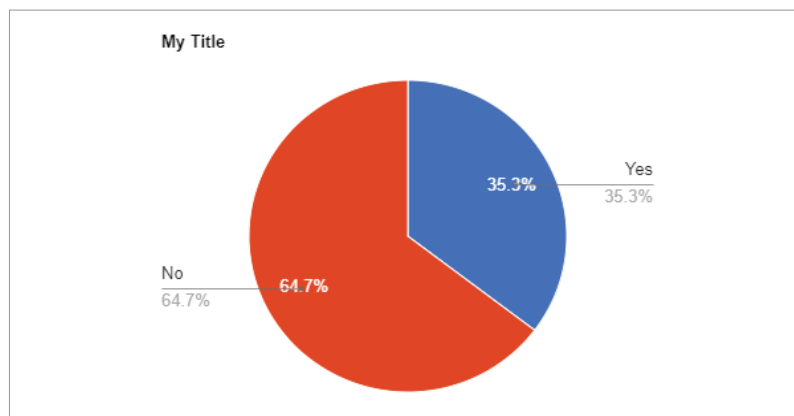
Source: Author

Figure 13.1 Teachers Teaching in 3T area and non-3 T area

The respondents who teach in 3T areas are 58.33% from East Nusa Tenggara, 8.3% is from Aceh, and the same percentage is respectively from Aceh, Central Kalimantan, South Kalimantan, Southeast Sulawesi, and West Nusa Tenggara, and 20.6% of respondents stated that they "never run online teaching-learning."
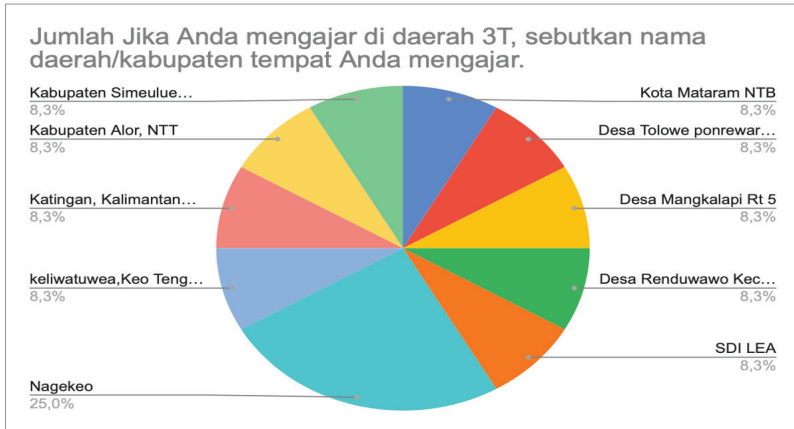
Source: Author

Figure 13.2 Demography of Respondents from 3T Area

Meanwhile, 15% of the respondents, who teach in 3T areas, answered "no internet connection at all," and 5.6% answered "inadequate ICT facility," which led to 20.6% of the respondents confessing that they have not had online teaching-learning experience. The study also intended to see any issues in online/blended learning faced by teachers during the lockdown. As shown in Table 13.2, the internet connection and improper ICT facilities are teachers' most significant issues in Indonesia.
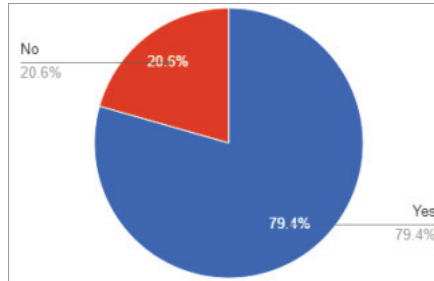
Figure 13.3 Respondents who Have Online Teaching-Learning Experience

Table 13.2 Issues in Online/Blended Learning

Issues in online/blended learning	Frequency
Internet connection issue	56%
Inadequate ICT facility	41%
Teacher's competence in ICT use	9%
Student's competence in ICT use	26%
Plagiarism/fraud issue	32%
Virtual Class management	35%
No significant issues	9%

How to provide distance teaching-learning if an internet connection is unavailable? To investigate the problem, a structured interview was conducted with a respondent from Nakegeo, East Nusa Tenggara, one region of the 3T area. The respondent revealed how schools run teaching-learning during the COVID-19 pandemic by sending teachers door-to-door to give and pick up learning materials to students' houses. Teachers walked or rode a boat across the river to each house. They did this because the internet connection is unavailable in the region, and most parents do not have mobile phones and computers. In addition, respondents from Hulu Sungai Selatan, South Borneo, and Alor Islands also respectively exposed how difficult to access the

internet. Sometimes they can access it, sometimes they cannot, due to poor connection. The situation caused trouble in knowledge delivery using online mediums/platforms.

Identifying the possible problems with integrating ICT technologies in schools, a strategy to improve the quality of teaching and learning should be employed carefully. It is significant to see what strategy teachers need to adopt to improve the quality of teaching-learning activities. Below is the data showing how teachers cope with their issues in teaching-learning and what teachers' expectations are in the future.
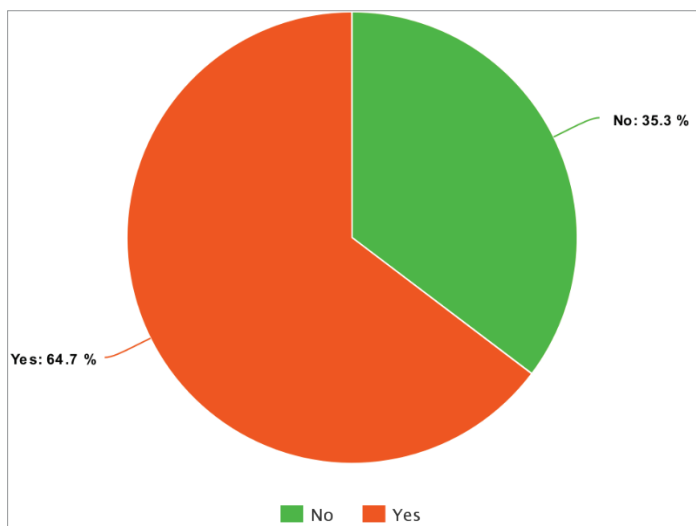

**Figure 13.4** Teachers' Perception of the Issues in Online Teaching-Learning

From Figure 13.4, we can interpret that 35.3% of respondents cannot handle the online learning issues independently; they need help from the institution they work at and from the government.

Table 13.3 Teachers' Expectations

Teacher's expectation	respondents
Internet access	62%
Proper ICT facility	65%
Teachers training in ICT use	76%
Students training in ICT use	50%
no help needed	3%

From Table 13.3, it is shown that from 100% of respondents, the highest teacher's expectation is, unexpectedly, for "Teachers training in ICT use," where the expectations also come from 64.7% of respondents who chose "They can deal with their online learning issues independently." Moreover, the second and third highest expectation is for "Proper ICT facility" and "Internet access" with 65% and 62%, respectively. The data describes that most teachers still need help improving their ICT use competence and access to good internet connection and proper ICT tools.

Regarding teacher training in ICT use (Figure 13.5), 57.6% of respondents attended the government's training, school/institutions they work at, and other organizations. Surprisingly, as shown in Table 13.4 below, only 28% of respondents from that percentage experienced the teacher's training organized by the government. It is still biased to confirm whether the government held a small number of teachers or only a small number of respondents who could attend the government's training. A further study is needed to investigate the phenomena.
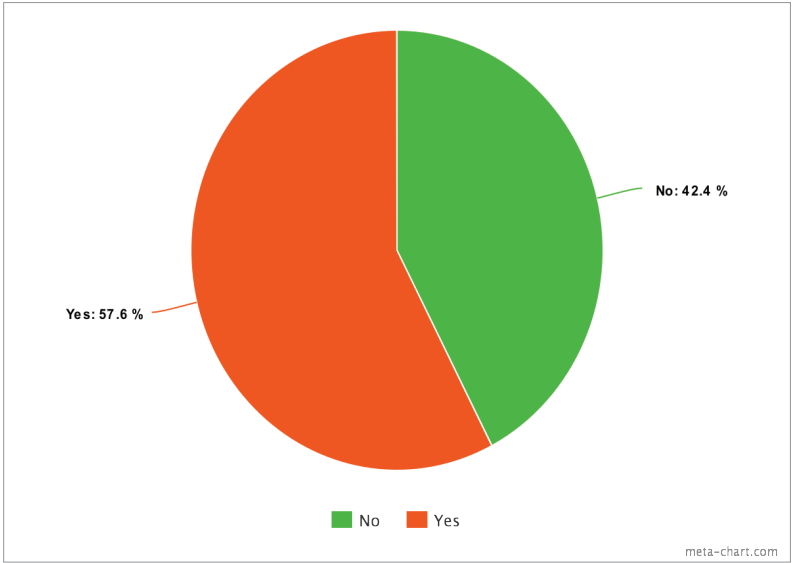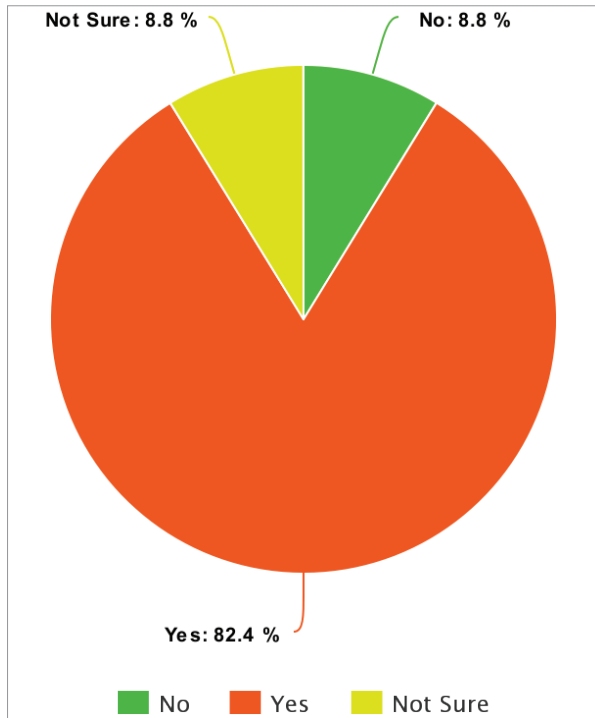
Source: Author

Figure 13.5 Teacher's Training Experiences

Table 13.4 Teacher's Training Organizers

| Teacher's Training Organizer	Respondent's experience
Government	28%
School/ institutions	34%
other organizers	38%

Source: Author

To see how teachers continue implementing online/blended learning towards post-pandemic time, the survey also revealed teachers' perception of their motivation to apply online/blended learning in their classes. From Figure 13.6 below, most teachers are motivated to continue the current teaching-learning method, while only a small number of respondents are not motivated and unsure of continuing.

Not Sure: 8.8 %   No: 8.8 %

Yes: 82.4 %

No   Yes   Not Sure

Source: Author

Figure 13.6 Teacher's Motivation for Online/Blended Learning

Besides the teacher's motivation, it is also significant to explore what teaching-learning method is the most doable and applicable in schools. Based on the data from Table 13.3, we can see that the most critical issue is not a teacher's competence but the internet access and ICT facility. As shown in Figure 13.7 below, 55.9% of respondents admitted that blended learning is the most applicable in their schools. In comparison, 41.2% urged face-to-face learning, only 2.9% agreed to run their classes in any learning method, and no respondent preferred solely online learning from the survey question.
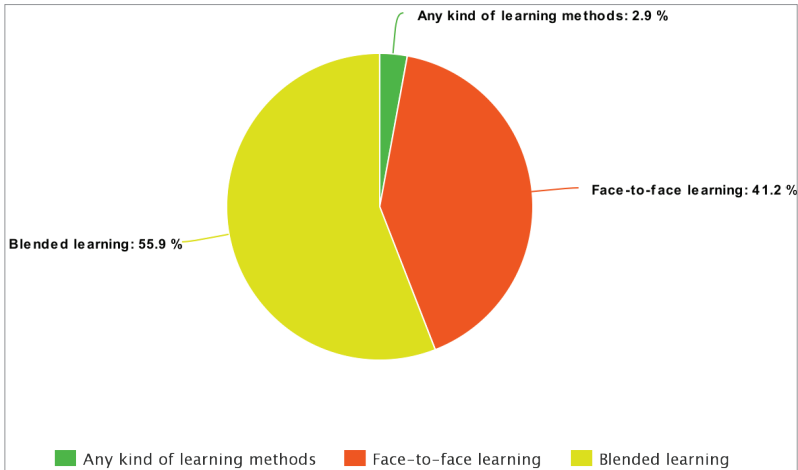
Source: Author

Figure 13.7 Applicable Teaching-Learning Method in School

D. Conclusion and Policy Implication

From the data analysis, it can be concluded that teachers tend to use Zoom, WhatsApp, and Google Meet as ICT tools to conduct teaching-learning during the COVID-19 pandemic period. Unfortunately, 20.6% of the respondents confessed that they do not have an online teaching-learning experience because 15% cannot afford an internet connection, and 5.6% have inadequate ICT facilities. Internet connection and improper ICT facilities are the most significant issues teachers face in Indonesia, especially those who work in the 3T area.

As an illustration, without internet access, schools in Nakegeo, East Nusa Tenggara conduct teaching-learning by sending teachers to students' houses door-to-door to give and pick up physical learning materials by walking for miles or riding a boat across the river. It was done because the internet connection is unavailable in the region, and most parents do not have mobile phones and computers. In addition, respondents from Hulu Sungai Selatan, South Borneo, and Alor Islands also respectively exposed how difficult to access the internet. The

situation caused trouble in knowledge delivery using online mediums/ platforms. Therefore, the government needs to support the internet and ICT facility in schools in remote areas.

Regarding online learning issues, 35.3% of respondents cannot cope with the issues independently; they need help from the institution they work at and from the government. Even though a large number of respondents believe they can handle the issues, still, the highest teacher's expectation is, unexpectedly, for "Teachers training in ICT use" with the second and third highest expectations being for "Proper ICT facility" and "Internet access" with 65% and 62% respectively. The data describes that most teachers still need help to improve their ICT use competence and demand access to good internet connection and proper ICT tools.

This chapter exposed how teachers demand training in ICT use to improve their tech-based teaching-learning. Surprisingly, only 28% of respondents experienced the teacher's training organized by the government. It is still biased to confirm whether the government held a small number of activities for teachers or only a small number of respondents who could attend the government's training. A further study is needed to investigate the phenomenon, but at least the study indicates that government should provide more teachers' development training all over the country, from big cities to remote regions.

To implement the most doable and applicable teaching-learning methods in schools, blended learning is considered the most practical, followed by face-to-face learning. By analyzing the effectiveness, the possible issues, and the expectations in teaching-learning during and after the COVID-19 pandemic, a solution can be considerably taken by all parties; teachers, schools, and the government.

References

Al Fodeh, R. S., Alhawadni, A. M. S, Alhajja, E. S. A, Hani, T. B., Ali, K., Daher, S. O, & Daher, H. O. (2021). Quality, effectiveness, and outcome of blended learning in dental education during the COVID pandemic: Prospects of a post-pandemic implementation. *Education Sciences, 11*(12), 1–19.

Arkiang, F. (2021). Analisis pembelajaran daring selama pandemi COVID-19 di daerah 3T (NTT). *Jurnal Pendidikan. 12*(1).

Arsendy, S. (2020). *Riset dampak COVID-19: Potret gap akses online 'belajar dari rumah' dari 4 provinsi.* The Conversation. https://theconversation. com/riset-dampak-COVID-19-potret-gap-akses-online-belajar-dari-rumah-dari-4-provinsi-136534

Christopher, C. & Weng, W. (2020). *Mitigating the economic shocks of COVID-19; protect our workers.* KR Institute.

Dewi, S. P., Abdillah, A. A., & Sofa, N. (2019). Persepsi dosen terhadap penggunaan ICT dalam pembelajaran bahasa Inggris. *Epigram, 16*(2), 169–174.

Dewi, S. P., Abdillah, A. A., & Sofa, N. (2020). *Lecturers' perception towards the barriers of the ICT use in English teaching.* Proceedings of the 8th Annual Southeast Asian International Seminar (18–21).

Dolenc, K., Šorgo, A., & Ploj-Virtic, M. (2022). Perspectives on lessons from the COVID-19 outbreak for post- pandemic higher education: Continuance intention model of forced online distance teaching. *European Journal of Educational Research, 11*(1), 163–177.

García, C. E., Rodríguez Román, R., Sosa Aparicio, L. A., & Alva Olivos, M. A. (2021). De la educación a distancia en pandemia a la modalidad hibrida en pospandemia. *Revista Venezolana de Gerencia, 26* (96), 1154–1171.

Graham, C. R. (2009). *Blended learning models.* Encyclopedia of Information Science and Technology.

Muharikah, A. (2021). *Sekilas pandang tujuan pembangunan berkelanjutan nomor 4. Indonesia emas berkelanjutan 2045: Kumpulan pemikiran pelajar Indonesia sedunia.* LIPI Press.

Samorodova, E. A, Belyaeva, I. G., Birova, J., & Kobylarek, A. (2021). Technology-based methods for creative teaching-learning of foreign languages. In Bylieva, D., & Nordmann, A. (Eds.), *Technology, innovation, and creativity in digital society. Lecture Notes in Networks and Systems, 345.* Springer.

Schoepp, K. (2005). Barriers to technology integration in a technology-rich environment. *Learning and Teaching in Higher Education: Gulf Perspectives, 2*(1), 56–79.

Sukiman, Haningsih, S., & Rohmi, P. (2022). The pattern of hybrid learning to maintain learning effectiveness at the higher education level post-COVID-19 pandemic. *European Journal of Educational Research, 11*(1), 243–257.

Yernagula, R. (2020), Significance of Research Growth and Narratives of Covid-19 from SCOPUS Scientific Database on South Asian Countries: Examining Through Syntometric Study. *Proceeding of Three-Day International Virtual Conference on Pandemic, Humanity and Education.* 1-6

Wiyono, B. B., Indrasweri, H., & Prestiadi, D. (2021). *The use of technology-based communication media in the teaching-learning interaction of educational study programs in the pandemic of COVID 19.* The 11th IEEE International Conference on Electronics Information and Emergency Communication (103–107).

Yalagi, P. S., Dixit, R. K, & Nirgudde, M. A. (2021). Effective use of online teaching-learning platform and MOOC for virtual learning. *Journal of Physics: Conference Series, 1854*(1)*,* 012019.