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Online practicum preparation for enhancing preservice teachers' reflection depths: a quasi-experimental approach

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Building preservice teachers' capacities with in-depth reflections on their acquired knowledge and practicum practice has become indispensable in teacher education programs' current field experience requirements. Lengthy training programs with blended learning have successfully promoted reflection in preservice teachers. However, it is unclear whether preservice teachers could benefit from a short self-access online training program (SSOTP) in promoting their reflection depths, especially when facing challenging situations such as COVID-19. Using a teaching and assessing reflective learning model, we examined reflection depth among Chinese preservice teachers in a quasi-experimental research approach. This study showed the effectiveness of an SSOTP in stimulating preservice teachers' reflection depth. The training sequence and different topics also significantly affected preservice teachers in generating reflections. The results suggested that establishing an SSOTP with systematic stimulations could enhance preservice teachers' reflection depths and help them achieve quality teaching during the teacher preparation stage. While preservice teachers generated many reflective statements, their reflection depths were relatively shallow. This study provides evidence to enhance different levels of reflection depth in future SSOTPs.

KEYWORDS

classroom observation, online training, preservice teacher, reflection depth, reflective teaching

Introduction

Since the onset of the COVID-19 pandemic, modern society has faced unprecedented challenges (Hill, 2021; Özüdogru, 2021). As one of the consequences, online teaching and learning practices have surged worldwide, making them a phenomenon in the history of education. Teaching and learning have been transformed more and more from the face-to-face teaching mode in traditional schools to a virtual learning environment in cyberspace. In this historic period of change and uncertainty, the traditional teacher education system is confronted with the new task of effectively improving the professional teaching competency of preservice teachers in a virtual learning environment to cope with various challenges in their future teaching careers.

Building preservice teachers' capacities with in-depth reflections on their acquired knowledge and practicum practice has become indispensable as part of the field experience requirements of teacher education programs. Nevertheless, it has been found that preservice teachers' reflection ability during the teacher education stage is challenging to sustain meaningful changes in their future teaching practice (Jay and Johnson, 2002; Cochran-Smith, 2004). Enhancing preservice teachers' depths of reflection is crucial to satisfying teaching performance in practicum practice. With the rapid development of advanced technology, this can be achieved through a virtual learning environment. Bates et al. (2016) asserted that online teacher training programs could enhance teachers' teaching reflection and professional development.

Reflection has been seen as a professional activity that is integrated into teachers' daily work and professional identity and that eventually guides teachers' professional growth (Glasswell and Ryan, 2017). Standards-based teacher education, which presents knowledge in the form of standards and measures knowledge in visible results (Delandshere and Petrosky, 2004), has been widely used in advancing preservice teachers' teaching performance in Western countries (Lewis and Young, 2013). However, few studies (e.g., Ye et al., 2019; Hong et al., 2021) were found to link professional learning with teacher standards among preservice teachers in China. Based on the researchers' knowledge, there was no empirical research evaluating reflection development with the guidance of a systematic framework in a virtual learning environment in China in 2018, when this study started. Therefore, based on a model for teaching and assessing reflective learning, this study aimed to evaluate reflection depths among preservice teachers through online reflection training during the teacher preparation stage.

Theoretical backgrounds and research questions

Online learning environments support preservice teachers' professional learning

Advanced technologies were applied to create virtual learning environments where preservice teachers were encouraged to engage in learning activities without time and space limits (Earle and Fraser, 2017). Using digital technologies in education makes it easier to fulfill diverse students' needs and teachers' learning at different levels (Vahed, 2021). Preservice teachers' learning outcomes and satisfaction could be improved with the use of digital technologies (He and Huang, 2017). For instance, social networking services (e.g., YouTube) provide platforms for preservice teachers to learn asynchronously. They can search for videos according to their interests. Moreover, various wireless technologies (e.g., smartphones and tablets) can help preservice teachers to obtain access to multiple resources more conveniently and efficiently.

Lengthy teacher training programs have contributed to promoting teachers' teaching performance. A full-term online training program with blended learning and reflective practice elements has improved in-service teachers' teaching quality (Krammer et al., 2006). Preservice teachers' lesson planning and teaching practices were improved after taking an e-learning course with credits during practicum practice (Smith and Greene, 2013). During the e-learning course, they were asked to reflect on their own and other peers' lessons, and they also received feedback from their mentor teachers and placement schoolteachers. In our previous study, we proposed an initial framework (see Figure 1) that a short self-access online training program (SSOTP) with four online training sessions and reflection tasks could develop preservice teachers' reflection depths (Wang et al., 2023).

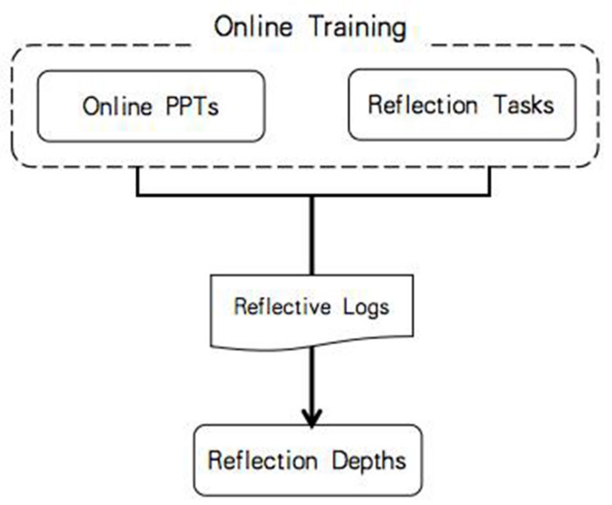


FIGURE 1
The initial framework for developing reflection depths.

Reflection depths in Ryan and Ryan's TARL model (2013)

Reflection involves a conscious consideration of the learning process and the anticipated outcome of that learning (Moon, 2013) rather than just recalling the incidents in the classroom. It has been widely recognized that critical reflection is crucial for preservice teachers' teaching effectiveness (Rodman, 2010; Etscheidt et al., 2012). Preservice teachers must develop competence to facilitate learning and provide meaningful thoughts about their practice (Tyrrell et al., 2016, p. 15). The developed reflective thinking skills help preservice teachers constantly question their teaching methods and strategies, adopt novel ideas to improve their teaching performance, and shape professional beliefs toward teaching (Orakci and Ruzgar, 2021; Orakci et al., 2023).

A model for Teaching and Assessing Reflective Learning (TARL), which focuses on the reflective learning process, has been developed for preservice teachers to improve their reflection depths in teaching practice (Ryan and Ryan, 2013). The TARL model categorizes reflection depths into four levels: reporting and responding, relating, reasoning, and reconstructing. With this systematic reflection framework, preservice teachers gradually learn to reflect from elementary to profound levels. Although reflection depths have been distinguished in this model, the measurement depends on the knowledge that preservice teachers acquire in teacher education programs. This study aimed to provide empirical evidence to stimulate reflection at different levels of depth.

Reflective practice in teacher standards in different contexts

In many Western countries, reflective practice has been put into teacher standards to evaluate and improve teachers' teaching performance. The Department of Education in the UK put forward *Teacher Standards* in 2011, in which teachers are required to become reflective teachers and to reflect on the effectiveness of instructions and teaching approaches systematically [Department for Education of UK (DfE), 2011]. In the US, the National Board for Professional Teaching Standards [National Board for Professional Teaching Standards (NBPTS), 2016] developed Five *Core Propositions for Teaching* to guide teachers to achieve high-quality teaching at the national level. Reflective practice has been highlighted in the document, as it proposes that teachers have to think systematically about their teaching practice and learn from their experiences. Another document, the Performance Assessment for California Teachers (PACT), has been used to assess and develop the teaching effectiveness of beginning teachers through analytic reflections (Merino and Pecheone, 2013). It was reported that preservice teachers benefited from PACT, as it supported them in reflecting deeply on their teaching (Okhremtchouk et al., 2009) and enhanced their understanding of effective teaching (Campbell et al., 2016). However, it was influenced by various factors, such as how preservice teachers were trained to use lesson videos to support their reflections and whether they could make teaching decisions independently (Okhremtchouk et al., 2009). Influenced by Western countries, Hong Kong developed *Professional Standards for Teachers* to improve teachers' professional development [Committee on Professional Development of Teachers and Principals (COTAP), 2015]. The document required teachers to adopt reflective approaches to evaluate their teaching practice and encouraged them to become reflective practitioners.

Over the past decade, reflection has also been emphasized in teacher education programs in China. Embracing the challenges of new curriculum reform in teacher education programs [Ministry of Education of China (MOE), 2011], Ministry of Education of China (MOE) (2012) developed *the Professional Standards for Primary and Middle School Teachers (Trial)*. Teachers were required to explore their problems and practical needs in teaching and reflect on their teaching continuously to improve teaching quality. A policy titled *Interim Measures for the Qualification Examination of Primary and Secondary School Teachers* was issued to increase the requirements for teacher professional admittance and break the lifelong system of teacher qualification [Ministry of Education of China (MOE), 2013]. The document stipulates that teachers must re-register every 5 years when they need to take no less than 360 h of training. It emphasized that preservice teachers must constantly reframe their knowledge and teaching skills. In 2020, MOE issued an updated version of the new curriculum for high school, in which teachers are required to explore teaching innovation and reform through critical reflections [Ministry of Education of China (MOE), 2020].

All these documents are related to teacher education programs that prepare future reflective practitioners and research-oriented teachers. However, it was found that Chinese preservice teachers lack depth when participating in research activities and reflections (Yan, 2017). Some researchers found that the professional standards did not significantly affect teachers' professional development in China. For example, while teachers acknowledge the importance of professional standards in improving teaching competence and facilitating educational reform, knowledge-based standards and textbook-centered approaches remain dominant as examination-oriented education is ingrained in the Chinese context (You et al., 2020).

Classroom observation approaches in teacher preparation

Classroom observation, which provides a direct way for observing and evaluating teachers' teaching behaviors (Martinez et al., 2016), is also involved in supporting preservice teachers to reflect deeply on their teaching performance in the teacher preparation stage. Observing lesson videos encourages preservice teachers to reflect deeply on their teaching practice and track their progress (Bayram, 2012; Gaudin and Chaliès, 2015). In China, observing and analyzing excellent teacher videos rated highly for their instructional quality is an effective approach commonly used to support preservice teachers' learning about teaching during the teacher preparation stage. Observing public lessons in teacher learning activities has become the basic learning approach for novice teachers to improve their teaching skills after entering the profession (Zhang et al., 2021).

Besides, understanding the requirements of assessments and classroom observation instruments has also been used to help preservice teachers improve their teaching performance in the West. Van de Grift (2007) developed the International Comparative Analysis of Learning and Teaching (ICALT) instrument to measure and develop teachers' teaching behavior. Preservice teachers' teaching practice was improved through understanding the staged teaching skills of effective teaching in the ICALT instrument during the teacher education period (Maulana et al., 2017). Additionally, two recent studies of language assessment training in Hong Kong emphasized the importance of developing preservice teachers' understanding of assessment knowledge and purpose in a practical context and using assessments to improve effective teaching in teacher education programs (Lam, 2015; Xie and Tan, 2019).

Research questions

This current study addresses the research gap that lacks an evaluation of an SSOTP to support preservice teachers in developing deep reflections in a virtual learning environment. Two research questions were proposed:

(1) (a) Can online training enhance preservice teachers' depth of reflection? (b) Does the order of the training sequence matter?
(2) Do reflection topics make a difference in stimulating preservice teachers' reflection depth?

Methodology and research design

This study adopted a quasi-experimental research design with mixed research methods to evaluate reflection depths among preservice teachers through an SSOTP in reflective teaching and classroom observation during the teacher preparation stage. However, because of its length, this study only focuses on and presents the quantitative results.

Participants

Ninety-four preservice teachers were recruited from a teacher education university in northern China as the study sample. During data collection, all participants were studying at the practicum preparation stage. Among these participants, 82 were women, and 12 were men. They were categorized by major: math and science studies, language studies (Chinese and English language study), primary education study, and others (e.g., Politics, Educational Technology). Ten participants would be assigned to primary schools and 84 to secondary schools in their future practicum based on their majors.

The participants were randomly assigned to two experimental groups (the RT-CO Group and the CO-RT Group) in two training sequences and one control group without training. A total of 33 participants were in the RT-CO group, 31 in the CO-RT group, and 30 in the control group. Table 1 shows the demographic characteristics of the participants.

Instruments

Self-access online training

To address the unprecedented situations brought about by the COVID-19 pandemic, an SSOTP was designed to support preservice teachers' professional learning and help preservice teachers to assess their learning outcomes beyond the classroom in a virtual learning environment (Anas et al., 2020; Kelly et al., 2020). By examining the learning process and whether they have mastered the learned knowledge, the self-access learning mode allows preservice teachers to identify their mistakes and disadvantages and facilitate them in making adjustments and improvements, thus promoting reflection depths.

Four online training sessions were provided for the participants in the experimental groups as an intervention in this study. Four narrated PowerPoints lasted about 40 min each in two themes: reflective teaching and classroom observation. For example, "What do preservice teachers need to know about reflective teaching?", "How to do classroom observation?".

The content of reflective teaching training was designed based on the literature on teaching reflection and reflection depths (e.g., Moon, 2013; Hall and Simeral, 2015) and collaborative reflection (e.g., Prilla and Renner, 2014; Wang and Quek, 2015). The classroom observation training was designed based on the literature on classroom observation approaches, effective teaching, and inspiring teaching (e.g., Ko and Sammons, 2013; Sammons et al., 2014, 2016; Van de Grift, 2014). Figures 2, 3 show some screenshots of the PowerPoint slides from the online training sessions.

Reflection topics as stimuli

Preservice teachers' reflective capacity significantly improved when provided with a problem-solving framework and scenarios with different teaching situations (Aubusson and Schuck, 2013). Therefore, the participants were asked to write a reflective log as a task after each online training session. In each task, the participants were given a reflection topic with some open questions to stimulate their in-depth reflections.

In reflective teaching training sessions, participants were asked to comment on a math teacher's teaching reflection after class (Topic 1) and write a self-reflection log based on their limited teaching experience (Topic 2). In classroom observation training sessions, participants were asked to write what they wanted to discuss with the teacher after observing a teaching clip of a lesson on insects (Topic 3) and two classroom videos teaching geography and math by overseas teachers (Topic 4). Figure 4 shows Topic 3 as an example.

Data source and analysis

The participants of the two experimental groups were asked to take four online training sessions in 2 weeks. The participants in the RT-CO Group took two training sessions in reflective teaching first and then two training sessions in classroom observation. The participants in the CO-RT Group took the online training sessions in the opposite order. Furthermore, they wrote four reflective logs according to the training sequence. The order to write reflective logs for the control group was the same as for the RT-CO group.

According to the TARL model (Ryan and Ryan, 2013), four codes were adopted to analyse the depths of 1,846 reflective statements identified from 376 reflective logs of 94 participants. Table 2 shows the code descriptions and examples excerpted from preservice teachers' reflective logs. It reported higher interrater reliability between two coders using Krippendorff's (2004) Alpha ($\alpha = 0.88$).

Second, descriptive statistics and chi-squared tests were conducted using SPSS 25 to determine whether the short self-access online training and training sequence might affect preservice teachers' reflection depths and whether different topics might affect reflection generation.

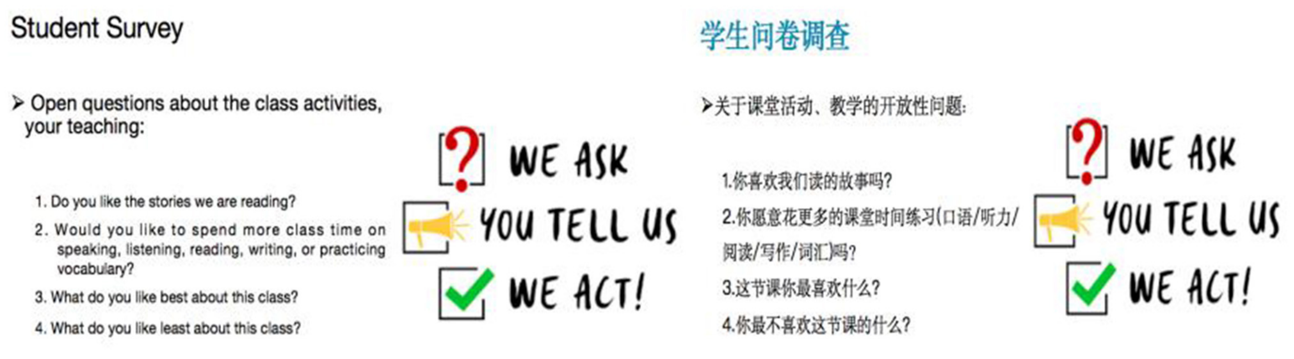
Findings

Reflection depths in preservice teachers' professional reflective logs

Generally, the means and standard deviations in Table 3 show that the number of reflective statements generated by participants in the two experimental groups ($M = 1.41$, $SD = 0.18$; $M = 1.33$, $SD = 0.72$ respectively) was higher than that of the control group ($M = 1.16$, $SD = 0.51$). At each level, the RT-CO group generated the most reflective statements, followed by the CO-RT Group,

TABLE 1 Demographic characteristics of participants.

Group	Major	School level for practicum preparation	Number	Total
RT-CO group	Math and science	Secondary	9	33
	Language studies	Secondary	15	
	Primary education	Primary	4	
	Other majors	Secondary	5	
CO-RT group	Math and science	Secondary	8	31
	Language studies	Secondary	13	
	Primary education	Primary	4	
	Other majors	Secondary	6	
Control group	Math and science	Secondary	9	30
	Language studies	Secondary	11	
	Primary education	Primary	2	
	Other majors	Secondary	8	
Total				94



Student Survey

➤ Open questions about the class activities, your teaching:

1. Do you like the stories we are reading?
2. Would you like to spend more class time on speaking, listening, reading, writing, or practicing vocabulary?
3. What do you like best about this class?
4. What do you like least about this class?

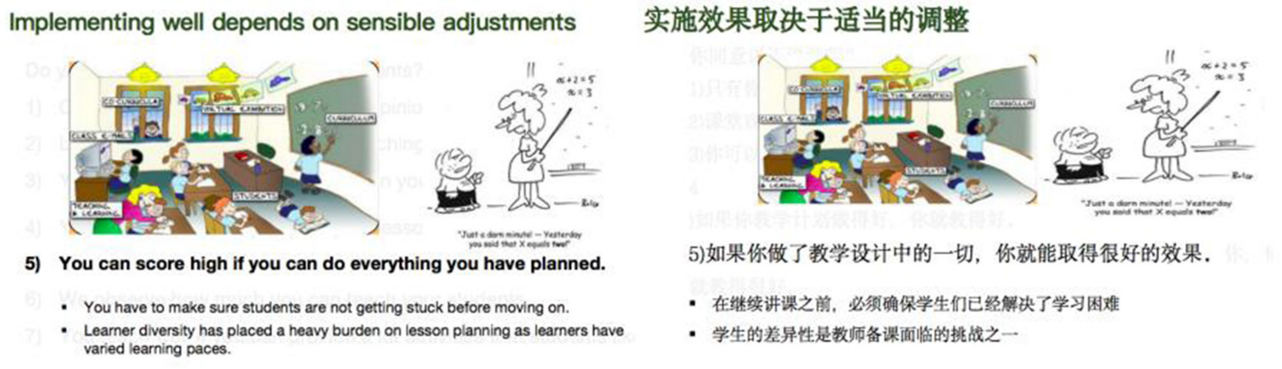
WE ASK
YOU TELL US
WE ACT!

学生问卷调查

➤关于课堂活动、教学的开放性问题:

1.你喜欢我们读的故事吗?
2.你愿意花更多的课堂时间练习(口语/听力/阅读/写作/词汇)吗?
3.这节课你最喜欢什么?
4.你最不喜欢这节课的什么?

FIGURE 2
A PowerPoint slide excerpted from reflective teaching training (English and Chinese versions).



Implementing well depends on sensible adjustments

5) You can score high if you can do everything you have planned.

- You have to make sure students are not getting stuck before moving on.
- Learner diversity has placed a heavy burden on lesson planning as learners have varied learning paces.

实施效果取决于适当的调整

5)如果你做了教学设计中的一切，你就能取得很好的效果.

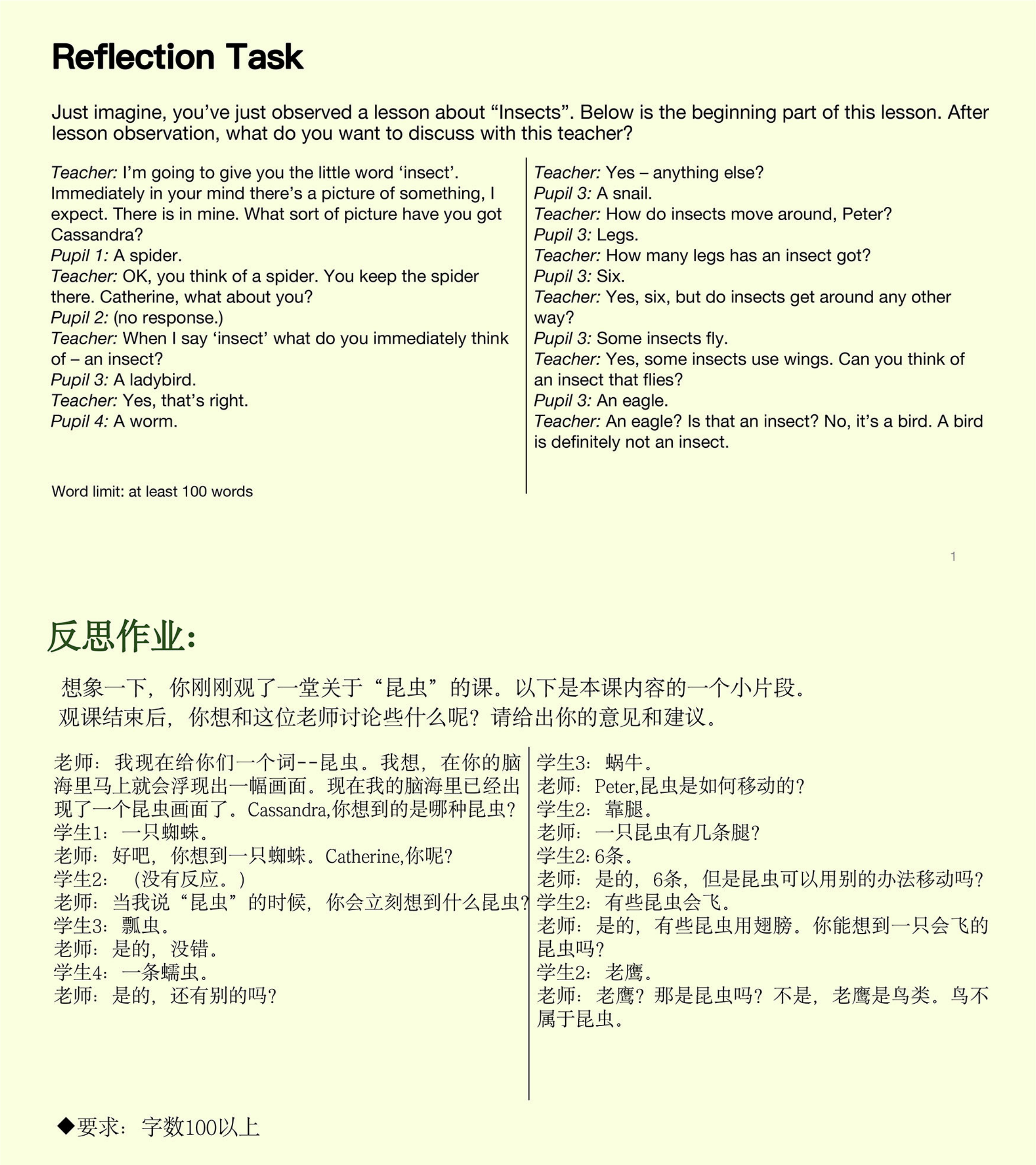
- 在继续讲课之前，必须确保学生们已经解决了学习困难
- 学生的差异性是教师备课面临的挑战之一

"Just a darn minute! — Yesterday you said that X equals two!"
"Just a darn minute! — Yesterday you said that X equals two!"

FIGURE 3
A PowerPoint slide excerpted from classroom observation training (English and Chinese versions).

with the control group generating the fewest. The proportion of *Reporting and Responding* statements in the control group (90.5%) was higher than that in the two experimental groups (78.7% and 81.8%, respectively). However, the proportion of the *Reasoning* statements in the RT-CO Group (17.4%) was almost triple that of the control group (6.3%).

Most reflective statements were at the *Reporting and Responding* level (n = 1,525, 82.6%). The reflective statements at



Reflection Task

Just imagine, you've just observed a lesson about "Insects". Below is the beginning part of this lesson. After lesson observation, what do you want to discuss with this teacher?

Teacher: I'm going to give you the little word 'insect'. Immediately in your mind there's a picture of something, I expect. There is in mine. What sort of picture have you got Cassandra?
Pupil 1: A spider.
Teacher: OK, you think of a spider. You keep the spider there. Catherine, what about you?
Pupil 2: (no response.)
Teacher: When I say 'insect' what do you immediately think of – an insect?
Pupil 3: A ladybird.
Teacher: Yes, that's right.
Pupil 4: A worm.
Teacher: Yes – anything else?
Pupil 3: A snail.
Teacher: How do insects move around, Peter?
Pupil 3: Legs.
Teacher: How many legs has an insect got?
Pupil 3: Six.
Teacher: Yes, six, but do insects get around any other way?
Pupil 3: Some insects fly.
Teacher: Yes, some insects use wings. Can you think of an insect that flies?
Pupil 3: An eagle.
Teacher: An eagle? Is that an insect? No, it's a bird. A bird is definitely not an insect.

Word limit: at least 100 words

1

反思作业:

想象一下，你刚刚观了一堂关于“昆虫”的课。以下是本课内容的一个小片段。
观课结束后，你想和这位老师讨论些什么呢？请给出你的意见和建议。

老师：我现在给你们一个词--昆虫。我想，在你的脑海里马上就会浮现出一幅画面。现在我的脑海里已经出现了一个昆虫画面了。Cassandra,你想到的是哪种昆虫？
学生1：一只蜘蛛。
老师：好吧，你想到一只蜘蛛。Catherine,你呢？
学生2：（没有反应。）
老师：当我说“昆虫”的时候，你会立刻想到什么昆虫？
学生3：瓢虫。
老师：是的，没错。
学生4：一条蠕虫。
老师：是的，还有别的吗？
学生3：蜗牛。
老师：Peter,昆虫是如何移动的？
学生2：靠腿。
老师：一只昆虫有几条腿？
学生2: 6条。
老师：是的，6条，但是昆虫可以用别的办法移动吗？
学生2：有些昆虫会飞。
老师：是的，有些昆虫用翅膀。你能想到一只会飞的昆虫吗？
学生2：老鹰。
老师：老鹰？那是昆虫吗？不是，老鹰是鸟类。鸟不属于昆虫。

◆要求：字数100以上

FIGURE 4
Reflection topic 3—a teaching clip of a lesson on insects (English and Chinese versions).

the *Reasoning* level came in second, accounting for 13.8% ($n = 254$) of all participants, followed by the *Relating* level ($n = 59$, 3.2%) and the *Reconstructing* level ($n = 8$, 0.4%). The *Reconstructing* level was excluded because only the participants in the RT-CO group generated a few *Reconstructing* statements, and no *Reconstructing* statements were generated in the other two groups. The results showed a significant difference in the participants' reflection depths among the three groups, $\chi^2(4, n = 1{,}838) = 32.65$, $p = 0.00$. Figure 5 shows the comparisons of the logarithmic counts of reflective statements at four reflection levels among three groups.

Based on the adjusted Z scores, a *post-hoc* test revealed that the statements between the RT-CO and control group had statistically significant differences in the *Reporting and Responding* and *Reasoning* statements ($p < 0.00$ and $p < 0.00$, respectively). Additionally, in the RT-CO Group, significant differences were shown between the appropriate proportions of *Reporting and Responding* statements and *Reasoning* statements ($p < 0.00$). In the control group, significant differences were shown between the appropriate proportions of *Reporting and Responding* statements and *Reasoning* statements ($p < 0.00$). The results indicated that the participants in the control group were more likely to generate *Reporting and Responding* statements. However, participants from the RT-CO group generated more reflective statements than others in the *Reasoning* category.

TABLE 2 Code descriptions and examples of reflective logs by reflection depth.

Category	Code	Description	Examples excerpted from reflective logs
Reporting and responding	RL1	Report what happened or what the issue or incident involved. Respond to the incident or issue by making observations, expressing an opinion, or asking questions	The students did not understand the decimal system the teacher taught in class, so they made many mistakes in the exercises
Relating	RL2	Relate or connect the incident or issue to preservice teachers' skills, professional experience, or discipline knowledge. Refer to the viewpoints of peers/colleagues/experts	From my knowledge about student engagement, the teacher should motivate students' interests with pictures/videos
Reasoning	RL3	Highlight in detail the significant factors underlying the incident or issue. Explain why the influential factors are essential to understanding the incident or issue	I think the teacher was weak in classroom management, instruction clarity, and student engagement because she did not sufficiently prepare the lesson
Reconstructing	RL4	Based on some theories, the preservice teacher should provide opportunities for a personalized learning experience to increase student autonomy	After discussing student engagement with my mentor, I will stimulate students' engagement through positive interactions with them in the future

TABLE 3 Reflective statements by levels of depth.

Depths of reflection		RT-CO group ($n = 33$)	CO-RT group ($n = 31$)	Control group ($n = 30$)	Subtotal ($n = 94$)
		Count (%)	Count (%)	Count (%)	Count (%)
Reporting and responding		651 (78.7)	455 (81.8)	419 (90.5)	1,525 (82.6)
Relating		24 (2.9)	20 (3.6)	15 (3.2)	59 (3.2)
Reasoning		144 (17.4)	81 (14.6)	29 (6.3)	254 (13.8)
Reconstructing*		8 (1.0)	0 (0.0)	0 (0.0)	8 (0.4)
Total	Count (%)	827 (100)	556 (100)	463 (100)	1,846 (100)
	M (*SD*)	1.41 (0.18)	1.33 (0.72)	1.16 (0.51)	1.32 (0.72)

χ^2 (4, $n = 1{,}838$) = 32.65, $p = 0.00$.
*Not included in the chi-square test.

The difference in reflection depths between the two experimental groups

The RT-CO Group showed higher counts of reflective statements of the two topics on the reflective teaching theme ($n = 227$, $n = 241$, respectively) than the CO-RT Group, whose topics were on the classroom observation theme ($n = 76$, $n = 127$, respectively) after the participants finished the first two online training sessions (see Table 4). The CO-RT Group ($n = 189$, $n = 164$, respectively) showed a similar number of reflective statements in reflective teaching topics to the RT-CO Group ($n = 143$, $n = 216$, respectively) in classroom observation topics after the participants finished the last two online training sessions. Additionally, the results showed that the percentages of reflective statements for the two themes were similar in the RT-CO Group (reflective teaching: 56.5%, classroom observation: 43.4%). However, the number of reflective statements increased from 36.5% in classroom observation topics to 63.5% in reflective teaching topics in the CO-RT Group. These two experimental groups showed significant differences across topics, χ^2 (3, $n = 1{,}383$) = 8.94, $p = 0.03$.

After conducting multiple z-tests of two proportions with a Bonferroni correction, we found in a *post-hoc* test that only Topic 1 showed a statistically significant difference in the proportion of reflective statements between the RT-CO Group and the CO-RT Group ($p < 0.00$). The results suggested that preservice teachers tended to get more benefit from reflective teaching training.

Preservice teachers' reflection depths on different topics

Table 5 shows that the participants generated more reflective statements in Topic 1, Topic 2, and Topic 4 (30.5%, 28.7%, and 24.7%, respectively) than in Topic 3 (16.1%). The mean scores showed that the reflective statements in Topic 1 were related to a more advanced level ($M = 1.41$, $SD = 0.78$), followed by Topic 2 and Topic 3, which shared the same level ($M = 1.34$, $SD = 0.74$; $M = 1.34$, $SD = 0.75$, respectively), and Topic 4 was the lowest ($M = 1.17$, $SD = 0.56$), although the count of statements in Topic 4 was higher than that in Topic 3.

The statements related to *Reporting and Responding* accounted for the most reflective statements in each topic (76.6%, 81.5%, 82.6%, and 91.4%, respectively). The proportions of statements in the *Reasoning* category were also evident in each topic (15.3%, 15.1%, 16.4%, and 8.6%, respectively). However, the statements occurred less frequently in all topics in the *Relating* and *Reconstructing* category (3.2% and 0.4%, respectively). The reflection depths of preservice teachers were significantly different for different topics, χ^2 (6, $n = 1{,}838$) = 65.11, $p = 0.00$.

Based on the adjusted Z scores, a *post-hoc* test demonstrated that the proportions of reflection depths differed significantly between Topic 1 and Topic 4 in *Reporting and Responding* and *Relating* ($p < 0.00$, $p < 0.00$, respectively). A significant difference was shown between the appropriate proportions of *Reporting and Responding* statements and *Relating* statements in Topic 1 (p

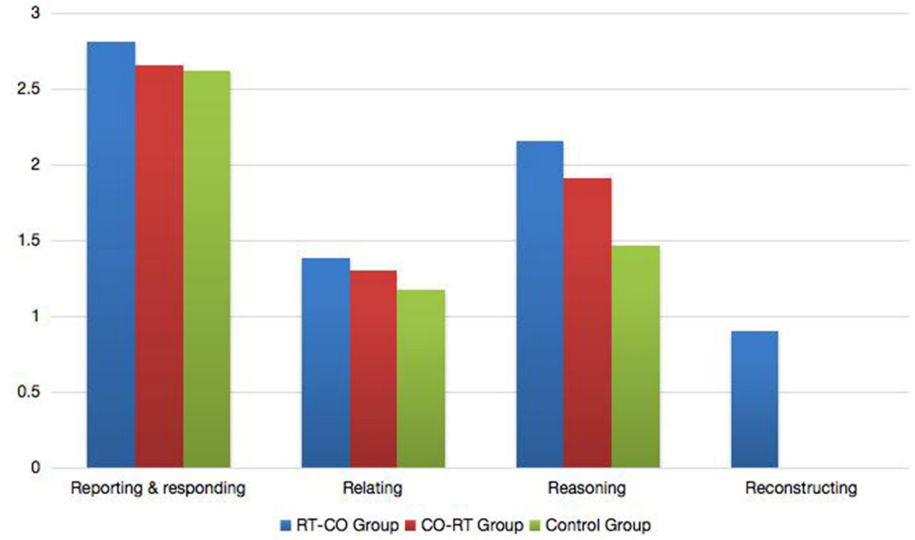


FIGURE 5
Comparisons of logarithmic counts of reflective statements among groups.

TABLE 4 Reflection depths by training order sequence.

Variable	RT-CO group ($n = 33$)	CO-RT group ($n = 31$)	Subtotal
	Count (%)	Count (%)	Count (%)
Topic 1 (RT1)	227 (27.4)	189 (34.0)	416 (30.1)
Topic 2 (RT2)	241 (29.1)	164 (29.5)	405 (29.3)
Topic 3 (CO1)	143 (17.3)	76 (13.7)	219 (15.8)
Topic 4 (CO2)	216 (26.1)	127 (22.8)	343 (24.8)
Total	827 (100)	556 (100)	1,383 (100)

χ^2 (3, $n = 1{,}383$) = 8.94, $p = 0.03$.
RT, reflective teaching; CO, classroom observation.

< 0.00). Additionally, significant differences were shown among the appropriate proportions of the statements in *Reporting and Responding*, *Relating,* and *Reasoning* in Topic 4 ($p < 0.00$, $p < 0.00$). The results indicated that preservice teachers generated a relatively more significant proportion of the *Relating* statements in Topic 1. Additionally, they generated a relatively more significant proportion of *Reporting and Responding* statements in Topic 4.

Discussion

This study aimed to provide insights into the adoption of short self-access online training with different reflection topics to stimulate preservice teachers to generate more profound reflections. Based on empirical evidence, we propose a framework for developing preservice teachers' reflection depths (see Figure 6). Preservice teachers' reflection depths could be improved by integrating different reflection topics and collaborative learning activities into online teacher training. Eventually, preservice teachers' teaching quality will be promoted by stimulating deeper reflections on teaching practice during practicum.

The effectiveness of the online practicum preparation and primacy of reflective teaching

The results showed that the preservice teachers in the two experimental groups generated significantly more reflective statements than the control group in their professional reflective logs. Meanwhile, the RT-CO Group generated significantly more *Reasoning*-related statements after taking online training sessions, suggesting that the online reflective teaching and classroom observation training sessions successfully stimulate preservice teachers' reflections. The results indicated the effectiveness of a short self-access online training in improving preservice teachers' ability to generate more profound reflections during the practicum preparation stage. Attending online workshop activities organized in higher education is helpful for students to reflect deeply on their learning and future careers (Hokanson et al., 2019).

Additionally, the results found a significant difference between the two experimental groups on different topics, indicating that the order of the training sequence makes a difference in improving preservice teachers' reflections. The results found that the preservice teachers in both experimental groups generated more reflections after taking reflective teaching training than classroom observation training, suggesting the predominance of reflective teaching training in developing preservice teachers' in-depth thinking and building the pedagogical knowledge base. Preservice teachers must learn to think critically about their

TABLE 5 Reflection depth by different topics.

Depths of reflection		Topic 1	Topic 2	Topic 3	Topic 4	Subtotal
		Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
Reporting and responding		431 (76.6)	431 (81.5)	246 (82.6)	417 (91.4)	1,525 (82.6)
Relating		40 (7.1)	16 (3.0)	3 (1.0)	0 (0.0)	59 (3.2)
Reasoning		86 (15.3)	80 (15.1)	49 (16.4)	39 (8.6)	254 (13.8)
Reconstructing*		6 (1.1)	2 (0.4)	0 (0.0)	0 (0.0)	8 (0.4)
Total	Count (%)	557 (100)	527 (100)	298 (100)	456 (100)	1,846 (100)
	M (*SD*)	1.41 (0.78)	1.34 (0.74)	1.34 (0.75)	1.17 (0.56)	1.32 (0.72)

χ^2 (6, $n = 1,838$) = 65.11, $p = 0.00$.
*Not included in the chi-squared test.

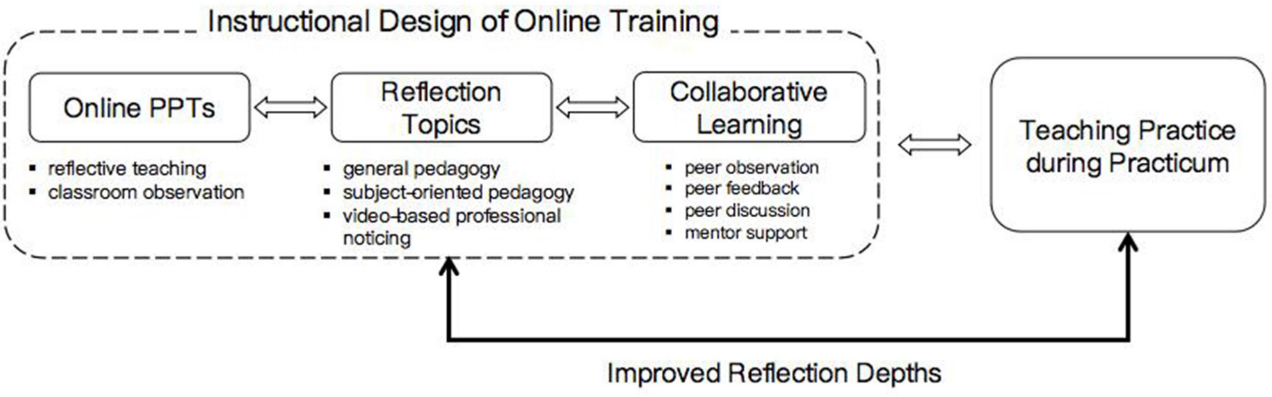


FIGURE 6
Framework for developing preservice teachers' reflection depth.

acquired knowledge and experience before their practicum practice, thus improving teaching quality and achieving satisfying teaching performance faster. The reflective learning experience in higher education can promote students' deep learning; meanwhile, it is still beneficial for students to transfer their learned knowledge into meaningful practice in their workplace (Griggs et al., 2018).

While this study has demonstrated the beneficial effects of online training and the order of the training sequence, we suggest integrating collaborative learning into the online teacher training programs to promote preservice teachers' reflection depth and improve overall teaching competency among preservice teachers. Collaborative learning has received more attention and is widely used to support preservice teachers' professional learning and teaching quality in teacher education programs. Various activities can be provided in the online learning environment to facilitate preservice teachers to work and learn with others, thus improving their learning engagement and outcomes. For example, peer observation, which provides an authentic teaching situation, stimulates preservice teachers to reflect on specific teaching problems and talk meaningfully with peers (Bacharach et al., 2010; Amineh and Asl, 2015). Moreover, collaborative learning (e.g., mentor support and peer feedback) helps preservice teachers shape and reshape positive perceptions and beliefs about teaching (Davis, 2006).

Beneficial effects of different topics in instructional design

The results showed that preservice teachers' reflection depth significantly differed from different topics, indicating that various topics impact preservice teachers' reflection depths. Through scenarios, preservice teachers could learn how to deal with issues in specific teaching situations in a real classroom before having practicum practice. Diversity topics with situational simulations could help preservice teachers enhance their knowledge and teaching capacity and be more reflective before teaching in a real classroom (Biza et al., 2007; Kaufman and Ireland, 2016).

Topic 1, which provided an in-service teacher's teaching reflection for preservice teachers' comments, significantly helped preservice teachers stimulate more profound reflective *Relating* statements. The results indicated that other teachers' teaching reflections could trigger preservice teachers to have more profound reflections. A study found that novice teachers could have more profound reflections on others' teaching practices than their teaching experience (Poom-Valickis and Mathews, 2013).

Additionally, the results showed that preservice teachers generated significantly more *Reporting and Responding* statements in Topic 4, evidenced by preservice teachers observing two overseas teachers' lesson videos. The results indicated that observing other teachers' teaching videos could stimulate preservice teachers' reflections during practicum preparation. Observing video-taped classrooms gives preservice teachers opportunities to reflect on the teaching practices of themselves and their peers (Darling-Hammond, 2006; Erickson, 2007). However, although the statements were relatively few in Topic 3, they were related at a higher level than in Topic 4. It might be an exciting result for instructional designers. We suggest stimulating preservice teachers' in-depth thinking by starting with providing specific teaching clips for preservice teachers to observe and learn from overseas lesson videos.

Developing video-based professional observation skills can also be an effective way to facilitate preservice teachers' reflective practice. Teacher noticing refers to teachers' ability to pay attention to noteworthy events in the classroom, interpret the noticed events meaningfully, and respond to the events by making pedagogical decisions (Lam and Chan, 2020). A recent study showed that in-service teachers got higher scores on pedagogy noticing and analysis by providing video-based classroom scenarios than text-based ones (She and Chan, 2022). The results suggested the effectiveness of video-based classroom observation, which provides a real-time teaching environment for teachers to capture situated and dynamic instructions, eventually promoting their in-depth reflections.

In this study, we provided general topics in pedagogy, while more subject-oriented topics could be provided for preservice teachers to generate more profound reflections based on their specific needs. Reflecting on the specific teaching events by drawing upon the specialized knowledge would promote preservice teachers' in-the-moment teaching decision-making (Griffith, 2017). For instance, we could provide classroom observation of teaching decimals for mathematics-major preservice teachers, let English-major preservice teachers discuss better ways to teach tense and sentence structure in English, or ask science-major preservice teachers to conduct a micro-teaching activity on acceleration and provide feedback to each other.

Lack of in-depth reflections in practicum preparation among Chinese preservice teachers

The results showed that *Reporting and Responding* reflective statements were the most common. However, the number of *Reconstructive* ones was minimal, suggesting that the depths of reflection of most Chinese preservice teachers were relatively shallow. More profound reflection requires preservice teachers to deepen their practice by integrating theoretical perspectives and reframe their knowledge by adopting theories to reflect critically on their practice (Korthagen, 2010; Stenberg et al., 2016). However, it was difficult for Chinese preservice teachers to combine theory with teaching practice because of the limited opportunities to practice in a real classroom during teaching practicum (Li and Qin, 2015).

In China, while the new curriculum standard [Ministry of Education of China (MOE), 2011] proposed an 18-week educational practice for preservice teachers, teaching probation takes up plenty of time (e.g., observation of senior teachers' lessons in the placement schools) and teaching practice only lasts for a period of 6 to 8 weeks in general (Campbell and Hu, 2010; He and Yan, 2011). For instance, preservice teachers at a teacher education university in northwest China are given eight weeks to practice their teaching skills (Chen, 2019). The teaching practice lasts ∼6 weeks at a teacher education university in central China (Zhu, 2019). The results suggested providing various opportunities for preservice teachers to experience teaching and use the acquired knowledge to solve teaching problems. For example, entirely using micro-teaching and effectively adopting mentorship to guide preservice teachers' teaching practice.

Additionally, preservice teachers' low performance in generating in-depth reflections might be explained by the feature of self-access online training sessions. Preservice teachers' motivation and engagement may be restrained since they took this online training and wrote reflective logs without getting credits in university courses. Many students who enrolled in free online courses with surrounding external factors dropped out because this type of student did not have an inner drive and realistic expectations, which gradually led them to lose motivation (Stevanović, 2014). The results suggested raising preservice teachers' awareness of the importance of reflections, increasing their intrinsic motivation toward teaching, and establishing specific goals, thus prompting them to generate profound reflections.

The results showed a higher frequency of the *Reasoning* statements than the *Relating* ones, which differed from the reflection levels of the TARL model (Ryan and Ryan, 2013). The results may suggest the difficulties of preservice teachers in generating the *Relating* statements in the Chinese context. The Chinese preservice teachers were more likely to be aware of identifying the main reasons behind teaching problems. In contrast, they could not connect the incident or issue in the classroom with their skills, specific subject knowledge, and professional experience. This might be because of the traditional Confucian culture and Chinese educational methods, which emphasize knowledge in textbooks rather than developing students' divergent thinking (Kim, 2007; Mullen and Browne-Ferrigno, 2018). Therefore, it was easier for Chinese preservice teachers to achieve the *Reasoning* level to explore the cause-and-effect conclusions.

In contrast, most of them lack the ability of association and imagination to make a meaningful linkage between a specific incident and their knowledge and experience. In a recent study by Orakçi (2021), the increase in reflective thinking skills positively affects preservice teachers' cognitive flexibility, promoting their learning autonomy to actively reflect on their learning and teaching practices. Therefore, it would be more effective to support preservice teachers to learn how their reflective thinking skills can be developed through reflective practice, thus improving their reflection depth by cultivating divergent thinking.

Conclusion

This study investigated the beneficial effects of an SSOTP on Chinese preservice teachers' reflection depths during the practicum preparation stage. The results suggested the favoring effects of a short self-access online training module, the order of the training sequence, and different topics in stimulating preservice teachers to generate a considerable number of reflections, although reflection depths were lacking.

This study contributes to the instructional design of online reflection training with different topics and their potential in teacher education programs. Additionally, this study provides evidence by operationalising different levels of reflection depth. This study implies establishing systematic stimulations to enhance preservice teachers' reflection depths and help them achieve quality teaching during practicum practice.

However, preservice teachers' reflection levels were relatively shallow in this study. Preservice teachers may not have sufficient time to reflect on what they have learned during the short online training schedule due to COVID-19. Future research could extend the length of online training, thus providing enough time for preservice teachers to improve their reflection depths. As a short online training program, limited topics and activities were provided for preservice teachers. Future studies could provide more activities to stimulate preservice teachers' engagement and learning autonomy. Future studies could also examine whether the short online training affects preservice teachers' teaching practice by assessing their teaching performance during practicum practice.

In addition, the online training and different topics were mainly designed based on non-Chinese approaches. Although the frameworks and approaches of reflective teaching and classroom observation adopted in the online training have been studied well and demonstrated to improve preservice teachers' reflection depths and teaching practice in other countries, these methods do not seem to support Chinese preservice teachers in attaining similar outcomes. Future studies should consider the specific contextual issues, thus benefiting preservice teachers' professional development in China.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

YW contributed to the conceptualization and design of this work, data analysis, and drafting and finalizing of the manuscript. JK contributed to the ideas development and revised draft and final versions of the manuscript. EL contributed to the revision of the manuscript. All authors have agreed to the published version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Amineh, R. J., and Asl, H. D. (2015). Review of constructivism and social constructivism. *J. Soc. Sci. Lit. Lang.* 1, 9–16.

Anas, I., Amansyah, F., Musdariah, A., and Irmawati, I. (2020). Technological and pedagogical considerations in supporting electronic self-access language learning (e-SALL): in-person learning practice in the time of crisis. *Stud. Self-Access Learn. J.* 11, 128–134. doi: 10.37237/110303

Aubusson, P., and Schuck, S. (2013). Teacher education futures: today's trends, tomorrow's expectations. *Teach. Dev.* 17, 322–333. doi: 10.1080/13664530.2013.813768

Bacharach, N., Heck, T. W., and Dahlberg, K. (2010). Changing the face of student teaching through co-teaching. *Action Teach. Educ.* 32, 3–14. doi: 10.1080/01626620.2010.10463538

Bates, M. S., Phalen, L., and Moran, C. G. (2016). If you build it, will they reflect? Examining teachers' use of an online video-based learning website. *Teach. Teach. Educ.* 58, 17–27. doi: 10.1016/j.tate.2016.04.004

Bayram, L. (2012). Use of online video cases in teacher training. *Procedia Soc. Behav. Sci.* 47, 1007–1011. doi: 10.1016/j.sbspro.2012.06.770

Biza, I., Nardi, E., and Zachariades, T. (2007). Using topics to explore teacher knowledge in situation-specific contexts. *J. Math. Teach. Educ.* 10, 301–309. doi: 10.1007/s10857-007-9043-y

Campbell, A., and Hu, X. (2010). Professional experience reform in China: key issues and challenges. *Asia-Pac. J. Teach. Educ.* 38, 235–248. doi: 10.1080/1359866X.2010.494004

Campbell, C., Ayala, C. C., Railsback, G., Freking, F. W., McKenna, C., Lausch, D., et al. (2016). Beginning teachers' perceptions of the california teaching performance assessment (TPA). *Teach. Educ. Q.* 43, 51–71.

Chen, Y. L. (2019). *A Comparative Study on the Current Situation of Undergraduate Education Internship Implementation in Cross-strait Preschool Education——Taking two Universities in Mainland China and Taiwan as Examples* [Master's Thesis]. Shenyang Normal University. Available online at: https://d.wanfangdata.com.cn/thesis/ChJUaGVzaXNOZXdTMjAyMzA5MDESCFkzNjQ4MjA3GghpZWRvanY4YQ%3D%3D (accessed August 23, 2023).

Cochran-Smith, M. (2004). The problem of teacher education. *J. Teach. Educ.* 55, 295–299. doi: 10.1177/0022487104268057

Committee on Professional Development of Teachers and Principals (COTAP) (2015). *T-standard: Professional Standards for Teachers of Hong Kong*. Available online at: https://www.cotap.hk/images/T-standard/T-standard-Booklet.pdf (accessed June 30, 2022).

Darling-Hammond, L. (2006). Assessing teacher education: the usefulness of multiple measures for assessing program outcomes. *J. Teach. Educ.* 57, 120–138. doi: 10.1177/0022487105283796

Davis, E. A. (2006). Preservice elementary teachers' critique of instructional materials for science. *Sci. Educ.* 90, 348–375. doi: 10.1002/sce.20110

Delandshere, G., and Petrosky, A. (2004). Political rationales and ideological stances of the standards-based reform of teacher education in the US. *Teach. Teach. Educ.* 20, 1–15. doi: 10.1016/j.tate.2003.09.002

Department for Education of UK (DfE) (2011). *Teachers' Standards*. Available online at: https://assets.publishing.service.gov.uk/media/61b73d6c8fa8f50384489c9a/Teachers__Standards_Dec_2021.pdf (accessed June 25, 2022).

Earle, J. E., and Fraser, B. J. (2017). Evaluating online resources in terms of learning environment and student attitudes in middle-grade mathematics classes. *Learn. Environ. Res.* 20, 339–364. doi: 10.1007/s10984-016-9221-x

Erickson, F. (2007). "Ways of seeing the video: toward a phenomenology of viewing minimally edited footage," in *Video Research in the Learning Sciences*, eds R. Goldman, R. Pea, B. Barron, and S. J. Derry (Mahwah, NJ: Lawrence Erlbaum), 145–155.

Etscheidt, S., Curran, C. M., and Sawyer, C. M. (2012). Promoting reflection in teacher preparation programs: a multilevel model. *Teach. Educ. Spec. Educ.* 35, 7–26. doi: 10.1177/0888406411420887

Gaudin, C., and Chaliès, S. (2015). Video viewing in teacher education and professional development: a literature review. *Educ. Res. Rev.* 16, 41–67. doi: 10.1016/j.edurev.2015.06.001

Glasswell, K., and Ryan, J. (2017). "Reflective practice in teacher professional standards: reflection as mandatory practice," in *Reflective Theory and Practice in Teacher Education*, eds R. Brandenburg, K. Glasswell, M. Jones, and J. Ryan (Singapore: Springer), 3–26. doi: 10.1007/978-981-10-3431-2_1

Griffith, R. (2017). Preservice teachers' in-the-moment teaching decisions in reading. *Literacy* 51, 3–10. doi: 10.1111/lit.12097

Griggs, V., Holden, R., Lawless, A., and Rae, J. (2018). From reflective learning to reflective practice: assessing transfer. *Stud. High. Educ.* 43, 1172–1183. doi: 10.1080/03075079.2016.1232382

Hall, P., and Simeral, A. (2015). Teach, *Reflect, Learn: Building your Capacity for Success in the Classroom.* Alexandria, VA: ASCD.

He, C., and Yan, C. (2011). Exploring authenticity of micro-teaching in preservice teacher education programmes. *Teach. Educ.* 22, 291–302. doi: 10.1080/10476210.2011.590588

He, J., and Huang, X. (2017). Collaborative online teamwork: exploring students' satisfaction and attitudes with Google Hangouts as a supplementary communication tool. *J. Res. Technol. Educ.* 49, 149–160. doi: 10.1080/15391523.2017.1327334

Hill, J. B. (2021). Preservice teacher experiences during COVID-19: exploring the uncertainties between clinical practice and distance learning. *J. Pract. Stud. Educ.* 2, 1–13. doi: 10.46809/jpse.v2i2.18

Hokanson, S. C., Grannan, S., Greenler, R., Gillian-Daniel, D. L., Campa, H., Goldberg, B. B., et al. (2019). A study of synchronous, online professional development workshops for graduate students and postdocs reveals the value of reflection and community building. *Innov. High. Educ.* 44, 385–398. doi: 10.1007/s10755-019-9470-6

Hong, X., Zhang, M., and Liu, Q. (2021). Preschool teachers' technology acceptance during the COVID-19: an adapted technology acceptance model. *Front. Psychol.* 12, 691492. doi: 10.3389/fpsyg.2021.691492

Jay, J. K., and Johnson, K. L. (2002). Capturing complexity: a typology of reflective practice for teacher education. *Teach. Teach. Educ.* 18, 73–85. doi: 10.1016/S0742-051X(01)00051-8

Kaufman, D., and Ireland, A. (2016). Enhancing teacher education with simulation. *TechTrends* 60, 260–267. doi: 10.1007/s11528-016-0049-0

Kelly, A., Johnston, N., and Matthews, S. (2020). Online self-access learning support during the COVID-19 pandemic: an Australian university case study. *Stud. Self-Access Learn. J.* 11, 187–198. doi: 10.37237/110307

Kim, K. H. (2007). Exploring the Interactions between Asian culture (confucianism) and creativity. *J. Creat. Behav.* 41, 28–53. doi: 10.1002/j.2162-6057.2007.tb01280.x

Ko, J., and Sammons, P. (2013). *Effective Teaching: A Review of Research and Evidence*. Reading: CfBT Education Trust.

Korthagen, F. (2010). The relationship between theory and practice in teacher education. *Int. Encycl. Educ.* 7, 669–675. doi: 10.1016/B978-0-08-044894-7.00638-2

Krammer, K., Ratzka, N., Klieme, E., Lipowsky, F., Pauli, C., Reusser, K., et al. (2006). Learning with classroom videos: conception and first results of an online teacher-training program. *ZDM* 38, 422–432. doi: 10.1007/BF02652803

Krippendorff, K. (2004). Measuring the reliability of qualitative text analysis data. *Qual. Quant.* 38, 787–800. doi: 10.1007/s11135-004-8107-7

Lam, D. S. H., and Chan, K. K. H. (2020). Characterising preservice secondary science teachers' noticing of different forms of evidence of student thinking. *Int. J. Sci. Educ.* 42, 576–597. doi: 10.1080/09500693.2020.1717672

Lam, R. (2015). Language assessment training in Hong Kong: implications for language assessment literacy. *Lang. Test.* 32, 169–197. doi: 10.1177/0265532214554321

Lewis, W. D., and Young, T. V. (2013). The politics of accountability: teacher education policy. *Educ. Policy* 27, 190–216. doi: 10.1177/0895904812472725

Li, X. H., and Qin, J. (2015). The development and improvement of intern students' PCK in apprenticeship. *Educ. Res.* 12, 141–145.

Martinez, F., Taut, S., and Schaaf, K. (2016). Classroom observation for evaluating and improving teaching: an international perspective. *Stud. Educ. Eval.* 49, 15–29. doi: 10.1016/j.stueduc.2016.03.002

Maulana, R., Helms-Lorenz, M., and Van de Grift, W. (2017). Validating a model of effective teaching behaviour of preservice teachers. *Teach. Teach.* 23, 471–493. doi: 10.1080/13540602.2016.1211102

Merino, N., and Pecheone, R. (2013). The performance assessment for California teachers: an introduction. *New Educ.* 9, 3–11. doi: 10.1080/1547688X.2013.751310

Ministry of Education of China (MOE) (2011). *Curriculum Standard for Teacher Education (Trial).* Available online at: http://www.moe.gov.cn/srcsite/A10/s6991/201110/t20111008_145604.html (accessed June 25, 2022).

Ministry of Education of China (MOE) (2012). *The Professional Standards for Primary and Middle School Teachers (Trial).* Available online at: http://www.moe.gov.cn/srcsite/A10/s6991/201209/t20120913_145603.html (accessed June 25, 2022).

Ministry of Education of China (MOE) (2013). *Interim Measures for Regular Registration of the Qualification of Primary and Secondary School Teachers.* Available online at: http://www.moe.gov.cn/srcsite/A10/s7151/201308/t20130821_156643.html (accessed June 25, 2022).

Ministry of Education of China (MOE) (2020). *Curriculum Plan and Standard of Chinese and Other Disciplines for High School* (2017 Edition and 2020 Revision). Available online at: http://www.moe.gov.cn/srcsite/A26/s8001/202006/t20200603_462199.html (accessed June 25, 2022).

Moon, J. A. (2013). Reflection in *Learning* and *Professional Development: Theory and Practice.* London: Routledge. doi: 10.4324/9780203822296

Mullen, C. A., and Browne-Ferrigno, T. (2018). Teacher leadership and teaming: creativity within schools in China. *Res. Educ. Adm. Leadersh.* 3, 231–255. doi: 10.30828/real/2018.2.5

National Board for Professional Teaching Standards (NBPTS) (2016). *What Teachers Should Know and Be Able to Do.* Available online at: https://www.accomplishedteacher.org/_files/ugd/0ac8c7_25be1413beb24c14ab8f6e78a20aa98f.pdf (accessed February 17, 2022).

Okhremtchouk, I. S., Seiki, S., Gilliland, B., Ateh, C., Wallace, M., Kato, A., et al. (2009). Voices of preservice teachers: perspectives of the performance assessment for California teachers (PACT). *Issues Teach. Educ.* 18, 39–62.

Orakçi, S. (2021). Exploring the relationships between cognitive flexibility, learner autonomy, and reflective thinking. *Think. Skills Creat.* 41, 100838. doi: 10.1016/j.tsc.2021.100838

Orakci, S., and Ruzgar, M. E. (2021). Analysing the relationship between attitudes towards teaching profession, reflective thinking and individual innovativeness. *Educ. Reform J.* 6, 19–30. doi: 10.22596/erj2021.06.01.19.30

Orakci, S., Yüregilli Göksu, D., Karagöz, S. (2023). A mixed methods study of the teachers' self-efficacy views and their ability to improve self-efficacy beliefs during teaching. *Front. Psychol.* 13, 1035829. doi: 10.3389/fpsyg.2022.1035829

Özüdogru, G. (2021). Problems faced in distance education during the COVID-19 pandemic. *Particip. Educ. Res.* 8, 321–333. doi: 10.17275/per.21.92.8.4

Poom-Valickis, K., and Mathews, S. (2013). Reflecting others and own practice: an analysis of novice teachers' reflection skills. *Reflective Pract.* 14, 420–434. doi: 10.1080/14623943.2013.767237

Prilla, M., and Renner, B. (2014). "Supporting collaborative reflection at work: a comparative case analysis," in *Proceedings of the 2014 ACM International Conference on Supporting Group Work*, eds S. P. Goggins, I. Jahnke, D. W. McDonald, and P. Bjørn (New York, NY: ACM Press), 182–193. doi: 10.1145/2660398.2660400

Rodman, G. J. (2010). Facilitating the teaching-learning process through the reflective engagement of preservice teachers. *Aust. J. Teach. Educ.* 35, 20–34. doi: 10.14221/ajte.2010v35n2.2

Ryan, M., and Ryan, M. (2013). Theorising a model for teaching and assessing reflective learning in higher education. *High. Educ. Res. Dev.* 32, 244–257. doi: 10.1080/07294360.2012.661704

Sammons, P., Kington, A., Lindorff-Vijayendran, A., and Ortega, L. (2014). *Inspiring Teachers: Perspectives and Practices.* Reading: CfBT Education Trust.

Sammons, P., Lindorff, A. M., Ortega, L., and Kington, A. (2016). Inspiring teaching: learning from exemplary practitioners. *J. Prof. Cap. Community* 1, 124–144. doi: 10.1108/JPCC-09-2015-0005

She, J., and Chan, K. K. H. (2022). Situated and dynamic versus declarative and static forms of pedagogical content knowledge: an evaluation of the differences in test reactions and performance. *J. Res. Sci. Teach.* 60, 568–607. doi: 10.1002/tea.21810

Smith, J. J., and Greene, H. C. (2013). Preservice teachers use e-learning technologies to enhance their learning. *J. Inf. Technol. Educ.:Res.* 12, 121–140. doi: 10.28945/1790

Stenberg, K., Rajala, A., and Hilppo, J. (2016). Fostering theory–practice reflection in teaching practicums. *Asia-Pac. J. Teach. Educ.* 44, 470–485. doi: 10.1080/1359866X.2015.1136406

Stevanović, N. (2014). "Effects of motivation on performance of students in MOOC," in *Sinteza 2014-Impact of the Internet on Business Activities in Serbia and Worldwide* (Belgrade: Singidunum University), 418–422. doi: 10.15308/sinteza-2014-418-422

Tyrrell, J., Lo, M-. L., Sankey, D., and Sam, C. A. (2016). *Field Experience Handbook (Preservice education programmes).* Hong Kong: The Education University of Hong Kong.

Vahed, A. (2021). Factors enabling and constraining students' collaborative online international learning experiences. *Learn. Environ. Res.* 25, 895–915. doi: 10.1007/s10984-021-09390-x

Van de Grift, W. (2007). Quality of teaching in four European countries: a review of the literature and application of an assessment instrument. *Educ. Res.* 49, 127–152. doi: 10.1080/00131880701369651

Van de Grift, W. J. (2014). Measuring teaching quality in several European countries. *Sch. Eff. Sch. Improv.* 25, 295–311. doi: 10.1080/09243453.2013.794845

Wang, Q., and Quek, C. L. (2015). "Investigating collaborative reflection with peers in an online learning environment," in *The International Conference on Computer Supported Collaborative Learning 2015 Proceedings,* 1 (Buffalo, NY: International Society of the Learning Sciences, Inc.), 244–251.

Wang, Y., Ko, J., and Wang, P. (2023). "The effects of a short self-access online training for practicum preparation on the depths of reflection of preservice teachers," in *Effective Teaching Around the World: Theoretical, Empirical, Methodological, and Practical Insights*, eds R. Maulana, M. Helms-Lorenz, and R. Klassen (Cham: Springer International Publishing), 575–593. doi: 10.1007/978-3-031-31678-4

Xie, Q., and Tan, S. (2019). Preparing primary English teachers in Hong Kong: focusing on language assessment literacy. *J. Asia TEFL* 16, 653. doi: 10.18823/asiatefl.2019.16.2.14.653

Yan, C. (2017). "You never know what research is like unless you've done it!" Action research to promote collaborative student-teacher research. *Educ. Action Res.* 25, 704–719. doi: 10.1080/09650792.2016.1245155

Ye, J., Zhu, X., and Lo, L. N. (2019). Reform of teacher education in China: a survey of policies for systemic change. *Teach. Teach.* 25, 757–781. doi: 10.1080/13540602.2019.1639498

You, Z., Conrad, C. F., and Hu, Y. (2020). The professionalisation of teaching and teacher education in China: a policy analysis of a nation-wide reform. *Compare* 52, 1–18. doi: 10.1080/03057925.2020.1850235

Zhang, M., Walker, A. D., and Qian, H. (2021). Master teachers as system leaders of professional learning: master teacher studios in China. *Int. J. Educ. Manag.* 35, 1333–134. doi: 10.1108/IJEM-04-2021-0127

Zhu, M. (2019). *A Case Study on the Influence of Teaching Practicum on English M. Ed. Interns' Classroom Management Self-fficacy.* [Master's thesis]. Central China Normal University. CNKI. doi: 10.27159/d.cnki.ghzsu.2019.000585