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# TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) IN THE INSTRUCTION DESIGN OF THE PARTICIPANTS IN TEACHER PROFESSION EDUCATION: A NARRATIVE INQUIRY CASE STUDY

## *Technological Pedagogical Content Knowledge (TPACK) Dalam Rancangan Pembelajaran Peserta Pendidikan Profesi Guru: Studi Kasus Inkuiri Narasi*

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**Kata kunci:**
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***ABSTRACT***:

*This study aims to assess pre-service and in-service teacher competency mastery in the Teacher Professional Education Program (PPG). Ultimately, teachers must integrate their pedagogy and content knowledge with technology or Pedagogical Technology content knowledge (TPACK) as a learning technique that highlights certain technologies and applications. Narrative inquiry case studies were used in this study to examine how 12 PPG members applied TPACK personally and publically, as well as their implementation experiences and disputes. In addition, this study confirms prior findings that technology integration improves the work efficiency of in-service EFL instructors. Finally, this study found that pre-service FLE teachers defined their experiences and stories using TPACK-related adjectives such as instructional, consistent with aims, appropriate to PPG targets, thought-provoking, and innovative.*



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**ABSTRAK:**

Penelitian ini bertujuan untuk menilai penguasaan kompetensi guru prajabatan dan dalamjabatan pada Program Pendidikan Profesi Guru (PPG). Pada akhirnya, guru harus mengintegrasikan pengetahuan pedagogi dan kontennya dengan teknologi atau Pedagogical Technology content knowledge (TPACK) sebagai teknik pembelajaran yang menonjolkan teknologi dan aplikasi tertentu. Studi kasus penyelidikan naratif digunakan dalam penelitian ini untuk mengkaji bagaimana 12 anggota PPG menerapkan TPACK secara pribadi dan publik, serta pengalaman dan perselisihan implementasi mereka. Selain itu, penelitian ini menegaskan temuan sebelumnya bahwa integrasi teknologi meningkatkan efisiensi kerja instruktur EFL dalam pelayanan. Akhirnya, penelitian ini menemukan bahwa guru FLE pra-jabatan mendefinisikan pengalaman dan cerita mereka menggunakan kata sifat terkait TPACK seperti instruksional, konsisten dengan tujuan, sesuai dengan target PPG, merangsang pemikiran, dan inovatif.

## INTRODUCTION

The advancement of technology causes paradigm shifts in 21st-century education as a result of changes in students' requirements in response to a rapidly expanding and digitalized world (Gonzales & Ilagan, 2020). However, how students regard technological integration in their instructional activities is unclear (Robin, 2008). In-service instructors of English as a Foreign Language who incorporate technology into their studies are presumed to have acquired their support. In Indonesian education, the competence and professionalism of teachers have been a prominent concern. The Law of the Republic of Indonesia No. 14/2005 on Instructors and Lecturers stipulates that, as professional educators, teachers must possess the necessary academic credentials, competencies, and teaching certificates. According to the context, teacher competency includes educational, professional, social, and personal competencies. However, pre-service and in-service teachers must master the competencies in their Teacher Professional Education Program (PPG) (Suryawati et al., 2017). Particularly for pedagogical competencies, they must create



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courses, execute learning activities, administer assessments, and evaluate learning outcomes using various digital learning resources and technologies. In addition, they must integrate technology into the teaching-learning process and engage with peers to utilize different relevant learning tools and resources (Gonzales & Ilagan, 2020; Soland et al., 2013).

As a result, teachers play a crucial role in giving classroom teaching that aids student learning, as competent teachers help their pupils become productive members of society and citizens of the nation. Therefore, teaching is a profession that must be regarded seriously. As a teacher, remaining current is essential (Brotosedjati, 2012). Consequently, teachers must have pedagogical, social, and professional skills and qualified, experienced educators. Personality competencies are traits that any educator must possess. Pedagogical competence is the teacher's capacity to supervise student learning. Social competence is a teacher's capacity to communicate and engage effectively and efficiently with pupils, guardians or parents, fellow teachers, and members of the surrounding community; Professional competence is the capacity to master teaching content comprehensively and in-depth (Undang-Undang Guru dan Dosen, 2005). Thus, professional or licensed schoolteachers must meet the current generations' aspirations for quality education (Kholis & Murwanti, 2019). Therefore, PPG graduates are equipped for the industrial revolution 5.0 era, which values critical thinking, problem-solving, communication, teamwork, and creativity (Putri & Fatimah, 2021).

Teachers must eventually combine their pedagogy and content knowledge with the technology or Technological Pedagogy content knowledge (TPACK) as a learning strategy highlighting specific technologies and applications. According to Cox and Graham (2009) and Bos (2011), this paradigm has recently received much attention. They provided opportunities for teachers and pre-service teachers to create one strategy to improve their TPACK (Robin, 2008; Sancar-Tokmak, Sürmeli, & Ozgelen, 2014; Yuksel-Arslan, 2013). Mishra and Koehler (2006) and Shulman (1986) stated that this education encompasses seven areas of expertise: Content Knowledge (CK) refers to the knowledge of learning materials; Pedagogical Knowledge (PK) refers to the understanding of various learning strategies to achieve learning objectives, and Technological Knowledge (TK) refers to the capacity



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to utilize digital technology. Pedagogical Content Knowledge (PCK) refers to the capacity to blend learning materials with learning processes and methods; Technological Content Knowledge (TCK) refers to the capacity to integrate digital technology and instructional materials; Technological and Pedagogical Knowledge (TPK) is the capacity to incorporate digital technologies and knowledge of learning processes and techniques; As represented in figure 1, Understanding of Technological, Pedagogical, and Content Knowledge (TPACK) is the capacity to integrate the use of digital technology, knowledge of learning processes and techniques, and learning materials (Mishra, 2019).

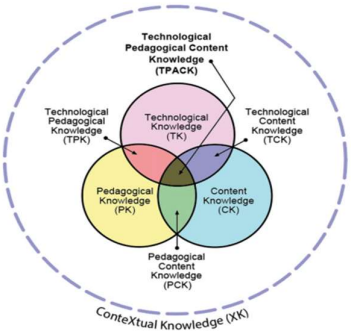


**Figure 1**: **TPACK Revision version**

(sumber: Mishra, 2019)

To effectively incorporate technology into learning, teacher planning must consider the objectives and resources, the student's learning needs, the available technology, and the classroom environment. Sadly, most technology-based media development focuses on the qualities of technology rather than how technology might be utilized to promote student learning. Consequently, not all teachers can create technologically based media (Harris & Hofer, 2011). Simsek and Sarsar (2019) proposed that instructors should work as learning designers, and the school should provide them with the proper technology. In addition, teachers should acquire high-level transdisciplinary creativity and design skills to empower pupils to obtain the same abilities (Koh et al., 2015).

Consequently, the PPG Program integrates technology effectively to enhance its competencies. However, the teachers' abilities may fall short of expectations. Some teachers who have completed the PPG program do not demonstrate a substantial rise in incompetence. Their participation in the PPG program was generally motivated by financial considerations (Artin, 2021; Brotosedjati, 2012; Putri & Fatimah, 2021). Due to their reluctance to update their topic knowledge on communication and teamwork, they were unaware of the significance of creativity and critical thinking.



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On the other hand, some PPG programs in Indonesia yielded qualified teachers equipped with the TPACK learning method. The modules and tasks given to the in-service teacher participants were able to foster independent learning. They showed positive attitudes toward implementing online autonomous learning, while limited task instructions, technical issues, and communication constraints were among the obstacles faced by the participants during the program (Masrizal et al., 2020). They successfully communicated and collaborated with their students and parents (Leoneto et al., 2020). They have less difficulty understanding the government education regulation, planning a more engaging and productive lesson, and generating a self-evaluation tool for further analysis or study to implement the STEAM approach, 4Cs skills, and online teaching platforms (Sabilah et al., 2021). Meanwhile, Suyanto et al. (2019) reported merely developing pedagogical knowledge (PK), content knowledge (CK), and technological knowledge (TK) in the medium category. Therefore, they suggested that teachers improve their PK, CK, and TK by giving more hands-on activities in schools and using ICT.

## RESEARCH METHOD

This study examined the quality of TPK, TCK, and TPACK in PPG participant lesson plans. The individuals' perspectives were then investigated. The writers assessed the quality of twelve lesson plans created by PPG members. Using questionnaires and semi-structured interviews, researchers determined how TPK, TCK, TK, and TPACK were employed in instructional activities. This study found that technological integration improved the efficiency of in-service EFL teachers' work (Janssen et al., 2019). Despite the teachers' reservations regarding technology integration, the study discovered that technology enhances their work. The relationship between technological pedagogical content knowledge (TPACK) and second language acquisition (SLA) contributes to a deeper understanding of TPACK's unique characteristics. These teachers provide empirical insights into how English as a foreign language could utilize SLA-investigated behaviors and processes to develop or adapt TPACK (Tseng, 2017). It demonstrates that in-service teachers have positive opinions toward integrating online autonomous learning. However, program participants met constrained work instructions, technological



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challenges, and limitations (Masrizal et al., 2020).

## 1. Research Design

This narrative inquiry case study examines 12 Teacher Profession Education (Pendidikan Profesi Guru/PPG) participants' life experiences, tensions, and personal-inquiry challenges in implementing TPACK to their lesson plans. Narrative inquiry, which uses tales and human experience, is popular among educational scholars and beneficial in teacher education (Goodson, 1992; Goodson, 1995). Narrative reflection on participants is essential for framing the research puzzle, being in the field, writing about the field, and publishing research materials (Cladinin & Huber, 2010). TPACK lesson plan indicators covered four domains: Technological Knowledge (TK): the teacher's understanding of technology and its use in education. Technological Content Knowledge (TCK): the teacher's technological selection for specific materials. Technological Pedagogical Knowledge (TPK): instructors' knowledge of learning technologies and technology utilization can influence their education. Technological Pedagogical Content Knowledge (TPACK): the knowledge teachers need to integrate technology into learning for all materials. November 2021, teacher guidance activities conducted the research. Analyses were descriptive and qualitative.

## 2. Population and Sampling

The convenient sampling was taken since not all the 35 in-service teacher participants of the PPG were willing to participate in this study. Therefore the 12 participants were recruited since they were sincerely willing to participate in this study. Their profile is described in the following table.

**Table 1: Population Sampling**

| Participants | Sex | Age | Year of Teaching Experience | Type of School | Teaching & living location in Indonesia |
|---|---|---|---|---|---|
| 1 | Female | 40 | 13 | Senior High School | West Java |
| 2 | Female | 35 | 7 | Senior High School | West Java |
| 3 | Female | 33 | 6 | Senior High School | West Java |
| 4 | Female | 33 | 7 | Junior High School | Southeast Sulawesi |
| 5 | Male | 35 | 9 | Senior High School | North Sumatra |
| 6 | Female | 34 | 9 | Senior High School | Central Java |
| 7 | Female | 39 | 10 | Senior High School | Central Java |
| 8 | Male | 30 | 4 | Junior High school | Central Java |



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| | | | | | |
|---|---|---|---|---|---|
| 9 | Male | 36 | 8 | Junior High school | South Sulawesi |
| 10 | Female | 36 | 8 | Senior High School | Aceh |
| 11 | Female | 37 | 9 | Senior High School | East Java |
| 12 | Female | 39 | 9 | Junior High school | East Java |

### 3. Research Instrument

This study used a semi-structured interview and a questionnaire to determine how the 12 participants used TPACK in their lesson planning. In addition, their 12 lesson plans were evaluated based on their TPACK qualification. The semi-structured interview reveals how each participant integrated Technological Content Knowledge (TCK), Pedagogical Knowledge (TPK), Technological Knowledge (TK), Technological Pedagogy Content Knowledge (TPCK), and Technological Pedagogical and Content Knowledge (TPACK) into their lesson plans.

### 4. Data Collection and Data Analysis

The authors used lesson plans, semi-structured interviews, and questionnaires from 12 participants in the Teacher Profession Education Program (PPG) Batch 4, English Language Education Study Program, Faculty of Social Sciences and Humanities, Universitas PGRI Adi Buana Surabaya. Technological Pedagogy Knowledge (TPK), Technological Content Knowledge (TCK), and TPK-TCK qualified their lesson plans (TPCK). Then, they described their lesson planning and classroom implementation in the semi-structured interview. The quiz assessed their TPACK skills. TPACK rubric analysis followed (Haley-Mize & Bishop, 2015). Finally, the authors narratively provided semi-structured interview results.

## RESULT AND DISCUSSION

The data collection was carried out after the 12 participants accomplished their PPG, and all were declared successful in undergoing the PPG. Since they submitted their lesson, attended the semi-structured interview, and filled in the questionnaire, the authors described them based on the TPACK application. First, the authors explain the quality of their submitted lesson plan in the following explanation. Next, the general overview of how the participants constructed the lesson plan and applied it in their classroom was narratively reported; it is also supported by the participant's



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personal experience on how they wrote the lesson plan and executed it in their classroom.

### 1. Lesson Plan

A lesson plan as the learning tool document was used for the field experience program during the PPG activities. The result of the 12 lesson plans where were equally the same among the Technological Pedagogy Knowledge (TPK), Technology Content Knowledge (TCK), and Technological Pedagogy Content Knowledge (TPCK). Their lesson plans report that the participant can apply the technology in their pedagogy and content knowledge, which is figured out in the following chart. These participants testified that the technology integration helped them, as EFL teachers, to work efficiently, which is in line with what (Janssen et al., 2019). Suryati et al. (2017) argued that these teachers' technology knowledge was gained in the Teacher Professional Education Program (PPG) since they could integrate technology applications with PK, CK, and PCK.

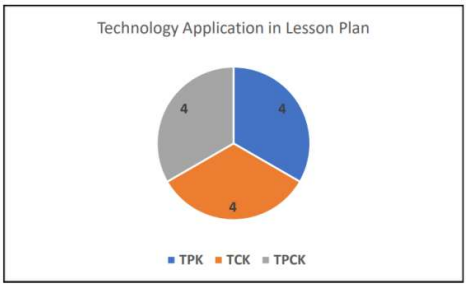
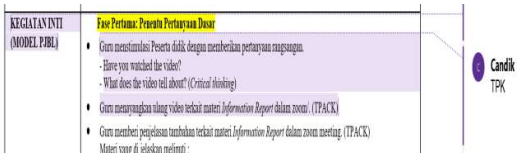



**Figure 2: Qualification of TPK, TCK, and TPCK in lesson plans**

Figure 2 describes that the 12 participants only showcased the TPK, TCK, and TPCK equally the same. Four participants described the TPK in their lesson plan, another four reported TCK, and the other four informed TPCK. The Figure testifies that the 12 participants have technical competence in presenting PK, CK, and PCK. Below is the result of their lesson plan described by participants 2, 7, and 9.

In detail, the sample results of their lesson plans are presented by participants 2, 7, and 9.

**Participant 2**




The lesson plan of participant 2 shows that Participant 2 could apply a suitable learning method for her students' learning *information report text* by using Project Based Learning (PJBL). In starting her lesson, she



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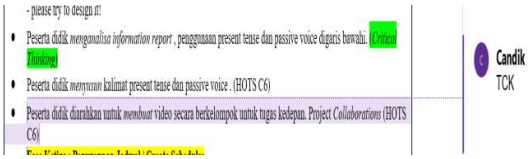
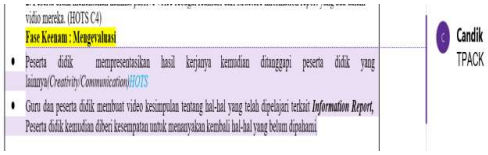
stimulated her students with some eliciting questions to arouse their students' critical thinking. She can teach 21st-century essential thinking skills by incorporating video technology into the teaching-learning process (Soland et al., 2013).

**Participant 7**




Participant 7 could showcase her lesson plan was integrated with a video project (Technological) because she assigned her students to make an *information report* (Content Knowledge) about how the students' district authority is handling COVID-19. She also directed her students to work collaboratively to finish their videos. On the other hand, Sabilah et al. (2021) claimed that the PPG participants can design a more engaging and productive lesson to implement one of the 4Cs skills and video projects.

**Participant 9**




Lastly, Participant 9 implemented the TPACK learning method because he could select the technology-based learning materials for his students. He evaluated his students' work by asking them to present their video project on how people enjoy and appreciate local cuisine. His students presented their work to their peers creatively, and the peers gave comments to each other. It seems that Participant 9 can communicate and collaborate with their students and parents because their parents also helped their kids to take the scene and prepare the content for their kids' video project (Leoneto et al., 2020).

## 2. Semi-structured Interview and Questionnaire

Below is the result of the semi-structured interview and questionnaire. The semi-structure interview reveals how each participant practiced Technological Content Knowledge (TCK), Pedagogical Knowledge (TPK), Technological Knowledge (TK), Technological Pedagogy Content Knowledge (TPCK), and Knowledge of Technological Pedagogical and Content (TPACK) in their teaching lesson plan integrated. Therefore, the semi-structured interview is to see the personal overview of the 12 participants in practicing the TCK,



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TPK, TK, TPCK, and knowledge of TPACK in their lesson plan, while the questionnaire is to perceive the general overview of the latter.

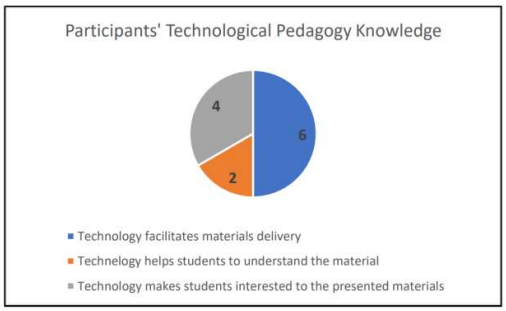


**Figure 3: Participants'Technological Pedagogical Knowledge**

Figure 3 describes the general overview of the participants' Technological Pedagogy Knowledge in their lesson plan. First, six participants reported that technology-based media facilitated the delivery of their teaching materials to their students. Next, two participants informed that technology made it easy for their students to understand their learning materials. Finally, four participants considered that using technology in learning activities made their students more interested in the materials presented by the teacher. These teachers combined their pedagogical knowledge with technology. They should work as learning designers, and the school should provide them with the proper technology (Simsek & Sarsar, 2019). Below is the excerpt from Participant 10, who had implemented technology within her classroom.

**Participant 10**

*By watching my created video, my students understood their duties during the covid 19 pandemic. I also showed them a tutorial video on how to create a video so they could work on the task of making videos on how they took care of their health during the pandemic. They submit their video tasks on time. By the time I was assessing their videos, I had judged that my students and their families were taking care of their health during the pandemic.*

Participant 10 applied technology in her teaching, starting from introducing the topic up to the assessment. She encouraged her students to create a video by watching her video, and they managed to create a video. In addition, she successfully made her students communicate and collaborate well with their families (Gonzales & Ilagan, 2020; Soland et al., 2013). It is in line with the statement of Leoneto et al. (2020) that teachers must communicate well with their students and parents.

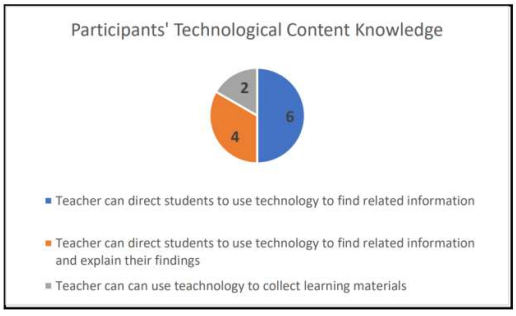


**Figure 4: Participants' Technological Content Knowledge**



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Figure 4 describes how the 12 participants teach one of the 21st-century skills – applying technology to help students learn. In this figure, six participants could direct their students to use technology to find information related to the materials. Four participants used technology to guide their students to find related information and explain the findings. Lastly, two participants used technology to collect learning materials. Their explanations were also supported by Participant 12' except below.

**Participant 12**

*I know my protégés love smartphones. So, I made a video tutorial with my cellphone on how to make a video about interesting places in his village. After they saw my tutorial video several times, they made videos of sites they found interesting, for example, fishing ponds, football fields, markets, and warung or traditional coffee shops. They also gave comments in simple English. They were very enthusiastic about finishing this task. They liked this task, although their family and parents assisted them in making the video.*

As shown in figure 4 and except for Participant 12, the content knowledge should be embedded with the technology. Thus, teachers can nurture the content and 21st-century skills, such as the values of critical thinking, problem-solving, communication, teamwork, and creativity (Putri & Fatimah, 2021).

Next is technological content knowledge, which is elucidated in figure 5 and Participant 11. Figure 5 below shows the participants' understanding of preparing technology-based learning media. The questionnaire resumed that the 9 participants recognized the characteristics of their students, materials, and technology-based media. Meanwhile, three participants could choose the materials and media to be used. However, none develop technology-based media.

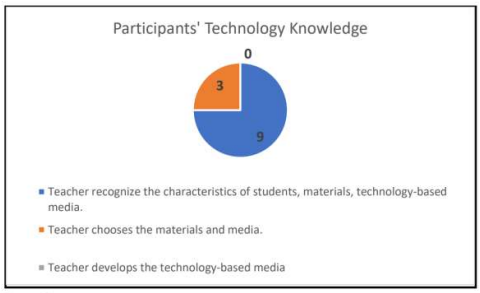


**Figure 5: Technological Knowledge**

**Participant 11**

*Usually, after I determine the learning method, I always make something intriguing by using technology such as word wall applications. If there are internet problems, I have prepared a PowerPoint with exclusive features to substitute for word wall gamification. Then for the electricity blackout, I have also to charge my power bank and smartphone until full battery. I use a laptop when I teach online or offline and collect my student assignments. For zoom meetings, I will use my smartphone. Gamification is exciting to teach English, but I can't make games myself.*

The participants of this study effectively combined technology into



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their planning by considering their objectives and resources, the student's learning needs, the available technology, and the classroom environment (Harris & Hofer, 2011). Simsek and Sarsar (2019) proposed that teachers should work as learning designers, and the school should provide them with the proper technology.

The following figure 6 and the excerpts of Participants 4 and 5 describe the teachers' practice of TPACK.

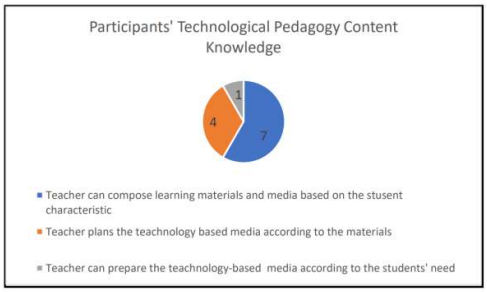


**Figure 6: Technological Pedagogical Content Knowledge**

The questionnaire reported the TPACK competence of the 12 participants, described in figure 6. It shows that seven participants could compose learning materials and media by utilizing technology according to the characteristics of students. In addition, four participants could plan the technology-based media according to their teaching materials, and 1 participant could prepare the technology-based media that their students need.

**Participant 4**

*I access youtube as a reference for my students in making simple videos and gamification tutorials for their online tasks, such as story jumpers. For example, in teaching English using ICT, I previously explained what they would gain from the subject matter first. Then I taught them how to access the learning website Kahoot, Quizizz, and Educandy and the tutorial from youtube videos. Next, I taught them how to use Kahoot, Quizizz, and Educandy so that they could learn English in a more fun way.*

**Participant 5**

*My students love animated stories and are very enthusiastic when they know they will learn to make their animated videos for reading and writing assignments. Then I taught them how to use story jumpers so they could make animated videos. I used making this video as a group assignment because I follow PPG online. I organized each student into a group to do different tasks, such as creating text, making videos, and presenting video results in zoom meetings. So, before the zoom meeting, my students communicated their group tasks. I like to use groups to assign my students' learning. For example, in creating a video, one group contains three people. So, each member has a specific task, accomplishes their job, and coordinates with each other in the group maximally.*

These teachers can plan engaging and productive lessons and generate appropriate evaluations for further analysis or study to implement TPACK, 4Cs skills, and online teaching platforms (Sabilah et al., 2021). They showed positive attitudes towards implementing independent



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online learning, while limited tasks, technical issues, and communication constraints were among the obstacles faced by participants during the program. They successfully communicated and collaborated with students and their parents (Sabilah et al., 2021; Suyanto et al., 2019).

## CONCLUSION

This study had design flaws. Thus, future research should use narrative inquiry, case studies, controls, and group discussions. In addition, future research may allow pre-service teachers to present their real-world classroom circumstances for student feedback. The study's instruments—TPACK, TCK, TPK, and TK—were another shortcoming. Qualitative findings included participant stories and experiences. CK, PK, TK, PCK, TCK, TPK, and TPACK comprise the TPACK framework. The current study's qualitative component determined the TPACK framework's PK, CK, and PCK constructs; however, the scale's properties prevented empirical results. Similar studies may use an all-TPACK scale. Future studies should also focus on TPACK and creation process scale development.

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