In-service Teachers' Opinions about the Use of Video-based Self-Reflective Thinking for Pedagogical Development

Hizmet İçi Öğretmenlerin Pedagojik Gelişim İçin Video-Temelli Öz-Yansıtıcı Düşünmeye İlişkin Düşünceleri

Sühendan ER[*] (iD)   **Zerrin TOKER**[**] (iD)   **Seçil YÜCELYİĞİT**[***] (iD)

ABSTRACT: Classrooms are a learning environment for teachers as well as students. Teachers can improve their teaching practices by monitoring and reviewing their practices. An important tool of this development is the reflective thinking of teachers. For teachers, reflection is an opportunity to look into the classroom from the outside, to examine the learning process, and to make inferences for pedagogical development. Video recordings of teachers' lessons can be used to stimulate self-reflection by capturing the details of the teaching process and by examining the classroom atmosphere. This study aims to investigate teachers' opinions about using video-based self-reflection for their pedagogical development. Seven teachers participated in the research. Data were collected through a Pre-interview Protocol, Teachers' Reflection Reports written for twelve weeks about one recorded lesson per week, and a Post-interview Protocol after the 12-week video-based self-reflection period. The main findings show that the teachers' video-based self-reflections constitute nine categories and two weeks video-based self-reflection process resulted in changes in teachers' opinions in terms of reflection on video recording, professional development and teaching and learning process.

Keywords: Case-study, in-service teachers, pedagogical development, video-based self-reflective thinking.

ÖZ: Sınıflar öğrenciler için olduğu kadar öğretmenler için de birer öğrenme ortamıdır. Öğretmenler uygulamalarını izleyerek ve gözden geçirerek öğretim pratiklerinde gelişim sağlayabilir. Bu gelişimin önemli bir aracı öğretmenlerin yansıtıcı düşünmesidir. Öğretmenler için yansıtıcı düşünme, sınıfa dışarıdan bakmak, öğrenme sürecini incelemek ve pedagojik gelişim için çıkarımlarda bulunmak için bir fırsattır. Öğretmenlerin kendi derslerine yönelik video kayıtları, öğretim sürecinin ayrıntılarını yakalayarak ve sınıf atmosferini inceleyerek öz yansıtmayı teşvik etmek için kullanılabilir. Bu çalışma, öğretmenlerin pedagojik gelişimleri için video temelli öz yansıtma kullanımına ilişkin görüşlerini araştırmayı amaçlamaktadır. Araştırmaya yedi öğretmen katılmıştır. Veriler, Ön Mülakat Protokolü, haftada bir kayıtlı ders hakkında on iki hafta boyunca yazılan Öğretmenlerin Düşünce Raporları ve 12 haftalık video temelli öz-yansıtma döneminden sonra Mülakat Sonrası Protokol aracılığıyla toplanmıştır. Temel bulgular, öğretmenlerin video temelli öz-yansıtmalarının dokuz kategori oluşturduğunu ve iki haftalık video temelli öz yansıtma sürecinin öğretmenlerin video temelli öz yansıtma kullanımına ilişkin görüşlerinde yoğunluk ve içerik açısından değişikliklere yol açtığını göstermektedir.

Anahtar kelimeler: Durum çalışması, hizmet içi öğretmenler, pedagojik gelişim, video temelli öz-yansıtıcı düşünme.

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[*] *Corresponding Author*: Assoc. Prof. Dr., TED University, Ankara, Turkey, suhendar.er@tedu.edu.tr, https://orcid.org/0000-0002-0317-2356
[**] Asst. Prof. Dr., TED University, Ankara, Turkey, zerrin.toker@tedu.edu.tr, https://orcid.org/0000-0001-9660-0403
[***] Asst. Prof. Dr., TED University, Ankara, Turkey, secil.yucelyigit@tedu.edu.tr, https://orcid.org/0000-0002-6886-5997

The classroom is a learning and development area for teachers as well as students. Teachers make many educational decisions, apply them, evaluate the validity of their choices, and make inferences about subsequent learning practices while preparing, using, and assessing the teaching and learning process. In doing this, reflective thinking plays a crucial role in providing and developing different perspectives.

Reflective thinking is thinking about the teaching process for teachers. A range of teaching activities requires teachers to look at these processes from an outside perspective from pre-planning analysis to evaluation. According to Dewey (1933), reflective thought is 'active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends' (Dewey, 1933, p. 118). Schon (1983) approaches reflective practice to consider one's own experiences in applying learning to practice. Jaworski (1998) claims that past experiences turn into plans by reflective practices. As Jao and colleagues (2020) described, it is "not a passive, cursory look at one's practice, but rather an active, ongoing consideration of pedagogical decision making and all of the factors that influence the making of those decisions" (p. 50). Thus, in a broad sense, teacher reflection can be defined as "a self-critical, investigative process wherein teachers consider the effect of their pedagogical decisions on their situated practice to improve those practices" (Tripp & Rich, 2012, p. 678).

Effective teaching is related to reflective practice which is defined by Zwozdiak-Myers (2012) as "a disposition to enquiry incorporating the process through which students, early career and experienced teachers' structure or restructure actions, beliefs, knowledge, and theories that inform teaching for the purpose of professional development" (p. 5). When teachers reflect on their lessons, they are more willing to try new approaches (Nagro et al., 2017). Through reflective thinking activities, teachers have the habit of looking at their teaching process as an observer. Besides, they have the opportunity to use the information they have acquired from the outside to organize new teaching activities. Reflective ability is a skill like other teaching skills (deBettencourt & Nagro, 2019), and it is strongly related to instruction. Teachers who regularly monitor their teaching and reflect on it improve their teaching understanding (Aslan et al., 2022). In this context, it is underlined in the literature that reflective thinking is handled in cycles that include a process rather than a once-applied activity. Thus, it is essential to consider the development process for reflective teaching practices as systematic and orderly. However, it is challenging for teachers to have reflective thinking activities, especially at the beginning.

Reflective thinking can be developed by guiding frameworks and the help of well-informed people (Shanahan & Tochelli, 2014). Without guidance, teachers would have difficulty in reflective practice (Nagro et al., 2017). Asking them to record videos without providing any support or guidance is not seen as a practice that serves the development of teachers (Chen & Chan, 2022). The need-based training of teachers between cycles may yield different results (Aslan et al., 2022). Besides, although teachers sometimes have problems spending time on reflective thinking on a busy school day, it may be suggested to address this as a whole, emphasizing the importance of improving the teaching process. However, teachers need to be encouraged to improve their teaching practices and think reflectively (Pow & Lai, 2021). Thus, incorporating

professional development into the school day is vital in maximizing success (van Veen et al., 2012). Despite the benefits of reflective thinking practices, research reveals that some teachers have concerns about using reflection in their classroom practices (e.g., Farrell, 2020). Based on teachers' opinions after a reflective experience, determining the factors which retain teachers from using this method can contribute to the in-service teachers' widespread use of it by eliminating their concerns.

Reflection requires looking at the classroom from outside, examining the learning process thoroughly, making inferences about this process, and continuing the teaching process. Many events occur in the learning environment, and it is difficult for the teacher to notice all of them during teaching. The use of video helps teachers to analyze the lesson despite the compelling effects arising regarding the multiplicity of the lessons, the combination of many events at the same time during lesson and the complex structure of it (Gaudin & Chaliés, 2015). Besides, teachers may not remember the entire process or details from different aspects after completing the lesson. For teachers, it is difficult to remember what they did in the classroom; there is a need to provide a retrospective data record (Farrell, 2020). Recent studies indicate that there is a tendency towards observations using digital technologies compared to observations made with traditional methods (e.g., Liang, 2015). At this point, video recordings can be used to capture the details in the course process and examine the classroom atmosphere thoroughly. There are findings in literature that reflection is made more deeply when video is added to the self-reflection process in the field of education (e.g., Danielowich & McCarthy, 2013; Kane et al., 2016). Using video allows teachers to watch the conducted lesson more than once. Video supports teachers' specific teaching practices as well as contributing to their professional development (Körkkö et al., 2019; Nagro et al., 2020). Besides, it provides an opportunity to look from a different perspective in viewing (Coffey, 2014; Sherin & van Es, 2005). Thus, video-assisted reflection is beneficial for pedagogical growth, student engagement and classroom management (e.g., Gibbons & Farley, 2021; Sydnor, 2016).

Teachers' self-reflection on their videos is a powerful technique for improving their educational performance. The use of video seems to be effective for improving teachers' reflective thinking potential and noticing skill (Marsh & Mitchell, 2014). In addition, video use can support the development of more specialized skills (McCoy & Lynam, 2021). As underlined in the literature, teachers' reflection on their teaching practices increases their potential to make changes in them (e.g., Harlin, 2014). External evaluation carries the risk of "control-oriented routines" (Towndrow & Tan, 2009, p. 285) perception and may result in denial rather than a support for professional development. On the contrary, encouraging teachers to be evaluators of their own performance (Cheung, 2009; Cranton, 2001) is preferable. Besides, video-based flood-reflection is both time-efficient and effective in supporting practitioners' active participation in the process (Gibbons & Farley, 2021). Self-reflection through video recording provides insight and information about the needs, progress level of the teacher who administers the technique and motivates them to continue with their professional development (Ross & Bruce, 2007). Besides, analyzing the lessons of teachers is seen as one of the effective practices in providing their professional development (e.g., Chen, 2020). In this respect, it is evident that recording and analyzing videos while applying the teacher's self-reflection is critical (Sablić et al., 2020). However, more in-depth

research is needed into how reflective thinking is in real transformation into the analysis (Ruffinelli et al., 2020).

Video recordings of teachers' teaching practices and self-reflections on these recordings are defined as an effective process in their development (e.g., Calandra et al., 2014; Kourieos, 2016). In this study, it was planned that teachers would create video recordings of their lessons for a semester and make video analysis on these recordings. In the literature, it is underlined that reflective thinking is handled in cycles that include a process rather than a once-applied activity (e.g., Aslan et al., 2022). In addition to this, studies in which the entire lesson was videotaped (e.g., Santagata & Angelici, 2010) have findings indicating that this contributes to professional development. Besides these, it is important for teachers to receive guidance in the reflection process (Straková & Cimermanová, 2018). To enhance the sustainability of systematic self-reflection process interviews and trainings that guide teachers at the beginning of the process, throughout the process and at the end of the process can be included in the practice. Thus, this study aims to investigate teachers' opinions about using video-based self-reflection for their pedagogical development. As the way systematic self-reflection process is handled in the study, it has a potential to provide a model for individualized professional development (Gibbons & Farley, 2021) for teachers. Thus, the research question of this study is "What are the teachers' opinions about video-based self-reflection on their lessons for their pedagogical development?" This research question is investigated under three sub-questions regarding the process of the research as their opinions before, during and after the process:

1. What are the teachers' opinions about video-based self-reflection on their lessons for their pedagogical development *before* the video-based self-reflective thinking process?

2. What are the teachers' opinions about video-based self-reflection on their lessons for their pedagogical development *during* the video-based self-reflective thinking process?

3. What are the teachers' opinions about video-based self-reflection on their lessons for their pedagogical development *after* the video-based self-reflective thinking process?

Method

Research Design

The research employs a qualitative approach using the case study method (Merriam & Tisdell, 2016). The data obtained from the Pre-interview before the process, Teachers' Reflection Reports during the process, and post-interview at the end were analyzed by using thematic analysis. Thematic analysis organizes the patterns in a data set and defines themes to interpret the aspects of the research topic (Braun & Clarke, 2006). In this analysis, direct quotations are often made to reflect the views of the individuals interviewed or observed (Yıldırım & Şimşek, 2016). The data obtained in the research are arranged by the researchers and interpreted concerning the themes.

Participants

The participants are seven in-service teachers pursuing their careers in three different subject areas: early childhood education, elementary education, and elementary mathematics education. Among 7 participants from different schools in Ankara, 2 of them are preschool teachers, 3 of them are elementary school teachers, and the last 2 are mathematics teachers at the elementary level. Their teaching experience ranges from 6 to 25 years. All of the participants were female. The selection of the participants was based on volunteerism and not having experience in the systematic reflective teaching process. In the selection of the participants, the questions were sent to all the teachers who could be reached, and opinions were received from 94 teachers for 4 questions. Seven of these teachers, who are willing to watch their lessons for 12 weeks and to reflect on them, were included in the long-term data collection process of the study. In this study, the focus was on teachers' opinions about their pedagogical development. Therefore, having different subject areas and having different years of experience for teachers were considered sources of rich data for commonality of opinions.

Data Collection

Data Collection Instruments

In this study, three data collection tools are used to provide an opportunity to triangulate the data (Yıldırım & Şimşek, 2016).

Pre-Interview Protocol. According to the research question to reveal the teachers' opinions towards video-based self-reflection, three questions are prepared. The questions asked the opinion of teachers about the effect of (1) video recording, (2) self-reflection only, and (3) self-reflection on video recording of their lessons on pedagogical development. The questions were; "What is your opinion on recording videos of your lessons?", "What is your opinion on self-reflective thinking on your lessons?", and "What is your opinion on self-reflective thinking by watching videos of your lessons?"

The questions were prepared by the researchers. The main purpose of preparing the questions is to determine the teachers' opinions on these concepts before the study. To ensure the appropriateness of the questions (Merriam, 1995), after preparation, 4 teachers who were not included in the study were asked for their opinions on the clarity of the questions. In addition, opinions about the appropriateness of the questions were taken from three experts working in the field of teacher education. Before the 12-week systematic data collection process, the questions are sent to several teachers to understand general opinions regarding video-based self-reflective thinking. The data collected from 94 teachers from various subject areas showed that the questions were understandable and that they could be used in the same way without any change.

Teachers' Reflection Reports. In Teachers' Reflection Report, there are three questions to reveal teachers' opinions about the video-based reflection are prepared. These same experts investigated the questions and finalized them as follows: (1) Please write your evaluations about the lesson you have completed (2) If you could do this lesson again, what changes would you make? Why? (3) Indicate other points you want

to evaluate about this process. Besides, the teachers were presented with a checklist of quality teaching items. This list is designed only to make the participants write their reflections quickly, as a supplementary and it is not put into the evaluation. Therefore, using the list statements is optional. In fact, the researchers are just the collector of the reflection reports and they do not interfere to the process. Sample items in the list are as follows: "Providing effective feedback", "Answering students' questions", and "Transition between activities".

Post-interview Protocol. At the end of the research, post-interview is organized in a focus group meeting format, and the process is discussed with the teachers. This time the researchers were the conductors of the semi structured interview. They asked questions and noted the given answers. The same questions used in the Pre-interview Protocol were asked during post-interview. Since this interview was in semi-structured format, the researchers put additional questions in order to enrich and expand the discussion for a deeper understanding of teachers' opinions. In addition to three main data collection tools discussed above, every three weeks of the data collection process (on 3rd, 6th, 9th weeks), the researchers organized 3 face to face brief interviews with unstructured questions with teachers for technical and procedural issues.

Data Collection Procedure

The ethical approval document and permission from the Ministry of National Education (MoNE) was presented to all subjects. Then, the volunteer teachers were informed about the aim and the procedure of the project and consent was obtained from all subjects before the study.

The researchers gave a face-to-face seminar regarding the techniques of using a video recorder, saving recorded sessions and writing reflections utilizing the data collection instrument designed by the researchers. The seminar included the sessions of informing the teachers about the purpose of the study, introducing the document (forms) to be used in the study process, and the technical use of the camera. In addition to this, a sample lesson video was watched, the teachers' thoughts were asked, and then they were asked to reflect on this lesson. 2 hours are allocated for all these activities. Expectations related to the research processes were presented and the teachers were guided to reflect on a sample lesson watched on the video by using the Teachers' Reflection Report. The teachers were guided about the placement of the video in the classroom in such a way that the faces of the students would not be visible. Besides, they were suggested to start using the video before the actual data collection process in order to help them get used to the camera in the classroom and act in a way that does not disrupt the natural process. Teachers were expected to explain to the students that it was within the scope of progress for their teaching. For obtaining permission, the teachers received written consent forms from their students and parents, which were submitted as an attachment to the ethics committee form.

After the seminar, a 12-week video-based reflection process was started. During the first lesson recordings of the teachers, the researchers were at the school to be accessible for support. The teachers recorded themselves for about one class hour, at least once a week for 12 weeks. The recordings were confidential and were not shared with the researchers. The teachers watched their teaching sessions on their recordings.

They wrote video-based reflections using a Teachers' Reflection Report. Teachers shared their reports via e-mail sent to the researchers. Every three weeks, the researchers conducted brief interviews to sustain the progress of the process. After the video recording and reflecting on lessons were over, researchers arranged a post-interview which lasted for an hour with the teachers. The summary of the research design is presented in Table 1.

Table 1

Summary of the Research Design

Process item	Instrument	Period	Schedule
Pre-interview	Pre-interview Protocol	Once	At the beginning
Video-based reflection process	Teachers' Reflection Reports	12 weeks	During
Brief interviews	-	Every 3 weeks	During
Post-interview	Post-interview Protocol	Once	At the end

Data Analysis

The data collected via the Pre-interview Protocol, Teachers' Reflection Report and the Post-interview Protocol are analyzed using descriptive analysis. As a first step, the data collected via the interview protocols, and reports were saved digitally on a computer without any alteration or correction. The participant teachers were indexed as P1, P2, … to P7 for the confidentiality of personal information so that the names remained anonymous. Then the answers to the open-ended questions were coded to identify topics, issues, similarities, and differences revealed through the teachers' narratives (Braun & Clarke, 2006; Yıldırım & Şimşek, 2016).

The data from the seven Pre-interview Protocols, 84 Teachers' Reflection Reports, and one Post-interview Protocol were analyzed in total. The researchers applied an independent coding process for the data gathered from interviews and each of the reports gathered from teachers. Evidence is provided from some quotes in the collected data. After discussing emerged meanings to agree on overemphasized or underemphasized themes (Shenton, 2004), another colleague is also consulted for his inner vision into the emerging codes to decrease or avoid any potential bias. Moreover, for inter-rater agreement, the formula of "[the number of agreement / (the number of agreement + the number of disagreement)] x 100" (Miles & Huberman, 1994, p. 64) was used. The interrater agreement in the initial case was 86.2%. For the thematic analysis of the data, MAXQDA qualitative data analysis software was used. The coding process is considered in three titles: Pre-interview, Teachers' Reflection Reports, and Post-interview. Pre-interview and Post-interview processes generated three categories: 'Teaching and learning process, 'reflection on video recording' and 'professional development'. For the coding of Teachers' Reflection Reports, the themes of teachers' answers fell into two categories: ''positive' and 'open for improvement'. If the teachers

in their video-based reflection of their lessons reflected on one of the subcategories in a positive way, it is considered under "Positive" category.

Ethical Procedures

The ethical approval for this study was obtained from the Human Research Ethical Committee of TED University with the document number 2019/04 on 28.02.2019.

Findings

Findings of the study were presented to provide answers to the research question as teachers' opinions about the effects of video-based self-reflection on their lessons for their pedagogical development "before the process", "during the process" and "after the process".

Teachers' Opinions before the Process

As part of the Pre-interview Protocol, the teachers were asked their opinions about video self-recording during teaching and reflecting on them. The teachers' answers in the pre-interview sessions were categorized drawn on the coding process, as shown in Table 2 below.

Table 2

Categories and Subcategories on the Coding of the Pre-Interview

Category	Subcategory	f	%
Reflection on video recording		12	52.2
	Benefit	7	
	Privacy	5	
Professional development		7	30.4
	Criticism of the lesson	4	
	Noticing mistakes	2	
	Enabling recall	1	
Teaching and learning process		4	17.4
	Approach in compliance with level of the student	2	
	Materials and examples used	1	
	Students' understanding and explanations	1	

As seen in Table 2, the findings of the pre-interview answers fall under three categories and eight subcategories. During this pre-interview session it was seen that what the teachers emphasize the most was reflecting on video recordings of their lessons. 'Reflection on video-recording', is the most powerful theme (f=12) comprising two sub-categories as 'benefit', and 'privacy'. These subcategories suggest that teachers foresee the potential benefits of reflecting on their video recordings of their lessons and at the same time they have concerns about the privacy of their lessons. Related to the

'benefit' subcategory, teacher P6 puts it as: *"Because what I live flies away, it is more effective for me if there is a video recording that I can access later."* P7 has concerns about being recorded regarding privacy issue but still agrees that there may be a beneficial use of it with the words as follows:

Classroom is a private place. Therefore, I do not find it accurate to have cameras and images in the classroom. ... I do not approve of sharing it with everyone, but if I am going to plug in a camera and watch it myself, then it might make sense.

'Professional development' (*f*=7) was another theme that emerged from the pre-interview session with three subcategories as 'criticism of the lesson', 'noticing mistake' and 'enabling recall'. The teachers seem to realize the contribution of the reflection process on their professional development. For example, teacher P5 expressed this as follows:

"... the teacher experiences something in the classroom, sometimes watching it again and seeing a mistake, seeing where and what went wrong means personal criticism, and it makes sense.". P4 puts it as: *"Just watching it again may be compensating for the mistakes I made, but I always question this in my mind without recording a video, though; maybe the video recording can make it easier."*

The weakest density belongs to the 'teaching and learning process' theme with a frequency of three. For the 'Teaching and Learning Process' category, subcategories were: 'approach in compliance with level of the student ', 'materials and examples used', 'explanation for student understanding'. The subcategories evince that the participant teachers can benefit from the reflection on self-video recording process in different ways in terms of teaching methods that they can use in the classroom. For instance, teacher P6 finds the clue about the student's level to adjust her approach accordingly and expressed it as follows:

I can predict what the student does not understand after explaining the subject without putting it in words, I can see where there is a question mark. It may be useful in that respect.

P6 also eliminated about the materials and examples she used in her lesson and put it as follows:
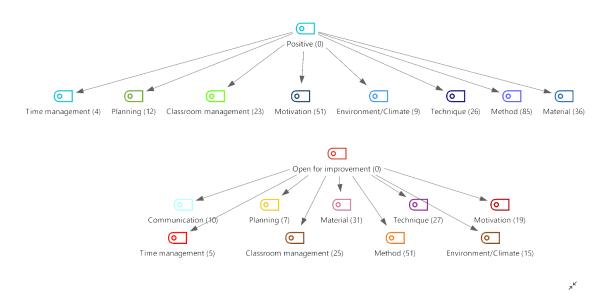
It can be useful to keep in my mind the materials I have made and the examples I have given.

Teachers' Opinions during the Process

The teachers' opinions in the Teachers' Reflection Reports were categorized drawn on the coding process, as shown in Figure 1 below.

Figure 1

The Density of the Categories in Teachers' Reflection Reports

As seen in Figure 1, data from Teachers' Reflection Reports revealed two categories as 'positive aspects' and 'aspects open for improvement' with nine subcategories comprising time management, planning, classroom management, material, technique, method, environment/climate, motivation, communication. In the reflections on their self-video recordings, the teachers reported about the methods, techniques and materials they used in their lessons, the environment of the classroom and the climate they created during the lessons, their time and classroom management skills, the motivation and the communication in their lessons, and their planning for the lessons. The density of the categories and subcategories listed above is presented in Table 3.

Table 3

Frequency Table for the Categories Drawn on the Coding of Teachers' Reflection Reports

Category	Positive Aspects		Aspects open for improvement	
Subcategory	*f*	%	*f*	%
Method	85	19.5	51	11.7
Motivation	51	11.7	19	4.4
Material	36	8.3	31	7.1
Technique	26	6.0	27	6.2
Classroom management	23	5.3	25	5.7
Planning	12	2.8	7	1.6
Environment/Climate	9	2.1	15	3.4
Time management	4	0.9	5	1.1
Communication	-	-	10	2.3

As seen in Table 3, among the nine subcategories, the 'Method' subcategory is the strongest, and it can be stated that it is referred to in most of the teacher reflections. For example, P1 mentioned outdoor lessons as a method for her students to benefit from her lesson more, and she expressed this as: *"Soil and seeds were very dispersed in the classroom environment. It would be better to do it outside of the classroom."* This reflection was categorized under 'Open for improvement'. For example, P6 shared how it worked well to start the lesson by answering the homework questions and using the revision method as follows: *"The lesson started with the solution of the homework. The assignment about the place value of decimal notation has been done, the subject was repeated."*

Although the same subcategories emerged in 'Positive aspects' and 'Aspects open for improvement' categories, the order of their density varied. For example, for the 'Positive aspects' category, the second subcategory that follows 'method' is 'motivation,' while it is 'material' subcategory for the 'Aspects open for improvement' category. P7 reflected on her motivation sources during the lesson and put it as follows: *"An introduction to the lesson was made by arousing students' interest and motivation throughout the lesson. Rewarding is a method I use very rarely in my lessons."* The same subcategory is referred to under the 'Aspects open for improvement' category by the same teacher (P7) in her ninth-week reflections as follows:

I try to explain the lesson in a clear and understandable language, but some of the students give up because of their negative prejudices against the new generation question types that require interpretative power. Unfortunately, I cannot attract the attention of some students with such questions.

P2 in both categories referred to the 'material' subcategory. In her seventh week, she reflected on how she should improve about using materials with the words: *"I have to diversify the materials to provide more interest and motivation."* while she refers in her ninth week under the 'Positive aspects' category with the words:

The materials I will use in the activity (metal, wood, plastic, fabric, wool) were prepared separately for each child, and it helped get their attention in the introduction and keeping the interest in the activity.

About the 'Classroom management' subcategory under the 'Positive aspects' category, participant P3 declared that she was successful in classroom management and expressed this as follows: *"Since it is a text that attracts the attention of children that they love, there was no problem in classroom management ..."* P3 continued: *"The course meets the criteria for classroom management."* About the same subcategory under the 'Open for improvement' category, the same participant thought that she failed to manage the classroom in that lesson and reported as follows: *"When I watched the video, I saw that this lesson, I focused on a few students. I should have been careful with that."*

Some reflections of the teachers address more than one theme at a time. In her second-week reflection, P3 put it as *"Reflecting the text on the board in the teaching-learning process took our time so that it could have been prepared in advance."* With these words, she points out room for improvement in time management, and at the same time, she mentions the necessity for planning before the lesson, both of which are categorized under the 'Open for improvement' category. An example for the same

subcategory under the 'Positive' category from the same teacher (P3) is recorded as follows:

From so many videos, I understand that the better preparation the teacher makes before the lesson, the easier and more enjoyable it is for children to learn. The participation of the children in the lesson shows that the interest and desire of the children were at the expected level, due to the preparation made in advance.

She reflected on preparing before the lesson, and following the plan during the lesson contributed to her lesson. On the other hand, P7 found last week's lesson satisfying in terms of time management and reflected as follows: *"The planning and time of the lesson were ideal."* There were some specific techniques that some participants emphasized the beneficial use. P5 used the experiment technique reported it as "*... It was observed that the course was properly introduced, techniques were used appropriately, necessary warnings were made, and active participation was achieved."* in her sixth-week report. Besides, *"An experiment was made on the states of matter."* in her seventh-week report while she determined the need for the use of different techniques in the lesson with his words: *"... I would organize a drama activity; get the attention, and then move on to the learning and teaching process."*

One of the themes drawn from the participants' reflection reports was the environment and the climate of the classroom. It was referred to in both the categories as to be improved and the successful implementations of it. For example, P4 expressed this as follows; *"I think that motivation is impaired from time to time in the lesson, and this is because the physical environment is not arranged according to the requirements of the lesson. Next time I will consider physical arrangement beforehand."* On the other hand, P7 shared in her report that she starts the lesson after arranging the physical environment: *"After preparing the physical environment of the classroom for the lesson ..."*
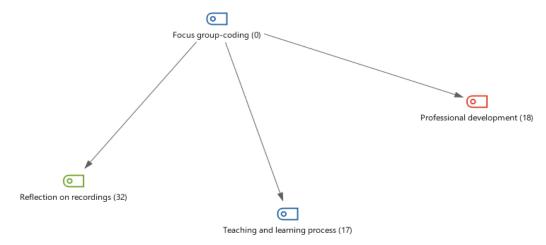
The last theme only under the 'Aspects open for improvement' category is the 'communication' subcategory. P7 shares her efforts for a healthy communication in her classroom and describes her attempt as follows: *"I try to communicate with the students by using my voice and body language effectively (in the teaching process). I listen to them with interest and try to make each one feel valuable."*

Teachers' Opinions after the Process

After the 12-week implementation session, a post-interview with teachers was arranged. This post-interview data was analyzed, and the teachers' answers to the post-interview questions were categorized drawn on the coding process, as shown in Figure 2 and Table 4 below.

Figure 2

The Density of the Categories for the Post-Interview

As seen in Figure 2, the coding for the post-interview falls under three categories and 14 subcategories:

Table 4

Themes and Their Density Are Drawn on the Coding of Post-Interview

Category	Subcategory	f	%
Reflection on video recording		32	47.7
	Contribution	11	
	Keeping written record	8	
	Watching video recordings	8	
	Missing information	5	
Professional development		18	26.9
	Hesitation	6	
	Self-evaluation and improvement	7	
	Learning by doing	3	
	Adjustment to environment	1	
	Pre-service teacher training	1	
Teaching and learning process		17	25.4
	Diversity	6	
	Pre-planning	4	
	Material	3	
	Introduction	2	
	Equity	2	

As seen in Table 4, 'reflections on video recordings', with a frequency of 32, is the most powerful theme. It is followed by 'professional development' with a frequency of 18. The weakest density belongs to the 'teaching and learning process' with a frequency of 17. Comparing to pre-interview results, it is seen that the post interview subcategory densities have increased. The reason for this is that the participant teachers emphasized some themes repeatedly. This gives a rise to the argument that the participants were highly influenced by the experience they had, and they used repetitive emphases to express this.

In the 'Reflection on video recording' category, subcategories are emerged as 'contribution', 'keeping written record', 'missing information', and 'watching video-recordings'. The teachers agreed on the contribution of recordings to their reflection on video recording. For example, P2 puts it as: *"There could be things we forgot. I know what I will write according to the criteria, but watching it helped me a lot. If we had written our reflections without watching the video recordings, there would be a lot more missing."* P1 shared the same idea and reflected as: *"We would have forgotten if there was no watching by that time."* and P6 declared that she agreed by saying *"Yes, same"* and continued, *"It is essential to watch."*

'Professional development' category revealed subcategories as 'hesitation', 'self-evaluation and self-improvement', 'self-improvement,' 'learning by doing', 'adjusting to the environment, pre-service teacher training', and 'life-long development'. For example, about the 'Professional development' theme, P2 mentioned her hesitation at the beginning of the process and how she ended up with the sense of self evaluation and self-improvement. P6 reflected on this as follows:

I thought maybe I would hesitate, but I think it contributed a lot to evaluate myself.... Even if I am not going to shoot it, I always have it in my mind, and I think I am improving myself. Rest of her words demonstrated her experience of learning by doing and adjusting to the environment. She voiced it as*: It contributed a lot to me. .... In other words, we learned by doing in professional life. It took a long time that we kept adjusting to the environment.* She also suggested the same study to be conducted with preservice teachers as follows: *I think a study of this kind will contribute a lot to the students as well,* and P5 contributed as: *"I can really express it as I grew up, and developed further."*

For the 'Teaching and Learning Process' category, subcategories risen as; 'diversity', 'pre-planning', 'material', 'introduction' and 'equity'. For example, P2 shared about the diversity in her teaching process using different methods and materials, and her pre-planning for the lessons:

For example, I realized that I diversified the methods and materials I used in my lessons after this project started. You know, there are differences in the children's learning how can I say... now that I believe there should be diversity, I started to teach the lesson by preparing myself according to student differences. P6 articulated that she started preparing an introduction to each subject and paying attention to be fair to the students during her lessons as *"So it makes sense to consider how I introduce a subject effectively or do I give equal opportunities to each child, or switch on that subject after a few students understand."*

Conclusion and Discussion

The results of the pre-interview and post-interview process revealed that the teachers' opinions on their pedagogical development changed after the 12-week video-based self-reflection practice and the findings of the video-based self-reflection reports provide insight about how these changes occur. It is thought that teachers' reflection in a systematic way for a long time instead of once is effective in this change, as suggested in previous studies (e.g., Aslan et al., 2022).

The teachers' major concern in the video-recording process was the privacy of their classroom. It is in line with the literature that when the video is watched by other people it can be perceived as a violation of privacy (Kleinknecht & Schneider, 2013). As a solution, teachers were told that they would be the only ones to watch the videos they recorded. Thus, knowing that others would not watch reduced teachers' anxiety and contributed to their being authentic (Nagro, 2019).

Teachers stated that knowing about reflection in the early stages of their profession would contribute a lot to their pedagogical development. They further suggested that pre-service teachers may benefit from the reflective process in undergraduate education before starting a profession as a teacher yet. These views of the teachers coincide with the findings of the Toker (2016) and Güngör (2016) studies. The suggestions of participant teachers seem to align with the literature as it is asserted that reflection is an ability that should be taught with other teaching abilities (deBettencourt & Nagro, 2019).

Teachers have difficulties reflecting that they spend time recording videos, watching videos, and reflecting during the busy school day due to their high workload for teaching. Thus, video-based reflection might be a part of the corporate culture of the school. Beyond that, the reflection would benefit from being a school policy in the scope of stimulating teachers to develop their teaching practices and self-reflection (Pow & Lai, 2021). Action steps such as scheduling reflection times like teaching time for teachers at school can enable teachers to reflect since incorporating such professional development maximizes sustainability and achievement (van Veen et al., 2012).

Within the study's scope, researchers provided flexibility for teachers in recording videos whenever they wanted, in the course and the type of lesson. Providing teachers with the flexibility to analyze their videos at a time that is convenient for them, a process did not require immediate response (Weber et al., 2018). This may have enabled them to adapt to the process more easily.

Data from the Teachers' Reflection Reports revealed that each teacher focused more on certain items in line with their own developmental needs, such as issues related to teaching methods. From this point of view, it can be predicted that reflection, which is oriented on needs, can benefit teachers (Ross & Bruce, 2007). In addition, this finding overlaps with previous literature findings (e.g., Chen, 2020) that it is beneficial for teachers to analyze their lessons in terms of improving their teaching practices. In the context of the study, teachers had a chance to include reflection elements to identify more situations at first, but as the process progresses, they seek solutions to the elements they reflect, and even start to reflect on them by applying these solutions in their lessons. This finding supports the previous finding that when video evidence is used

successively, teachers' emphasis shifts from personal issues such as feelings to decisions based on data related to their instruction (Nagro et al., 2020).

It was seen that the teachers used the list consisting of items about quality teaching for more than one purpose, such as using in lesson planning. In other words, they were able to pre-reflect not based on previous teaching experiences but only based on elements in this list. Thus, it became a robust professional development practice (Körkkö et al., 2019; Nagro et al., 2020) for teachers.

Teachers' reflections show that this process encouraged them to plan and implement more student-centered lessons. From this point of view, although this cannot be said for every teacher, it can be said that the video-based reflection process, as in this study, contains some factors that may lead to some skill and attitude changes in teachers' teaching and development. Teachers' reflections on student learning and engagement may have triggered their practice to review and improve in this direction.

Development takes time and may be related to different factors; the same level of change and development is inevitably not observed in every teacher. Thus, video-based reflection can provide improvement opportunities for teaching practices (Gibbons & Farley, 2021; Sydnor, 2016; Tripp & Rich, 2012).

Previous studies have shown that teachers' videos for their lessons facilitate them to recognize the elements they did not notice before since they have a chance to watch their videos more than once (Sherin & van Es, 2005). As seen in the reflections of teachers, it enables them to notice (Marsh & Mitchell, 2014) to make refinements in their lessons and their teaching and learning process.

The literature suggests that guiding frameworks and knowledgeable people can promote the reflection process (Shanahan & Tochelli, 2014). In this study, participating in a systematic reflection provided a framework to reflect at a particular time. This framework provided an opportunity to rank what they should focus on to improve their teaching. Teachers have facilitated this guidance which is important in their reflection process (Straková & Cimermanová, 2018).

The teachers stated that they would continue to reflect on their teaching, although it is not mandatory, because they have seen the benefit of this development process. Teachers who are volunteer to experience new approaches to meeting their students' needs have a positive approach to use reflection (Nagro et al., 2017). The students continuously change, but teachers remain the same, and if they reflect, they can keep up with this change and development.

Implications

In this study, although the teachers shared their reflections with the researchers, the sharing among them was limited to the focus group. In future studies, planning can be made to increase teacher sharing to enhance collaborative reflection since it is beneficial for teachers to engage in practices that will encourage their communication and reflective thinking with their peers (Nami, 2022). Besides, although a framework for reflection is presented in the study, it is for pedagogical development in general. In future studies, the contribution of focused reflections to the pedagogical development of teachers can be studied.

Teachers in this study were expected to make their reflections in writing, and to create a sound recording if they wanted to. Different digital resources and tools such as video annotation tool (e.g., Shek et al., 2021) or coding software can be used for teachers to make their reflections. In this way, teachers can use their time effectively.

The interviews were made face-to-face in this study. In future studies, online interviews and supervision processes can be added to the study. Besides, in this study, the teachers analyzed the videos holistically and made their reflections accordingly. In other studies, it is possible to take cuts from the videos and focus on them according to the development areas and needs of the teachers. In addition, teachers made reflections by watching their own videos in the study. Besides, watching other people's videos can be included in the process.

In light of all of the above, it can be concluded that for teachers, a video-based self-reflection process has been defined as seeing themselves through the student's eyes and seeing themselves in the mirror. As stated by the teachers, video-based reflection can be used as a tool to evaluate the teaching process from the students' perspective. The data were obtained through teachers' opinions on video-based reflection to support their pedagogical development. In future studies, research can be conducted to examine how teachers put their opinions into practice in teaching to ensure their pedagogical development. Since this study focuses on pedagogical development, it is important to include teachers from different branches. In other research studies, researchers can also work with teachers from a single field that focuses on pedagogical content development. It was observed that each of the teachers with different experience periods benefited from this process. Studies can be conducted on how reflection contributes to teachers of different experience levels based on this.

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Statement of Responsibility

Assoc. Prof. Dr. Sühendan Er provided supervision, project administration and funding acquisition for this project. Besides, she conducted validation and formal analysis with other researchers. Asst. Prof. Dr. Zerrin Toker conducted resource investigation and data curation process. Besides, conceptualization of the framework was done in collaboration with other researchers. Asst. Prof. Dr. Seçil Yücelyiğit provided methodology part and conducted software use process for data analysis and interpretation. Writing the original draft and editing are all conducted within collaborative work process of all authors.

Conflicts of Interest

There is no conflict of interest in this study.

Author Bios:

Dr. Sühendan Er got PhD from Ankara University, Child Development and Education Department. She has been working at TED University Faculty of Education Early Childhood Education Department since 2012. Dr. Er has been having her

academic studies on cognitive and language development in early years, teaching foreign languages to children, child and family relationships, teacher training, interactive story reading, sharenting, sibling relations and child development. She has several articles and presentations on her profession in national and international congresses. She is also the founder member of the World Council for Curriculum and Instruction and she has been the vice president of the institution's Turkish chapter since 2011.

Dr. Zerrin Toker got her bachelor's degree from Middle East Technical University, Department of Elementary Mathematics Education. She got an MS and PhD from the same universiy. She worked as a mathematics teacher from 2004 to 2017. Besides, she served as the head of the mathematics department from 2010 to 2017. as a professional development coordinator from 2010 to 2013. She had an International Baccalaureate Teaching Experience for more than 10 years. She wrote mathematics textbooks for MoNE. Her field of interest includes student-centered instructional design, the reflective thinking process of pre-service and in-service teachers. She is interested in design-based research, interdisciplinary learning, differentiated instruction, and data-driven instructional design.

Dr. Seçil Yücelyiğit received her bachelor's degree in mathematics from Hacettepe University Department of Mathematics in 1997 and gained her Ph.D. degree from Ankara University Child Development and Education Program in 2014. Dr. Yücelyiğit has been conducting research on early childhood mathematics and science education; STEM approach in early childhood education; the integration of instructional technologies in early childhood education and early childhood teacher education. She has several international and national publications, book chapters, conference papers, and seminars on these subjects. She is a faculty member of TED University at the Faculty of Education, Early Childhood Education Program.

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