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Learning from expert or own practice: reflectively editing video cases for professional development

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ABSTRACT

This research aimed to investigate how the video editing process professionally affected preservice teachers' reflection levels and whether it differed by the type of in-class teaching experiences (their own and expert teacher experiences). The editing procedure of video cases means selecting and combining parts from an entire recorded in-class teaching experience and adding reflective thinking on actions. Seven participants took part in the research process during a semester, with three-cycle of the video case editing procedures being applied separately to two different research groups. Both inductive and deductive content analysis procedures were applied in a total of 21 video cases edited by PTs. By editing in-class teaching experiences, PTs could deeply analyse the events and transform their reflections on the contextual features. The process facilitated PTs' professional development by identifying, noticing, and reflecting on in-class teaching experiences. PTs learned to analyse their experiences by using different types of perspectives. PTs could deeply analyse the events and transform their reflections on the contextual features. Contrary to the difficulties for PTs' reflection-in-action, the process of editing in-class teaching experiences expanded their reflection-on-action opportunities.

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KEYWORDS

Teacher education;
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Introduction

Professional development (PD) is a process including teachers' knowledge and skills relating to regulations in their instructional practice (Desimone, 2009). PD is a dynamic and flexible process beginning with teacher education college and continuing all over professional life. Especially during the teacher education process, teacher training, internship and school applications, and connection between theory and practice are the most common focus to professionally develop preservice teachers (PTs; Sancar et al., 2021). In the common teacher education process, internship application determines as only a school to observe and to teach in a semester. Though the literature frequently underlines the value of PT's diversified teaching repertoire (Sancar & Deryakulu, 2020a; Scales et al., 2018; Shen et al., 2017), widespread internship practices are insufficient to provide this enriched repertoire. Correspondingly, Sancar and Deryakulu (2020b) find out that PTs

often tend to associate being professional in-class teaching directly with experience and underline that they need much more opportunities to collect diverse repertoire. While professionally ensuring various experiences for PTs, it could not be underestimated that they need to be directed strategic thinking on the context-specific situation (Meschede et al., 2017). Because professional teaching practice requires cognitive awareness of the context-specific knowledge and applying methods and strategies in these situations (Antoniou & Kyriakides, 2013). Moreover, situational-contextual skills as an important mediator between a teacher's professional knowledge, beliefs, and teaching experiences are gradually attractive in teacher education (Kennedy, 2019; Meschede et al., 2017; Nielsen, 2015; Schieble et al., 2015).

Using video cases is a way to support PT's PD in many ways such as diversifying teaching experience, noticing teaching practice and contextual features, effective and efficient internship design, and transferring theoretical knowledge to practice (Tilson et al., 2017; Ulusoy, 2020; Van Es & Sherin, 2021). Although in many studies on video cases, it is emphasized the value of own videos or others' videos in reflecting/discussing process, it is not common to edit in-class teaching experiences. Mainly, since the process of editing teaching experiences is rarely used as a research design, a mutual analysis of the editing process of self or experienced teachers' in-class teaching practices will preciously contribute to the literature. In this regard, we investigated four research questions below.

- (1) What are the contents of edited video cases?
- (2) Are there any differences in the contents of video cases between editing own and experts' video cases?
- (3) What are the reflection types of edited video cases?
- (4) Are there any differences in the reflection types of video cases between editing own and experts' video cases?

Video cases focusing on the type of experience

Video cases could generate from PTs' own, peers', or others' (expert teachers') in-class teaching experiences considering instructional goals. In addition to the instructional goals, the first focus of the type of experience in video cases is the accessibility and cost (such as duration, cost, participant, and ethical issues). Although the video cases generated from others/expert teachers' experiences commonly employ in the instruction process due to the low cost, when the conditions (duration, cost, participant, and ethical issues) are convenient, the video cases edited from PTs' own experiences have an additional contribution to the instruction (Civitillo et al., 2019). For example, if PTs' own experiences are to be used, it should be taken into account that the number of participants should not be intense (Tilson et al., 2017). In other words, it is not affordable to employ PTs' own experiences in video cases for large groups.

Another focus of the types of experience in video cases is their benefits, and the related literature provides us with quite a wealth of data on this point. For example, PTs' own video cases provide more benefits than the use of others' video cases, especially in determining their professional identities and contributing to their professional identity development (Maclean & White, 2007). In this regard, while designing the teaching process for professional identity development, it may be preferable to use PTs' own video cases. Moreover, if the focus is the increasing PTs' learning motivations, it is suitable

to use their own experiences in video cases. According to Johnson et al. (2019), PTs' regarded that employing their own experiences in the learning process is different from many other course processes. Allas et al. (2020) determined that PTs' video cases would facilitate to select the meaningful events in in-class teaching experiences, especially their theoretical assessment skills on situational knowledge would be empowered. Moreover, Rosaen and his colleagues' research (Rosaen et al., 2009), in which PTs' own experiences employed as a different lens to learn how to teach effectively, was underlined that the process positively affects PTs' professional development. Nevertheless, all these studies do not answer the questions of a comparative analysis of the type of experience in video cases to focus on the perspective of editing video cases. The editing of video cases means that after PTs watched their in-class teaching experience records, they select and combine 'any' parts of it with reflective comments. The editing procedure consists of recording in-class teaching experiences, deciding the parts, gathering the excerpt, and adding reflective thinking (Sancar & Deryakulu, 2022). Recently, the unique advantages of the video editing procedure for teacher training have increasingly been investigated. For example, Sherin and Dyer (2017) named the video editing procedure as capturing and they investigated how the editing procedure contributes to a deeper focus on their teachers' experiences. In another study, the editing procedure was named as generating video cases to being teachers more professional (Richards et al., 2021). According to the research results, although the video editing procedures had complexity the edited video cases were found to promote teacher learning. Under these research findings, the current research literature was tried to brighten with both cross and systematic analysis of PTs' video editing processes (by analysing the products called the edited video cases) according to the type of experience in the video case editing process.

Methodology

This study was designed as a case study with a qualitative research perspective. The main concern of this perspective was to reveal the meaning process of individual experience and to understand the participants' meaning-making process of the phenomenon (Merriam, 2009). Applying the case procedure, we aimed to explore how PTs edit their own and expert teachers' experiences. This case procedure provided us with a deep investigation of preservice teachers' noticing and reflection skills on different types of in-class teaching experience. Since the video case editing process has been rarely employed in research design, the cross-checking of preservice teachers' own or expert teachers' in-class teaching experiences would encourage in strengthened the studies on preservice teachers' professional development process.

Participants

This case procedure was conducted in the Teaching Practice II Course throughout the last semester of their bachelor's program at the Faculty of Educational Sciences in Turkey. The course included the field experience process, especially in certain schools and with expert teachers (information and communication technology [ICT] specialists) who has been appointed after completing his/her teacher training and has been performing his/her job more than 5 years. All the PTs went through the Teaching Practice I course, in which PTs

had opportunities to observe the school context besides in-class teaching procedures. Moreover, none of the participants had any experience in real context in-class teaching before the case procedure was conducted. The participants were 7 PTs (2 female, 5 male) of computer and instructional technologies teacher education. The participants were divided into two groups: editing preservice teachers' own in-class teaching experiences and expert teachers' experiences. As seen in [Table 1](#), care was taken to arrange the PTs as two people in each group. [Table 1](#) details the information of participants.

The case procedure

Initially, the research procedure began with approval obtained from the ethics committee of the relevant university. All participants were informed about the research process in detail, and they were asked to sign a detailed consent form.

The case procedure began with an informative meeting, all the information of the research process provided to participants. During the informative meeting, the main focus was on the video editing process, so the components of the video editing process were detailedly explained to the participants. After the participants videotaped the in-class teaching experiences as a whole (the type of experiences differed on the research groups), they individually watched the experiences. Afterwards, they decided which decisions/ events/situations were needed to share with their peers, and not only did they cut the specified decisions/events/situations and separated them from the whole in-class teaching experiences but they also reflected on the experiences. Although the whole in-class teaching experience took to 40 min, the duration of edited video cases differed from 8 min to 15 min.

In the first research group, editing their own in-class teaching experiences, participants videotaped their in-class teaching experiences as a whole. Follow-up, they edited their video cases to reflect on their instructional decisions and shared the video cases with other group members on google classroom. For this group, the cycle included four video cases, and 12 video cases totally were produced during the research process.

In the second research group, editing expert ICT teachers' in-class teaching experiences, participants recorded experts' in-class teaching experiences. They edited experts' video cases to reflect on experts' instructional decisions and shared the video cases with other group members on google classroom. For this group, the cycle included three video cases, and nine video cases totally were produced during the case process. Since the main aim was to explore the differentiation of reflection across the research groups, the design

Table 1. Participants by research group.

Group	ICT Teacher	Participant
Editing One's Own Video Cases	ICT Teacher I	Doga Ozgur
	ICT Teacher II	Kemal Celal
Editing Expert Teachers' Video Cases	ICT Teacher II	Damla
	ICT Teacher I	Can Toprak
2	2	7

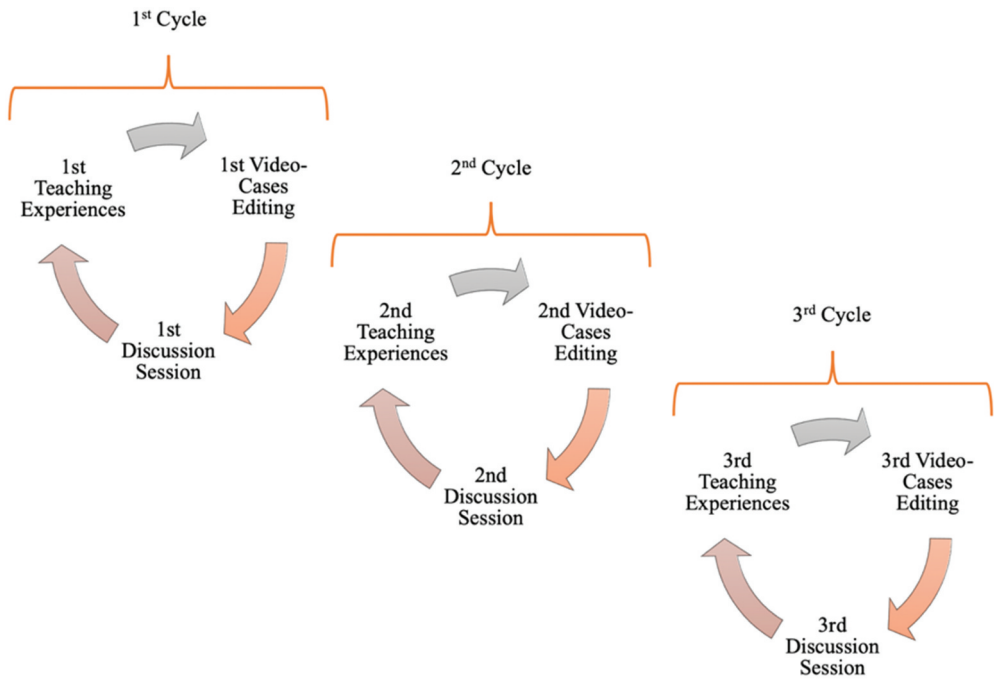


Figure 1. Research procedure.

procedure was conducted on the research groups separately. It was implied that the first group members have never seen the second group sharing video cases. **Figure 1** summarizes the case procedure.

Data source and analysis

The data of this research were video cases, which were edited from PTs’ own and expert teacher in-class teaching experiences. The edited video cases consisted of selecting, capturing, and reflecting on the experiences. The data source of the research is detailed in **Table 2**.

The meaning-making process is contained to combine, reduce, and interpret statements of participants with an understanding of researchers (Merriam, 2009). In this regard, the data analysis was conducted as inductive and deductive reasoning, explaining, and

Table 2. Data source of the research.

Group	Participant	First Cycle	Second Cycle	Third Cycle	Total by Group
Editing One’s Own Video Cases	Doga	Video Case I	Video Case II	Video Case III	12
	Ozgur	Video Case I	Video Case II	Video Case III	
	Kemal	Video Case I	Video Case II	Video Case III	
	Celal	Video Case I	Video Case II	Video Case III	
Editing Expert Teachers’ Video Cases	Damla	Video Case I	Video Case II	Video Case III	9
	Can	Video Case I	Video Case II	Video Case III	
	Toprak	Video Case I	Video Case II	Video Case III	
2	7	7	7	7	21

interpreting. The video cases were stored and transcribed verbatim, after the first and second research questions, the inductive reasoning process was applied. The process consisted of four different stages which deriving codes from the data, determining the related content, gathering the related codes into categories, and finally producing themes by combining categories. For example, when Doga's reflection point in the first video case included, 'I repeat some words too much', he dealt with the situation from the teacher perspective and teacher characteristics. To answer the third and fourth research questions, the framework was formed to define the reflection types on edited video cases. The framework included seven categories; noticing, describing, identifying reasons, expressing emotions, judging, analysing, and generalizing (Sancar & Deryakulu, 2022; see, Figure 2). For example, Doga's reflection points in the previous example 'I repeat some words too much', he both noticed and judged the situation. After 50% of the data was individually analysed by two experts to ensure the credibility of the analysis, the Kappa Cohen coefficient was determined as 0.89 for the codes in video cases.

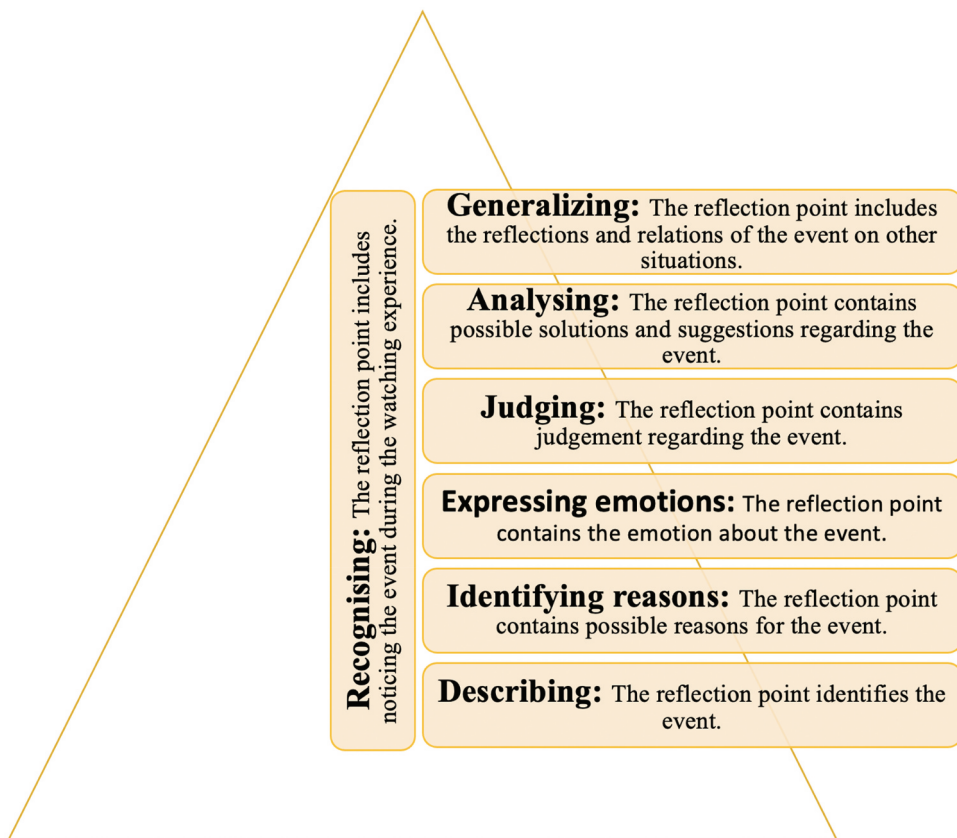


Figure 2. Reflection types of the edited video cases (Sancar & Deryakulu, 2022).

Results

Based on the research questions, the results were categorized into two main themes including the contents and reflection types of edited video cases. Moreover, the findings were cross controlled on the type of experiences in edited video cases.

The contents of edited video cases

Regarding the contents of the edited video cases were methodological knowledge (37%), classroom management (26%), student characteristics (19%), teacher characteristics, technology usage, content knowledge, and teaching obstacles. Figure 3 presents the percentages of the categories of contents of edited video cases.

When the contents of edited video cases were examined regardless of the research groups, the most handled contents were methodological knowledge (37%) and classroom management (26%). Surprisingly, the percentage of the student characteristics (19%) had a significant rate in the contents of edited video cases. Although the content knowledge was as crucial and priority as the methodological and management

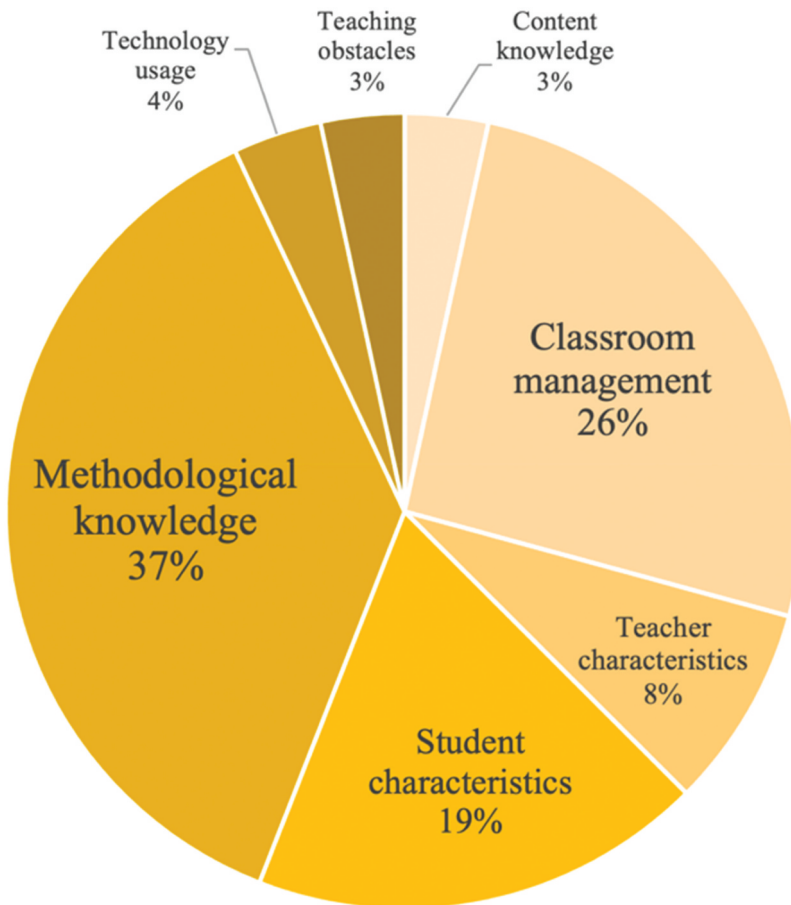


Figure 3. Proportion of the content of the edited video cases.

knowledge for the teaching practice, PTs rarely mentioned it in edited video cases. Moreover, PTs tended to focus on technology usage and teaching obstacles as much as content knowledge. In other words, the percentages of contents that showed technology usage, teaching obstacles, and content knowledge were roughly the same (3%, 3% vs 4%). For example, in the first edited video cases Ozgur underlined that 'Since I will explain the subject of the algorithm, I am introducing the subject. First, I am talking about the problem, then moving from known to the unknown'. In this reflection statement, although Ozgur mentioned the content knowledge, it has obviously been that her main emphasis was related to the teaching methods in the teaching experiences. Another example, while Kemal was explaining his acts during his teaching experiences, he underlined that 'Setting rules at the beginning of the lesson was a good example as it could affect the course progress'. The basic point of his reflection statement was to emphasize the classroom management strategies.

The contents of edited video cases across PTs' own and experts' experiences

While PTs' edited video cases were examined on type of experiences, the first attractive finding was the difference between the amounts of the reflection statements. Although the group members differed in number, there was a significant difference in the average of the amounts of reflection statements (The average of PTs' own is 78,8 and Experts' is 52,3). This finding favouring PTs' own video cases could be interpreted that editing PTs' own experiences more encourages their reflection skills.

Table 3 indicates the contents of edited video cases across PTs' own and experts' experiences by categories. It is possible to inquire about the categories of contents of edited video cases in both the groups and the video case cycles. The first finding was that the group in which PTs' edited experts' video cases were hardly ever focused on issues related to the content knowledge. Although the content knowledge did not have a large amount in the total percentage, it was noteworthy that there was a difference in the percentage between the PTs' own video cases (5%) and the experts' video cases (1%). The second finding was that the group in which PTs' edited experts' video cases relatively more considered at issues related to classroom management. PTs' tended to focus on experts' classroom management skills than theirs. Another finding, when PTs editing their own teaching experiences, they considered the teacher characteristics much more than the group that edited experts' experiences. In this regard, in the group that PTs edited

Table 3. Content of the edited video cases across PTs' and experts' experience.

	PTs' video cases								Experts' video cases							
	VCI		VCII		VCIII		Sum		VCI		VCII		VCIII		Sum	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Content knowledge	4	4	7	6	4	3	15	5	0	0	1	2	0	0	1	1
Classroom management	25	28	26	24	24	21	75	24	24	32	10	24	13	32	47	30
Teacher characteristics	15	17	5	5	12	10	32	10	1	1	4	10	2	5	7	4
Student characteristics	13	14	21	19	27	23	61	19	16	22	4	10	6	15	26	17
Methodological knowledge	28	31	40	37	49	42	117	37	29	39	18	43	11	27	58	37
Technology usage	5	6	4	4	0	0	9	3	2	3	0	0	6	15	8	5
Teaching obstacles	0	0	5	5	1	1	6	2	2	3	5	12	3	7	10	6
Total	90	100	108	100	117	100	315	100	74	100	42	100	41	100	157	100

their own teaching experiences, although PTs tended to deal with themselves at the first edited video cases, they learned the focus on any other issues during the second and third video cases. The fourth finding was that the percentage of student characteristics (19% vs 17%) and methodological knowledge (37% vs 37%) were almost the same. Moreover, the rate of these categories in both groups increased during the video case process. The fifth finding was of the technology usage and the teaching obstacles. When PTs editing experts' experiences, they considered the technology usage and the teaching obstacles much more than the group that PTs edited their own experiences.

The reflection types of edited video cases

In order of percentage, the reflection types of the edited video cases contained describing, identifying reasons, judging, generalizing, noticing, analysing, and expressing emotions. Figure 4 details the percentage of these categories.

Regardless of the research groups, it was noticed that the most commonly handled reflection types were describing (40%), identifying the reason (19%), and judging (16%). Although it was stated that PTs tended to express their feelings, especially when they were editing their own teaching experiences, expressing emotions (2%) was the least percentage within all reflection types for both the research groups. Moreover, the percentages of reflection types of edited video cases that showed noticing (6%) and

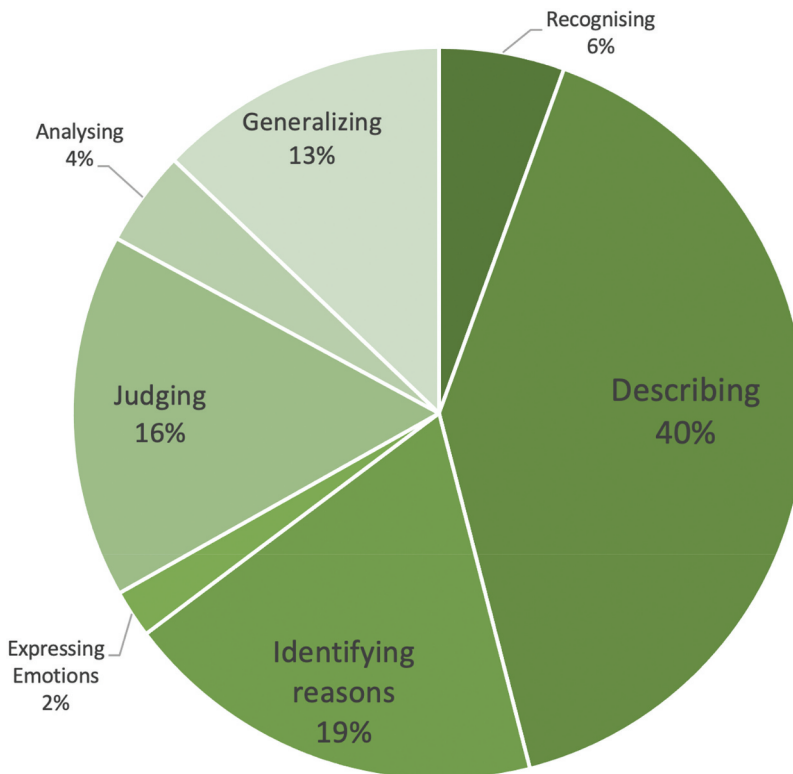


Figure 4. Proportion of the reflection types of the edited video cases.

analysing (4%) were roughly the same. For example, in the first edited video cases Damla who edited the expert teachers' experiences mentioned that 'In the lesson, the teacher searched and showed the photos of the product that they were going to prepare on the internet. Before the lesson, he could have prepared the photos on this topic to show them to his students'. In this reflection statement, Damla noticed and analysed the situation. Another example, 'The teacher was dealing with her students needing support one by one'. was seen that Can only described the expert teachers' behaviours and what happened in-class.

The reflection types of edited video cases across PTs' own and experts' experiences

Before comparing the types of reflection according to the research groups, when we looked at the research cycles within the group, it was seen that the most rising types of reflection in the group editing PTs' own experiences were generalizing, identifying the reason, and describing. Likewise, the most radical ascending type of reflection statement in the group that edited expert teachers' experiences was identifying the reason. Additionally, it was noticed that the generalizing was slightly rising in the group. In this regard, the findings clearly showed that PTs editing their own experiences encouraged them to enhance their reflection skills to a higher level, especially when the types of reflection were taken into account. Table 4 shows the changes in the reflection types by both groups and research cycles.

According to the research groups, the types of reflection differed considerably. The first finding was that while the group in which PTs' edited their own experiences had a relatively even distribution among the percentage of types of reflections, the group in which PTs' edited experts' video cases tended to describe the events more than the others. Correspondingly, the second finding means that the group PTs edited their own video cases relatively highly reflective of their teaching experiences than the other group. Furthermore, it was obvious that while editing their own video cases, PTs considerably tended to generalize the event (15%). It was striking that both of the research groups hardly expressed any emotions in their reflection statements. While the difference between the groups could have been expected to be more encouraging the group that PTs' edited their own teaching experiences, it was noteworthy that there was rough equality in the percentage between the PTs' own video cases (3%) and the experts' video cases (1%).

Table 4. Reflection types of the edited video cases across PTs' and experts' experience.

	PTs' video cases								Experts' video cases							
	VCI		VCII		VCIII		Sum		VCI		VCII		VCIII		Sum	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Recognising	17	14	6	4	9	5	32	7	1	1	0	0	1	3	2	1
Describing	36	30	48	31	65	37	149	33	53	71	29	63	18	45	100	62
Identifying reasons	21	18	43	27	32	18	96	21	5	7	5	11	9	23	19	12
Expressing emotions	1	1	2	1	9	5	12	3	0	0	0	0	1	3	1	1
Judging	25	21	24	15	24	13	73	16	11	15	7	15	8	20	26	16
Analysing	9	8	6	4	8	4	23	5	2	3	1	2	0	0	3	2
Generalising	10	8	28	18	31	17	69	15	3	4	4	9	3	8	10	6
Total	119	100	157	100	178	100	454	100	75	100	46	100	40	100	161	100

Discussion

This study analysed the type of in-class teaching experiences to reveal the main differentiation of contents, the reflection types, and the type of perspectives of the edited video cases. Given that the difficulties of generating edited video cases, it was crucial for both researchers and teacher educators to understand the effectiveness of the video case procedures in terms of types of teaching experiences. Analysis of PTs' video case editing procedure based on the type of teaching experiences indicated differences in edited video cases. According to the research groups, besides that the findings were severely different on the research groups, this differentiation was particularly striking in the group that edited PTs' own teaching experiences. In this regard, these research results differed from prior studies in a few crucial aspects.

First, although the video case editing process required PTs to generate their own and expert teachers' experience including what and how a subject was, the percentage of the methodological knowledge and classroom management was of the most common focus on the contents of edited video cases in both PTs' own and expert teachers' experiences. In addition, frequently encountering these findings in the literature, it was underlined that the video case process improved PTs' beliefs, knowledge, skills, and confidence in classroom management and applying methodological knowledge (Sancar & Deryakulu, 2020a; Page & Jones, 2018; Sedova et al., 2016; Xiao & Tobin, 2018). In contrast to this finding, the percentage of the content knowledge of edited video cases was slight. These findings could argue that PTs were not concentrated enough on the content knowledge issue related to ICT in contrast with how to teach ICT. Moreover, it could also indicate that they did not learn enough content knowledge from the point of view of the context of learning to teach during their teacher education program. Simpson and Vondrová (2019) stated that despite being statistically insignificant, the participants' evaluations on the video cases differed according to the type of subject and emphasized that one could not apart participants' subjects from the video contents they watched. Furthermore, the research on learning to teach mathematics was highly controversial because the percentage of the content knowledge differs when the topics were on mathematics. In the mathematics research, it was found out while analysing instructional video cases, PTs were detailedly attended to the mathematical aspects of the instruction and holistically interpret the role of mathematical issues on the teaching process (Averill et al., 2016; Van Es et al., 2017; Van Es & Sherin, 2021; Watters et al., 2018). Ulusoy (2020) argued that although it was difficult to engage in the content-specific dimensions of teaching, PTs' attention to the mathematical issues was fundamentally enhanced during the examination of video cases. According to Todorova et al. (2017), while analysing PTs in-class video cases, so that they could focus on content knowledge it was considered useful and necessary to provide PTs with learning opportunities to acquire and apply the knowledge of the teaching content to their practices.

Second, since this research procedure differentiated from the others in terms of experiences editing, it was also precious for the video case literature that the results differed beyond discussion or reflection. Consistent with other research, this study was noted that editing of video cases, especially editing own teaching experiences, substantially encouraged PTs in learning to notice the in-class teaching process even though not statistically strong. Whereas PTs were editing their own in-class teaching

experiences, not only learned a more inclusive reflection of student perspectives but also gained their privilege to reflect on generalizing the events on other issues. Correspondingly, Watters et al. (2018) observed that in many instances, they found that the PTs' explanations were superficial, but the video case discussions positively contributed to PTs to justify and linking the many events in the teaching practices. Furthermore, Sancar and Deryakulu (2022), emphasized the video case editing process was effective in enhancing PT self-reflections on their in-class teaching experiences since PTs' self-reflections advanced the route of associating and suggesting solutions to the situations. Hence, Adarlo and Pelias (2020) noted that in teacher education, to develop PTs professionally, the purposeful practice of reflective inquiry, feedback, mentoring, and discussion could be effective.

Conclusion

These research findings highlighted the positive roles that video cases, used in an iterative way that supports thinking and reflecting on in-class teaching experiences by centring PTs' decisions and the rationale that they adopt in implementing their behaviour. What was unique to this video case study, which examined teaching experiences iteratively and comparatively was indicating that PTs' reflection skills facilitated the editing of video cases by identifying, noticing, and reflecting on in-class teaching experiences and deeply analysed the situations by using the different type of perspectives. Particularly, it meant that through the editing of in-class teaching experiences, PTs could deeply analyse the events and could transform their reflections on the contextual features. Contrary to the difficulties for PTs' reflection-in-action, the process of editing in-class teaching experiences expanded the opportunity for their reflection-on-action. Since the edited video cases include the reflective reality generated by PTs, the video case editing process created an opportunity to reveal how PTs make sense of themselves as professional teachers. Moreover, iteratively dealing with the editing process facilitated the examination of their professional development process. These research findings revealed the importance of the reflective way of editing video cases to the ongoing development of the teaching profession as well as PTs to make sense of their professional development through evaluating and reflecting on themselves.

In the current study, the enhancing depth of PTs' professional teaching skills seemed to be related to the nature of the editing procedure that included different types of in-class teaching experiences on diverse topics. Thus, it would be crucial to intentionally design and conduct instructions using video cases, significantly support PTs' ability to learning to teach. Although these research findings enhanced the value of the video case editing process, the more information is acquired based on the type of experiences or the type of research process (the editing process versus the discussing/reflecting process), the deeper interpretations could be made in the video case literature. Based on the results of this research, future research could be comparatively conducted on different subject areas to determine that there were any differences in PTs' noticing skills on the content knowledge of the subject area. Moreover, due to the concern with how editing video cases could affect PTs' real in-class teaching procedures, we propose that future research will discuss whether the editing activities transform to PTs' in-class teaching experiences. That the number of PTs could be affected the analysis and results of the research was the limitation

of this study. Nevertheless, applying the iterative cycle of the process and diversifying the number of experiences was a meaningful way for the credibility of this research. Although applying the iterative cycle of the process and diversifying the number of experiences was a meaningful way for the credibility of this research, the analysis and the results of the research could be affected by the number of PTs. In this regard, while the results are interpreting and generalizing, the number of PTs should be considered as the main limitation of the research.

Note

Ethical approval for the study was obtained from the ethics committee of Ankara University.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Raziye Sancar has a Ph.D. degree in the educational technology research area. Also, Dr. Sancar is a research assistant in the Faculty of Education at Kirsehir Ahi Evran University, Turkey. Her research interests involve instructional design, instructional decision, ICT education, professional development, and teacher education. She has published book chapters and articles on these topics in both national and international refereed journals. Dr. Sancar conducted two national projects on pre-service teacher education especially digital competency, virtual reality. Her new research topics are especially cyber identity and virtual reality on the teacher education process.

Deniz Atal has a Ph.D. degree in the educational technology research area. Dr. Atal is a visiting scholar at Leiden University, The Netherland. Her post-doctorate research interest is to integrate virtual reality technology in preservice teacher education. Her current research interests in ICT education are teachers' identity, teachers' ICT usage, and teachers' professional development. She has published several articles and book chapters on these topics in both national and international refereed journals. Also, She has conducted a national project on virtual reality technology to enhance preservice teachers' digital teaching competency.

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