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EARLY VIEW

The "Silver Lining" of The Pandemic: The Development of English Teachers' Technological Competency during The Emergency Remote Teaching in Indonesia

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Abstract: Along with turmoil in human life, COVID-19 brought opportunities for English teachers to develop their technological competence. English teachers' technological competence is needed to bring more effective teaching and assessment. This qualitative study attempts to shed light on the development of English teachers' technological competence in Banyumas as the effect of the COVID-19 pandemic. The research questions are: 1) how is the teachers' technological competence before the pandemic; 2) how is their technological competence during the pandemic?; and, how is the comparison between the two conditions?. Six English high school teachers participated in this study. They were selected through a purposive sampling technique to give the needed information for the purpose of the research. Data were collected through virtual interviews, observations, and documentation. The data were then analyzed through Substitution, Augmentation, Modification, and Redefinition model (SAMR) developed by Puentedura (2011). The results exposed that the teachers' technological competence before the pandemic is in the stage of Substitution and Augmentation. When the pandemic strikes and they had no way but to integrate technology, their competency increases into the Modification stage. However, activities belonging to the Redefinition stage were not shown. The development of teachers' technological competence is seen as the "silver lining" of the pandemic. The limitation of this research lies in the small number of sample that the result could not represent generalization. Also, this research focuses on the performance of the teachers without investigating the factors that influence their action such as age, gender, training, and school facility.

Keywords: Emergency remote teaching, technological competence, SAMR Model

INTRODUCTION

The beginning of year 2020 to the end of year 2022 recorded one of the most grieving periods in humanity, *i.e.* the emergence and wide spread of COVID-19 (Xu et al., 2023). The fast transmitting virus, coupled with the inadequacy of empirical study to develop its medication obliged people to lessen contacts with others. Consequently, public spaces are closed, roads are blocked, and mass activities are banned.

Education is one of the most severely affected sectors by the condition (Öçal et al., 2021). Policies for emergency remote teaching (ERT) were taken by authorities. Information and Communication Technology (ICT) became the artery of education that it was hardly possible for schools to maintain education without it. As a result, teachers' pedagogical and technological competences were put forward that even the most technophobic teachers do not have any options but to integrate ICT into their teaching (Mouw et al., 2023).

To maintain the ERT and to ensure that the learning goes as expected, teacher's technological competence is very essential. Teachers' technological competence had become a rising issue in the educational research even before the pandemic time, especially along with the emergence of discussion regarding education in the 21st century (Saavedra & Opfer, 2012). The interconnected of information and communication around the globe, as aided by the advent of ICT and the Internet, has raised awareness in the importance of digital literacy (Kereluik et al., 2013). The awareness gained prominence when the COVID-19 pandemic pressed educators to find ways for ERT (Yen & Nhi, 2021). Therefore, investigating teachers' technological competence is important not only exclusive for the pandemic context but also for the teaching in the 21st century context in general.

Discussing the development of teachers' technological competence covers topics on its measurement. To measure the development of teachers' technological competence, the Substitution, Augmentation, Modification, and Redefinition (SAMR) model developed by Puentedura (2011) could be used as an instrument (Hockly et al., 2014; Nair & Chuan, 2021; R. Puentedura, 2014). SAMR model serves to categorize the ICT integration into enhancement level (substitution and augmentation) and transformation level (modification and redefinition). The substitution stage is when the pre-service teachers use ICT without much change such as using a word processor to do assignments instead of paper. The augmentation stage is when they use ICT and make minor changes such as using slide shows with animated figures rather than whiteboard and pictures. The modification stage is when they make major changes to the materials to be compatible with technology such as giving quizzes on Kahoot! and Quizziz. Finally, the redefinition

stage is when they transform the teaching into an activity that cannot be done without ICT such as synchronous distance collaboration through Google Docs or Padlet (Hockly et al., 2014; Puentedura, 2011).

The SAMR model has received currency among researchers in technology integration into education. It is seen by many to capable of measuring teachers' technological competence as well as assisting professional training (Hamilton et al., 2016). Such as Jude et al. (2014) who employed the model to investigate the ICT integration process at a university; Aldosemani (2019) who used the model to better navigate the professional development training of in-service teachers; Romrell et al. (2014) who showed sample activities for each stages of the model on mLearning; and Bicalho et al. (2022) who investigated how 116 teachers in Brazil utilized technology through the model. Hamilton et al. (2016) doubted the appropriateness of the model for measurement since the model emphasized outputs rather than process. But Blundell et al. (2022) proved otherwise after reviewing 230 academic publications. They posit that the SAMR model also involves processes of teaching and learning.

In the context of Indonesia, the shift of teaching mode from face-to-face to ERT during the COVID-19 pandemic faced a number of problems especially for teacher educators and pre-service teachers such as lack of knowledge of virtual instruction, learning management system, and lack of self-discipline (Hermansyah & Aridah, 2021; Sumardi & Nugrahani, 2021). Inability of quick responses to the students and students' engagement are also serious problems of school that implemented the ERT (Nugroho & Haghegh, 2021). However, Cahyadi et al. (2021) point out that there is no severe problem found in any institutions which may implement ERT framed by three principles: simplicity, flexibility, and empathy. Learning in the ERT should be designed as simple as possible such as using low bandwidth applications, short video clips, etc. Besides, the learning should be flexible rather than strictly following a certain authoritative regulation. It is good to enforce some rules in the ERT, but when the rules result in burdens rather than supports, then the rules should be evaluated. Moreover, in the uncertain time, teachers should emphasize empathy to the problems encountered by the students (Cahyadi et al., 2021). Furthermore, to achieve significant impacts on the students, teachers' motivation also has a pivotal role although it still needs exploring in term of teacher strategy, experience and beliefs to know how teachers can thrive during the ERT (Moorhouse & Kohnke, 2021). The development of EFL teachers' technological competence as the side effects of the pandemic has not much been investigated. Therefore, it is worthwhile to learn that the COVID-19 pandemic did not only bring crisis, anxiety, and frustration. There is also a "silver lining" brought by it, namely the development of teachers' technological competency.

The purpose of this research is to shed some light on the development of the teachers' technological competence in the regency of Banyumas as the effect of the COVID-19 pandemic. Three research questions are formulated to achieve the above-mentioned purpose. They are 1) How is the teachers' technological competence before the pandemic? 2) How is their technological competence during the pandemic? 3) What is the comparison between the two contexts?

METHODS

This research employed a qualitative approach. The complexity of the phenomenon requires digging deep into the subject being involved rather than formulating generalizations. The research took place for four months from January to April 2022. Six in-service English as Foreign Language (EFL) teachers in the regency of Banyumas were invited as the informants of the research by implementing a type of purposive sampling namely maximum variation sampling. This sampling type is aimed at gathering small sample but has the ability to represent the diversity of the larger group (Yildirim & Simsek, 2008). Therefore, the location and accreditation category of the participants' schools are described. They expressed readiness to participate in this research when a letter was sent to the MGMP (regional subject teacher group) in December 2021. Subsequently, a formal consent declaration document was signed. Their names were masked and replaced with pseudonyms. Their schools were not mentioned. These were to ensure the confidentiality of their identity.

Table 1. Respondents of the research

Respondents of the research					
Pseudonym	Age	Education background	Length of teaching	Location	Accreditation category
Armand	24 y.o.	BA in English Education	2 years	Urban	A (excellent)
Bulan	53 y.o.	BA in English Education	> 6 years	Semi rural	A (excellent)
Siti	50 y.o.	BA in English Education	> 6 years	Rural	B (good)
Dario	24 y.o.	BA in English Education	2 years	Urban	A (excellent)
Ernest	36 y.o.	BA in English Education	> 6 years	Semi rural	A (excellent)
Feri	30 y.o.	BA in English Education	> 6 years	Rural	B (good)

Data were collected through semi-structured interviews on Zoom. Questions were oriented to how they teach English during the pandemic and, how they compared it with the pre-pandemic situation. Five questions were used as the basic guide of the interview. Additional questions that popped up during the interview were addressed to deepen information. The duration of the interviews varied ranging from 30 to 40 minutes. Non-participant observation and documentation were employed as the triangulation to assure

the reliability of the data. The researchers entered the virtual classes on Zoom for two times for each respondent (12 times in total) with no interference to the class activity. An observation checklist with SAMR indicators adapted from Drugova et al. (2021) and Jude et al. (2014) was used. The observation checklist consisted of descriptions whether the teachers' actions are regarded as Substitution (S), Augmentation (A), Modification (M), or Redefinition (R). Besides, documents namely syllabus, lesson plans, and teaching materials were analyzed. The interview data were transcribed by using the automatic transcription in Zoom. Then, codes were given to statements showing teaching practices by using technology. The coded data were then gathered to the categories of SAMR model. The observation data were subsequently added. The coded data were then separated into two themes/contexts: "before the pandemic" and "during the pandemic". Finally, the two datasets were compared to see the changes in the informants' technological competency. See figure 1 for the overview of the research procedure. The limitation of this data collection is the inability to do observation to the classes before the pandemic since the time was already passed.

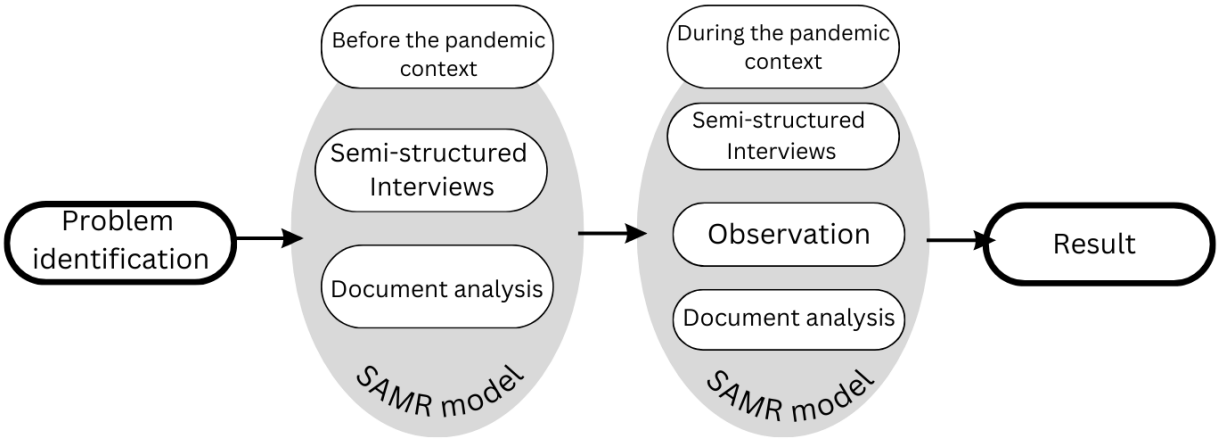

Figure 1. Overview of the research procedure

FINDINGS AND DISCUSSION

This section is presented to show how the teachers integrated technology in two contexts: before the pandemic and during the pandemic and see whether there was a development according to the SAMR model. The explanation in both contexts covers their action and written documents in the preparation, implementation, and evaluation of the English classes.

Teachers' Technology Integration into English Teaching before the Pandemic

The respondents stated that their teaching preparation always involved technology harnessing. Before the commencement of an academic year, they prepared paper works for teaching which include a syllabus, annual and semesterly programs, and lesson plans. In preparing the mentioned documents, they utilized technology such as Personal Computer (PC), laptops, and mobile phones. The applications used for the work were Ms. Word, Ms. Excel, Ms. PowerPoint. Google and Youtube were used to find additional materials.

> "I use the standard procedure. Nothing is new. Software like Microsoft word, and Microsoft excel are used to organize the teaching programs and prepare materials" (Armand).

> "I receive a bundle of teaching administration (paper works) from the MGMP (group of subject teachers in a region). I develop everything from the bundle. I copy, paste, add, and omit stuff from the bundle and made it mine. In doing so, I use only Ms. word. Are there any other applications?" (Siti).

> "I adopt materials from the available textbooks published by Erlangga and LPPI (state publishing agency). I also search materials on Google so I can add something that has more connection to the students" (Bulan).

> "I sometimes search for videos on Youtube. I download them and keep them for my teaching material inventory" (Dario).

The interviews further revealed that the respondents had little technology integration into their teachings in the classroom. Laptops and projectors were two technologies all respondents mentioned. They used the two to present slides as a substitution for whiteboards and also to project pictures and video files. No other forms of new technologies were mentioned.

> "I use a laptop and a projector quite frequently" (Feri).

> "Laptop is very important for teaching, I combine it with a projector and a speaker" (Siti).

> "A portable speaker with Bluetooth technology is very important for teaching listening" (Armand).

In their lesson plans, a laptop and a projector were often mentioned by the respondents. The two technologies were very basic for all teaching purposes as it was mentioned for teaching all skills of English. A Bluetooth-ed portable speaker was added for teaching listening.

As for evaluation, all respondents mentioned printed question sheets as their favorite medium for assessment. They compiled question sheets on Ms. Word, printed them out, and gave them to the students.

> "In the evaluation process, I compile a question sheet on Ms. Word, print it out, and give them to the students in the classroom"(Armand).

> "I only implement paper-based assessment" (Bulan).

> "I know there are many websites for assessment but the paper based ones [showing piles of answer sheets] are very convenient for me" (Dario).

A few technologies were mentioned in the lesson plans for doing assessment. Ms. Power point and projector were mentioned in Dario's lesson plan. They were used for giving prompts for speaking tests. A portable speaker was mentioned by all respondents for listening tests. There was no mention of any new technologies for assessment such as Google form, Edulastic, Flipgrid, Quillion, and so on.

The interview and documentation data revealed that before the pandemic, teachers did not take much advantage of the technology in the preparation, implementation, and evaluation stages of their teaching. What they did was compiling teaching administration with the help of Ms. Word and Ms. Excel. This action fell in the stage of Substitution since technology was used to replace traditional media (Puentedura, 2014). In the implementation of the teaching, the respondents took little use of technology. Often they replaced the use of whiteboards with in-focus projectors. They also did not find real pictures in magazines or newspapers, they searched for them on Google instead. Performing these jobs was seen as the Augmentation stage since they modified minor aspects of the teaching (Puentedura, 2014). The evaluation was done entirely paper-based. There was no significant use of technology in the evaluation stage. Hence, this stage does not regard to any of the SAMR model. Though technology was seen to have benefits to enhance teaching, it was not very much utilized before the pandemic. This finding is in sync with those of Ayçiçek & Karafil (2021) and Kılıçkaya (2023) whose respondents stated that technology integration was a matter of preference before the pandemic.

Changes in English Teaching When the Pandemic Struck

In an effort to respond to the pandemic many schools in Banyumas regency provided training in technology integration as an addition to the regular teacher development training. Some applications such as Learning Management System (LMS) and video editor were introduced to the teachers. There was a school that has cooperation with a notable book-publisher, the teachers of which were assisted by the publisher in preparing for the semester. The teachers were given a bundle of teaching administration, trained, and evaluated. In the context of the pandemic, the respondents expressed to have modified their teaching and used applications such as Pearson software, Google Classroom, YouTube video, and Google workspace.

> "We were trained how to create video contents and how to edit them" (Armand).

> "We were trained how to use Google Classroom" (Bulan).

> "The publisher acted fast, they trained us how to prepare lessons for synchronous and asynchronous classes" (Siti).

The respondents expressed that as soon as the lockdown policy was declared, the teachers received online professional development training employing both synchronous and asynchronous modes. Google meet and Zoom were two prevalent applications. The way the teachers prepare the teaching administration (paper works) had likewise migrated to online modes. They compiled syllabus and lesson plans cooperatively on Google Docs.

The respondents expressed to have transformed the materials in virtual formats such as pdf., doc., ppt., audio, and video files. New technologies utilized for the emergency remote teaching (ERT) were WhatsApp, Telegram, Google Classroom, Google Form, Video manager, Edulastic, Pearson software, and Youtube. The teachers expressed that they decided to use the popular and easy-to-operate platforms. Some of them, especially the younger ones, did know other new technologies but they believed that the knowledge of how to use simple technologies for many activities is more essential than the knowledge of various applications with little use.

> "I think the creativity of teachers will decide if an application is effective or not. So, it not the matter of various applications, it is the use for learning" (Dario).

> “I know other applications. I just prefer to use the more popular ones so we do not need to learn something new” (Ernest).

> "I prefer applications that everybody knows" (Feri).

Some changes in teaching were observed. At the beginning of the ERT, all respondents implemented synchronous learning by using videoconference applications such as Zoom, Google Meet, and Microsoft Teams attempting to replicate the face-to-face mode. The synchronous mode of online teaching was possible when the teacher and students present at the same time (Rehn et al., 2016) they could brainstorm, discuss, and make interaction in distanced places (Grammens et al., 2022). The respondents stated that at first, they and their students enjoyed the perks of the ERT. They enjoyed the ERT since they did not have to move from their homes, they wore formal clothes only in parts that were visible on camera, and they could do other jobs while doing the teaching. However, as time went by, synchronous RT was found exhausting. Sitting and looking at a screen for a daylong was tiring. It required high bandwidth which gave more financial burdens to them. The learning was then changed into asynchronous modes. Teachers pre-recorded their teachings, uploaded the video on Youtube, and sent the video’s link to their class’ WhatsApp Group together with a link to a Google form quiz.

> “It was very hard. I did everything to assist my students to study at home. First, I did videoconferences. It was costly both for me and for the students. Than I moved to asynchronous classes, I prerecorded videos and send the link to the students. At that point, I don’t have a control whether or not my student watch the video” (Siti).

> “I had videoconferences, it was good to see my students on screen. After some times, they complain about the cost for videoconferences. One-hour session could consume 1GB of credits. Then I changed it into asynchronous classes” (Dario).

Some respondents were observed to be resilient with the challenges of synchronous teaching. Given the high cost of videoconference, some of them utilized low bandwidth applications such as Telegram to reduce the cost but kept up with the synchronous teaching. The teachers separated the materials into small chunks, sent it to the class’ Telegram group one by one along with explanation in voice notes while continually checking the students’ responses by giving stimuli such as “send your favorite stickers!”, “raise your hand!”, and “replay to this poll!”.

> "Some low bandwidth apps could facilitate synchronous ERT, I used Telegram group and send my materials in slides, one by one while maintaining the students attention by asking simple questions, such as 'raise your hand!', 'send emoticons', and so on" (Ernest).

As for the evaluation, the summative and formative tests were done virtually. All respondents mentioned Google form and Google Classroom as the most convenient tools and two of them mentioned Edulastic as an additional tool. Edulastic was viewed as a more integrative and accommodating tool for evaluation. Further, they mentioned Google Classroom as the most convenient tool for giving essay tasks and receiving the students' works.

> "For evaluation, I use Google Form. It is very convenient since it could give the results immediately after finishing the quiz" (Bulan).

> "In our school, beside Google Form, we use Edulastic. It is far more convenient than Google Form" (Siti).

> "I don't use platforms other than Google Form. I was thinking of using Kahoot! and Quiziz. It turns out that they are good only for games not for evaluation" (Dario).

> "Google Classroom was used in my class for task submission" (Feri).

The lesson plans were crafted following the face-to-face mode of teaching with little modification. The remote teaching was not explicitly mentioned. The shortage of the teaching duration as well as the materials were also not mentioned. However, more technologies were mentioned such as Google Classroom, Youtube, Google Meet, Zoom, and Google Form. When asked about the minimum modification made to the lesson plans, the teachers replied:

> "Our principal mentioned that it was not necessary to modify our lesson plan. The online learning was not done only in emergency. It will return to normal mode eventually" (Siti).

> "The authority did not require us to modify the lesson plan" (Armand).

> "Since online teaching is emergency we are not asked to describe what we do in online teaching in the lesson plan" (Bulan).

Analysis on materials showed that the workload of the class activities was shortened. Some enrichment activities especially those related to speaking and listening were not delivered. This was because the ministry of education regulated that the teaching should put individual safety and capitals first, the teaching duration was therefore shortened (Kemendikbud, 2020).

The "Silver Lining" of the Pandemic: the Development of Teachers' Technological Competency

The technological competency of the respondents in the preparation stage during the pandemic for teaching did not record any development compared to the pre-pandemic time. It was steady in the Substitution stage since they used technology to replace traditional media (Jude et al., 2014; Nair & Chuan, 2021; Puentedura, 2014) such as using e-book instead of printed book, working on Google docs instead of Microsoft word. The increase was recorded in the implementation and evaluation stages of the teaching. There was an increase from Substitution to Augmentation and Modification. For example, the use of videoconference tools, the transfer of file formats, the use of Google Classroom, Google Forms and Edulastic met the description of Augmentation stage. Moreover, the strategy to do synchronous teaching with low bandwidth applications by separating materials into small clips and hooking the students' participation with simple stimuli were the respondents' action to do major modification to the classes, hence regarded as Modification stage (Jude et al., 2014; Nair & Chuan, 2021; Puentedura, 2014).

This development was the result of their resilience against frustration caused by the pandemic which was seen by Pawan et al. (2016) as the natural behavior of a true teacher. Teachers' professional and personal roles, technology integration, and uncertainties were among the stressors during the pandemic (Kim et al., 2021; Robinson et al., 2023). Nevertheless, they were grateful that the hard time was a "silver lining" of the "dark cloud", they were forced to learn new technologies and approaches to facilitate teaching in the uncertain time. As a result, they developed knowledge and skills in technology that felt practical so that they could jump and reach higher objectives in teaching. When asked to compare their teaching during the pandemic to that before it, the respondents stated:

> "In the beginning, it was very stressful for us and the students. We were lack of technological competence and facility, we could not help our students directly, and we did not know when the pandemic would end. However, education must go on, we tried to find any possible means to make students study" (Armand).

"I think my ability in teaching with technology has increased. I never used Zoom, Google meet, Google classroom, and so on before the pandemic" (Feri).

"It was a 'silver lining' of the pandemic. In the one hand, I feel frustrated from the sudden shifts, but on the other hand, I got to learn how to teach with technology" (Bulan).

Data from interviews, observations and document analysis did not show the highest stage, namely Redefinition. The respondents did not perform action that change the course of the teaching to be compatible with technology (Puentedura, 2014). This was not reached because of the insufficient technological training and affordance of the teachers. Krajka (2021) stated that unless the teachers are trained intensively in technology utilization or are exposed to the high intensity of technology use, they do not likely to show the Redefinition stage.

The documentation data did not provide much description on technology integration. The most frequently mentioned technologies for face-to-face teachings were projectors and laptops. The lesson plans for the remote teaching were compiled following the format of face-to-face teaching. The changes that happened due to the teaching-mode switch were not described extensively. Rahiem (2020) suggests that teachers need to formulate various plans for ERT so that if an approach was not successful, they were ready with other approaches. Krajka (2021) mentions that teachers' technological literacy for emergency teaching should be clearly reflected in the lesson plans. Please have a look to table 2 to see the development of the respondents' technological skills grouped into the stages of Substitution (S), Augmentation (A), Modification (M), and Redefinition (R).

Table 2. The respondents' technological skill comparison in the two contexts

Teaching phase	Technological skills before the pandemic	Stage	Technological skills during the pandemic	Stage
Preparation	• The teachers (Ts) prepared teaching plans, designs, worksheets, and assessment on Microsoft Office (Ms. Word, Ms. Exel, Ms. PowerPoint). • The Ts looked for additional materials on Google for teaching reading and writing and Youtube for teaching listening and speaking.	S, A	• The Ts prepared teaching plans, designs, worksheets, and assessment on Microsoft Office (Ms. Word, Ms. Exel, Ms. PowerPoint). • The Ts collaboratively prepared teaching plans and assessment on Google Docs. The Ts took videos of them teaching the subject on smartphones and edited it on Kinmaster.	S, A, M

Implementation	• The Ts used LCD projector to teaching with slides. The Ts used a bluetooth-ed portable speaker for teaching listening.	S, A	• The Ts sent materials, gave assignment, and received the students' (Ss) works on Google Classroom. • The Ts taught synchronously on Zoom and Google Meet. The short videos were uploaded on Youtube, and the links were sent to the Ss' Whatsaapp and Telegram groups.	S, A, M
Evaluation	• Paper-based test and quizzes	None	• The Ts prepared quizzes on Google Forms. • Some Ts used Edulastic for assessment.	A, M

The emergence of the pandemic, though not favorable, has indirectly fueled the EFL teachers in Banyumas regency to explore technology for teaching. The pedagogical implication resulted from this study is that technological competence should be taken into account more intensively in the curriculum of teacher training as well as that of the teacher professional development programs. Meanwhile, the practical implication from this study was that though the pandemic in Indonesia has been declared to end, the changes affected by it could be sustained to enhance the quality of the teaching. For instance, the teachers' current familiarity with video editing tools and LMS could facilitate flipped teaching, their knowledge in Google Form could enhanced assessment, and the existing chat groups could be used to eliminate anxiety in speaking activity by inviting students to send their pre-recorded speaking assignment.

CONCLUSION

This research describes how some teachers in the regency of Banyumas developed technological competency while struggling to give the best education to their students during the pandemic. Data gleaned from interviews, documentation, and observation showed that before the pandemic, technology was very little explored by the respondents. Their technological competency, modeled to the description of technology integration measurement by Puentedura (2011), was in the stages of substitution and augmentation. When the pandemic struck, they were forced to utilize technology to keep the learning run. By doing that, their competency developed to stages of substitution, augmentation, and modification. However, the highest stage, redefinition, was not exhibited. By the increase of the teachers' awareness of the importance of technology for English teaching, it is recommended that authorities in Banyumas regency

could take this as a capital for providing training in technology integration into teaching more intensively for the post-pandemic time. The limitations of this study are the absence of observation for the pre-pandemic context. Since the pre-pandemic period has passed, the data of this context relied on the interviews and document analysis. Besides, this study is not able to provide generalized results since this is approached through a qualitative method which aimed at describing the phenomena extensively rather than finding generalized data. Further research could measure the teachers' technological competency quantitatively to see the current state and trend of the teachers' technological competency. Finally, SAMR model used in this study was oriented to results rather than process. This model focused on what is performed by the teachers not what are the supporting and inhibiting factors of their performance. Therefore, further research could take factors predicting the teachers' technology integration as the focus of their research. Information on this matter will be beneficial for the enhancement of teachers' pedagogical and technological competence.

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