Ayşegül Sağlam Arslan
ORCID iD 0000-0001-8340-2205
PhD in Education, Professor,
Department of Mathematics and Science Education,
Trabzon University, Fatih Faculty of Education,
Söğütlü Mahallesi, Adnan Kahveci Blvrd, 61335 Trabzon, Turkey,
asaglam-arslan@trabzon.edu.tr

Canan Cengiz
ORCID iD 0000-0003-4547-3293
PhD in Education, Associate Professor,
Department of Mathematics and Science Education,
Trabzon University, Fatih Faculty of Education,
Söğütlü Mahallesi, Adnan Kahveci Blvrd, 61335 Trabzon, Turkey,
canancengiz@trabzon.edu.tr

Faik Özgür Karatas
ORCID iD 0000-0002-1391-1597
PhD in Education, Associate Professor,
Department of Mathematics and Science Education,
Trabzon University, Fatih Faculty of Education,
Söğütlü Mahallesi, Adnan Kahveci Blvrd, 61335 Trabzon, Turkey,
fokaratas@trabzon.edu.tr

Suat Ünal
ORCID iD 0000-0002-0495-8385
PhD in Education, Professor,
Department of Mathematics and Science Education,
Trabzon University, Fatih Faculty of Education,
Söğütlü Mahallesi, Adnan Kahveci Blvrd, 61335 Trabzon, Turkey,
suatunal@trabzon.edu.tr

EXAMINING CHEMISTRY TEACHERS' REFLECTIVE JOURNALS DURING MENTORING PRACTICES

The aim of this study is to determine the impact of mentorship program on professional development of the mentees. This study is guided by case study. The case, in this study, is each of four chemistry teachers who took part in mentorship program as mentees in order to better understand the mentorship program. The data collection tool employed in this study is the reflective journals kept by the mentees throughout the mentorship practice (for eight weeks). Participants filled out reflective journals for evaluation after they completed the lessons (material, lesson plan, etc.) they prepared in the group mentoring sessions held every week. These forms have five questions that might lead mentees to reflect on their implementation of the plans and their professional development in the course of the mentorship program. The data obtained suggest that the mentees had qualified reflections on their current practices as well as future practices. The article focuses on different categories of reflection: reflection-in-action and reflection-for-action. The reflection-in-action category covers the statements provided by the mentees, about the solutions they came up during the class (in action) for the unexpected cases they faced during teaching. The reflection-for action covers the views the mentees reached with respect to the education they carried out at their classes, after the

education is completed. The mentors frequently noted in their weekly reflective journals form that the mentorship program has a positive impact on their teaching methods competencies while implementing the co-designed lessons plans. On the other hand, the most important problem that the mentees uttered is the need for extra time as they could not complete the activities within the planned time frame. In light of the findings, it can be deduced that the mentorship program has improved the professional practices of the mentees.

*Key words: **chemistry teachers; mentoring practices; reflective journal; reflective pedagogical practice.***

INTRODUCTION

Professional development level of the teachers is one of the most important indicators of schools, and as a result education system. The conditions that change so fast thanks to the development of the information and communication technologies require teachers to develop themselves in terms of both their profession and pedagogically and general knowledge, and accordingly be up on improving their in-class applications (Özdemir, 2016). The mentoring applications implemented to meet this need play a key role in the professional development of teachers (Hudson, 2013).

«Mentoring is deliberate pairing of a more skilled or more experienced person with a less skilled or less experienced one, with the mutually agreed goal of having the less skilled person grow and develop specific competencies (Murray, 2001, p. xiii)». Mentoring can be defined as a supportive relationship, assistance process, teaching-learning process, reflective process and career development process (Roberts, 2000). In this mentoring process, mentors share their knowledge, skills and experience with the mentees, the general and specific competencies of the mentees are improved, and they are supported emotionally (Petrovska, Sivevska, Popeska, & Runcheva, 2018). Although mentoring practices are more common for the trainee teachers who have just enrolled in teaching profession in many countries, mentoring services are also used for the experienced teachers to continuously improve and facilitate teaching and learning environments in some of the countries that show high success in PISA exam (Uğurlu, Dolmacı, & Evran Acar, 2018). For example, in Shanghai, teachers constantly work on developing and evaluating innovative teaching practices like a researcher. Within the scope of the mentoring system, teachers periodically observe each other's lessons and give feedback to each other (Jensen, 2012). It is stated in the literature that the mentoring system, which is included in the education systems of countries like Shanghai with high success in international exams, contributes to more efficient learning environments, increasing the success of students, and therefore, they have important contributions to the advancement of their countries in the field of science and technology (İlğan, 2021; Jensen & Farmer, 2013). Reflective practices have an important place among the various methods employed in revealing the effects of mentoring practices (Sağlam Arslan et al. 2017). Reflection, which is a mentoring practice, is an application that enables teachers to analyze their own teaching processes and to be responsible for this (Flesch, 2005).

Reflective practices enable teachers to reflect on their current experiences, analyze them in detail, and develop their future teaching practices with the inferences they have made from these (Sari, Drajati, So & Sumardi, 2021). Therefore, such practices are seen as an important component of teacher training (Loughran, 2007; Vermunt & Endedijk, 2010). One of the primary prerequisites of successful mentorship practices which support the development of mentors and

their partnering mentees is to support the mentee through reflective practices with a view to transforming them into independent and high-level thinker professionals (Barnett, 1995; Sundli, 2007). «Reflective practice is viewed as a means by which practitioners can develop a greater level of self-awareness about the nature and impact of their performance, an awareness that creates opportunities for professional growth and development» (Osterman & Kottkamp, 1993, p. 19).

It is thought that mentoring practices will enable mentees to acquire professional knowledge and skills, so that they have information about their developed or inadequate characteristics, and thus to evaluate themselves better. Therefore, it can be said that mentoring practices are one of the ways that can be used to improve reflection (Frick, Carl & Beets, 2010). Training individuals on a given issue and enhancing their skills makes it possible for them to get a comprehensive picture of the knowledge in that field, improve their metacognitive capabilities, and achieve an objective analysis of themselves (Kruger and Dunning, 1999).

Reflective practices are an important practice that a professional educator should make use of in order to ensure that they carry out quality practices in the learning and teaching process (Huntley, 2008). Reflective journals, which are one of the reflective practices, are an analytical activity that enables the writer to reflect on his/her experience and learn through his/her experience (Boud, 2001). Reflective thinking and writing help teachers examine what happens during instruction and thus plan it accordingly (Roberts, Barblett, Boylan, & Knaus, 2021). Examining the reflective journals to be prepared by the mentees during their mentoring practices is important as it will give clues about the effectiveness of mentoring practices on their professional practices and their effects on their reflection skills. Thus, this study sets out to examine the contents of the journals prepared by the mentees during their mentoring practices in the context of reflective teaching.

Reflective Thinking and Reflective Practices. Reflection is on the basis of reflective practices. Dewey defined reflection as a special problem-solving method in which thoughts are organized by linking each thought to the previous in order to find a solution to an issue (Hatton & Smith, 1995). Reflection should include reflecting on experience and creating future practice (Dewey, 1933). Schön (1983, 1987) states that reflection covers the questioning and evaluation of the actions of practitioners (cited in Kozan, 2007). It can be said that reflection helps to reduce the complexity of the teaching process by enabling different thinking and more appropriate action (Tonna, Bjerkholt, & Holland, 2017).

In 1984, David Kolb proposed a four-step model for reflection: concrete experience (do it), reflective observation (reflect on it), abstract conceptualization (read up on it), active experience (plan the next stage). Within the framework of this model proposed by Kolb, first the action is taken, then the action is thought about, then it is determined which aspects are good and which are bad, and the reasons behind are determined. After the evaluation analysis of the current situation, information is collected from different sources and finally the next action is planned. Unlike Kolb, Schön (1987), who used the concept of reflection in the field of teacher training, did not propose a model for reflection but examined it in three categories, taking into account the time of reflection. These are reflection in action, reflection on action, and reflection for action. When an individual encounters an unexpected situation while an action is in progress, being able to respond immediately and intuitively and produce a solution is «reflection in action». After the action is over, looking back and reflecting on the actions is «reflection on the action» / «reflection for action», on the other hand, is the use of these two types of reflection to guide further actions and reconstruct actions. In Gibbs's (1988) model proposed for reflection and called the reflective circle, the model consists of six steps: definition, feeling, evaluation, analysis, conclusion and

action plan. When these models, which form the basis of reflection studies, are examined together, it is seen that action plans for the future are created by criticizing the current situation. While this reveals the effect of current situation analyses in reflection studies, it makes it necessary to use some tools for these analyses. One of the tools used to develop-reflect reflective thinking is reflective writing.

One of the tools that provide reflection on experience, which is frequently used in teacher training, is reflective journals (Stevens, Emil, & Yamashita, 2010). The act of writing, which can be defined as a self-learning process (Locke & Brazelton, 1997), provides a deeper analysis on the experience by evaluating the experience. This activity allows the learner to move away from the experience and evaluate it more objectively (Pavlovich, 2007). Self-assessment in the reflective journal-keeping process helps teachers gain confidence, increase their motivation towards learning, and have a greater command of the subject area (Canning, 1991; Hinett, & Weeden, 2000), and it enables them to gain research skills and develop self-awareness about their actions and behaviors.

METHOD

This study is essentially one based on case studies. Case studies review a condition and seek answers to a specific research question with reference to that case. The condition in question (case) can entail an individual, group, community, or even a multitude of conditions (Gillham, 2000). The case reviewed in this study is about four chemistry teachers who took part in mentorship practices as mentees. Mentees are coded C1, C2, C3, and C4. C2 is female, while other mentees are male.

Data collection tool and analysis. The data collection tool employed in this study is the reflective journals kept by the mentees throughout the mentorship practice (for eight weeks). Participants filled out reflective journals for evaluation after they completed the lessons (material, lesson plan, etc.) they prepared in the group mentoring sessions held every week. In this context, C1, C3 and C4 kept eight reflective journals, while C2 kept 14 reflective journals since she had more classes. Since the 2-hour Chemistry lessons of C1, C3 and C4 participants were held consecutively, they prepared a total of eight reflective journals for these lessons over eight weeks; and the C3-coded mentee was involved in the mentoring process for a total of 7 weeks due to health problems and prepared a total of 14 reflective journals since the lessons were one hour on different days of the week.

The reflective journals are intended to lead mentees to think about the learning activities they had designed each week as a group under the guidance of their mentors, as well as the teaching they perform and themselves as professionals, in light of their practices at their own classes.

Question prompts can be used in reflective journaling in order to guide the reflective process, while in others, the writing may be unstructured (Cengiz, 2020; Moon, 2007). These two different types of journals affect the quality of reflection in various ways (Cohen-Sayag & Fischl, 2012). For instance, in unstructured journals, the lack of guidance may lead to lack of depth in the reflections (Aronson, 2011; Boud & Walker, 1998), whereas the use of question prompts in structured journals serve to organize the process of writing and encourage the writer to reflect more deeply (Aronson, 2011; Cengiz, 2020; Moon, 2007; Van den Boom, Paas, & Van Merriënboer, 2007).

The questions, the mentees were presented with in the reflective journals, are presented below (Table 1).

Table 1

Questions from reflective journals

Reflection Prompts		
Reflection-on-Action	Reflection-in-Action	Reflection-for-Action
• What parts of this course did I succeed in? Why do I think so? • What are the most difficult points in this course I had difficulty in? Why do I think I had difficulties?	• What did I encounter during the lesson that I did not expect? How did I get over this?	• What changes would I make if I taught this lesson again? • What implications did I have to make use of in the next lesson(s)?

Developed by authors

The responses provided by the mentees on the prompt questions included in reflective journals were subjected to content analysis. During the analysis of the standard forms, perspectives recommended by some researchers Patton (2002) and Yıldırım and Şimşek (2011) were taken into consideration. In this context, the forms submitted by the mentees were read for a second time by one of the authors to gather information on all the data, followed by the classification of the data in terms of their similarities and differences with a view to producing a coding scheme. Finally, the codes were categorized among themselves to come up with major themes. The themes thus identified were then reviewed by the other author to check the consistency of the themes with the responses. The process was concluded with a discussion among the authors to finalize the definition of the themes. The grouping and categorization of the themes were based on Schön's (1987) work, leading to a three-way categorization based on the timing of the reflection action: reflection-in-action, reflection-on-action, and reflection-for-action. *Reflection-in-action* refers to the individual's ability to come up with a solution for any unexpected circumstances she may come across during an action. *Reflection-on-action* refers to looking back once the action is completed and rethinking about the actions. *Reflection-for-action* on the other hand, refers to the application of such reflection to provide guidance for subsequent actions, and to restructure the actions thereafter (quoted from Schön (1987) by Alp and Taşkın, 2008).

Mentoring Process. Four chemistry teachers took part in the study as mentees and met their mentors once a week during the eight weeks. The group mentoring practice implemented within the scope of the study consists of three stages (Figure 1).

The preparatory work, which started with the needs analysis in the 2015–2016 academic year, continued with the mentoring sessions (implementation phase) in the next two terms and was finalized with the evaluation studies in the next term following the implementation process. In the preparation stage, which is the first stage of the mentoring model, lessons were observed for four weeks without intervening in the environment, and the individual needs of the teachers and the common needs of the group were determined in order to determine the needs of the participant teacher.

In the implementation stage, the second stage of the group mentoring model, mentoring sessions lasting 3–4 hours per week were held for 8 weeks, and in these sessions, supportive practices were included in the presence of mentors: (i) short seminars enriched with mentor and mentee discussions on the common needs of mentees, (ii) designing (preparing materials,

activities, etc.) and planning the lessons to be conducted by teachers with the support of mentors, (iii) discussing the practices carried out in the previous week's lesson under the mentor's guidance within the framework of the lesson observation notes, and developing suggestions for detecting and eliminating the problems in the practices, (iv) revising the lesson materials and plans by working on eliminating the deficiencies identified in the mentoring sessions.
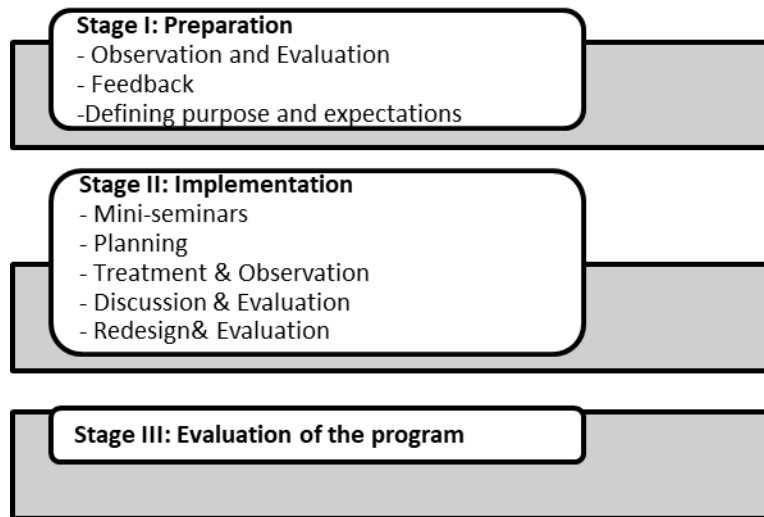
Stage I: Preparation
- Observation and Evaluation
- Feedback
- Defining purpose and expectations

Stage II: Implementation
- Mini-seminars
- Planning
- Treatment & Observation
- Discussion & Evaluation
- Redesign & Evaluation

Stage III: Evaluation of the program

Figure 1. **Stages of the mentoring process**

Developed by authors

In the evaluation phase of the program, which is the last stage in the model, the effects of mentoring practices on the classroom practices of the participating teachers were revealed by comparative analyzes of unstructured in-class observations conducted before mentoring (4 weeks), during mentoring (8 weeks) and after mentoring (4 weeks).

FINDINGS

As Table 2, Table 3, and Table 4 suggests, the data obtained from the reflective journals provided by the mentees on the forms were classified under three major categories – reflection-on-action, reflection-in-action, and reflection-for-action. The themes and codes for each category are presented below, along with private reflections by the mentees.

Reflection-on-Action. This category covers the views the mentees reached with respect to the education they carried out at their classes, after the education is completed. This category is discussed under three themes: inferences reached through the mentees experience concerning classroom practices; positive aspects of the course they had developed, and the problems faced in the course.

Table 2

The mentees' reflections on their professional practices (Reflection-on-action)

Theme	View	C1*	C2	C3	C4
Inferences	Realizing the effectiveness of the method/material in use	–	4**–5–6–8–14	5–6–7	3–8
	Gaining confidence regarding the application of the method	–	7–9–10	–	–
	Realizing the aspects to be considered during teaching process (like submitting directives, drawing attention, etc.)	2–4	3–11	–	1–2–4–7
Positive aspects of the course	Active/lasting/effective learning was achieved	1–2–3–4–5–6–7–8	5–6–7–9	3–5–8	1–2–3
	The experiment helped to increase interest and motivation levels	2–3	9	5	1
	Misconceptions were identified/corrected	–	2–3	–	–
Problems faced in the course	Lack of time	2–7	1–2–3–5–7–9–13–14	3	1–3–6–8
	Problematic behavior/shortcomings on part of the students		1–4–9–11		2–3–5
	Shortcomings in terms of the capabilities at the schools	2–6	–	5	4
	Failure to manage the class	6	1–2–6	3–6	–
	Students' inexperience of course activities	–	9–13	6	–
	Some students had difficulties in understanding certain parts	–	–	2	7

*Chemistry teacher (mentee) 1
** Reflective journal № 4 by the chemistry teacher (mentee) 2
Developed by authors

The issue the mentees most frequently emphasized under the theme Inferences was the fact that they had an applied perspective on the teaching methods, gained through the mentorship practices. For instance, one of the mentees (C2) stated that «*I came to realize that I can use presentations by the students for the course, rendering them more active participants and encouraging them to research (C2S10)*». In terms of the positive aspects of the course, the mentees often provided statements on how the method applied had affected learning on part of the students: «*The students' knowledge in a given area increases in parallel to the number of distinct methods used for teaching. Experiments and videos were particularly successful parts of the course, in terms of helping the students come up with a reflection of the matter in their minds (C4S1)*». In addition, the mentees referred to the problems they had during the classes. Most frequently reported one among these problems is the lack of time for the application of the activities developed. For instance, C1 stated that «*The extent of the topics, coupled with time limitations make it impossible to convey all the intended gains. This makes it impossible to have*

adequate discussions with the students, and to reach to the conclusions together (C1S2)». Another problem mentees reported to have observed during the teaching process was about the problems posed by certain students during the application of the activities, and the excessive noise in the class: «*[I had problems with] keeping students under control and drawing their attention. Moreover, their failure to comply with the rules required to be observed in the laboratory, despite a detailed explanation I provided in advance, posed difficulties. It was also impossible to complete the class on time, for they were slow in responding to the questions on the work paper, and in interpreting the experiment. I believe I was unable to control the students* (C2S1)». Another mentee made a similar statement: «*It was a very disorderly and noisy work environment* (C1S6)». Mentees had some remarks on the causes of these problems as well. For instance, according to C2 the problem stemmed from the fact that this was the first time the students had experienced such practices: «*There were certain irregularities in group work. I believe they were caused by the fact that this was the first time the students had such an activity* (C2S6)». Yet another mentee said «*The students attached great importance to the outcome we intended to reach in this study, which led to an inability to complete the class on time* (C3S3)».

    Reflection-in-Action. The reflection-in-action category covers the statements provided by the mentees, about the solutions they came up during the class (in action) for the unexpected cases they faced during teaching. Just two among the mentees provide information on the reflections-in-action in their reflective journals. One said «*We did not have classroom activities to reinforce the topic we had just gone over. I tried to overcome this problem by assigning homework* (C2S14)».

Table 3

The mentees' reflections during their professional practices
(Reflection-in-action)

Theme	View	C1	C2	C3	C4
Action plans implemented during the class	The topics were covered earlier than expected/I used the rest of the time with problem solving	–	–	7	–
	I tried to overcome this problem by assigning homework	–	14	–	–

Developed by authors

    Reflection-for-Action. This category covers the plans the mentees come up with for their future teaching practices, in conclusion of their review of the teaching they just had. For instance, C2, in the ninth self-assessment form, noted that the students were required to make presentations during the course, but that time-related problems were faced due to the audience asking irrelevant questions to the presenter during the Q&A session to follow the presentations. She reflected «*I would skip the Q&A session to follow the presentation, and make them ask their questions at the end of the class* (C2S9)» to avoid this problem. In the next reflective journal, the same mentee noted that «*we did not have Q&A session at the end of the presentations, and instead had them at the end of the class. This allowed us to make better use of time in the presentations* (C2S10)», describing how she implemented the action proposal she came up with.

Table 4

The mentees' reflections on professional practices (Reflection-for-action)

Theme	View	C1	C2	C3	C4
Action plans for the future	I would teach the course as usual	5	6–7–8–11–12–13	–	8
	Making the teaching/learning activities richer	1–3–4–6–8	1–2	1–2–4–7	1–7
	Giving preliminary work/assignments for the next classes.	3	–	1–8	4–6
	Enhancing the courses where the students make presentations	–	9	5	2–5
	Better preparing for the classes as a teacher	–	5	2–3–4	1–6
	I would try and to take measures on timing	7	3–14	–	6
	I would motivate students to get better prepared for the classes.	–	4–10	–	–

Developed by authors

DISCUSSION AND CONCLUSION

In this study, the contents of the journals prepared by the mentees during their mentoring practices were examined within the framework of Schön's (1987) reflection in, on, and for action model and in the context of reflective teaching. When the contents of the reflections (reflection on action) made by the mentees after the lessons they taught during their mentoring practices were examined, it was determined that the mentees made some inferences about their teaching and talked about the positive issues that took place in their lessons. Mentees stated that the practices they perform using the knowledge and skills they acquired during the mentoring process often ensure permanent and effective learning. They also stated that they did not pay attention to their teaching before, but they became aware of some practices that would improve the quality of teaching. This supports the results of some studies (e.g., Hudson, 2013; Kuzu, Kahraman, & Odabaşı, 2012; Petrovska, Sivevska, Popeska & Runcheva, 2018) revealing that mentoring training has a positive effect on the development of mentees' professional performance. It was determined that the mentees also mentioned the problems they encountered during the lesson in their reflection on the action. When these problems are examined, it is seen that the mentees have time problems in performing the activities and they are insufficient in providing classroom management.

When the reflections of the participant teachers for the action are examined, it is seen that they have developed some solution suggestions for the negative situations they mentioned in their reflection on the action. On the other hand, it was seen that the participants included measures that would enable them to teach their future lessons more effectively in their statements on reflection for action in their self-evaluation forms. It can be thought that this is related to the need to design more qualified teaching environments. As stated by Flesch (2005), mentoring practices

supported by reflective practices support teachers' professional development by helping them question their own teaching practices.

On the other hand, unlike the reflection on action and reflection for action categories, it was determined that the participants made very few reflections in the reflection in action category; just two self-assessment forms contain statement reflection in action. Reflection in action is defined as a difficult skill to teach (Edwards, 2017) and it is stated that it occurs when an unexpected situation is encountered during the action (Moghaddam, Davoudi, Adel, & Amirian, (2020).

To make it possible, the individual should present certain characteristics; these include an awareness, critical though capability, and rapid action (Schön, 1987, quoted in Alp and Taşkın, 2008). Although the teachers stated in their reflection-on-actions that the students had problematic behaviors during the activities and that they were insufficient in classroom management, they did not include what they did (reflection-in action) in the face of these situations during the lesson in their journals. This fact can be interpreted as an indication of need to improve that side of the mentees who took part in the study. The learnable practical decisions which are considered reflection-in-action are often based on technical knowledge. The technical knowledge is usually developed through the scientific knowledge the academic staff produces. Such knowledge has direct or indirect effects on practical decisions, even unwittingly (Hager, 2000, quoted in Ekiz, 2006). The teachers were found to lack sufficient skills for the development of solutions – in practice – for the problems they came across. During the mentorship process, the mentees were asked kept reflective journals following the mentorship practices, following classroom practices. One would consider explicit reflective thought trainings an effective means to enable the mentees take practical decisions much more easily. Metacognitive prompts are one of the methods that support the individual in reflection-in-action. Since the inclusion of more prompts in self-evaluation studies supports the emergence of reflection-in-action expressions (Cattaneo & Motta, 2021), it is recommended to consider this in studies to be conducted in this area. It can also be said that the reason why the participants did not include more detailed reflection statements may be related to the fact that they experienced reflective journaling for the first time. As the more reflection-on-action is experienced, the more successful individuals will be in reflecting during the action (Cattneo & Motta, 2021), it is important to encourage participants to use reflective journals regularly. While this will enable teachers to critically evaluate their effective teaching processes, it will also support them to improve their future teaching.

The fact that the mentees have not received training on reflective thinking or reflective writing, yet they can reflect on their actions and look for solutions to the problems they encounter during their practice shows that mentoring practices contribute to the reflective thinking skills of mentees in the current study. In addition, the mentees did not include reflection in action in their diaries. It can be suggested for similar applications that mentees be supported in reflective thinking and writing in order to improve their reflection skills in action.

References

Alp, S. ve Taşkın, Ş. Ç. (2008). Eğitimde yansıtıcı düşünmenin önemi ve yansıtıcı düşünmeyi geliştirme. *Milli Eğitim Dergisi,* 178, 311–320.

Aronson, L. (2011). Twelve tips for teaching reflection at all levels of medical education. *Medical teacher,* 33 (3), 200–205. https://doi.org/10.3109/0142159X.2010.507714

Barnett, B. G. (1995). Developing reflection and expertise: can mentors make the difference? *Journal of Educational Administration,* 33 (5), 45–59.

Boud, D. (2001). Using journal writing to enhance reflective practice. *New Directions for Adult and Continuing Education, Special Issue: Promoting Journal Writing in Adult Education,* 90, 9–18. https://doi.org/10.1002/ace.16

Boud, D., & Walker, D. (1998). Promoting reflection in professional courses: The challenge of context. *Studies in Higher Education,* 23 (2), 191–206. https://doi.org/10.1080/03075079812331380384

Canning, C. (1991). What teachers say about reflection. *Educational leadership,* 48 (6), 18–21.

Cattaneo, A. A., & Motta, E. (2021). «I Reflect, Therefore I Am… a Good Professional». On the Relationship between Reflection-on-Action, Reflection-in-Action and Professional Performance in Vocational Education. *Vocations and Learning,* 14 (2), 185–204. https://doi.org/10.1007/s12186-020-09259-9

Cengiz, C. (2020). The effect of structured journals on reflection levels: With or without question prompts? *Australian Journal of Teacher Education (Online),* 45 (2), 23–43. http://dx.doi.org/10.14221/ajte.2020v45n2.2

Cohen-Sayag, E., & Fischl, D. (2012). Reflective Writing in Pre-Service Teachers' Teaching: What Does It Promote? *Australian Journal of Teacher Education,* 37 (10), 20–36. http://dx.doi.org/10.14221/ajte.2012v37n10.1

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process.* Henry Regnery and Co.

Edwards, S. (2017). Reflecting differently. New dimensions: reflection-before-action and reflection-beyond-action. *International Practice Development Journal,* 7 (1), 1–14. https://doi.org/10.19043/ipdj.71.002

Ekiz, D. (2006). *Öğretmen eğitimi ve öğretimde yaklaşımlar.* Nobel Yayın Dağıtım.

Flesch, G. (2005). Mentoring the non-coping teacher: A preliminary study. *Journal of Education for Teaching,* 11 (2), 69–86. https://doi.org/10.1080/02607470500127145

Frick, L., Carl, A., & Beets, P. (2010). Reflection as learning about the self in context: Mentoring as catalyst for reflective development in pre-service teachers. *South African Journal of Education,* 30 (3), 421–437.

Gibbs, G. (1988). *The reflective cycle.* Further Education Unit, Oxford Polytechnic.

Gillham, B. (2000). *Case study research methods.* Bloomsbury Publishing.

Hatton, N. & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education,* 11, 33–49. https://doi.org/10.1016/0742-051X(94)00012-U

Hinett, K., & Weeden, P. (2000). How Am I Doing?: developing critical self-evaluation in trainee teachers. *Quality in Higher Education,* 6 (3), 245–257. https://doi.org/10.1080/13538320020005981

Hudson, P. (2013). Mentoring as professional development: 'growth for both' mentor and mentee. *Professional development in education,* 39 (5), 771–783. https://doi.org/10.1080/19415257.2012.749415

Huntley, C. (2008). Supporting critical reflection in pre-service teacher education. *Journal of the Scholarship of Teaching and Learning for Christians in Higher Education,* 3 (1), 18–28. https://doi.org/10.31380/sotlched.3.1.18

İlğan, A. (2021). A conceptual frame about professional development of teachers and implications for Turkish education system. *Journal of Education for Life,* 35 (1), 256–280. https://doi.org/10.33308/26674874.2021351225

Jensen, B. (2012). *Catching up: Learning from the best school systems in East Asia.* Grattan Institute. https://grattan.edu.au/wp-content/uploads/2014/04/129_report_learning_from_the_best_main.pdf

Jensen, B., & Farmer, J. (2013). *School turnaround in Shanghai: The empowered-management program approach to improving school performance.* Center for American Progress. https://www.americanprogress.org/article/school-turnaround-in-shanghai/

Kolb, D. (1984). *Experiential learning: experience as the source of learning and development.* Prentice-Hall, Inc; Englewood Cliffs.

Kozan, S. (2007). *Yansıtıcı düşünme becerisinin kaynak tarama ve rapor yazma derslerindeki etkisi; Unpublished masters' thesis.* Selçuk Üniversitesi. https://www.researchgate.net/publication/338645061_Yansitici_Dusunme_Becerisinin_Kaynak_Tarama_ve_Rapor_Yazma_Derslerindeki_Etkisi

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of personality and social psychology,* 77 (6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

Kuzu, A., Kahraman, M., & Odabaşı, H. F. (2012). Mentörlükte Yeni Bir Yaklaşım: E-Mentörlük. *Anadolu University Journal of Social Sciences,* 12 (4), 173–183.

Locke, K., & Brazelton, J. K. (1997). Why do we ask them to write, or whose writing is it, anyway? *Journal of Management Education,* 21 (1), 44–57.

Loughran, J. (2007). Researching teacher education practices: Responding to the challenges, demands, and expectation of self-study. *Journal of Teacher Education,* 58 (1), 12–20. https://doi.org/10.1177/0022487106296217

Moghaddam, R. G., Davoudi, M., Adel, S. M. R., & Amirian, S. M. R. (2020). Reflective teaching through journal writing: A study on EFL teachers' reflection-for-action, reflection-in-action, and reflection-on-action. *English Teaching & Learning,* 44 (3), 277–296.

Moon, J. A. (2007). *Learning journals: A handbook for reflective practice and professional development.* Routledge. https://doi.org/10.4324/9780203969212

Murray, M. (2001). *Beyond the Myths and Magic of Mentoring: How to Facilitate an Effective Mentoring Process.* Jossey-Bass.

Osterman, K., & Kottkamp, P. (1993). *Reflective practice for educators: Improving schooling through professional development.* Corwin Press.

Özdemir, S. M. (2016). Öğretmen niteliğinin bir göstergesi olarak sürekli mesleki gelişim. *Gazi Eğitim Bilimleri Dergisi,* 2 (3), 233–244.

Patton, M. Q. (2002). *Qualitative research & evaluation methods.* Sage Publication.

Pavlovich, K. (2007). The development of reflective practice through student journals. *Higher Education Research & Development,* 26 (3), 281–295. https://doi.org/10.1080/07294360701494302

Petrovska, S., Sivevska, D., Popeska, B., & Runcheva, J. (2018). Mentoring in teaching profession. *International Journal of Cognitive Research in Science, Engineering and Education,* 6 (2). https://doi.org/10.5937/ijcrsee1802047P

Roberts, A. (2000). Mentoring revisited: a phenomenological reading of the literature. *Mentoring and Tutoring,* 8 (2), 145–166. http://dx.doi.org/10.1080/713685524

Roberts, P., Barblett, L., Boylan, F., & Knaus, M. (2021). Revitalising reflective practice in pre-service teacher education: developing and practicing an effective framework. *Reflective Practice,* 22 (3), 331–344. https://doi.org/10.1080/14623943.2021.1881888

Sağlam Arslan, A., Ünal, S., Alev, N., Özsevgeç, T. & Karataş, F. Ö. (2017). *Öğretmenlerin yenilenen öğretim programına uyumunu geliştirmeye yönelik mentörlük uygulamalarının tasarlanması, uygulanması ve değerlendirilmesi: Fizik ve Kimya öğretmenleri örneği.* TUBITAK Projesi.

Sari, Y. R., Drajati, N. A., So, H. J., & Sumardi, S. (2021). Enhancing EFL teachers' technologıcal pedagogıcal content knowledge (TPACK) competence through reflectıve practıce. *Teflin Journal,* 32 (1), 117–133. http://dx.doi.org/10.15639/teflinjournal.v32i1/117-133

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action.* Basic Books Inc.

Schön, D. (1987). *Education the reflective practitioner: Toward a new design for teaching and learning in the professions.* Jossey-Bass.

Stevens, D. D., Emil, S., & Yamashita, M. (2010). Mentoring through reflective journal writing: A qualitative study by a mentor/professor and two international graduate students. *Reflective Practice,* 11 (3), 347–367. https://doi.org/10.1080/14623943.2010.490069

Sundli, L. (2007). Mentoring – A new mantra for education? *Teaching and teacher education,* 23 (2), 201–214. http://dx.doi.org/10.1016/j.tate.2006.04.016

Tonna, M. A., Bjerkholt, E., & Holland, E. (2017). Teacher mentoring and the reflective practitioner approach. *International journal of mentoring and coaching in education,* 6 (3), 210–227. https://doi.org/10.1108/IJMCE-04-2017-0032

Uğurlu, F., Dolmacı, A., & Evran Acar, F. (2018). Uzakdoğu ülkelerinde öğretmenlerin mesleki'gelişim modelleri. *Electronic Turkish Studies,* 13 (27), 1525–1540. http://dx.doi.org/10.7827/TurkishStudies.14589

Yıldırım, A. ve Şimşek, H. (2011). *Nitel araştırma yöntemleri.* Seçkin Yayıncılık.

Van den Boom, G., Paas, F., & van Merriënboer, J. J. (2007). Effects of elicited reflections combined with tutor or peer feedback on self-regulated learning and learning outcomes. *Learning and Instruction,* 17 (5), 532–548. https://doi.org/10.1016/j.learninstruc.2007.09.003

Vermunt, J. D., & Endedijk, M. D. (2010). Patterns in teacher learning in different phases of the professional career. *Learning and Individual Differences,* 21 (3), 294–302. https://doi.org/10.1016/j.lindif.2010.11.019

ОЦІНЮВАННЯ РЕФЛЕКСИВНИХ ЩОДЕННИКІВ УЧИТЕЛІВ ХІМІЇ ПІД ЧАС МЕНТОРСЬКОЇ ПРАКТИКИ

Айшегюль Салам Арслан
ORCID ID 0000-0001-8340-2205
PhD в галузі освіти,
професор кафедри математичної та природничої освіти,
Педагогічний факультет Фатіха, Трабзонський університет,
район Согутлу, бульвар Аднана Кахведжі, 61335 Трабзон, Туреччина,
asaglam-arslan@trabzon.edu.tr

Джанан Дженгіз
ORCID iD 0000-0003-4547-3293
PhD в галузі освіти,
доцент кафедри математичної та природничої освіти,
Педагогічний факультет Фатіха, Трабзонський університет,
район Согутлу, бульвар Аднана Кахведжі, 61335 Трабзон, Туреччина,
canancengiz@trabzon.edu.tr

Фаїк Озгур Каратас
ORCID iD 0000-0002-1391-1597
PhD в галузі освіти,
доцент кафедри математичної та природничої освіти,
Педагогічний факультет Фатіха, Трабзонський університет,
район Согутлу, бульвар Аднана Кахведжі, 61335 Трабзон, Туреччина,
fokaratas@trabzon.edu.tr

Суат Унал
ORCID iD 0000-0002-0495-8385
PhD в галузі освіти,
професор кафедри математичної та природничої освіти,
Педагогічний факультет Фатіха, Трабзонський університет,
район Согутлу, бульвар Аднана Кахведжі, 61335 Трабзон, Туреччина,
suatunal@trabzon.edu.tr

Метою дослідження є визначення впливу програми менторства на професійний розвиток підопічних. Дослідження ґрунтується на прикладі чотирьох учителів хімії, які брали участь у програмі наставництва як підопічні, щоб краще зрозуміти програму наставництва. Інструмент збору даних, використаний у цьому дослідженні – це рефлексивні щоденники, які підопічні вели протягом усієї менторської практики (протягом восьми тижнів). Учасники заповнювали рефлексивні щоденники після завершення уроків (матеріал, план уроку тощо), які вони готували під час групових наставницьких сесій, що проводилися щотижня. Форми для оцінювання містять п'ять запитань, які можуть спонукати підопічних до роздумів над реалізацією планів і професійним розвитком під час програми наставництва. Отримані дані свідчать про те, що підопічні мали кваліфіковані роздуми щодо своїх поточних, а також майбутніх практик. У статті зосереджено увагу на різних категоріях рефлексії: рефлексії в дії і рефлексії для дії. Категорія «рефлексія в дії» охоплює заяви підопічних про рішення, які вони знайшли під час уроку (в дії) для несподіваних випадків, з якими вони зіткнулися під час навчання. Категорія «рефлексія для дії» охоплює погляди підопічних щодо навчання, яке вони проводили на своїх уроках після завершення навчання. Наставники часто зазначали у своїх щотижневих рефлексивних щоденниках, що програма наставництва має позитивний вплив на їхні компетентності щодо методів навчання під час виконання спільно розроблених планів уроків. З іншого боку, найважливішою проблемою, яку назвали підопічні, є необхідність

додаткового часу, оскільки вони не можуть завершити діяльність у запланований термін. У світлі отриманих даних можна зробити висновок, що програма наставництва покращила професійну практику підопічних.

*Ключові слова: **вчителі хімії; менторські практики; рефлексивна педагогічна практика; рефлексивний щоденник.***