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EFL PRE-SERVICE TEACHERS' EXPERIENCES IN DESIGNING TPACK - BASED INSTRUCTIONAL VIDEOS

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ABSTRACT

The article analyzed pre-service teachers' experiences in designing and implementing instructional videos based on the TPACK framework in their microteaching course. This was a qualitative study in which nine students of English teacher education (i.e., preservice teachers) were the participants who learned to design and implement instructional videos in their micro-teaching course. The data were extracted from the results of the interview and document analyses on their instructional videos made in microteaching class together with other 29 students participating in the class. The data were analyzed by using the interactive model proposed by Miles et al. (2014). The result showed that pre-service teachers had various self-reflections in the experiences of designing and implementing the instructional videos based on the TPACK framework, putting into three phases of steps in design-making and product-implementing. The pre-service teachers' inadequacies in having the TK and CK caused difficulties in designing the instructional videos in general. Moreover, the pre-service teachers coped with numerous challenges, both personally and technically. Finally, this finding is advisable for 21st-century teacher candidates who should integrate technology into teaching in that they should be technology-alert in any circumstance of teaching.

Key Words: pre-service EFL teachers; instructional video; microteaching course; TPACK-based instructional video

ABSTRAK

Artikel ini menganalisis pengalaman calon guru dalam merancang dan mengimplementasikan video instruksional berdasarkan kerangka kerja TPACK dalam kursus microteaching mereka. Ini adalah studi kualitatif di mana sembilan siswa pendidikan guru bahasa Inggris (yaitu, calon guru) adalah peserta yang belajar merancang dan mengimplementasikan video instruksional dalam kursus micro-teaching mereka. Data diambil dari hasil wawancara dan analisis dokumen pada video instruksional mereka yang dibuat di kelas microteaching bersama dengan 29 siswa lain yang berpartisipasi di kelas tersebut. Data dianalisis dengan menggunakan model interaktif yang diusulkan oleh Miles et al. (2014). Hasil penelitian menunjukkan bahwa calon guru memiliki berbagai refleksi diri dalam pengalaman merancang dan mengimplementasikan video pembelajaran berdasarkan kerangka TPACK, menempatkan ke dalam tiga fase langkah dalam pembuatan desain dan implementasi produk. Kekurangan guru prajabatan dalam memiliki TK dan CK menyebabkan kesulitan dalam merancang video pembelajaran secara umum. Selain itu, calon guru menghadapi berbagai tantangan, baik secara pribadi maupun teknis. Akhirnya, temuan ini disarankan untuk calon guru abad ke-21 yang harus mengintegrasikan teknologi ke dalam pengajaran karena mereka harus mewaspadai teknologi dalam segala situasi pengajaran.

Kata Kunci: *calon guru EFL, video instruksional, kursus microteaching, video instruksional berbasis TPACK*

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INTRODUCTION

The instructional video seemingly puts itself in a lucrative function as digital resources might bring teachers to their new roles in the post-pandemic era of instruction. It occurs because videos as media of instruction have been empirically claimed as practical tools to enhance learning achievement. For instance, numerous previous findings proved that video, specifically, can be highly effective as an educational tool (e.g., Kay, 2012; Allen & Smith, 2012; Lloyd & Robertson, 2012; Rackaway, 2012; Hsin & Cigas, 2013). Some other researchers emphasized that instructional video used with a clear purpose in the mind of the video-makers may support the learning (Seidel et al., 2005; Sherin & VanEs, 2009). In addition, various technology platforms, like tutorial videos, short animations with dialogue, short videos, short English videos, Plotagon, tailor-made animated cartoons, modalities of videos, short stories through computers, WhatsApp groups, and silent short movies are numerous technology-based media in EFL teaching which previous researchers mentioned as giving significant effects on the student's achievement (see Akib & Syatriana, 2019); Bakla, 2019); Guzmán Gámez & Moreno Cuellar, 2019; Marashi & Adiban, 2017; Haslida, 2019; Irawati, 2016; Masruddin, 2018; Kartika et al., 2017; Umutlu & Akpinar, 2020; Wahyuni & Febianti, 2019; Yilmaz, 2015; Sari et al., 2021). However, using video as media of instruction without having them in a straightforward design, especially for instruction, will bring teachers into disadvantageous and inefficient classroom actions. Moreover, integrating technology will be successful depending on the teachers' roles since teachers' beliefs and best experiences influence how they apply the technology in the classroom Abukhattala (2015).

A question arose on what instructional video looks like as it becomes an effective medium in teaching. The Technological Pedagogical and Content Knowledge (TPACK) frame might presumably answer this question. TPACK is the relationship between all three essential components of knowledge (technology, pedagogy, and content) and becomes a unit as a framework (Mishra & Koehler, 2008). Furthermore, TPACK was implemented into education research as a theoretical framework for understanding teacher knowledge of effective technology integration in the TPACK (Mishra & Koehler, 2006). TPACK framework builds on Shulman's (1986) Pedagogical Content Knowledge (PCK) construct to include technology knowledge situated within

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the content and pedagogical knowledge. PCK refers to the content knowledge that deals with the teaching process. Various findings approved the notion that the TPACK framework is practical not only for sharpening clear purpose in instructional video design but also for implementation of technology in class generally (see Ajloni & O'toole, 2021; Bonafini & Lee, 2021; Niess & Gillow-Wiles, 2021; Lachner et al., 2021; Quyang & Scharber, 2018; Santos & Castro, 2021; Limbong, 2017; Setiawan et al., 2018; Tokmak, 2015). Hence, pre-service teachers' experiences in designing and implementing technology-driven instruction presumably play a vital role in whether teaching with technology gains any success in the classroom. This is crucial because 21st-century teachers should be equipped with technology-based competence as complementary skills and pedagogical competence as their main subjects. This article is a research report on designing and implementing instructional videos using the TPACK framework. This research is mainly intended to analyze the pre-service teacher's reflective experiences in designing and implementing instructional videos based on the TPACK framework in their microteaching course.

Literature Review

Concepts of Technological Pedagogical Content Knowledge (TPACK).

There have been some researchers arguing models indicating the integration of technological knowledge and pedagogical and content knowledge in the last decade (see Gao et al., 2009; Goktas et al., 2009; Mishra & Koehler, 2006; Mishra et al., 2009; Niess, 2005; Zhao et al., 2002). Mishra & Koehler (2006) were very familiar with the framework for Technological Pedagogical Content Knowledge (TPACK). The framework is an extended version of the original framework proposed by Shulman (1986), which focuses on Pedagogical Content Knowledge (PCK). There are three primary forms of knowledge, i.e., Content, Pedagogy, and Technology (Mishra et al., 2009).

The TPACK framework builds on Shulman's (1986) work to include technology for effective teaching and emerges from content, pedagogy, and technology (Mishra et al., 2009). TPACK has a more flexible framework for research ends. Mishra et al. (2011) argued that the TPACK framework could have different pedagogical approaches, content areas, and technologies. Furthermore, TPACK studies have been explored in various

educational institutions to study the relationship between technology and pedagogy with opportunities and challenges identified in the process. The TPACK model has increased student engagement, collaboration, and learning flexibility (Lye, 2013).

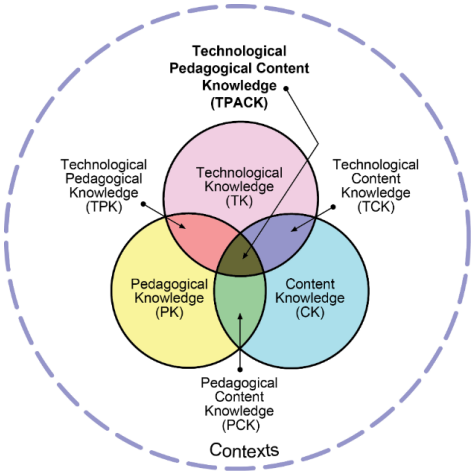

Figure 1. The TPACK Framework and Its Knowledge Components

Moreover, as is seen in Figure 1, the intersections of the three circles of knowledge are Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), and Technological Pedagogical Knowledge (TPK), reside in the TPACK, which should then be viewed within the learning and teaching context. Teacher educators have embraced TPACK for research and teaching purposes. The TPACK framework (Mishra & Koehler, 2008) for teachers describes the teacher knowledge required to teach effectively with technology. TPACK was introduced to the educational research field as a theoretical framework for understanding teacher knowledge necessary for effective technology integration (Mishra & Koehler, 2006).

Pedagogical Knowledge (PK)

According to Shin et al. (2009), pedagogical knowledge is knowledge about teaching practices and techniques. Teaching practices mean the teacher teaches the material or specific content in the classroom and uses an appropriate approach. Design in the teaching and learning process means how teachers deliver the material step by step. The technique is a classroom practice used by a teacher or implementing an approach and method. In addition, Pedagogical Knowledge is teachers' deep knowledge about the processes and procedures or teaching and learning methods. They encompass overall educational purposes, values, and aims, among other factors. This generic knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment (Mishra et al., 2009). Pedagogical knowledge is the teaching methods or processes presumably consisting of knowledge in classroom management, assessment, lesson plan development, or student learning. Richards & Rodgers (2014)

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mentioned this as a method theoretically concerned with an approach organized by design and practically realized in the procedure.

Content Knowledge (CK)

Content Knowledge refers to the knowledge or subject matter. This knowledge would include understanding concepts, theories, ideas, organizational frameworks, practical parts, evidence, and proof of such knowledge (Mishra et al., 2009), or it is the factual subject matter taught in class (Mishra & Koehler, 2006). Teachers must know about the content they will teach and how the nature of knowledge is different for various content areas.

Technological Knowledge (TK)

Technological Knowledge includes a practical understanding of computer software and hardware, specialized tools presentation, and other use of technologies in the instructional function. Knowledge of the existence, components, and capabilities of various technologies used in teaching and learning settings, and conversely, knowing how teaching might change due to using technologies (Mishra & Koehler, 2006). TK mainly encompasses the ability to adapt to and learn new technologies.

Pedagogical Content Knowledge (PCK)

Pedagogical content knowledge refers to the knowledge about the process of teaching (Shulman, 1986). It gives different perspectives by blending the pedagogy and content to accomplish the teaching goal better. There are usually some steps for the teacher to prepare the material in the teaching process. (Richards & Rodgers, 2014) defined the term activity in the teaching and learning process as any kind of goal-oriented class procedure involving students taking class action concerning the goals of the course.

Technological Content Knowledge (TCK)

Technological content knowledge refers to the understanding of how technology can create new representations for specific content. Mishra & Koehler (2006) defined TCK as knowledge that is both technology and content related. When the teacher wants to teach the material or content, they must choose the related technology tools they will use in the teaching and learning process. In addition, TCK gives learners the ability to digest the link between content knowledge and technology and how technology and content impact and restrict one another. Hence, TCK is defined as learning about the

technologies used within the content area. For instance, in teaching the English language, when they wanted to deliver the material about simple present tense from the dialogue in the movie. To make the teacher quickly get the part of the dialogue related to simple current tense material, they will use some tools; for instance, they will use Camtasia to cut and get the amount they want. Moreover, it suggests that teachers understand that they can change the way learners practice and digest concepts in a particular substance by using technology.

Technological Pedagogical Knowledge (TPK)

Technological pedagogical knowledge is defined as how technologies can be used in instructional issues. Mishra & Koehler (2006) argued that technical, pedagogical knowledge is knowledge about pedagogical strategies for using existing specialized tools for teaching. In addition, specialized pedagogical knowledge is about how participants used technologies to understand student learning's cognitive, social, and behavioral aspects. To that end, a discussion forum was commonly preferred. The knowledge of innovative technologies and pedagogies can help academics to improve student learning. Although technology has been related to functional fixedness, lecturers need to rethink creative ways of using technologies to customize pedagogical purposes (Koehler et al., 2013).

Technological Pedagogical Content Knowledge (TPACK)

TPACK is a framework for describing and understanding the goals for technology use. TPACK framework (Mishra & Koehler, 2008) describes the type of teacher knowledge required to teach effectively with technology. Teaching effectively involves using tools, techniques, and strategies to optimize student learning and understanding context, mainly how your students learn, how they process information, what motivates them to learn more, and what impedes the learning process with a technology tool.

The importance of understanding the TPACK framework for pre-service teachers is to make them learn quickly, and they will teach with an educational video.

Concepts of Educational Video

An educational video is a form of multimedia that conveys information through two simultaneous sensory channels: aural and visual. It often uses multiple presentation modes, such as verbal and pictorial representations in the case of on-screen print and closed-captioning (Mayer, 2009). With the

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evolution of digital technology and fast access to streaming video channels via the Internet, video has moved from being an essential element to being considered a teaching methodology, with the increase in the number of settings that use dynamic images to catch learners' attention (Ardanuy Raso et al., 2009), to the notion that experts (see Choi & Johnson, 2007; Shyu, 2000; Wisher & Curnow, 1999 perceived it as much more efficient than those presented in books or text material.

Teaching English with Educational Video

Teaching English with Video is a common thing in the 21st era; in addition, Wang (2015) explains that there are three targets of teaching English with video materials, i.e., to help EFL learners development of language skills; to prepare students' competence in intercultural communication, and to sharpen students' aesthetic values and competence in appreciating Artistic values' English videos.

Learning Object Review Instrument (LORI)

The researcher used LORI as the mainline learning object (LO) evaluation methodologies using review instruments such as evaluation rubrics, of which the most cited is the Learning Object Review Instrument (LORI) developed by Vargo et al. (2003) and improved by Niess (2005) LORI 1.5 uses nine items with brief descriptive rubrics associated with each item. The items and what they measure may be outlined as:

1. *Content Quality*: The LO content is free of error and presented without bias. Logical arguments support claims, and presentations highlight significant ideas.
2. *Learning Goal Alignment*: Appropriate learning goals are stated. The learning activities, content, and assessments provided by the LO align with the declared purposes.
3. *Feedback and Adaptation*: The LO provides feedback driven by differing learner inputs or learner modeling.
4. *Motivation*: The LO content is relevant to the personal goals and interests of the intended learners.
5. *Presentation Design*: The style of information design in the LO enables users to learn efficiently. The presentations of the LO minimize visual search; text and graphics are clear, concise, and free of errors. Screen

components do not interfere with learning goals.

6. *Interaction Usability*: The user interface design implicitly informs learners about how to interact with the LO. Navigation through the LO is simple. The behavior of the user interface is consistent and predictable.
7. *Accessibility*: The design of controls and presentation formats in the LO may accommodate learners with sensory and motor disabilities. The LO can be accessed through different electronic means, including assistive and highly portable devices.
8. *Reusability*: The LO is a stand-alone resource that can readily transfer to different courses, learning designs, and contexts.
9. *Standards Compliance*: The LO conforms to relevant international standards and specifications. Sufficient metadata is provided in tagged codes and made available to users.

Microteaching Course

According to Bell & Bull (2010), microteaching is a course in teacher education where pre-service teachers 'teach' in front of their friends to gain experience before becoming in-service teachers. In addition, Ghanaguru et al., (2013) also stated that microteaching is one of the most appropriate tools to reduce the gap between theory and practice.

Based on the statement of some researchers above, microteaching is an introductory course for pre-service teachers. Thus, in microteaching, the pre-service is trained to be a teacher in the future, and they learn how to make an appropriate lesson plan and teach with the proper method, strategy, and technique. To sum up, microteaching can be defined as a course in a university, especially in the education field. In the Microteaching course, the pre-service teachers are being trained before they become a teacher because they practice teaching in the classroom in front of their friends with selected topics based on the material that they will teach for elementary school, junior high school, senior high school, or even university student.

Furthermore, Microteaching in English Department at Mulawarman University, Samarinda, East Kalimantan, Indonesia, is one of the compulsory courses that sixth-semester students must take. In the Microteaching course, the pre-service teachers learned how to teach in the classroom using a methodology,

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strategy, and technique for teaching and learning progress based on students' necessity. Before taking a Microteaching course, they must pass Teaching English as a Foreign Language I and Teaching English as a Foreign Language II in the fourth and fifth semesters as compulsory courses. They must get B (70-79) for the minimum score to continue to take a Microteaching course in the following semester.

At the beginning of the Microteaching course semester, pre-service teachers will conduct the educational video with the TPACK framework as the instructional design model. Then, pre-service teachers will guide the educational video phase by phase in the TPACK framework. Last, they had to do teaching practice in the classroom using educational videos. Pre-service teachers will be interviewed regarding their experiences designing and implementing the video.

Previous Studies

The first previous study is a study by (Tokmak, 2015) with the title Pre-Service Teachers' Perceptions on TPACK Development After Designing Educational Games. His study collected the data through educational computer games designed by participants, focus group interviews, observations, and participant journals. The researcher used the qualitative method as his research design.

The similarity between the previous study and the present study is the use of the TPACK framework in designing specific teaching material and using interviews to collect the data. The present study analyses preservice teachers' experience when implementing educational videos in Microteaching courses. But the previous study described how the researcher aimed to investigate Early Childhood Education (ECE) pre-service teachers' perceptions of their TPACK development during an educational game design activity using PowerPoint.

The second previous study is The Pre-Service EFL' Experience Making Project Using PACI by Limbong (2017). The design of this study was qualitative data. The researcher collected the data through interviews. To develop the discussion, the researcher relied on analyzing information by asking five pre-service teachers about their experiences through PACI to develop the TPACK framework.

The similarity between the previous study and the present study is the use of TPACK in designing specific teaching material and using interviews to collect the data. The difference study analyses pre-service teachers' experience when implementing

educational videos in Microteaching courses. But the previous study described how the researcher designed and developed multimedia technology-integrated materials of the PACI model with project-based learning through blended learning between traditional face-to-face and Facebook closed-group discussion methods throughout the TPACK framework during the Computer Literacy course in the Faculty of Teacher Training.

METHOD

The design of this study was qualitative, in which the researchers used the result of interviews and documents to interpret data through narrative explanation. Specifically, the researchers explored the pre-service teachers' experiences after conducting teaching practices on *Microteaching* courses where they were required to implement instructional videos in front of the classroom. The researchers analyzed the designing and implementation of such instructional videos based on TPACK's framework.

Research Participants

The study was conducted in the Microteaching class of the English Department, Faculty of teacher training and education, Mulawarman University, Indonesia. The participants were nine students of EFL pre-service teachers who were selected from the total class members of 29 students. The chosen participants represented the highest, middle, and lowest-scored students in that course.

Data Collection Technique

The data were extracted from the results of the interview and document analyses on an instructional video. The nine pre-service teachers were chosen as the representatives of the 29 teacher students. The standard used in selecting the participants and sites was whether they were "information-rich" fields (Creswell, 2012), which finally showed that the representatives were: those who had the highest scores, those who had got the middle scores, and those who had brought the lowest scores. The Interview was conducted approximately 15-30 minutes in line with the number of questions. Furthermore, the researcher collected the instructional videos from the participants' subject reflections and lesson plans of their teaching practices in the Microteaching course. Before the research process, the participants signed a consent form informing them that they were involved in the study.

Data Analysis Technique

The researchers made the coding extracts to interpret the data by reviewing a set of field notes, transcribing, synthesizing the quotes

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meaningfully, and gradually drawing the relations between parts of the intact. Codes were used to organize details, driving the researchers to progressively find the segments relating to particular constructs or themes about the research questions.

Furthermore, the researchers used Saldana's (2009) guidelines to make such coding schemes, as shown in Table 1. In addition, the researchers analyzed the data by using the interactive model proposed by (Miles et al., 2014). The data analyses were proceeding three concurrent flows of activities, i.e., data collection, data display, data condensation, and conclusion (drawing/verifying).

Table 1. Coding Scheme by The Researchers

No.	ASPECTS IN TPACK	INDICATOR	Code
1.	Technology Knowledge (TK) includes understanding how to use computer software and hardware, presentation tools such as document presenters and projects, and other technologies used in educational contexts. Knowledge of the existence, components, and capabilities of various technologies used in teaching and learning settings, and conversely, knowing how teaching might change due to using particular technologies (Mishra & Koehler, 2006).	1. Tools: computer, laptop, power point, Camtasia, filmora, audacity, etc. 2. Function: laptop as the media, power point as the tool for make presentation, Camtasia for editing video.	**Tl** **Fn**
2.	Content Knowledge (CK) refers to the knowledge or subject matter. As Shulman (1986) noted, this knowledge would include understanding concepts, theories, ideas, organizational frameworks, evidence and proof, and established practices and approaches to developing such knowledge.	1. Theory: material or topic for teaching. 2. Facts: the material based on fact. 3. English Ability: speaking, writing, grammar, pronunciation.	**Th** **Fa** **Ea**
3.	Pedagogical Knowledge (PK) is knowledge about teaching practices and techniques. Teaching practices mean the teacher teaches the material or specific content in the classroom and uses an appropriate approach (Shin et al. 2009).	1. Learning Style: methodology for teaching. 2. Classroom Management: sitting arrangement. 3. Activity: exercise. 4. Assessment: rubric scoring for students.	**Ls** **Cm** **Act** **Ast**
4.	Pedagogical Content Knowledge (PCK) refers to the content knowledge that deals with the teaching process (Shulman, 1986).	1. Learning Style: methodology for teaching. 2. Theory: material or topic for teaching. 3. Implementation: how teacher use the methodology to deliver the material.	**Ls1** **Th1** **Imp**
5.	Technological Content Knowledge (TCK) refers to the knowledge of how technology can create new representations for specific content, Mishra and Koehler (2006) defined TCK as knowledge that is both technology and content related.	1. Tools Selection: an appropriate technology for teaching (PACIFIC). 2. Theory: material or topic for teaching. 3. Implementation: how teacher use technology to deliver the material.	**Tl1** **Th2** **Imp1**
6.	Technological Pedagogical Knowledge (TPK) refers to how various technologies can be used in teaching and understanding that using technology may change the way teachers teach. Mishra and Koehler (2006) defined TPK as knowledge about pedagogical strategies for using existing technological tools for teaching.	1. Tools Selection: an appropriate technology for teaching (PACIFIC). 2. Learning Style: methodology for teaching. 3. Implementation: how teacher use and apply the methodology with technology to deliver the material.	**Tl2** **Ls2** **Imp2**
7.	Technological Pedagogical Content Knowledge (TPACK) is a framework for describing and understanding the goals for technology use. The model introduces the relationships between all three basic components of knowledge	1. Tools Selection: an appropriate technology for teaching (PACIFIC). 2. Learning Style: methodology for teaching. 3. Theory: material or topic for teaching	**Tl3** **Ls3** **Th3** **Imp3**

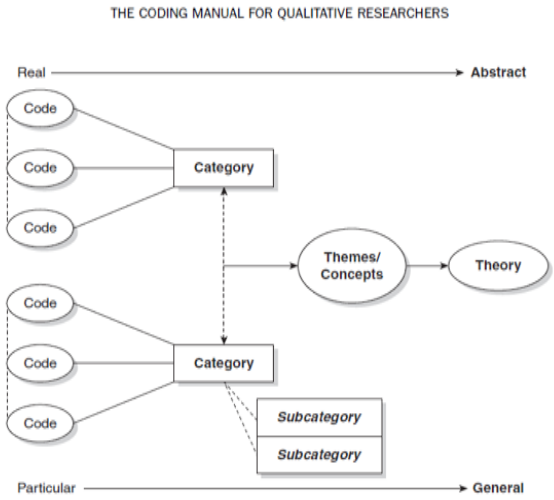

Figure 1: The Coding Manual for Qualitative Researchers (Saldana, 2009).

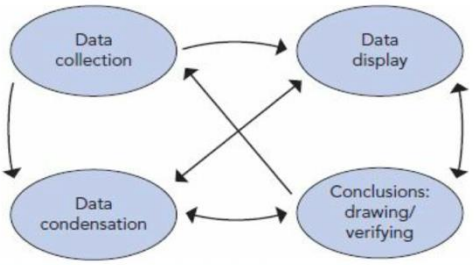

Figure 2. Component of the interactive model (Miles et al., 2014)

FINDINGS AND DISCUSSION

Findings

Pre-Service Teachers' Experiences in designing and implementing instructional videos

As designed in this study, the researchers explored the pre-service teachers' experiences after conducting teaching practices on *Microteaching* courses. They were required to implement instructional videos in front of the classroom. The researchers analyzed the design and implementation of such instructional videos based on TPACK's framework. The results showed that the pre-service teachers had time fifteen to twenty minutes for implementing their teaching materials. After one pre-service teacher successfully implemented the teaching material, the other pre-service teachers and the lecturer gave feedback on their teaching performance. The input, among other things, is about whether the topics given in the materials implemented in

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the videos are interesting. In this result, there are three steps of designing and implementing the instructional videos, i.e., 1) Preparation, 2) Pre-designing Process, 3) Post-designed. Most pre-service teachers admitted that the experience of designing instructional models enhanced their knowledge concerning logical, pedagogical, and content knowledge in those three steps. Therefore, they had positive experiences designing and implementing the instructional videos, where effectiveness, creativity, and innovation appeared.

Firstly, in preparation, the pre-service teachers prepared for the teaching material or chose the right topic for students. Then they decided on the teaching strategies or learning styles suitable to their issues and learners' grades in school. Furthermore, in this step, in the designs of the videos resides the Pedagogical Knowledge (PK), Content Knowledge (CK), and Technological Knowledge (TK). For the next step, i.e., the pre-designing process, there is an activity when the pre-service teachers design the video with some technology tools such as PowerPoint, Camtasia, Internet, Filmora, and C-Map.

For instance, as was stated by *Student 1*, she designed the teaching materials using TK. She adopted a part of a YouTube video suitable to the topic; then, she used PowerPoint, Audacity, Camtasia, Internet, Filmora, and C-Map as applications for designing the subject matter. As she said:

"I chose and took a video from YouTube that focuses on language features about expressing intention; then I also had to record my voice and myself to explain the materials." (S1, lines 62-63)

She had experience designing her teaching materials and then converting them into PACIFIC applications during the design step.

Another was experienced by *Student 3; in* designing the teaching material, she used her Technological Knowledge. As she said:

"I know the technology tool is PowerPoint because it is one of the most common tools for teaching or explaining materials. Then luckily, in college, I now know Filmora Camtasia and C-Map. Similarly, laptop, LCD and speakers." (S3, lines 10-13)

She knew she acknowledged some technology tools when designing her educational video. Table 3 displays the analytical constructs summarized from the whole process done by the subjects of the study.

Table 3. Summary of preparation phase of designing and implementing instructional videos

Aspects of TPACK	*Indicator*	*Analytical construct*
PK	Learning style	Both Teacher-centered and student-centered
	Classroom management	Different arrangement of class Different topics, student free-topics
	Activity	Individual, Pair work and group work
	Assessment	Assignment
CK	Theory	Various topics of theories
	Facts	Learners' daily life experiences
	English ability	Both skills and lg components/integrated
TK	Tools	computer, laptop, power point, Camtasia, filmora, audacity, etc
	Function	laptop as the media, power point as the tools for making a presentation, Camtasia for editing video

Secondly, in the pre-designing process, there was an activity when the pre-service teachers designed instructional videos with some technology tools. The pre-service teachers showed their skills and knowledge to apply the technology tools in this process. As acknowledged by *student 8*, she used TCK to explain the materials integrated with instructional videos briefly. As she consented:

> "Umm, my main tool is the instructional video. I only played and paused the video, gave them more explanations, and made sure they understood the instruction. I showed them the instructional video using LCD, laptop and speaker mic, and I used microphone so my students can hear the sounds from video clearly" (S8, line 75-79)

It was exemplified in the above data extract that *student 8* knew how to use these applications, i.e., the instructional video they used contained PowerPoint, Audacity, Camtasia, Internet, Filmora, and C-Map. She used PACIFIC, starting from the beginning of teaching until the end. Additionally, as also mentioned by *student 9*, she used TCK as well to explain materials briefly in her instructional video, as follows:

"And also, I took dialogue from some famous movies so students will know the context of the topic from the real action." (S9, lines 51-52)

In addition, she took some dialogue from the internet related to the topics, and she edited the video to put in the video based on her lesson plan. Table 4 displays the analytical constructs summarized from the whole process done by the subjects of the study.

The last step is a post-designing process. This is the finishing process of making the pre-service teachers' instructional videos based on TPACK for teaching and learning practices. TPACK is a framework for describing and understanding the goals for technology use. The model introduces the relationships between all three essential components of knowledge,

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i.e., technology, pedagogy, and content (Mishra & Koehler, 2006b). In this last phase, all pre-service teachers (i.e., student one until student 9) have succeeded in making the instructional videos and implementing them in the teaching and learning practices.

Table 4. Summary of pre-designing phase results

Aspects of TPACK	Indicators	Analytical construct
PCK	Learning style	Cooperative learning, teamwork, scientific method
	Theory	Topical/thematic based real daily life authentic materials
	Implementation	Cooperative learning, teamwork, scientific method
TCK	Tools selection	applications such as Power Point, Audacity, Camtasia, Internet, Filmora, C-Map
	Theory	Thematic/topical materials
	Implementation	Drilling listening practices using technology, technology is used from beginning to the end of the lesson, text of story in technology, video for explaining concept,
TPK	Tools selection	applications such as Power Point, Audacity, Camtasia, Internet, Filmora, C-Map
	Learning style	Topical/thematic based real daily life authentic materials,
	Implementation	technology used for dialogue, topical conversation, identifying language features and language function, reading text.

Pre-Service Teacher's challenges in designing and implementing instructional videos based on the TPACK framework

Most pre-service teachers faced two kinds of challenges in designing their instructional videos, i.e., external-technical challenges and internal-personal challenges.

External-technical challenges

In these challenges, the pre-service teachers faced difficulties with the technology tools, software, or applications they used to design the videos. Technical issues like the Camtasia or Filmora render being very slow, Camtasia could not cut the audio, the inability to use the software, etc., were among other problems to challenge. For instance, the challenge stated that *student 1* said that she found it difficult to cut the videos from YouTube and unite them into the instructional videos she made as she told:

> "Sometimes my laptop worked slowly because the software is too heavy for my laptop… then, it's a kind of difficulty when I had to cut the videos from YouTube and unite them." (S1, line 76-78)

Another case is as was experienced by *student 7,* where h e had challenges in terms of his adequate knowledge of specific software. He said that he had already known many technology tools that can be used for teaching practices but had not been quite familiar with using them. Therefore, he had to learn repeatedly until he understood enough how to use the technology tools for his teaching practice as he added:

> "The most challenging for me was, honestly, I already knew that many technology tools can be used for teaching practice in the college. Then, I had to learn, learn, and repeatedly learn from the basics

until I understood enough about the software to design my educational video. I was shocked because I had no clue and had zero knowledge about using the software. I learned how to use Camtasia, Audacity, Filmora, and C-Map to design my educational video. It was so hard for me; there are many technology tools that I must master and understand the function." (S7, lines 67-73)

Internal-personal challenges

These challenges are related to experiences in pedagogical activities, such as knowledge about designing lesson plans, triggering creativity in videos, managing their time to create videos, and personal survival. For instance, they had difficulties creatively defining objects, colors, scenarios, buttons, and characters; as was experienced by student 5, she had challenges breaking down the topics, and choosing which words, and which sentences she should put in the slides. As she said:

"Umm… when I broke down the topic, choosing which words and sentences I should put in the slides. It was so hard and confusing because I'm afraid my explanation in the slides wasn't the right one or probably not important, not the exact point. Then, searching for qualified pictures is a must. I have to search and search again until I find the right ones. Moreover, when I did a zoom-in/out in the Camtasia, highlighting or underlining which words or sentences are effective, give the colors to them was sometimes confusing" (S5, line 73-80)

It was not easy to search for the right pictures or videos related to her topic. In addition, she felt confused whenever she had to do a zoom-in or zoom-out in Camtasia, highlight or underline which words or sentences were adequate, and give color to them to make clear explanations for the learners.

Another subject, namely, student 9, felt run out of creativity when she was making the design, animation, or any other highlighted essential points in her videos, as she confessed:

"The most challenging thing for me was how to design the PowerPoint, put a brief explanation, make it as interesting as I could for my students so they can understand the materials very well, then they will not get bored easily while watching and paying more attention to my videos. At the same time, when I take a video from YouTube, sometimes I am afraid that the video is not related to

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topics and is not suitable for my students' grades. So, I had to filter the videos, search and watch them, search for other videos, and repeat them until I thought I had already found the right videos. It took time. At this moment, I was often run out of inspiration. In conclusion, the challenge was a little bit tiring for me." (S9, lines 64-70)

In coping with challenges, however, there are differences among pre-service teachers who get higher scores, those who get average scores, and those who earn lower scores in terms of facing the challenges. The higher pre-service teachers prepared the materials well before teaching practices, even though some sometimes got nervous because they lacked PCK. If the higher score pre-service teachers did this, let alone the average and lower score ones. In terms of being anxious when implementing the materials in the teaching practices, it was tough for them to cope.

Discussion

The challenges and the solving strategies faced by the pre-service teachers reside in how they make the TK and CK in the videos they created. They had difficulties using Camtasia and Filmora (i.e., the TK) and reflecting on their ideas in their educational videos (i.e., the TK and CK). With the help of friends, they learned to use technology. This implies that during the process, the pre-service teachers' inadequacies in having the TK and CK caused difficulties in designing the instructional videos in general. This finding supported (Thompson & Mishra, 2007) study, which argued that the three knowledge domains (i.e., the TK, PK, and CK) are integrated. In other words, the level of competence stipulated in each knowledge domain influences the entire processes in the TPACK frame. However, at the same time, the result revealed that the pre-service teachers compensated for inadequacy in each knowledge domain with the help of peers, lecturers, or internet searching, in addition to personal efforts to increase their knowledge.

Furthermore, the pre-service teachers' preferences on topics for videos were quite crucial in determining how well the process of designing videos was, as the topic they decided on will influence the ease and difficulty levels in making the videos. In the assignment, the lecturers asked them to generate English-written content, for example, about grammar and text genres, within their content knowledge; in the meantime, some of them found that they felt difficult to choose suitable topics, which ease their high creativity to make and at the same

time were interesting for learners. This notion seemingly confirms Tokmak's (2015) study, which stated that creativity requires combining too many elements, namely elements related to, for instance, pre-service teacher thoughts, how to suit the instructional games to the learners' levels, subject matters' characteristics, game characteristics, and design issues. Furthermore, the pre-service teachers agreed that designing the topics into instructional videos was a difficult task, so was selecting the method appropriate for their materials. The syllabus does not clearly describe teaching methods; it contains only a general guideline of teaching materials for one semester. In addition, they also must obtain a strenuous effort to make the purpose of the teaching because it should suit the learning materials to be contextual. This issue supported what Sert and Li (2019) found that the learners' levels are considered critical, influential factors in preparing materials. The pre-service teachers do not just focus on students' linguistic levels but also the cultural values and norms.

Nevertheless, even when they designed their video for teaching practices with those technology tools, they were not satisfied enough with their results because most pre-service teachers stated that it takes time for them and needs more creativity. They had to make the subject matter interesting, attractive, and easy to digest for the learners. These results were different from Tokmak (2015), in which it was stated that most pre-service teachers were satisfied with the instructional computer games they designed. They felt their games were attractive, followed design principles, and were appropriate for the target audience and curriculum. This difference might be caused by the fact that the curricula used are different.

Finally, the results revealed that designing instructional technology requires all knowledge domains of TPACK in addition to experiences in teaching practices. Moreover, creativity was highly emphasized by the pre-service teachers. The TPACK Framework means generic knowledge necessary for teachers to have for their abilities to integrate technology into teaching. This finding is in line with what Schmidt et al. (2009) argued that teachers should spontaneously recognize the complex interactions amongst three essential components of knowledge: the PK, CK, and TK, to integrate the teaching of materials into technology-driven pedagogic methods or appropriate subject matters. That is why the pre-service teachers under study combined the subject matters, the design, and the technique to implement

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teaching practices in the classroom with those three pieces of knowledge.

Further, the pre-service teachers are willing to apply TPACK in the teaching process, although they have challenges when implementing the PCK, TCK, and TPK. Specifically, most pre-service teachers faced difficulties managing the teaching time because they had only fifteen minutes. It was not enough for them to implement those videos into their teaching practices. At the same time, they have some issues to solve in designing the educational videos, such as upgrading technology-use capacity, increasing creativity, and enhancing motivation.

CONCLUSIONS AND SUGGESTION

The EFL pre-service teachers had various self-reflections on the experiences of designing and implementing the instructional videos based on the TPACK framework, putting into three phases of steps in design-making and product-implementing. This becomes a positive experience for them. They need such experiences in designing and implementing instructional videos based on the TPACK framework in microteaching courses, increasing their innovation, creativity, and motivation in their teaching skills. The challenge they should embrace is always present in such attempts. The challenges were divided into two categories, external-technical and internal-personal challenges. The trend exemplified the first one that some pre-service teachers had slow programs on their laptops; second, the pre-service teachers had to struggle when they were developing their videos; third, the specification of their laptops did not meet the requirements to run a specific application; forth, the laptops were not faster enough to render the videos, and fifth, their laptops worked very slowly when they wanted to edit, adjust the pictures with the contents, cut the videos, and use some applications. As a result, it all became a difficulty that needed an immediate solution for them. In the second one, typical cases showed that 1) the pre-service teachers did not have experience making a lesson plan, so they had to learn independently; 2) when they designed the videos, sometimes they were run out of creativity to make the design suitable with their materials to get learners' attention and be attractive to the learners; and 3) some of them did not conduct some activities because they could not properly take advantage of their time in teaching. Despite those difficulties, designing an instructional video gave them some experience in using advanced technology tools for their teaching and learning practices in

the future. An implication that can be drawn from this conclusion is that pre-service teachers, in addition to being equipped with their primary subject competence, need an essential supplementary technological competence before they become teachers in the actual field.

REFERENCES

Abukhattala, I. (2015). The use of Technology in Language Classrooms in Libya. *International Journal of Social Science and Humanity*, *6*(4).

Ajloni, M., & O'toole, M. (2021). Adopting TPACK to Video Technology in the Context of the Jordanian Education System. *TOJET: The Turkish Online Journal of …*, *20*(2).

Akib, E., & Syatriana, E. (2019). Engaging EFL Learner in Explainer Video for Creative Writing. *4th Progressive and Fun Education International Conference (PFEIC 2019)*, 119–123.

Allen, W. A., & Smith, A. R. (2012). Effects of video podcasting on psychomotor and cognitive performance, attitudes and study behaviour of student physical therapists. *Innovations in Education and Teaching International*, *49*(4), 401–414. https://doi.org/10.1080/14703297.2012.728876

Ardanuy Raso, M., Serrano, P., Rajadell Carreras, M., Sunyer Torrents, A., Albareda Sambola, M., Simó Guzmán, P., Salán Ballesteros, M. N., Fernández Alarcón, V., Algaba Joaquín, I. M., & Enache, C. M. (2009). Integració de vídeos docents de baix cost a ATENEA desenvolupats pel Grup d'Innovació Docent de Terrassa (GIDT). *Jornada Dia d'ATENEA*, 1–16.

Bakla, A. (2019). A mixed-methods study of tailor-made animated cartoons in teaching punctuation in EFL writing. *ReCALL*, *31*(1), 75–91. https://doi.org/10.1017/S0958344018000046

Bell, L., & Bull, G. (2010). Digital video and teaching. *Contemporary Issues in Technology and Teacher Education*, *10*(1), 1–6.

Bonafini, F. C., & Lee, Y. (2021). Portraying Mathematics Pre-service Teachers' Experience of Creating Video Lessons with Portable Interactive Whiteboards through the TPACK. *New Educator*, 1–26. https://doi.org/10.1080/1547688X.2021.1980167

Choi, H. J., & Johnson, S. D. (2007). The effect of problem-based video instruction on learner satisfaction, comprehension and retention in college courses. *British Journal of Educational Technology*, *38*(5), 885–895.

http://journal.uinjkt.ac.id/index.php/ijee | DOI: http://doi.org/10.15408/ijee.v9i2.27447
P-ISSN: 2356-1777, E-ISSN: 2443-0390 | This is an open access article under CC-BY-SA license

Creswell, J. W. (2012). *Education Research: Planning, conducting and evaluating quantitative and qualitative research* (Fourth Edi). Boston: Pearson Education, Inc.

Gao, P., Choy, D., Wong, A. F., & Wu, J. (2009). Developing a better understanding of technology based pedagogy. *Australasian Journal of Educational Technology*, *25*(5), 714–730.

Ghanaguru, S., Nair, P., & Yong, C. (2013). Teacher trainers' beliefs in microteaching and lesson planning in a teacher training institution. *The English Teacher*, *42*(2), 216.

Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main barriers and possible enablers of ICTs integration into pre-service teacher education programs. *Journal of Educational Technology & Society*, *12*(1), 193–204.

Guzmán Gámez, D. Y., & Moreno Cuellar, J. A. (2019). The use of plotagon to enhance the english writing skill in secondary school students. *Profile Issues in TeachersProfessional Development*, *21*(1), 139–153.

Haslida, S. N. (2019). *The Use of Short English Video to Improve Students' Vocabulary*. UIN Ar-Raniry Banda Aceh.

Hsin, W. J., & Cigas, J. (2013). Short videos improve student learning in online education. *Journal of Computer Science*, *28*, 253–259.

Irawati, D. (2016). Supporting student's English speaking achievement using Video. *IJEFL*, *1*(1), 45–60.

Kartika, R. A. R., Susilo, S., & Natsir, M. (2017). The effect of the silent short movie on EFL writing achievement of Vocational High School students. *Jurnal Pendidikan Vokasi*, *7*(2), 168. https://doi.org/10.21831/jpv.v7i2.14191

Kay, R. H. (2012). Exploring the use of video podcasts in education: A comprehensive review of the literature. *Computer Human Behavior 28*, *28*, 820–831.

Koehler, M. J., Mishra, P., & Cain, W. (2013). What Is Technological Pedagogical Content Knowledge? *Journal of Education and Practice*, *193*(3), 1–14.

Lachner, A., Fabian, A., Franke, U., Preiß, J., Jacob, L., Führer, C., Kuchler, U., Paravicini, W., Randler, C., & Thomas, P. (2021). Fostering pre-service teachers' technological pedagogical content knowledge (TPACK): A quasi-experimental field study. *Computers & Education*, *174*(December), 104–304.

Limbong, E. (2017). Designing and Developing Supplemental Technology of PACI Model Materials through Blended Learning Methods. *Celt: A Journal of Culture, English Language Teaching & Literature*, *16*(2), 271–304.

Lloyd, S. A., & Robertson, C. L. (2012). Screencast Tutorials Enhance Student Learning of Statistics. *The teaching of Psychology*, *39*(1), 67–71. https://doi.org/10.1177/0098628311430640

Lye, L. T. (2013). Opportunities and challenges faced by private higher education institutions using the TPACK model in Malaysia. *Procedia-Social and Behavioral Sciences*, *91*, 294–305.

Marashi, H., & Adiban, H. (2017). The effect of using short silent animations on EFL learners' writing. *English Review: Journal of English Education*, *5*(2), 207–216.

Masruddin, M. (2018). The efficacy of using short videos through group work in teaching speaking to Indonesian English as Foreign Language (EFL) students. *Arab World English Journal (AWEJ) Volume*, *9*.

Mayer, R. E. (2009). *Multimedia Learning* (2nd ed.). Cambridge: Cambridge University Press.

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). Qualitative Data Analysis. A methods Sourcebook. In *Sage: Vol.* (3rd ed., Issue). London: SAGE Publications Ltd

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054.

Mishra, P., & Koehler, M. J. (2008). Introducing Technological Pedagogical Content Knowledge. *Proceedings of the Annual Meeting of the American Educational Research Association, New York*, 16.

Mishra, P., Koehler, M. J., & Henriksen, D. (2011). The seven trans-disciplinary habits of mind: Extending the TPACK framework towards 21st century learning. *Educational Technology*, 22–28.

Mishra, P., Koehler, M. J., & Kereluik, K. (2009). Looking back to the future of educational technology. *TechTrends*, *53*(5), 49.

Niess, M. L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teaching and Teacher Education*, *21*(5), 509–523.

Niess, M. L., & Gillow-Wiles, H. (2021). Online Instructional Strategies for Enhancing Teachers' TPACK: Experiences, Discourse, and Critical Reflection. *Research Anthology on Developing Effective Online Learning Courses*, 326–348.

Quyang, F., & Scharber, C. (2018). Adapting the TPACK framework for online teaching within higher education. *International Journal*

http://journal.uinjkt.ac.id/index.php/ijee | DOI: http://doi.org/10.15408/ijee.v9i2.27447
P-ISSN: 2356-1777, E-ISSN: 2443-0390 | This is an open access article under CC-BY-SA license

of Online Pedagogy and Course Design, *8*(1), 42–59.

Rackaway, C. (2012). Video Killed the Textbook Star?: Use of Multimedia Supplements to Enhance Student Learning. *Journal of Political Science Education*, *8*(2), 189–200. https://doi.org/10.1080/15512169.2012.667684

Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching*. Cambridge: Cambridge university press.

Saldana, J. (2009). *The Coding Manual for Qualitative Researchers*. New York: Sage Publication, Inc.

Santos, J. M., & Castro, R. D. R. (2021). Technological Pedagogical content knowledge (TPACK) in action: Application of learning in the classroom by pre-service teachers (PST). *Social Sciences & Humanities Open*, *3*(1), 100–110. https://doi.org/10.1016/j.ssaho.2021.100110

Sari, D. N., Susilo, S., & Limbong, E. (2021). Short-animation video in web meeting classes for secondary school learners' EFL writing achievement. *ELT Forum: Journal of English Language Teaching*, *10*(1), 1–11.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers. *Journal of Research on Technology in Education*, *42*(2), 123–150.

Seidel, T., Prenzel, M., & Kobarg, M. (2005). *How to run a video study: Technical report of the IPN Video Study. (Eds.)*. Nordrhein-Westfalen, Germany: Munster Waxmann.

Sert, O., & Li, L. (2019). A qualitative study on CALL knowledge and materials design: Insights from pre- service EFL teachers. *Computer-Assisted Language Learning: Concepts, Methodologies, Tools, and Applications*, 2036–2051.

Setiawan, I., Hamra, A., Jabu, B., & Susilo, S. (2018). Exploring A Teacher Educator's Experiences in Modeling TPACK to Create English Language Multimedia in Technology Courses. *Journal of Language Teaching and Research*, *9*(5), 1041. https://doi.org/10.17507/jltr.0905.19

Sherin, M. G., & VanEs, E. A. (2009). Effects of video club participation on teachers' professional vision. *Journal of Teacher Education*, *60*(1), 20–37.

Shin, T., Koehler, M., Mishra, P., Schmidt, D., Baran, E., & Thompson, A. (2009). Changing technological pedagogical content

knowledge (TPACK) through course experiences. *Society for Information Technology & Teacher Education International Conference*, 4152–4159.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*, 4–14.

Shyu, H.-Y. C. (2000). Using video-based anchored instruction to enhance learning: Taiwan's experience. *British Journal of Educational Technology*, *31*(1), 57–69.

Thompson, A. D., & Mishra, P. (2007). Editors' Remark. *Journal of Computing in Teacher Education*, *24*(2), 38–64. https://doi.org/10.1080/10402454.2007.10784583

Tokmak, H. S. (2015). Pre-service Teachers' Perceptions on TPACK Development after Designing Educational Games. *Asia-Pacific Journal of Teacher Education*, *42*(5), 392–410.

Umutlu, D., & Akpinar, Y. (2020). Effects of Different Video Modalities on Writing Achievement in Flipped English Classes. *Contemporary Educational Technology*, *12*(2).

Vargo, J., Nesbit, J. C., Belfer, K., & Archambault, A. (2003). Learning object evaluation: Computer-mediated collaboration and inter-rater reliability. *International Journal of Computers and Applications*, *25*(3), 198–205.

Wahyuni, S., & Febianti, K. (2019). The use of WhatsApp group discussion to improve students' writing achievement. *Indonesian Educational Administration and Leadership Journal*, *1*(1), 45–51.

Wang, Z. (2015). An analysis of the use of video materials in college English teaching in China. *International Journal of English Language Teaching*, *2*(1), 23–28.

Wisher, R. A., & Curnow, C. K. (1999). Perceptions and effects of image transmissions during internet-based training. *American Journal of Distance Education*, *13*(3), 37–51.

Yilmaz, A. (2015). Short stories via computers in EFL classrooms: An empirical study for reading and writing skills. *The Reading Matrix*, *15*(1), 41–53.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. (2002). Conditions for classroom technology innovations. *Teachers College Record*, *104*(3), 482–515.

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