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Exploring Pre-Service Teachers' Beliefs and Experiences during Emergency Remote Teaching

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Abstract
Little is known about pre-service teachers' (PSTs) content-specific pedagogical beliefs and what causes alignment or misalignment, particularly when it comes to technology integration in emergency remote teaching (ERT). This study looked at the use of technology in teaching practice, content-specific pedagogical views held by PSTs, and the factors influencing these beliefs. The study employed multiple case studies with fifteen PSTs from Indonesian teacher education programs and employed a variety of instruments, including a questionnaire, a teacher belief inventory, a checklist for observations, an interview, and artifacts. The study highlights several crucial findings. First, the PSTs exhibit distinct belief orientations toward their teaching activities. Second, the findings show both alignment and misalignment between EFL content-specific pedagogical beliefs and technological integration, which is driven by three major socio-cultural belief changes. Furthermore, alignment and misalignment were attributed to internal and external causes, as evidenced by the PSTs' technology-supported content-specific pedagogical attitudes and practices during Emergency Remote Teaching (ERT). Due to its importance in teacher development, this study suggests that a greater understanding of the dynamic shift in pre-service teachers' content-specific pedagogical views is required. In a nutshell, this study endorses the alignment and misalignment of pre-service teachers' experiences and content-specific pedagogical beliefs as positive elements in teacher preparation during ERT situations.

INTRODUCTION

In teacher education, pre-service teachers (PSTs), unlike in-service teachers, tend to lack real-world experiences in the teaching profession, and their cognition and appraisal of the

teaching profession are centered more on teachers as students. Therefore, some researchers feel that pre-service teachers have only created a student identity and have yet to form an important professional identity throughout their education (Beauchamp & Thomas, 2009; Flores & Day, 2006; Levin & Ye He, 2008). Hong (2010) discovered that pre-service teachers vaguely perceive their profession, whereas in-service teachers had specific and realistic attitudes toward their profession, including classroom control, knowledge teaching, and relationships with parents, colleagues, and managers. As a result of the career development, the structure of pre-service teachers' professional identity is very straightforward; it is likely to focus primarily on the value of the teaching profession. Based on the characteristics of pre-service teachers' professional identities, some scholars claimed that during the teacher education stage, pre-service teachers would go through an intricate transition of professional identity; that is, their professional identity would constantly be negotiated, constructed, and accepted. Fundamental change, on the other hand, is less likely to occur (Korthagen, 2004).

To strengthen pre-service teachers' competence, ICT has brought significant technological innovations in the teaching and learning process (Ghory & Ghafory, 2021; Jedrinović et al., 2019; Sousa et al., 2022). Consequently, teacher education programs adopt technology into their curriculum and teacher candidates are prepared to be more digitally fluent in integrating technology into their instruction. Recent developments in technology integration have heightened the need for ICT experiences to be integrated with subject matter content in pre-service education. The opportunities to gain the experience are available in a CALL integrated course syllabus (Jeong, 2017) or separate activities like training programs with different strategies and practices. Another important area for investigation is the role model from mentor and teacher educators in preparing PST to be digitally competent (Admiraal et al., 2017; Aşık et al., 2020) to be ready in facing 21st work-competency (Susilo, 2015)

One potential factor associated with technology use is belief. Belief is a complex system when it comes to the relationship between belief and practice, belief and context, and various kinds of belief. The complexity theory promoted by Zheng (2015, p. 13) dwells on the principle of 'teaching according to different circumstances.' It means that teachers will apply a different method in a different condition. In Chinese context, it is called eclectic practice as a sign of diversity. Najdabbasi & Pedaste (2014) stated that in addition to knowledge, belief plays an important role in technology integration. Several researchers have reported the role of PSTs beliefs on the practice of technology integration (Farjon et al., 2019). In Henriques & Gutiérrez-Fallas' (2017) study, the potential of TPACK framework adopted for specific subject matter and beliefs about teaching and learning appears to influence pre-service teachers' decisions in using educational technology for teaching. How the belief develops and changes from the pre-service teachers' experiences during a four-year education program was studied by Tang et al. (2012). The result shows that the views of pre-service teachers are dynamic and formed by the interaction of theoretical knowledge, practical experiences, and reflection during their education program. Ding et al. (2019) found the overall alignment between EFL teachers' content-specific pedagogical beliefs and technology use. Also, Ertmer et al. (2012) investigated close alignments between the pedagogical beliefs and practices of technology.

Coronaviruses, including SARS-CoV-2, caused the COVID-19 respiratory disease pandemic in 2019. The virus impacted everyone, regardless of nationality, education, income, or gender. The pandemic's effects continue to impact education and the lives of those affected. The crisis exposed inequities in education systems, including broadband, computers, and supportive environments. COVID-19 lockdowns disrupted conventional schooling. During the pandemic, the educational community aimed to maintain learning continuity, but students relied on their own resources and teachers had to adapt to new teaching methods. Marginalized groups, lacking digital resources or engagement, risked falling behind.

In this present study, teaching practices during the Covid-19 pandemic are used to explore the idea of the alignment and misalignment between belief and practice. The content-specific pedagogical belief with three belief orientations; skill, rule, and function-based orientations is used as the focus. The setting provides various environments in which the teacher preparation program has conducted the teaching practices in both national and international scopes. In line with the teacher professionalism based on Indonesian certification policy, four prominent elements are strongly considered, namely personal, social, pedagogical, and professional competencies. In this ERT case, not only are in-service teachers encouraged to develop their competence, including digital pedagogies and digital content to facilitate instruction, teacher education program also benefits from having their pre-service teachers prepare their performance in the teaching practice during ERT environment optimally. This study, thus, is intended to explore the implications of alignment and misalignment to get an insight on how to look at those possibilities and provide wise pedagogical treatment to the pre-service teachers and other stakeholders in a teacher preparation program.

LITERATURE REVIEW

Technology use, practices, and experiences

Some studies have shown pre-service teachers have varying experiences with integrating technology into the classroom. Meagher et al. (2011) found that pre-service teachers' attitudes toward technology integration were influenced by the modeling of exemplary practice in their field placements. (Ebersole, 2019) explored the impact of the teacher education program on pre-service teachers' efficacy in technology integration, finding that the use of the TPACK framework or ISTE Standards in coursework design positively impacted their experience. Huda et al. (2018) investigated pre-service teachers' competencies, experiences, and attitudes toward technology integration, finding that they were competent in using technology taught through ICT courses and had a positive attitude towards technology integration. Ruggiero & Mong (2015) identified three themes in pre-service teachers' perception of technology integration throughout their teacher education program, corresponding to Bloom's Revised Taxonomy: identifying and understanding technology as a tool, applying technology and analyzing the process of integration, and not evaluating and creating technology integration experiences. Overall, the papers suggest that pre-service teachers' experiences with technology integration are influenced by their coursework, field placements, and attitudes toward technology.

Teacher belief

Researchers conclude that misalignment occurring in teachers' beliefs and practices is due to barriers. Ertmer (1999) classified barriers impacted on the use of technology as first-order barriers and second-order barriers. First-order barriers are the teachers' external factors such as resources, training, and support. On the other hand, second-order barriers are the internal factors, such as beliefs, confidence, and perceived value of technology for teaching and learning activities. Highlighting teachers' beliefs, it is mentioned that they become the most frequently cited barriers impacting technology integration, after resources and teacher's knowledge and skill. In other words, broadening internet access only is not adequate to assist teachers' technology integration practice. Thus, teachers' pedagogical belief is urgently needed to support the relevance between the content and technology use. To be more specific, technology, in addition to teacher knowledge, cannot provide what is needed by the learners in understanding the certain concept of materials without teachers' pedagogical beliefs (Najdabbasi & Pedaste, 2014).

To fill the gap, this research identified several limitations of the previous studies on the relationship between PSTs pedagogical beliefs and practice. Firstly, the studies are not in an EFL background and involved teacher as the participants (Ding et al., 2019; Farjon et al., 2019). In addition, previous studies tend to use general pedagogical beliefs for the classification, namely teacher-centered and student-centered (Petko, 2012), which are not the only types of teacher belief. There is another classification, called content-specific pedagogical belief with three belief orientations; skill, rule, and function-based orientations. The skill-based approach relates to behaviorism theory which stresses the prominence of drilling; the rule-based approach relates to the cognitive approach which emphasizes grammar, and; the function-based approach is similar to the communicative method which emphasizes meaningful utterances and contexts. In this case, the absence of content-specific belief discussion in previous research findings cannot sufficiently accommodate English teacher content-specific pedagogical consideration when designing and making language instruction (Johnson, 1992). The theory is strengthened by De Souza et al. (2021) who stated the specific example from Johnson's theory. For instance, if the teacher wants to frequently employ a digital timer, sound, or phrase pattern, this may be viewed as a skill-based activity since repetition and memorization are crucial components of incorporating technology. An example of rule-based instruction may be if the teacher gave out dictionaries and reference books to aid in the students' vocabulary development. This is true, however if a teacher used a function-based strategy for engagement, one may describe this exercise as ask-based instruction (Karaseva et al., 2018).

Content-specific pedagogical belief

The term pedagogical in this study refers to the teacher's approach to delivering the materials. In other words, this belief focuses on pre-service teachers' instructional behavior. The use of the term 'content-specific pedagogical belief' is not only discovered in the English language learning context but also in other areas of study which have also investigated this type of belief, such as Physics (Kapon & Merzel, 2019) and Math (Kuntze, 2011). The term used is subject-related belief, pedagogical content belief (Behrmann & Souvignier, 2013), and discipline

subject-related belief. Pertaining to the theoretical reference of the belief orientation in content-specific pedagogical belief, the theories serve as the foundation. The skill-based approach relates to Skinner's behaviorism (Stern, 1983) which emphasizes drilling and habituation; the rule-based orientation is relevant with Chomsky's (1965) cognitive approach that highlights the conscious study of structure, and; the function-based approach is similar to the communicative method suggested by Littlewood (1981) which focuses on involving the learners in meaningful expressions and contexts.

Further, content-specific pedagogical belief applied in the teaching practice of EFL context during Emergency Remote Teaching (ERT) due to the Covid-19 pandemic is under-explored. Although some studies have shown the e-practicum situation during an emergency (Gustine, 2021; Koşar, 2021), the discussion on different school policies implemented in Indonesia that would require the pre-service English teachers to do their practices in different school levels is still minimum. Through this study, the result is also expected to verify the existing assumption showing that the link between teachers' beliefs and practices (planned behaviors seen from the lesson plan and teaching materials) of technology integration is higher than those between beliefs and incidental behaviors (Basturkmen et al., 2004) . Next, past research focused on the shifting belief without exploring technology integration practice comprehensively within the PSTs' teaching experience (e.g., Tang et al., 2012). In relation to the different educational contexts for EFL countries, certain government policies invite various interpretations. For example, a study by Han et al. (2017) in South Korea with its technology integration policies using a top-down approach might not be applicable for other countries with a different system of education.

This study calls for the needs for a further investigation that can give a more fruitful portrayal of how EFL pre-service teachers' content-specific pedagogical beliefs are translated into technology integration during teaching experience in schools during ERT. By using the Indonesian educational context, this study aims to fill the gap by investigating content-specific pedagogical beliefs through adopting Johnson (1992) analytic framework covering three belief orientations—skill-based, rule-based, and function-based— and EFL pre-service teachers' ICT integration. To be more specific, without this exploration, the possible consequence may occur both theoretically and practically. The absence of understanding pre-service teacher belief and practice in the context of content-specific areas causes insufficient concepts towards the pre-service teacher cognition development process in relation to technology integration. Furthermore, the important role of content-specific pedagogical beliefs developed through material development-related courses and school environment during the practice is not maximally exposed. Hence, discussion in this area can also influence the way teacher education programs develop the pre-service teachers' preparedness through the curriculum.

It is crucial to conduct this study to provide empirical data about content-specific pedagogical belief orientations of pre-service English teachers underlying their ICT classroom activities and how those are aligned or misaligned in their teaching practice. This study seeks to address the following questions:

1. What are the pre-service English teachers' content-specific pedagogical beliefs and technology integration in teaching practice?

2. In what ways do pre-service English teachers' content-specific pedagogical beliefs align or misalign with their technology integration during teaching practice, and what factors contribute this alignment/misalignment?

RESEARCH METHOD

This study used a multiple case study consisting of within-case analysis and cross-case analysis with purposive and snowball sampling. Borg (2019) noted that only qualitative studies can help "develop deeper understandings of how teachers' beliefs are shaped during a PDI (professional development initiative)". This statement indicates this current research is appropriate to be conducted through qualitative way in which the information is collected comprehensively by the direct statements from the participants. During the process, the researcher used three steps of the case study model developed by Yin (2013), i.e., define and design (select case and design data collection protocol), prepare, collect, and analyze the data (conduct series of case studies and write individual case report), and analyze and conclude (draw cross-case report, modify theory, and write a cross-case report). The steps were used since this case study shows the how and why of the occurrence question is addressed. It is believed that the procedure is comprehensive and used logical sequence that establishes a link between the empirical data, the study's initial research questions, and the study's final results.

Subjects of research

This study implemented several steps to determine the subjects. First, the team distributed digital literacy questionnaire to EFL pre-service teachers in English Department at selected universities and selecting candidates of EFL pre-service teachers. Then, we seek further information about the candidates by interviewing their lecturers or coordinators of the institution. After the information was obtained, it was analyzed to confirm the research subject candidates. As the last step, the selected research subjects were asked to complete consent form to show their willingness in involving as the participant of the study.

This study involved eight male and seven female pre-service English teachers enrolling in a teaching practice program in their third year (the academic year 2020/2021). Aging between 20 and 24 years old, they were placed in both national (some regions in East Java, Indonesia) and international (three different schools in Thailand) settings. Each of these pre-service teachers had signed a consent form before the research started. The researcher communicated with the pre-service teachers using WhatsApp and email correspondence. The process of subject selection is illustrated in Figure 1, and the profile of the pre-service teachers is listed in Table 1.

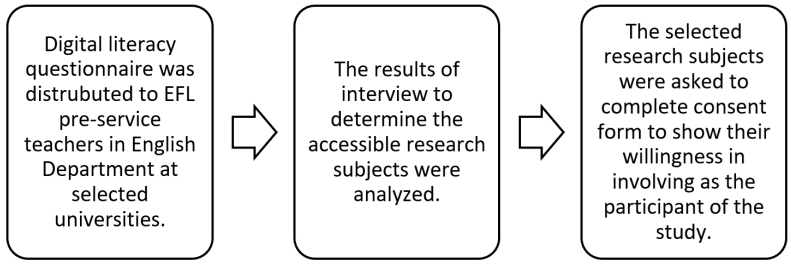

Figure 1 Steps in implementing the subject selection process

Table 1

The pre-service teachers when they took teaching practice program

PST*	Gender	Institution	Teaching Practice Program**	Placement School	Students' Grade
PST 1	M	A	KPL	Malang	Secondary School
PST 2	M	A	KPL	Singosari	Secondary School
PST 3	F	A	KPL	Singosari	Secondary School
PST 4	M	B	Magang III	Malang	Secondary School
PST 5	M	B	Magang III	Malang	Secondary School
PST 6	M	B	Magang III	Batu	Secondary School
PST 7	F	C	Magang III	Thailand	Primary School
PST 8	F	C	Magang III	Thailand	Primary School
PST 9	F	C	Magang III	Thailand	Primary School
PST 10	M	D	PLP II	Sidoarjo	Secondary School
PST 11	M	D	PLP II	Surabaya	Secondary School
PST 12	M	D	PLP II	Sidoarjo	Secondary School
PST 13	F	E	PLP II	Sidoarjo	Secondary School
PST 14	F	E	PLP II	Mojokerto	Secondary School
PST 15	M	E	PLP II	Gresik	Secondary School

*PST = *Pre-service Teacher*

**Name of Teaching Practice Program used in different universities

KPL = *Kuliah Pengenalan Lapangan*

Magang III = *School Internship III*

PLP II = *Pengenalan Lapangan Persekolahan II*

Data collection technique

For data collection, a timeline and schedule were set before its implementation. When collecting data, the instruments had been arranged carefully to investigate the expected data in a proper turn. Table 2 gives detailed information about the collected data and Figure 2 illustrates the turn of instrument use.

Table 2

The instrument for data collection

Instrument	Timeline	Activities	To find out …
Teacher Beliefs Inventory	Before teaching practice	Identifying belief from the students' response	Teaching beliefs
Pre-Interview	Before teaching practice	Interviewing to make sure their option in belief inventory	Teaching beliefs
Lesson Plan	During teaching practice	Identifying the content presented in lesson plan and the learning technology implemented in teaching practice	Teaching beliefs
• Observation checklist • Self-Assessment report	During teaching practice After teaching practice	• Observing the subject when teaching • The subject self-evaluated themselves when performing teaching	Technology integration practice
Post Interview	After teaching practice	Interviewing the subject individually regarding their performance with technology in teaching practice	Technology integration practice
Teaching Artifacts (Teaching practice report, teaching materials, students' work, teacher and students' online communication)	After teaching practice	Identifying the relevant documentation	Technology integration practice

Data analysis

Within-case analysis required two steps; pre-teaching practice and post-teaching practice. Before teaching practice, the response from belief inventory was documented and supported by interview answers analysis as the triangulation. After teaching practice, the observations checklist was analyzed and triangulated into interview responses and artifacts (particularly reflective reports), teaching materials, and students' projects integrated with technology. This analysis was used because teaching materials in lesson plan was prepared and written based on the condition of school setting for pre-service teachers. Each EFL pre-service teacher was subjected to coding to identify skill-based, rule-based, and function-based beliefs and practices during teaching practice performance. Coding was done by identifying the relevant keywords to be linked to the three kinds of belief orientation by Johnson (1992). Furthermore, coding was applied to know the belief change by analyzing PSTs' beliefs change categorized by Cabaroglu and Roberts (2000, pp. 393–398).

Before performing cross-case analysis, within-case analysis had been finished. The evidence from each case was summarized and coded under broad thematic headings and then summarized within themes across studies with a brief citation of primary evidence. Subsequently, the case profiles from all EFL pre-service teachers' content-specific pedagogical beliefs and technology integration were analyzed to find commonalities and differences between the cases. The result

shows how EFL pre-service teachers' technology integration in teaching practice is aligned or misaligned with their content-specific pedagogical beliefs. Next, data reliability analysis was performed by assessing the data from the participants' materials through inter-coder reliability by using Cohen's Kappa. The inter-coder agreement was used to determine the classification of textual, visual, or audio data obtained. Since materials were given online through some applications/programs, rater 1 (researcher) and rater 2 coded the content from PowerPoint slides or other explainer videos, e.g., PowToon, YouTube, and so forth. In this study, based on the calculations, the average Kappa coefficient is 0.8 with the percentage of agreement reaching 98.048%. The guidelines for the interpretation of the kappa value and the conclusion indicate that with the Kappa coefficient = 0.8 which exceeds 0.75, the reliability of this study is classified as Excellent Agreement.

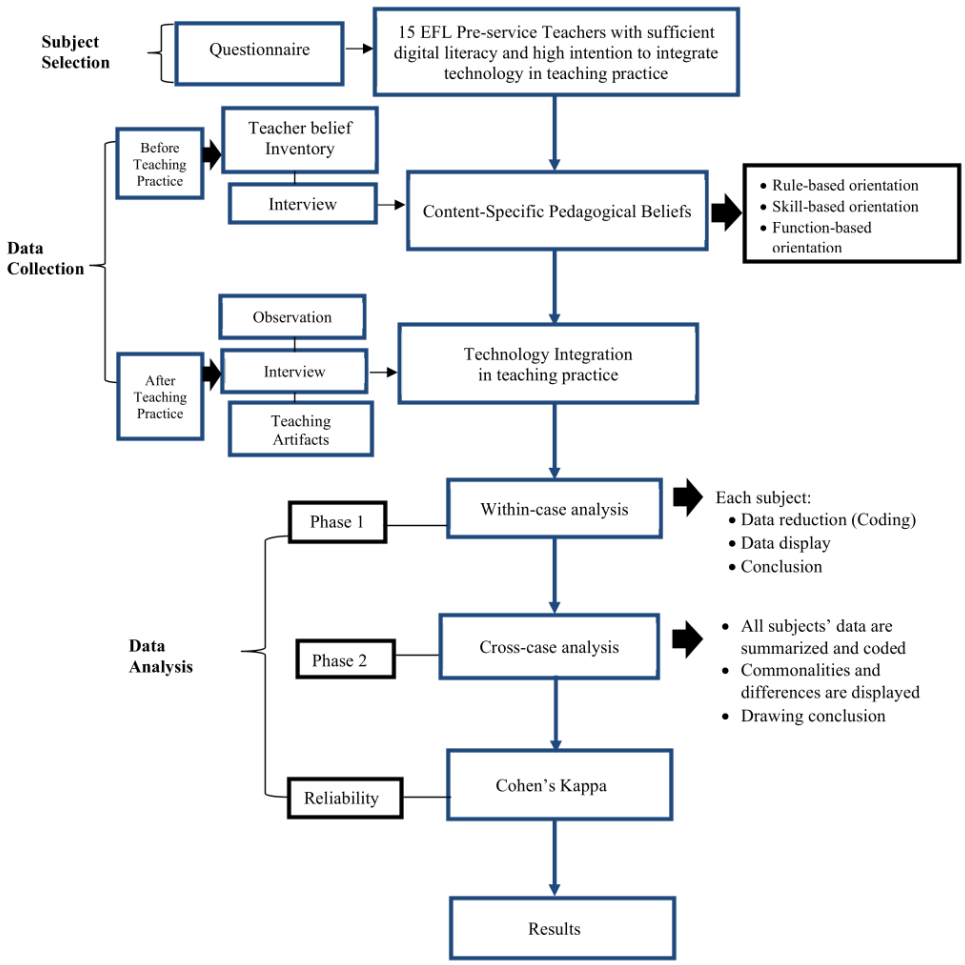

Figure 2 Research design

Ethical considerations

Before the research was conducted, ethical approval was obtained from the consent form delivered to each participant of the study. The participants signed and confirmed their agreement by sending messages via WhatsApp.

RESULTS & DISCUSSION

Results

The content-specific pedagogical beliefs before teaching practice were explored by using teacher belief inventory and clarification interviews. Based on the result of belief inventory, fifteen participants gave various answers. The first three responses were used as the priority to make interpretation. If there are double beliefs found, the next step was doing confirmation by interviewing the participants to ask whether the response was appropriate or not. During the clarification, the participants finalized their agreement with their choice and the researcher's interpretation. The beliefs expressed by the participants through teacher belief inventory is presented in detail in Table 3.

Table 3
The pre-service teachers' content-specific belief orientation before teaching practice

PST	Content-specific pedagogical belief orientation
PST 1	Function-based orientation
PST 2	Skill-based orientation
PST 3	Rule-based orientation
PST 4	Function-based orientation
PST 5	Skill-based orientation
PST 6	Function-based orientation
PST 7	Function-based orientation
PST 8	Function-based orientation
PST 9	Rule-based orientation
PST 10	Rule-based orientation
PST 11	Skill-based orientation
PST 12	Rule-based orientation
PST 13	Skill-based orientation
PST 14	Function-based orientation
PST 15	Skill-based orientation

After teaching practice, the data showing the result of data analysis based on a lesson plan and content analysis of the materials given during the English lesson by the pre-service teachers is summarized in Table 4. This analysis was used because lesson plan was prepared and written based on the condition of school setting for pre-service teachers. Since this study deals with technology integration and teaching process; therefore, the appropriate part for content analysis is focused on learning objective, technology, and observed belief orientation reflected from the teaching performance. The key coders are on the students' expected ability, type of technology, and the main activities of teaching and learning activities. Table 4 also explains the converting results of materials into the indicators of content-specific pedagogical beliefs.

Table 4

Summary of lesson content-specific pedagogical beliefs and technology integration

PST	Objective (Students are able to …)	Source of Technology	Observed Belief Orientation
1	make an analytical exposition text	• PPT • Kahoot! • WhatsApp Group • E-Learning	Function
2	describe people, objects and places	• PPT • WA group • Google Classroom	Rule
3	arrange a descriptive text	• PPT • Google Classroom • WhatsApp Group	Rule
4	practice how to read and write time	• PPT • Vlog	Rule
5	make simple and interesting greeting card	• PPT • Vlog	Skill
6	make simple sentences of obligation, prohibition and suggestion	• PowToon • Vlog	Function
7	express the vocabulary of market	• PPT audio • Presentation Plus • Zoom	Skill
8	express the vocabulary of animal	• PPT • Presentation Plus • Zoom	Skill
9	express the vocabulary of vegetable	• PPT Audio • Google Meet	Skill
10	compose a caption text	• PPT audio • E-learning • WhatsApp Group	Function
11	make an announcement text	• PPT audio • ePub • Google Classroom • YouTube • Proprofs • Quizziz	Function
12	make a simple dialogue of asking for attention	• PowToon • Google Classroom	Skill
13	arrange the act of offering services	• PPT	Skill
14	create texts of giving and asking for information	• PPT • Google Meet	Rule
15	make a descriptive text	• PowToon	Function

Alignment between EFL content-specific pedagogical beliefs and technology integration

The alignment showed as the result refers to the similarity between pre-service teacher content-specific pedagogical belief and teaching practice with the assistance of technology

integration during ERT situation. In general, the results show that 6 of the 15 EFL pre-service teachers showed alignment between their content-specific pedagogical beliefs and their technology integration practices during emergency remote teaching. They are PST 1, 3, 5, 6, 7, and 9. PST 3 showed his consistency in belief orientation and technology integration practice, particularly rule-based orientation. PST 1 and 6 had the same belief orientation, namely function-based orientation. Next, PST 5, 7, and 9 shared similarities in selecting skill-based orientation.

In the case of PST 1 and 6, function-based orientation was presented through the participant's materials indicating one indicator, particularly indicator number 7 Language can be thought of as meaningful communication and is learned subconsciously in nonacademic, social situations. In other words, PST 1 and 6 tried to teach the use of English in a contextual situation to their students. Both had different approaches to technology integration. PST 1 applied more various applications such as PPT, Kahoot!, WhatsApp Group, and E-Learning., while PST 6 used PowToon and learning Vlog.

Furthermore, PST 5, PST 7, and PST 9 also shared similarities. They proved that their technology integration could accommodate their skill-based belief orientation, particularly number 10. If EFL students practice the language patterns of native speakers, they can make up new sentences based on those language patterns which they have already practiced. Their teaching employed PPT audio, Presentation Plus, Vlog, Zoom, and Google Meet. The technology classified as new media was Presentation Plus presented in virtual meeting platform Zoom and given by PST 7.

Misalignment between content-specific pedagogical beliefs and teaching practice

The misalignment indicated as the result refers to the difference between pre-service teacher content-specific pedagogical belief and teaching practice with the assistance of technology integration during ERT situation. Of the fifteen participants, nine cases showed misalignment between content-specific pedagogical beliefs and technology integration practice. They were PST 3, PST 4, PST 8, PST 12, PST 13, PST 10, PST 11, PST 14, and PST 15. In the classroom activities, rule-based orientation was implemented by PST 3 (skill-based), PST 4 (function-based), and PST 14 (function-based). The skill-based orientation was identified in the technology integration during teaching practice by PST 8 (Function-based), PST 12 (rule-based), and PST 13 (function-based). Meanwhile, PST 10 (rule-based), PST 11 (skill-based), and PST 15 (rule-based) showed shift of function-based orientation.

Technology integration during emergency remote teaching

In this part, the cross-case analysis found that majority of the host schools implemented online learning during ERT, while the remaining implemented offline class and blended learning. Furthermore, three schools opening offline classes were vocational high schools, which was necessary since the activities were dominantly practicums. During the process, both teachers and students were required to implement Covid-19 health protocols. Additionally, students attended offline schedules in shifts.

> *I specifically teach 10th & 11th grade. The class distribution for 10th grade is based on the odd & even-numbered, so a week odd & a week even for offline learning. And I have 2x even & odd meetings for the 1st KD is about Simple Future Tense. (PST #15)*

There are two categories of the synchronous way of learning or synchronous computer-mediated communications (SCMC), namely virtual and live. In virtual synchronous, WA was dominantly used for English class activities. Apart from the basic teaching and learning needs, WA was also used for crosschecking students' presence through self-picture like what PST 1 experienced. The second platform used by three participants taking international teaching practice was LINE. This technology was used for sending the materials and worksheet. Additionally, the participants, school mentors, and school students used the application for consultation and communication forums. Based on the participants' experience, LINE is more popular in the host country (Thailand) than in WA.

> *Sometimes, they get exercises or homework. For the homework, I usually asked them to write the answer on book & capture it, then they sent it through LINE. (PST #8)*

Not all of the schools suggested the participants implement online face to face meetings with the students (live synchronous/live lecture online) mainly due to the absence of fast Internet support in the students' home, school's limited experience with the technology, the availability of e-learning platform in the school that was considered sufficient for online learning, and no strong obligation from the government to carry out a classroom from home through the live platform. From four participants experiencing online live meeting platforms, namely PST 7, PST 8, and PST 9, three of them implemented international teaching practice in which they had direct communication with the students through Zoom or Google Meet. The three participants used the platform collaboratively from the school facility, instead of the individual student. Meanwhile, PST 14 utilized Google Meet in his class using the students' devices.

In contrast, in this study, collaborative live synchronous through the use of teachers' phones was carried out since Indonesian EFL pre-service teachers could not travel abroad to meet the target learners due to the global pandemic. Fortunately, the students in the host country could safely attend the class in the school. Live learning for students at the elementary school level who were banned from bringing phones to school was possible because the teachers were able to facilitate the communication through their devices. The role of the school mentor and Internet used in the class were significant to support the live learnings.

To investigate the next commonalities among the participants, through the use of NVivo software, the research tried to cross-case the participants and other nine attributes of technology integration most commonly used during ERT, namely live synchronous (Zoom and Google Meet), virtual synchronous (WA and Line), supporting app for Asynchronous (Moodle, Google Classroom, and Google Form), explainer application (PPT, PPT audio, Presentation Plus, PowToon), and online learning way (synchronous).

> *…. Hmm it might be 2 apps, ma'am. In my opinion, for the asynchronous, I used one of these, Google Classroom or WhatsApp to deliver the materials. Whereas for the synchronous, I used Zoom or Google meet to see the students. (PST #4)*

In Table 5, it is clear that all of the participants used at least two applications for implementing the teaching performance, and the highest number of applications used were at three programs. Dealing with the most popular application used by most of the student teachers in teaching practice is learning and communicating through WA, delivering materials in PPT, and posting assignments or share materials via Google Classroom. However, the least useful technology applied during the teaching practice were making quiz from Google Form, integrating social media in the form of Instagram, and sharing materials as well as tasks in Moodle. Social media can be used for authentic material for topic of caption as stated by the participant based on her teaching experience.

> *I also gave an example, picture & its caption. For the submission, they have to upload it to their Instagram. However, there was someone who initiated to upload it on the class' Instagram. I think they don't have, but they have. It's fine then. (PST #7)*

Table 5
The summary of application

PST	Virtual Synchronous		Live Synchronous		Asynchronous				Explainer Application			
	WA	Line	Zoom	Google Meet	Google Classroom	Google Form	Moodle	Insta gram	PPT	PPT Audio	Presentation Plus	Pow Toon
1	■						■		■			
2	■				■				■			
3										■		
4	■								■			
5	■				■				■			
6	■				■							■
7	■								■			
8	■											■
9	■					■			■			
10	■							■		■		
11					■							
12	■				■							■
13		■	■								■	
14		■	■	■							■	
15		■							■			

The alignment/misalignment occurring in this present study is also related to the belief change process. Before the pre-service teachers made their decision in the practice, they had set their immediate beliefs (Hayati et al., 2013). This confirmed what has been categorized by Cabaroglu and Roberts (2000, pp. 393–398) into eleven stages of teachers' belief change (see Table 7) that offer a comprehensive look into the complexities of student teachers' belief transformation. Additionally, two new change processes, integration and modification, were also identified by Yuan and Lee (2014) during the teaching practice through observation. Based on the category, the cases have shown stability and flexibility in the indicators under one main belief orientation and that their substance differed greatly. Various pupils displayed different behaviors in various aspects at different periods. To conclude, three main classifications—awareness, no change,

and re-ordering—were detected. Furthermore, no change indicates alignment occurred. In contrast, awareness and re-ordering show misalignment. Table 6 illustrates the detailed process.

Table 6

Shifting indicators and belief change

PST	Belief Orientation	Technology Integration Practices	Belief Change Process	Alignment
1	FbO	FbO	No Change	✓
2	RbO	RbO	No Change	✓
3	SbO	RbO	Re-ordering	X
4	FbO	RbO	Re-ordering	X
5	SbO	SbO	No Change	✓
6	FbO	FbO	No Change	✓
7	SbO	SbO	Awareness	✓
8	FbO	SbO	Re-ordering	X
9	SbO	SbO	No Change	✓
10	RbO	FbO	Re-ordering	X
11	SbO	FbO	Re-ordering	X
12	RbO	SbO	Re-ordering	X
13	FbO	SbO	Re-ordering	X
14	FbO	RbO	Re-ordering	X
15	RbO	FbO	Re-ordering	X

Note:

✓ : Aligned

X : Misaligned

RbO : Rule-based Orientation

SbO : Skill-based Orientation

FbO : Function-based Orientation

Table 7

Summary of belief change category (Cabaroglu & Roberts, 2000)

Belief change category	The process of belief change
Awareness/ realization	Student teachers become more fully aware of a construct, idea or process so that they accept and understand it better in real teaching contexts.
Consolidation/ confirmation	Student teachers perceive a consistency between existing beliefs and newly presented information in the learning process and as a result, their prior beliefs become more established.
Elaboration/ polishing	Student teachers refine their existing beliefs by elaborating relevant knowledge and/ or connecting with new input.
Addition	Student teachers add new constructs to their existing beliefs. This process usually occurs after they recognize new information as useful in making sense of a learning/ teaching issue.

Belief change category	The process of belief change
Re-ordering	Student teachers rearrange their beliefs according to importance so that some beliefs might be considered more important or relevant than others in their teaching practice.
Re-labeling	Student teachers perceive no change in the construct or belief but adopt a new term for it.
Linking up	Student teachers make a new connection between two constructs or beliefs.
Disagreement	Student teachers abandon an old belief and embrace a new one in order to revolve a conflict between one's current beliefs and a new learning experience.
Reversal	Student teachers adopt a belief that seems to deny a former one. It can be seen as a more extreme form of disagreement.
Pseudo change	Student teachers experience a "false change" in their beliefs, which might take place when they perceive a belief to be important but inappropriate or inapplicable to a current context of use.
No change	Student teachers experience no apparent change or development in their beliefs.

DISCUSSION

The pre-service English teachers' content-specific pedagogical beliefs and technology integration in teaching practice

According to the present study's findings, PSTs aligned and misaligned content-specific pedagogical principles with teaching practice. The alignment shown as a result refers to the similarities between pre-service teachers' content-specific pedagogical beliefs and teaching practice when technology is integrated during an ERT circumstance. The mismatch highlighted as a result refers to the disparity between pre-service teachers' content-specific pedagogical beliefs and teaching practice with the help of technology integration within an ERT setting. Considering the important role of teacher belief in teachers' decisions, judgment, and behavior, plenty of previous studies explore pre-service teacher beliefs. A lot of attention has been given to the issue related to how EFL pre-service teacher develops their beliefs based on their limited experience and supportive environment during their teaching practice program to strengthen their professional development. This finds resonance with Merisi and Pillay (2020) and Taşkın (2019) who indicated that more attention has to be given to pre-service teachers.

With regards to the content-specific pedagogical belief of the research participants in the present study, the overall findings have enriched the previous study by Ding et al. (2019) regarding the kinds of belief orientations that are commonly practiced in the school by EFL pre-service teachers during ERT. Additionally, this study gave helpful insight on the investigation of the pre-service teachers' rule-based orientation as promoted by Debreli (2012), particularly by adding two important aspects in teaching, namely, function- and skill-based orientation.

This study identified that the participants have shown the three belief orientations, in addition to the rule-based orientation that is closely related to Grammar. To be more specific, the rule-based orientation was identified in the four participants, function-based in five participants, and skill-based in six participants.

Qiu et al. (2021) dove deep into the pre-service teacher's belief before and after teaching practice (others also call it practicum). Unlike others, their study employed a quantitative approach and showed that teaching practice intervention became a critical period for pre-service teacher professional identity development, eventually resulting in the dynamic belief change. Focusing on belief, they laid on two orientations, traditional orientation and open orientation from four dimensions, namely: beliefs on student management, beliefs on students' learning, beliefs on teaching and evaluation, and beliefs on curriculum and teaching plan. When compared to this present study, nine out of fifteen pre-service teachers changed their belief orientations toward the content of materials stated through teacher belief inventory responses. Consequently, this resulted in the alignment/misalignment, indicating that the research subjects showed development after experiencing the real context of teaching during practicum.

Inputs from the process of teaching practice toward pre-service teachers' decision-making and alignment/misalignment do not always have the same outcomes. In other words, changes are not in the same patterns. For instance, the six participants of this study had similar content-specific pedagogical beliefs before and after teaching practice. This verified Capan (2014) and Tang et al.'s (2012) studies which showed stability of the pre-service teachers' beliefs. In understanding the stability of teachers' beliefs, researchers contended that teachers' pre-existing beliefs assist to filter new information and abilities gained throughout their teacher education before they are integrated into the existing schemata (Johnson, 1994)

In relation to belief change occurring in this study, three out of eleven types were the discussion focus. As for the first type, awareness/realization was identified as the process in which pre-service teachers became more fully aware of the belief orientation. In other words, the prior belief was strengthened to accept it better. In this context, this process was found in PST 7's case. The second type is "no change," which refers to the stability of the participants' beliefs. This process is presented through the appearance of similar beliefs that occur before and after teaching practice at least by performing one indicator. . It can be seen in four cases, namely PST 1, PST 2, PST 5, and PST 9. The last and dominant change process belongs to "re-ordering category". This category was experienced by PST 14, PST 15, PST 13, PST 12, PST 11, PST 10, PST 8, PST 6, PST 4, and PST 3. They rearranged their belief based on what they encounter during teaching practice, including feedback from the mentors and peers and students' responses in the previous meetings.

The relation between belief change category and PSTs' content-specific pedagogical beliefs has confirmed that alignment/misalignment is a dynamic process depending on its context. This alignment/misalignment explains PSTs' development through certain behavior performed in the new situation during the teaching practice period. In pre-service teachers' context, the dominant situation is from the classroom followed by the school. This part is in line with the theory of EFL teachers' complex belief system (Zheng, 2015). The theory of belief change

process can answer the question in the conceptual framework, "How content-specific pedagogical belief and practice aligned/misaligned?". It happened through being fully aware of the belief so that they are consistent with their belief with more performed indicators, rearranging their belief according to the relevant condition in the field, and being consistent with the belief with no specific additional understanding of the belief indicators.

Alignment/misalignment of pre-service English teachers' pedagogical beliefs and technology integration

Given the pre-service EFL teachers' particular experiences and numerous contacts in placed situations, multiple alignment and misalignment, as well as belief change processes, may occur in distinct correlating circumstances. As a result, it contributes to the formation of PSTs' unique belief system in directing their teaching-learning. They may be confined by the mandated syllabus and established classroom habits, which limit them to innovate from the standard methods usually used by instructors at the school (Tang et al., 2012).

Buehl and Beck (2014) classified other categories contributing to the alignment/misalignment between belief and practice as internal and external factors. Internal factors include the existence of other beliefs, knowledge, experience, and teachers' self-awareness and self-reflection. Meanwhile, external factors cover classroom-context factors, school context factors, and national-, state-, district-level factors. In relation to these categories, the cases of this study seem to show both of them. In the context of internal factors, knowledge and teaching experience were more evident in this study. The PSTs with teaching experience showed good preparation for their materials and were more confident in the classroom management aspect. Knowledge in this part is about the comprehension of the lesson. While all PSTs had knowledge about the English lesson, PST 7 and PST 8 stood out more as they performed confidently and excelled in the presentation of materials and media because they had used them before. Concerning belief and practice, they, however, showed a different result. PST 7 showed alignment, while PST 8 showed misalignment. This indicates that longer teaching experience cannot always ensure the alignment of belief.

Pertaining to the external factors or socio-cultural factors, from the cases during ERT in this study, the limited possibility for direct interaction seemed to be apparent. From the socio-cultural standpoint, student teachers' ideas might shift as a result of their interactions and practice during the teaching practicum (e.g., Borg, 1999; Ng et al., 2010). To begin with, student teachers' ideas might be heavily impacted by their engagement and connection with various members (e.g., students, mentors, and other school colleagues). During ERT, most of the participants had to communicate virtually with school mentors and students. Consequently, the school- and classroom- context brought distinct nuance compared to the normal situation (classroom setting) in terms of community. However, national-, state- and district-level factors were strongly evident in this study. Although national-level authorities announced that school from home was mandatory at that time, the district-level schools still had the autonomy to decide whether to open the school or not and to implement specific rules in response to the danger of Covid-19 pandemic. This was, of course, very influential to class activities run by the pre-service teachers.

This present study has explored the various technology platforms applied by the pre-service teachers during their practice in an online environment. Technology in this case has three main functions, namely, communication, teaching-learning process, and a blend of the two (communication and teaching and learning process). WhatsApp and Line were the dominant supporting apps used by the pre-service teachers since these are the most popular applications in the respective countries. Pre-service teachers who took the teaching practice in Indonesia used WhatsApp, and participants who carried out their teaching practice program in Thailand used Line. Based on the survey by the ministry of education and culture in 2020, it revealed that WhatsApp was the most common application used by the school stakeholders; thus, the program is registered as free access for educational purposes. Furthermore, the use of WhatsApp for blended activities resonated with what was found by Rahiem (2020). The study found that at the university level the students used WhatsApp for various types of activities, such as reading the teacher's explanation, doing some exercises for assessment, discussing topics, and other enriching agendas. This is also supported by other previous studies showing WhatsApp as a meaningful application in other different contexts during pandemics (Amin & Sundari, 2020; Ramdhani & Nandiyanto, 2021).

The next important specific part is identified in the practice of PST 7, PST 8, and PST 9. The international teaching practice program provided English teaching experience to young learners or primary students. Focusing on the interaction during synchronous learning, the students were able to give both verbal and non-verbal responses without operating the device, and the process resulted in better classroom management. The class situation was controlled by the teacher in the host country in which the students gave their much attention to the teacher in the room and on the screen. However, students could only participate in the class by using the microphone feature. This situation is in line with Cheung (2021) who investigated social presence in Teaching English for Young Learners in the context of response (verbal ad non-verbal) without utilizing the features of Zoom application, such as a chatroom, gesture, annotation, and share screen. What was presented by PST 7, PST 8, and PST 9 were slightly like hybrid learning with some distinct emphasis. In hybrid learning, there are offline and online activities given by the teachers. In this context, the offline and online situation was from the students; thus, that condition did not meet the criteria of hybrid learning. In a nutshell, the result of this study can be structured into a proposed framework to elaborate pre-service English teachers' experience during teaching practice as a contribution. Figure 3explains this schema and shows that the previous research findings (Cabaroglu & Roberts, 2000) have been expanded in terms of the contributing factors and the process of belief change.

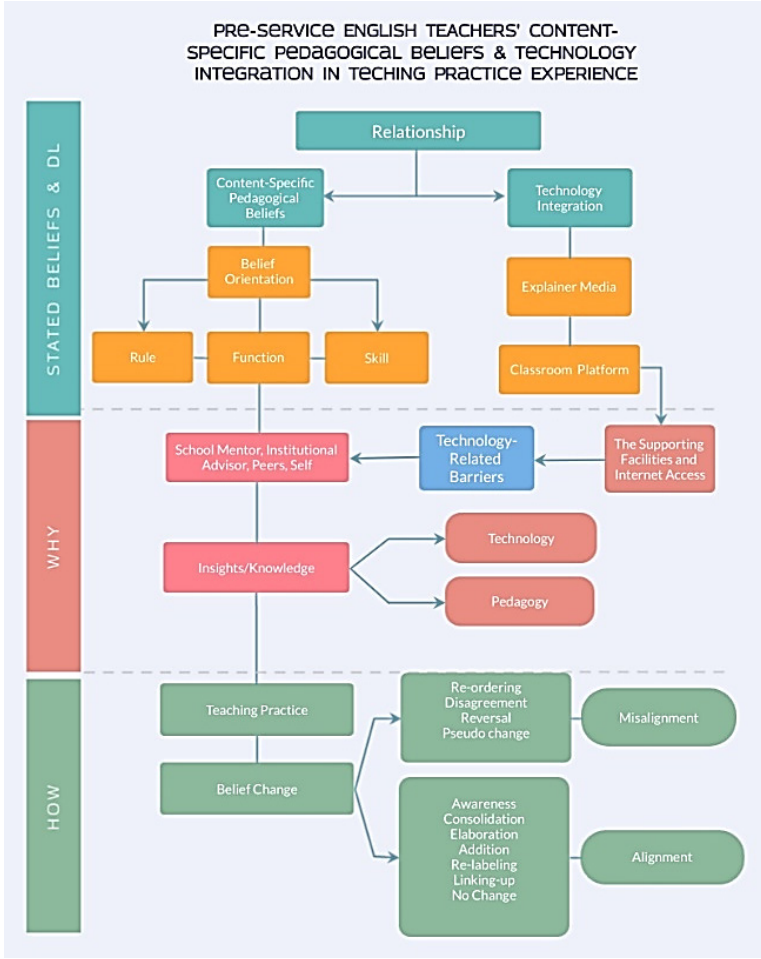

Figure 3 A diagram showing the contribution of this present study

Based on the belief change process shown in Figure 3, there are three stages to be explored to unpack alignment and misalignment, namely stated belief and digital literacy of the pre-service teachers, "why" that represents the contributing factors happening during the consultation and observation phase in teaching practice, and "how" that contains belief change and decision making before PSTs implement certain content-specific pedagogical belief in the classroom. These processes indicate that alignment/misalignment is not something to be judged or changed from aligned to misalign. Rather, alignment/misalignment refers to the developmental stages that have values to construct professionalism in the context of teaching practice.

CONCLUSION

This study concludes with the following points: First, the PSTs have different orientations of content-specific pedagogical beliefs. The subjects of this study express three types of belief orientation in different cases, namely rule-based, function-based-, and skill-based orientation investigated from selected indicators of teacher belief inventory (before practice) and matched

indicators (observed during the observation). Second, the identified integration of technology platforms used in the class were carried out synchronously, asynchronously, and the combination. Accordingly, three functions are considered pivotal to support the class activities, namely, for communication, teaching and learning process, and blended purpose (both communication and teaching & learning process). Third, pre-service English teachers' content-specific pedagogical beliefs and practices supported by technology integration during emergency remote teaching (ERT) show alignment and misalignment depending on various situations and technology support from the pre-service teachers and school students.

To enrich the body of knowledge dealing with ELT, there are several suggestions for future researchers. First, since the focus of teaching experience included in this study involves one basic competence for each case of PST, future researchers can do more investigation on how alignment/misalignment, as well as belief change, occur from several basic competencies pre-service teachers should present in the teaching practice program experience. Second, since it remains under-explored whether the student teachers' beliefs would undergo similar changes if they were to be placed in a school with less or more support, further analysis is still needed to confirm pre-service teachers' perceived beliefs through different settings, instruments, procedures, and length of teaching practice program.

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Appendix 1

Teacher belief inventory adapted from Johnson (1992)

Instructions: Please read all 15 statements. Then select five statements that most closely reflect your beliefs about how English as a foreign language is learned and how English as a foreign language should be taught.

1. Language can be thought of as a set of grammatical structures which are learned consciously and controlled by the language learner.
2. As long as EFL students understand what they are saying, they are actually learning the language.
3. When EFL students make oral errors, it helps to correct them and later teach a short lesson explaining why they made that mistake.
4. As long as EFL students listen to, practice, and remember the language which native speakers use, they are actually learning the language.
5. EFL students generally need to understand the grammatical rules of English in order to become fluent in the language.
6. When EFL students make oral errors, it usually helps to provide them with lots of oral practice with the language patterns which seem to cause them difficulty.
7. Language can be thought of as meaningful communication and is learned subconsciously in nonacademic, social situations.
8. If EFL students understand some of the basic grammatical rules of the language they can usually create lots of new sentences on their own.
9. Usually, it is more important for EFL students to focus on what they are trying to say and not how to say it.
10. If EFL students practice the language patterns of native speakers they can make up new sentences based on those language patterns which they have already practiced.
11. It's important to provide clear, frequent, precise presentations of grammatical structures during English language instruction.
12. Language can be described as a set of behaviors which are mastered through lots of drill and practice with the language patterns of native speakers.
13. When EFL students make oral errors, it is best to ignore them, as long as you can understand what they are trying to say.
14. EFL students usually need to master some of the basic listening and speaking skills before they can begin to read and write.
15. It's not necessary to actually teach EFL students how to speak English; they usually begin speaking English on their own.

Notes:

- Rule-based belief orientation : No 1, 3, 5, 8, 11
- Skill-based belief orientation : No 4, 6, 10, 12, 14
- Function-based belief orientation : No 2, 7, 9, 13, 15

Appendix 2

Interview guide (adopted from Harris, et al.., 2012)

Lesson description:

1. Describe the content and/or process topic(s) for the lesson.
2. Describe the student learning goals/objectives addressed in the lesson.
3. Describe your students (e.g. grade level, and specific learning needs/preferences).
4. Walk me through the lesson/project as it unfolded in the classroom.
5. What educational technologies (digital and non-digital) did you use and how did you and/or your students use them?
6. Describe any contextual information (e.g. access to a computer lab, materials and resources available; particular departmental/school-wide initiatives) that influenced the design or implementation of the lesson/project.

Technology-specific questions

1. How and why do the particular technologies used in this lesson/project "fit" the content/process goals?
2. How and why do the particular technologies used in this lesson/project "fit" the instructional strategies you used?
3. How and why do the learning goals, instructional strategies, and technologies used all fit together in this lesson/project?