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The Role of Different Types of Feedback in the Reciprocal Interaction of Teaching Performance and Self-efficacy Belief

Nalan Akkuzu
University of Dokuz Eylul, nalan.akkuzu@gmail.com

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Nalan Akkuzu
University of Dokuz Eylul, Turkey

Abstract: The purpose of this study was to explore the role of feedback based on self-efficacy belief sources in the reciprocal interaction of teaching performance and self-efficacy beliefs. A single case study design was employed to address and began to bridge the gap in our understanding of the relationship between feedback, self-efficacy belief and teaching performance. The data for this study were collected in the form of semi-structured interviews from 6 volunteer 5th-grade chemistry student teachers. The data were analyzed based on an inductive analytical approach. The results indicated that different types of feedback based on self-efficacy belief sources directly affected the student teachers' self-efficacy beliefs and teaching performance. It may be concluded that different types of feedback provided key paths for student teachers to better understand their own developing teaching performance and that of other teachers.

Introduction

From past to present, student teachers have encountered various difficulties in their practice teaching. Teaching performance evaluation is the most important subject in teaching practice in terms of solving these difficulties and creating qualified teachers who can pursue their own professional development through reflection and self-evaluation (Kagan, 1992). Furthermore, teacher education can be conceptualized as a space for student teachers to explore and continue to renegotiate their teaching performance and professional competence. According to Danielson & McGreal (2000), teaching performance evaluation is a continuous process of learning, goal achievement, communication and assessment, as well as a means of becoming a professional learner. In this respect, feedback as a teaching performance evaluation practice has been suggested as a systematic means for promoting learning and growth. A number of studies have demonstrated that feedback may, indeed, stimulate growth in learning to teach and may effect positive change in student teachers (Brent & Thomson, 1996; Ganesh & Matteson, 2010; Peker, 1992; Traister, 2005). In order to improve our understanding of the effects of feedback, the present study focuses on explaining the role of feedback in student teachers' performance, as well as how it contributes to their professional development.

The Impact of Performance Evaluation on Student Teachers' Development

In order to become effective and competent teachers, student teachers are exposed to authentic teaching environments in practicum schools. However, if the number of live teaching practice sessions is minimal, and student teachers' performances are not systematically evaluated through various informative agents, they may not be able to successfully identify the elements of good teaching; this may result in a lack of awareness of necessary teaching skills (Boz & Boz, 2006; Paker, 2005). Consequently, student teachers

may lack confidence in their own teaching strategies, resulting in poor teaching performance and negative feelings toward teaching. Under these circumstances, they may acquire inaccurate views of teaching in the short term. To avoid this problem, student teachers should be given clear and objective explanations about their teaching performance; thus, feedback is an important aspect of teacher education.

The Definition of Feedback

Education without a teacher is like a body without soul, a skeleton without flesh and blood, a shadow without substance. Similarly, teaching without feedback is unimaginable. Feedback in the context of teacher education has been defined as information that is presented to an individual following a performance that reflects upon the adequacy, quantity, or quality of the teaching performance (Tower, 1999). Feedback provides information about the truth or falsehood of human behavior, as well as providing student teachers with a means to improve their own teaching performance and to correct their errors (Paccapaniccia, 2002; Peker, 1992). Taking these interpretations into account, it can be said that feedback serves as a door for student teachers to open in order to obtain a variety of data about themselves through their own eyes and through the eyes of others. In essence, feedback involves making the experiences and actions of student teachers visible and comprehensible.

The Role of Feedback in Performance Evaluation of Student Teachers

Numerous researchers have demonstrated that feedback is a vital informative tool that allows student teachers to view their teaching performance critically (Eksi, 2012; Eraslan, 2009; Shute, 2008; Voerman, Mejier, Korthagen, & Simons, 2012). When student teachers do not receive sufficient feedback in the course of their practice teaching, they are unlikely to be aware of the particulars of their performance, and as a result, they may have mixed feelings about the challenges they will face when teaching in a real classroom for the first time (Kukanauza de Mazeika, 2001).

As student teachers are faced with greater diversity and greater challenges in the classroom, it is not enough for them to possess the scientific facts, theories, concepts and principles of a discipline alone; they must also know how to teach the subject and how to solve problems that arise in their teaching. In this respect, the concern is not simply in knowing the subject matter, but in giving clear and coherent explanations that students can understand and use to construct their own knowledge in the classroom. The transformation of content knowledge in teaching requires the use of pedagogical knowledge; this includes knowledge of the learning process, knowledge of learners, and understanding of classroom management skills and educational aims (Loughran, 2007). Feedback helps student teachers to connect the content they have learned in the university classroom to real-world situations. Providing student teachers with feedback can help them to see the most useful manner in which to present their subject matter using the most powerful illustrations, examples and explanations.

The Reciprocal Interaction of Feedback, Teaching Performance and Self-efficacy Belief

Student teachers' teaching performances are affected by a complex set of interactions between the self and the environment. This judgment is based on the social cognitive theory that emphasizes how behavioral, personal and environmental factors interact to determine

behavior (Crothers, Hughes, & Morine, 2008). Personal factors, in this respect, refer to internal factors such as the cognitive, affective and biological events that form specific personality characteristics and self-efficacy beliefs. Self-efficacy belief, which is defined for the purposes of this study as a student teacher's "judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Tschannen-Moran& Woolfolk-Hoy, 2001, p. 783), is an internal cognitive process that has been used effectively to examine the development of teachers' performance (Dembo & Gibson, 1985; Riggs & Enochs, 1990). In particular, Bandura (1986) refers to self-efficacy belief as one component of the social cognitive theory that describes human behavior as part of the interplay between a person's internal cognitive processes, the environment, and his or her external behavior.

Another component of social cognitive theory is the environmental factors - the external factors or stimuli from the social and physical environment - that can affect a person's behavior. Social support such as feedback is a crucial aspect of the environmental factors affecting teaching self-efficacy beliefs, as it may impact behavior, and accordingly, teaching performance (Bruning, Schraw, Norby, & Ronning, 2010).

The final component of the social cognitive theory described by Bandura (1986) is the behavior that is shaped and controlled by environmental influences or driven by internal dispositions. According to Bandura, human functioning is the result of the transaction among these three factors. In essence, people are products of the dynamic interplay between the external, the internal, and their current and past behavior. These components of "triadic reciprocal determinism" suggest that environmental factors (e.g., feedback) affect both personal factors (e.g., self-efficacy belief) and behaviors (e.g., teaching performance) (Bransford, Brown, & Cocking, 2000). Thus, teaching performance is dependent not only on self-efficacy beliefs, but also on feedback and on the behavior itself (see Figure 1 below).

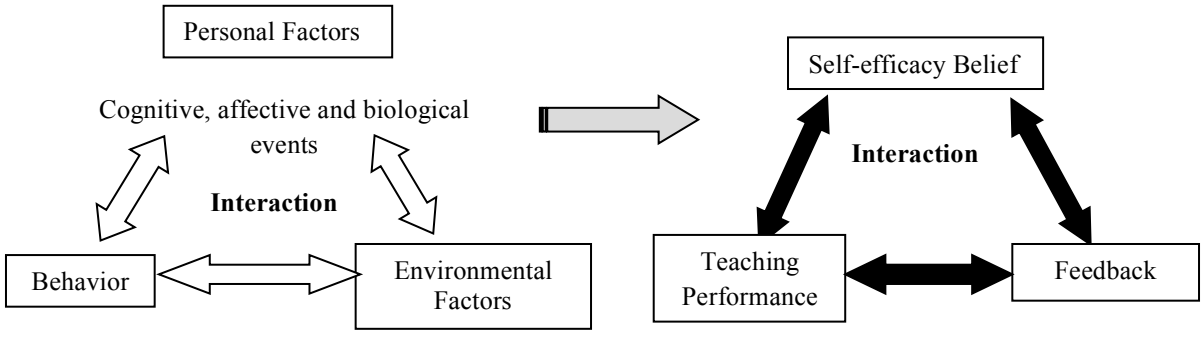

Figure 1. Theoretical model of triadic reciprocal determinism.

According to Locke's (2001) Mediation-Linking Model, self-efficacy belief has a direct influence on teaching performance; on the other hand, motivators of behavior such as feedback affect teaching performance indirectly through an individual's self-efficacy and personal goals. This interaction is demonstrated in Locke's Mediation-Linking Model (see Figure 2). This model proposes that personal goals and self-efficacy beliefs are the most immediate, motivational determinants of teaching performance (Bandura, 1986; Locke & Latham, 2002). In addition, feedback, as a vital part of the motivation hub, has an important influence on self-efficacy and teaching performance.

For instance, low self-efficacy can be caused by internal and external factors such as consistent failure, limited ability to see growth and lack of explicit goals. On the other hand, feedback, as external factor, can help make performance goals explicit, encourage self-assessment and make progress more evident, resulting in improved teaching performance (Bransford, Brown, & Cocking, 2000). As such, feedback is a necessary element in changing behavior. Through feedback based on self-efficacy beliefs, student teachers can observe, model, reinforce desired behaviors and adjust their emotional reactions. Consequently, feedback stands at the core of social cognitive theory.

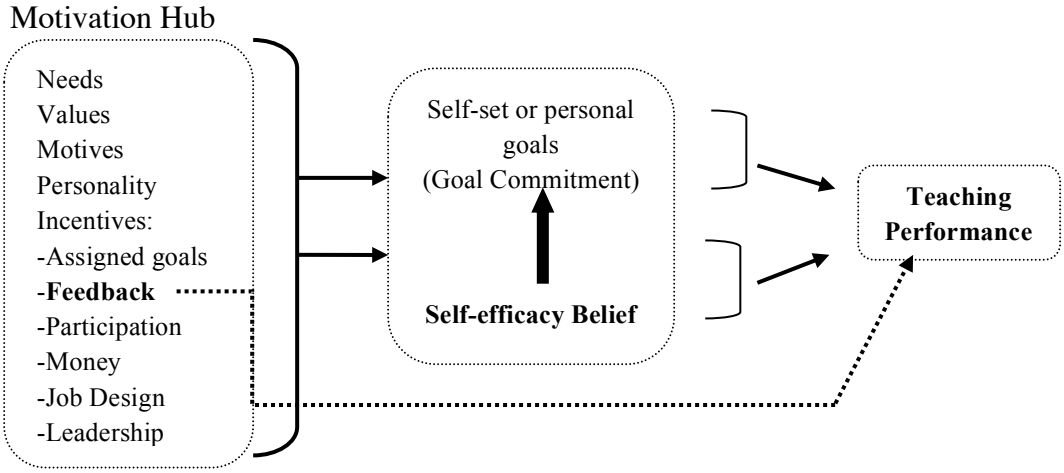

Figure 2: Locke's mediation-linking model modified

Self-efficacy Belief Sources as Feedback

According to Bandura (1997), there are four main factors that may influence student teachers' beliefs: mastery experiences; vicarious experiences; verbal/social persuasions; and physiological and affective states.

Mastery Experiences

Mastery experiences, which are the result of performance accomplishments, are seen as one of the most powerful sources of self-efficacy in teaching (Bandura, 1997). In general, student teachers are enactive learners; they learn by carrying out a specific task. Bandura explains that this enactive learning provides feedback about a performance, which can impact positive self-efficacy for that situation. Likewise, Usher and Pajares (2008) note that as student teachers work to overcome obstacles through ongoing efforts, they are able to see the results of their actions; completing an experience successfully on the basis of their own performance results in increased self-efficacy.

Vicarious Experiences

The second source of self-efficacy information noted by Bandura (1997) is the vicarious experience gained by observing others who are performing teaching tasks that are relevant to the observer's goals. In this case, modeling comes into the equation, as this process is most effective when the student teacher sees him or herself as similar to the model. As Bandura explains, knowing that another person who is similar to oneself can be successful

in a given situation helps to encourage feelings of ability; this, in turn, is reflected in an individual's teaching performance (Bandura, 1997). On the other hand, when a model is seen as failing in his or her teaching, a student teacher's self-efficacy and teaching performance may be impacted negatively (Pintrich & Schunk, 2002; Wang & Lin, 2007).

Verbal/Social Persuasion

Verbal persuasion comprises a third source of performance-based self-efficacy beliefs; in particular, positive and detailed verbal persuasion may work to encourage self-efficacy and enhance teaching performance (Schunk, 1995; Wang & Wu, 2008). Verbal persuasion is based on suggestion given from peer, university supervisors or practice teachers. These persuaders play an important part in the development of an individual's teaching performance. As Glickman (2002) elaborates, in order for teachers to be successful, administrators should help them take risks and learn independently. In this respect, verbal feedback promotes student teachers' ability to master a given activity. Studies have shown that student teachers who receive verbal feedback at a high cognitive level exhibit professional growth through exploring the strengths and weaknesses of their own performance and developing deeper conceptual understanding of their classroom behaviors (Kukanauza de Mazeika, 2001; Wang & Wu, 2008).

Physiological and Emotional States

The final information source for increasing self-efficacy beliefs is the individual's physiological and emotional state. If a student teacher has feelings of stress or anxiety while observing or performing a teaching task, these negative feelings act as a type of feedback, resulting in negative thoughts or feelings. These can impair a student teacher's working memory and affect his or her ability to learn, teach and function in teaching (Linnenbrink & Pintrich, 2000). If student teachers experience success in their teaching, they gain positive thoughts and feelings, enabling good performance in their future teaching (Bandura, 1997).

For the purposes of this study, the self-efficacy sources of mastery, vicarious experiences, verbal persuasion and physiological and emotional states are viewed as types of feedback. There is a continuous loop between feedback, self-efficacy and teaching performance; the student teachers are looking forward to receiving this feedback as a means to support their self-efficacy and teaching performance. While all these sources enable to get information about self-efficacy and teaching performance they have important role as feedback in this study. Kouritzin and Vizard (1999) see feedback as a "continuous, ongoing and interactive" process that comes from multiple sources in a variety of forms.

A variety of feedback strategies have been implemented by researchers in order to provide more accurate and meaningful feedback for student teachers (Eraslan, 2009; Shute, 2008; Voerman, Mejier, Korthagen, & Simons, 2012). In addition, a number of studies have shown that providing multiple types of feedback is beneficial, because individuals react differently to various types of feedback based on their personal characteristics (Butler & McMunn, 2006; Darling-Hammond & Bransford, 2005; Eksi, 2012; Kukanauza de Mazeika, 2001; Marzano, 2003). Furthermore, the social aspect of feedback may also promote effective learning in the individual teaching process. From this point of view, the role of feedback becomes more important; and thus, it is understood that feedback is the main variable in this study. In order to understand the impact of feedback on self-efficacy beliefs and teaching performance, student teachers should be provided with appropriate practice environments that

will allow them to receive multiple forms of feedback based on self-efficacy sources. Such an environment can be established in the context of Micro-Reflective Teaching (MRT) sessions.

Micro-reflective Teaching

Micro-Reflective Teaching (MRT) is a systematic development of critical academic skills in a controlled classroom environment in consideration of the feelings and thinking of student teachers (Guney, 2008). MRT provides a safe elementary learning context in which the student teachers are introduced gradually into the teaching environment and provided with feedback on their teaching performance. Because MRT provides meaningful opportunities for instruction, observation, modeling, use of verbal persuasion and reflection of emotions, it can also help to develop high levels of self-efficacy and teaching performance. MRT is derived from two different types of teacher training techniques: microteaching and reflective teaching. Microteaching is a training strategy that includes a teaching experience, a provision for feedback given to the student teacher, and a reteach of the original lesson to incorporate changes as a result of the feedback (Kukanauza de Mazeika, 2001; Kucukoglu, Kose, Tasgın, Yilmaz & Karademir, 2012). Higgins and Nicholl (2003) explain microteaching as a cycle that is used to demonstrate specific teaching behaviors which depends on the number of teach-reteach cycles, the time lapse between the teaching and feedback, and the kind of feedback used.

On the other hand, reflective teaching is a process in which student teachers are involved in solving problems. This not only allows them to perceive and define problems and generate and apply solutions, but also to modify and enhance their understanding of professional teaching performance and to reconstruct their knowledge (Campoy & Radcliffe, 2002; Dewey, 1933; Korthagen & Vasalos, 2005; Schon, 1987). The reflective teaching process enables student teachers to reflect on their experience and receive feedback; through this feedback, they are able to review and analyze their own teaching performance and take informed action for the next experience.

Both microteaching and reflective teaching provide a constructive spiral of teacher development and involve similar steps that include planning, implementing, and reflecting, both individually and as a group. Feedback plays a vital role in both reflective teaching and microteaching; therefore, these two cycles can be combined to achieve better teaching performance. By doing so, student teachers are able to see their teaching performance holistically and develop a more thorough understanding of the feedback process. The MRT process allows student teachers to discuss their own and their peers' teaching realistically, accurately and comfortably; through this process, they use feedback to help themselves and their peers to solve problems in their teaching and to think in depth, analyze their thoughts and explore different behaviors related to their teaching.

The Aim of the Study

Although various studies have focused on explaining the effects of different types of feedback (Eksi, 2012; Hoban & Hastings, 2006; Kukanauza de Mazeika, 2001), as well as the particular forms of feedback such as peer feedback (Kim, 2005; Topping, Smith, Swanson, & Elliot, 2000), supervisor feedback (Paker, 2005; Rolheiser & Anderson, 2004; Traister, 2005), and video feedback (Eroz-Tuga, 2013; Lee & Wu, 2006), there is a gap in the research in terms of explaining the role of the feedback on student teachers' performance and self-efficacy beliefs. Furthermore, no studies have been carried out in relation to the role of

different feedback based on self-efficacy sources in teaching performance and self-efficacy beliefs.

In order to address this gap, this study was designed to explore the role of feedback based on self-efficacy belief sources on student teachers' teaching performance and self-efficacy beliefs, as well as to shed light on how these feedback sources supported or impeded their teaching performance and self-efficacy beliefs. The intent was to discover how student teachers perceived and experienced various types of feedback in the micro-reflective teaching process. This was not an intervention study, and although the student teachers may have improved their teaching performance, teaching improvement was not the focus of the investigation. The study was guided by the following questions:

1. Does the type of feedback received by student teachers affect their self-efficacy beliefs towards teaching positively or negatively?
2. What are the roles of mastery, vicarious experiences, verbal persuasion and physiological and emotional states in student teachers' teaching performance?
3. What types of feedback that are based on self-efficacy sources do student teachers find to be most useful in their teaching after MRT sessions?
4. On what areas of their teaching do student teachers see different types of feedback as having the most impact?

Method

Research Design

As the researcher wanted to understand how the various types of feedback based on self-efficacy belief sources operate, a case study design was found to be most appropriate. A case study is an exploratory type of research which can be used to illuminate a given situation, perform assessments and reveal possible relationships among the events observed. Furthermore, a case study allows for a diverse, rich and detailed description of human behavior in various settings (Feagin, Orum, & Sjoberg, 1991; Robson, 2002; Yin, 2003). Case study design provides the researcher to attempt to learn about a little known phenomenon by studying a single case in depth (Johnson & Christensen, 2000). The current study is focused on a single case, which Miles and Huberman (1994) define as a phenomenon of some sort occurring in a bounded context; namely, the role of various types of feedback based on self-efficacy sources in the reciprocal interaction of teaching performance and self-efficacy belief.

Research Setting and Participants

The study was set in a Chemistry Teacher Program at Dokuz Eylul University in Turkey with a small number of participants who were taking a Teaching Practice course in the spring semester. There were 26 student teachers registered in the course. Within the frame of this course, student teachers have only a few teaching practice opportunities, and as a result, they receive little feedback on their performance during the semester. At the beginning of the semester, the researcher obtained permission from the course instructor and explained the nature and process of the study to the students. After explaining the objective of the study, the students were given a personal information form which asked them to provide their gender, academic grade point average, their previous teacher experience existence (if any), the amount of prior teaching experience and whether they were willing to participate in the investigation.

The micro-reflective teaching sessions were to be conducted separately from the course itself, on the weekends; therefore, the student teachers had to use their free time for this study. When this requirement was taken into consideration, six volunteer 5th grade student teachers were selected according to the stratified purposeful sampling method, accounting for willingness and accessibility (Patton, 2001). As Patton explains, stratified purposeful sampling is comprised of particular units or cases that vary as to a key dimension, with each stratum constituting a fairly homogeneous sample. In this case, the sample stratification operation was done according to the academic grade averages of participants (under 2.5, between 2.5-3.00, above 3.00). The maximum academic achievement in the Chemistry Teacher Program was 4.00, but none of the volunteer participants had a 3.5-4.00 academic grade average. Therefore, two participants were chosen from each strata, for a total of six. Each student teacher was selected according to different academic grade averages in order to provide maximum variety (Yildirim & Simsek, 2008).

Participants (Student Teachers)	Gender	Academic Achievement Average	Teaching Experience	Length of Teaching Experience
PT1	Male	3.10	None	-
PT2	Male	3.00	Study center	18 months
PT3	Male	2.63	Private class and study center	9 months
PT4	Female	2.61	None	-
PT5	Male	2.33	Private class	7 months
PT6	Female	2.30	Study center	6 months

Table 1. Features of the participants

Focusing on a small number of participants allowed the researcher to collect a large amount of data from each of them and to analyze it in depth. The features of the participants are provided below, in Table 1. In order to maintain confidentiality, the participants' names are not revealed; the student teachers are referenced using the code "PT" and a number. Two information sessions on micro-reflective teaching practices were carried out, allowing the student teachers to experience the classroom environment as active participants and to understand the feedback process.

The Researcher's Role

The researcher had a dual role in this study as both a participant observer and also as an evaluator. Her activity as participant observer involved observing the student teachers' practices in the micro-reflective teaching sessions; as an evaluator, she provided feedback on their teaching practices following the micro-reflective teaching sessions. The researcher's professional position as an observer and collector of data could have caused the student teachers to see her as an evaluator, placing her at a social distance from them and potentially coloring their responses. To overcome this condition, she talked with each of the student teachers individually, conversed informally with them, and gave them feedback as a peer. By doing so, she became an integral part of the social structure and was linked with the observed in a reciprocal process of mutual modification. As such, the difference between herself and the participants was lessened. Furthermore, the student teachers were familiar with the researcher, as she had been working in their university as an assistant for approximately six years. In addition, she had attended various laboratory courses with them in the past and conducted a School Practice course with their instructor. As a result, she fit into the scene

well enough to be ignored while she was interviewing and recording their teaching practices. This situation primarily enabled the researcher to be a natural part of the research. Furthermore, it provided researcher with direct access to data sources and aided to understand the holistic meaning of the data sources. Additionally, while she was graduated from Chemistry Education Program and took similar courses as participants in this study she was able to understand and interpret the meaning of the student teachers' behavior and the nature of the study. These circumstances were assumed to enhance the credibility of the data.

Instruments

Semi-structured interviews provided the fundamental source of reflective data for this study; the semi-structured format included a pre-determined set of open-ended questions. Since the defining characteristic of semi-structured interviews is that they have a flexible and fluid structure, this provides the researcher with valuable information and allows for the exploration of particular categories (Patton, 2001; Yildirim & Simsek, 2008). Only one interview was conducted with each participant to gather data on the overall feedback process with student teachers. The interviews were conducted following the completion of 4 micro-reflective teaching sessions.

Prior to carrying out the interviews, the interview questions were checked by two expert instructors to determine whether the questions reflected the purpose of the study. After this process of validation, the researcher obtained oral consent from the participants to audio-record the interviews. The interviews were conducted in a conversational style, which allowed for flexibility and spontaneity; furthermore, the researcher established rapport with the participants to avoid a sense of hierarchy and to encourage them to disclose their thoughts and feelings candidly. Each interview lasted approximately 30-45 minutes. Afterwards, the recorded interviews were transcribed for analysis. The interview questions focused on the following points: The relationship between the types of feedback and student teachers' self-efficacy; the relationship between the types of feedback and teaching performance; the most beneficial feedback types and their advantages; and finally, the effects of the various types of feedback on the participants' teaching.

In addition to interviewing the student teachers, the researcher observed the student teachers' classroom teaching practices. This observation provided the researcher with the opportunity to seek clarification of the feedback process and to gain a holistic understanding of the data obtained in the interviews. Employing interviews in conjunction with participant observation allowed the researcher to gather pertinent insights from the student teachers and to learn the multiple realities and perspectives that different individuals bring to an object or experience (Fitzpatrick, Sanders, & Worthen, 2004). Marshall and Rossman (1999) categorized data collection methods in qualitative research into four types which are participation in the setting, direct observation, in-depth interviews, and document analysis. For the purpose of this study, the researcher used interview and participation in the setting for observation of the nature process of the study. As Yin (2003) points out, the use of multiple sources of evidence in case studies allows an investigator to address a broader range of historical, attitudinal, and behavioral issues; furthermore, using multiple data sources helps to ensure reliability.

Procedure

After obtaining the necessary permissions, the personal information form was applied to all of the student teachers who were enrolled in the Teaching Practice course in the spring semester. Six volunteer participants were selected according to their academic grade point averages. Next, information about MRT and the feedback process was given to the participants in two sessions. A pilot study was done with one 5th grade student teacher who attended the study. The purpose of the pilot study was to watch and discuss the videotape of the student teacher's practice, to provide learning about how a reflective journal was written, and to make the participants aware of the various types of feedback based on self-efficacy sources. Four micro-reflective teaching sessions were conducted on the weekends over the course of 4 weeks. The student teachers were free to select teaching subjects that were familiar to them. The subjects taught by the student teachers are described below, in Table 2. In order to create a real classroom environment, 14-15 volunteer secondary school students who were at an adaptable level were asked to participate in this study. Before each MRT session, the student teachers were given sufficient time and asked to prepare a lesson plan concerning their subject content. The student teachers observed their peers' teaching practices during each MRT session and took notes. During each MRT session, a portable video camera was set up to record the teachings. By using the video camera, the student teachers could monitor both their own and their peers' practices. Following each session, the student teachers and the researcher provided verbal and written feedback in a group discussion. These evaluations were taken into account by the student teachers during their next teaching session. At the end of the study, the researcher conducted a semi-structured interview with each of the participants.

Student Teachers	Chemistry Subjects	Class Level of Chemistry Subjects
PT1	Dissolution and Precipitation Equilibrium	11
PT2	Gas Laws	10
PT3	Mixtures	10
PT4	Redox Reactions	11
PT5	Nomenclature of Hydrocarbons and Isomers	12
PT6	Chemical Bonds	10

Table 2. The chemistry subjects taught by the student teachers

Data Analysis

The goal of the case study was to provide a rich accumulation of data. Case study analysis enables the researcher to distinguish emerging categories or concepts from the data, thus leading to new insights. With this in mind, firstly, the recorded interviews of the six participants were carefully transcribed by the researcher. As she transcribed the interview data, she checked them repeatedly to look for major evidence of how various types of feedback sources supported or impeded the student teachers' teaching performance and self-efficacy. In order to discover the emergent categories, content analysis was implemented with the data. Content analysis can be divided into two types: deductive and inductive (Ellis & Barkhuizen, 2005). In the present study, the researcher's analytical approach was generally centered on the latter type of content analysis, inductive analysis, which is based on Miles and Huberman (1994) framework for qualitative data analysis. According to this framework,

the data was operationalized through data reduction, data display, and drawing and verifying conclusions. The data reduction was carried out through editing, segmenting and summarizing the data. Afterwards, coding and memoing was carried out to look for emerging categories and patterns. The researcher used check coding to test inter-coder reliability. This stage was conducted by calculating the percentage of agreement related to the transcribed interviews. For this purpose, the researcher coded the transcriptions along with one expert who had carried out numerous studies related to teacher education. After discussing the coding, inter-coder reliability was determined at 0.90. In the data display phase, all of the coding categories were added to the appropriate grid in order to obtain a better understanding of the messages apparent in the data. Drawing and verifying of conclusions were done concurrently with data reduction and data display. In this manner, the researcher worked back and forth between the categories and the database until a comprehensive set of categories was established.

Limitations

The data from the research were obtained from semi-structured interviews, which were conducted at the end of the study in order to explore the role of various types of feedback in student teachers' self-efficacy beliefs and teaching performance. Furthermore, this was a case study that consisted of 6 volunteer chemistry student teachers in their senior year. With a larger sample size, it would have been possible to discover rich and various descriptions of interviews. Additionally, since the perspective of qualitative research is partial the findings of this study represent a temporary and limited view. The data collection phase was limited to 4 weeks.

Findings and Discussions

The findings of each sub-problem of the study are presented in tables below, followed by the researcher's interpretations and discussion.

Findings of the First Sub-problem

The first question in the first sub-problem of the study was "Does the type of feedback received by student teachers affect their self-efficacy beliefs towards teaching positively or negatively?" According to the interview data presented in Table 3, each student teacher stated that the feedback they received had a positive effect on their self-efficacy beliefs towards chemistry teaching. PT_3 and PT_5 stated that feedback helped them to develop themselves and that they believed they could become more sufficient in the upcoming education process. PT_1 and PT_6, furthermore, expressed that while they had concerns about teaching chemistry, this anxiety diminished after the application. However, PT_1's negative experience caused by his mistakes in lecturing led to concern during his second lesson and decreased his self-efficacy belief somewhat. As a result, PT_1 reported that the feedback based on mastery experiences lowered his self-efficacy belief in teaching chemistry.

Discussion of the First Sub-problem

When the student teachers were asked whether the feedback based on self-efficacy beliefs affected their self-efficacy beliefs toward chemistry teaching positively or negatively, they mainly answered that it had a positive effect. Each of the student teachers expressed that the feedback enhanced their performance and increased their beliefs about being sufficient for teaching. This may be explained by their generally positive experiences, as with Parker and Spink (1997), who established that student teachers with successful experiences have high self-efficacy. In the present study, only PT_1 related that his poor experience in the first lesson was reflected in the second lesson, and therefore, his belief about being sufficient was decreased. However, it was observed that the experiences he had in subsequent lessons and the verbal persuasion he received from the researcher decreased his worries, and he conducted a more successful lesson with a more positive classroom environment. This situation revealed the idea of having a better teaching in the future. This result supports Nespor's (1987) study, which demonstrated that the positive and negative experiences of student teachers affected the decisions they made in the classroom. In this regard, while student teachers who had positive experiences were more eager to teach, the ones who had poor experiences stated that they tried to avoid teaching and that the experiences affected their self-efficacy beliefs.

In addition, the emotions of the student teachers during their experiences in the classroom environment affected their self-efficacy beliefs. Sutton and Wheatley (2003) expressed that a positive classroom atmosphere was effective in encouraging thinking about a problem and creating solutions, and emphasized the importance of emotions on self-efficacy. Likewise, Carter (2006) established that the teaching experiences of student teachers affected their self-efficacy beliefs, and that the other candidates following these student teachers had more positive beliefs towards teaching. Thus, it was revealed that both mastery and vicarious experiences affected self-efficacy beliefs.

Many researchers have revealed that student teachers overcame difficulties by mastery experiences, and individual and cooperative feedback, and thus acquired high self-efficacy beliefs (Bandura, 1997; Bryan, 2003; Tschannen-Moran & Woolfolk-Hoy, 2007). Bandura (1997) likewise argued that self-efficacy belief sources not only provide opportunities for student teachers to develop themselves and implement teaching strategies, but also that reflecting individually and cooperatively contribute greatly to self-efficacy beliefs. Furthermore, Atay (2003) emphasized that efficacy beliefs in student teachers should be revealed with different resources, and that existing thinking and beliefs should be developed.

The impact of feedback on self-efficacy belief	PT	Sample views
Positive	PT_1 PT_2 PT_3 PT_4 PT_5 PT_6	As volunteering students in this study, we learned a lot from each other. We learned not only from our experiences, but also from the lessons we had, the approaches of the student teachers we observed and our understanding of positive environment … Honestly, I didn't really believe that I would be able to teach chemistry very well, and I had some concerns. But I saw that I could teach chemistry much better with the feedback [I received]. My self-confidence improved. I have no doubt that I will be much better at teaching chemistry. (PT_1) Feedback helped me self-criticize in many respects. I even started to give contemporary examples for students to learn better in the last lessons. All the feedback I received helped me refresh my self-confidence and self-respect. (PT_2) Feedback helped me develop myself in some areas where I was insufficient. No doubt it made me think that I could teach more effectively. (PT_3) I can say that it had a positive effect. For example, I had some difficulty in solving problems in the second lesson. However, both the experience during the lesson and my peers' having the same thinking made me go to my next lesson better prepared. In other words, making up for this mistake increased my self-confidence. This situation made me happy inside. (PT_4) If I were to draw a graphic starting from the first lesson to the last one, I can definitely say that it increased positively. Even the question-answer technique I used in the first lesson was a lot different from the last lesson … I developed myself in every respect, and I became open to every criticism. Therefore, I felt more competent in the next lesson compared with the previous one. (PT_5) It decreased my concern about lecturing in chemistry subjects and how to reach students. (PT_6)
Negative	PT_1	I got very nervous after [I made] mistakes during the mastery experience, and of course I could not teach the subject to the students. In the next lesson, again, I could not shake off this nervousness … To tell the truth, the best thing with that much tension and negative thoughts was to reach the end of the lesson. Therefore, I thought I would have trouble in lecturing, and I got concerned. (PT_1)

Table 3. The views of chemistry student teachers about the impact of the feedback they received on their self-efficacy beliefs

Findings of the Second Sub-problem: The Relationship between Mastery Experiences and Teaching Performance

The views of the teachers concerning the role of feedback that was received through their mastery experiences after their micro-reflective teaching sessions in their teaching performance are described in Table 4. While all of the student teachers except PT_6 stated that the mastery experience helped them to discover their strengths, the entire group expressed that the mastery experiences were helpful in allowing them to see their deficiencies and in implementing theory. Apart from this, PT_2, PT_3 and PT_5, who had prior teaching experience, were observed to have the ability to make decisions based on situations that occurred during the application; therefore, they could take appropriate steps when unexpected situations arose during a lesson. This helped the student teachers to realize that they could reflect during the course of active teaching.

Mastery experiences	PT	Sample views
Determining strengths in teaching	PT_1 PT_2 PT_3 PT_4 PT_5	I was wondering what kind of path to follow during a lecture; however, I realized that I was sufficient during the experiences. (PT_2) I realized that I was able to actively include students in the lessons and make them listen to me. (PT_5)
Determining deficiencies in teaching	PT_1 PT_2 PT_3 PT_4 PT_5 PT_6	Seeing my deficiencies in many respects demoralized me; however, I realized that I could eliminate them through intense experiences. (PT_1) I gained a lot from the mastery experiences. I had the opportunity to realize some of my deficiencies and also to change them before becoming a teacher. (PT_2) In theory, we can understand how experiments take place. To give an example from daily life, there are many programs that provide recipes. However, you cannot say "I learned them and I can cook them." Your spoon might be smaller than the one on TV. This can change the taste of your food. Only when you [actually] cook can you understand the circumstances. It is the same for the way you teach… Therefore, I think that this four-week process definitely helped me see my deficiencies in teaching. (PT_4)
The opportunity to implement theory	PT_1 PT_2 PT_3 PT_4 PT_5 PT_6	To live mastery experiences is actually the biggest contribution in my chemistry teaching capacity... because the pedagogical lessons we had provided useful theoretical information; however some things you experience cannot be explained in books. (PT_1) I gained the ability to apply my theoretical knowledge, and the contribution to my future teaching is considerable. (PT_6)
The ability to reflect during action	PT_2 PT_3 PT_5	Of course it had an impact. For example, when I was about to show the students some animations about Boyle's law, the computer was slow to start … To use the time, I asked if any of the students knew about Boyle's law; this provided them with reinforcement and also kept them interested. I realized that I can overcome difficult situations during lessons. (PT_2) It was very effective. For example, during one lesson, instead of writing mass concentration, I wrote weight concentration while separating concentrations in terms of amounts … of course, before, I said weight concentration instead of mass concentration while giving the difference between mass and weight … of course I immediately corrected it … so I realized my mistake during the lesson. (PT_3) Because I did not know the level of the students beforehand, I started with a general lecture. However, I realized that they did not have much information about organic chemistry, and immediately I decided how long it would take for students with little chemistry information to learn and how would they learn; and I applied this immediately. So I realized that I could make instant decisions during a lesson. (PT_5)

Table 4: The views of the chemistry student teachers about the impact of the feedback they received in regard to the mastery experience on their teaching performance

Discussion of the Second Sub-problem: The Relationship between Mastery Experiences and Teaching Performance

When the student teachers were asked how they viewed the role of feedback based on mastery experiences in their teaching performance, they all expressed that the mastery experience had contributed to revealing their deficiencies in teaching and in applying theory in practice. Likewise, numerous researchers have found that mastery experiences were useful in helping student teachers to see the deficiencies or problems in their teaching; furthermore, they affected and enhanced their performance due to the experiences it provided (Arikan, 2004; Kukanauza de Mazeika, 2001).

Similarly, Cannon and Scharmann (1996) established in a study with student teachers that mastery experiences were effective in drawing attention to deficiencies in teaching science. In this study, all of the student teachers except PT_6 expressed that mastery

experiences enabled them to determine their strengths in teaching. Usher and Pajares (2008) also argued that mastery experiences provide valuable opportunities for individuals to learn about their own teaching and how they were valuable, while Sisman and Acat (2003) likewise emphasized that student teachers perceived a positive change in their understanding of teaching and had the chance to learn about their own teaching through mastery experiences.

Furthermore, PT_2, PT_3 and PT_5, who had also had prior teaching experience, revealed that they could reflect in the course of their teaching through making instant decisions in unexpected situations that occurred during their mastery experiences. This reflects Schon's (1987) contention that student teachers with past teaching experiences can evaluate their environment and make new decisions when they encounter unexpected situations, and they can implement those decisions in the course of direct experiences. Similarly, Bandura (1997) expressed that student teachers with past experiences can improve their performances based on those experiences and alter their behaviors based on the classroom atmosphere. On the other hand, as Osterman (1990) argued, without prior experience, an individual may not see his deficiencies or mistakes, or in other words his needs, and that experiences enhance the ability to reflect while acting.

Findings of the Second Sub-problem: The Relationship between Vicarious Experiences and Teaching Performance

When the views of student teachers about the role of feedback based on vicarious experiences in their teaching performance were examined, PT_1 and PT_4 reflected about whether they had made similar mistakes themselves and stated that it was necessary to focus on such mistakes in order to improve (see Table 5). In addition, PT_3 and PT_6, who modeled some successful behaviors that they admired from vicarious experiences, indicated that they applied these in later lessons. Finally, PT_2 and PT_5 reported that observing others improved their self-confidence, and therefore, they became more competent in some areas.

Vicarious experiences	PT	Sample views
Realizing repeated mistakes	PT_1 PT_4	For example, while watching a friend of mine, I saw that he completely forgot to communicate with the students and that he focused only on lecturing. I wondered if I did the same, and yes, I did. Therefore, I realized that this mistake was made by others, too. Of course we had to fix this situation. (PT_1) Looking at them, I analyzed similar mistakes in my teaching. I focused on my mistakes for the sake of my improvement. (PT_4)
Taking successful behaviors as an example	PT_3 PT_6	I caught the successful aspects and tactics of some of my friends. For example, I found my friend PT_5's relationship with students, and my friend PT_1's sensitivity in planning and programming the lesson, to be very successful. I tried to pay attention to these subjects. (PT_3) According to my first lesson, I gave the impression of a distanced teacher. At this point, I observed how my friends talked and behaved toward the students. I found one of my friend's joking with the students to be quite amusing. Seeing that made me think that it was possible for me, too. (PT_6)
Enhancing self-confidence	PT_2 PT_5	Actually, observing my friends enhanced my self-confidence even more, because I saw myself more competent in some areas than them. Moreover, I think that other student teacher friends of mine benefited from my knowledge and experiences. (PT_2) I can say that it affected me positively. I criticized myself by looking at them, and of course I realized how I was able to make students listen to me, and therefore, my self-confidence increased. (PT_5)

Table 5: The views of the chemistry student teachers about the impact of the feedback they received in regard to vicarious experiences on their teaching performance

Discussion of the Second Sub-problem: The Relationship between Vicarious Experiences and Teaching Performance

In the findings acquired in relation to the question of how feedback based on vicarious experiences affected the student teachers' performance, PT_1 and PT_4 expressed that vicarious experiences helped them to realize that they had made similar mistakes. This issue supports the contention of Sullivan, Buckle, Nicky, and Atkinson (2012) that observing others contributes to a review of one's own teaching style and recognition of teaching behaviors. Topping et. al. (2000) assert that this reflection results in student teachers gaining metacognitive skills and also permits them to see the mistakes of others. According to Lin, Liu, and Yuan (2001), this critical insight may result in improved performance. Moreover, PT_3 and PT_6 indicated that vicarious experiences allowed them to take successful and admirable behaviors as examples, thus enhancing their performance. These views are supported by Argun (2008), who established that when student teachers encountered difficult situations, they tended to switch to teaching methods used by expert teachers, as well as Bandura (1997), who based the performance of student teachers on their taking successful behaviors as a model.

According to the views of PT_2 and PT_5, who had prior experience, observing their peers enhanced their own self-confidence, and their performance was positively affected as a result of the recognition that they were competent in this area. The enhanced self-confidence of the student teachers, as well as its visible reflection on their performance, relates to the study of Gunning (2010), who noted that vicarious experiences affected student teachers' self-confidence and enhanced their sense of efficacy, leading to more successful teaching performance. Likewise, Kim (2005) revealed that observation alone did not contribute significantly to teaching performance; however, student teachers who both observed others and gave and received feedback demonstrated improved performance. In the present study, as well, student teachers' roles as both observer and observed enabled them to see themselves critically.

Findings of the Second Sub-problem: The Relationship between Verbal Persuasion and Teaching Performance

The findings concerning the role of feedback based on verbal persuasion in the performance of student teachers are outlined in Table 6. According to the data, all of the student teachers except for PT_5 and PT_6 reported that verbal statements were motivating, and they joined later lessons with a higher degree of motivation. PT_1, in particular, expressed that he had difficulty in accepting the criticisms from his peers at the beginning of the study; however, considering the objective of the study, he started to view these criticisms as constructive and afterwards accepted them. All of the student teachers except PT_2 and PT_3 emphasized that verbal statements motivated and enhanced their critical thinking, because it gave detailed information. Furthermore, critical thinking enabled them to see the incorrect behaviors they had missed during their teaching.

Discussion of the Second Sub-problem: The Relationship between Verbal Persuasion and Teaching Performance

An examination of the relationship between verbal persuasion and teaching performance revealed that feedback based on verbal persuasion affected student teachers'

performance in terms of motivation and critical thinking. Primarily, all of the student teachers except PT_5 and PT_6 set forth that verbal persuasion motivated them and improved their performance. Similarly, Visser (1998) established that verbal persuasion including motivation created positive tendencies with student teachers. According to his research, when student teachers who had received verbal persuasion were compared with those who had not, the teachers who had received verbal persuasion demonstrated enhanced motivation and performance. Similarly, Kainz (2007) examined the relationship between verbal statements, motivation and performance, and found that motivation was increased by positive statements; thus, it had a positive effect on student teachers' performance. In the related research, student teachers' stating how feedback based on verbal statements affected their performance was attributed to motivation, which might result from the fact that student teachers made statements that were trustworthy and believable. The results of the present study concerning the performance-enhancing impact of verbal statements appear to support many existing studies (e.g., Akilli, 2007; Biggs & Tang, 2007; Lomas & Nicholls, 2005). Furthermore, in a study concerning the relationship between peer assessment and professional development, Salih (2013) revealed that when student teachers assessed their peers' teaching, their performance was enhanced.

An additional issue noted by most of the student teachers in the present study was that verbal statements lead to critical thinking. Likewise, Harford and MacRuaric (2008) demonstrated that verbal statements between student teachers about their teaching performance created a critical dialogue and helped them to lecture more effectively. Numerous additional studies have also indicated that verbal persuasion eased achieving the goal of the lesson, and at the same time they emphasized that through critical thinking, individuals had the opportunity to analyze their problems and view them differently (Boreen, Johnson, Niday, & Potts, 2000; Jay & Johnson, 2002; Griffin, 2003; Sibbald, 2008).

Verbal persuasion	PT	Sample views
Enhance Motivation	PT_1 PT_2 PT_3 PT_4	Especially as our researcher and teacher, you tried not to demotivate us, even when you knew we had [given] a bad performance. I comprehended better as the study developed that you were trying to enhance our motivation. At first, it was hard for me to accept my friends' criticisms; however, after starting to experience the real purpose of the study, there were not any problems left for me … so I started to become more motivated during the study. (PT_1) I saw that verbal persuasion is very important in teaching in terms of motivation. The feedback I received from my friends helped me to be more motivated toward the lesson … it enhanced my success in the classroom. Therefore, I felt more happy and hopeful … and this was reflected in my lecturing. (PT_2) In particular, the advice from you and my friends enhanced my motivation … for example, it helped me to use the tools and equipment in the classroom and to lecture more actively and sympathetically. This became a permanent teaching competence for me. (PT_3) I would like to explain its impact like this. During the third lesson, not being able to solve the hard problem I chose on the board for a while made me think I was teaching very poorly. However, my friends told me that I panicked a little, but I was not so bad, and that I had looked at my notes for a long time. The support of my friends encouraged me … it enabled me to enter to the next lesson with more confidence. (PT_4)
Create critical thinking	PT_1 PT_4 PT_5 PT_6	I tried to consider the criticisms from you and my friends. The detailed feedback made me think harder about them … I took the parts I thought of as correct … and I tried to show this with my performance. (PT_1) Firstly, I learned to look critically…I considered all the verbal assessments in my head. So, the things that I doubted became clear … I also helped some to come up with new solutions. (PT_4) Because they did not come to the board in the first lesson, I called one of the students a "coward". You and some of my friends told me that I should not call her that, because it might be misunderstood … I thought about that …it was right. You told me the truth, actually … and I saw this as important verbal advice … I can say that it was quite useful. (PT_5) Frankly, my friends observed me carefully … afterwards, I criticized myself, too … especially having the same tone of voice … and they were right about my standing position in the classroom. A friend said that wearing high heeled shoes … having a loud voice distracted the students, as well. (PT_6)

Table 6: The views of the chemistry student teachers about the impact of the feedback they received in regard to verbal persuasion on their teaching performance

Findings of the Second Sub-problem: The Relationship between Physiological and Emotional Situation and Teaching Performance

The findings concerning the role of feedback based on physiological and emotional situations in the performance of student teachers are presented in Table 7. According to the data, PT_2 and PT_6 reported that their self-confidence and performance were both enhanced due to a constructive classroom environment. On the other hand, PT_1 expressed a negative view, noting that because it was his first time before a class, he felt nervous and therefore did not perform well. Similarly, PT_3 revealed that lecturing in front of a camera in his first lessons caused him stress, and this diminished his presentation ability. PT_4, PT_5 and PT_6, however, emphasized that the close relationships they built with the class over time decreased their concern about their teaching skills, and this was reflected positively in their performance.

Physiological and emotional situation	PT	Sample views
Enhancing self-confidence	PT_2 PT_6	Of course it affected my performance. For example, the animations I prepared for the students helped them get all the answers to the questions they had in their minds. Seeing them understand made me happy, as well, and enhanced my self-confidence. (PT_2) In particular, the positive atmosphere I experienced from the students in time affected me a lot. I said to myself that I can achieve more … my concerns decreased … of course, my self-confidence was enhanced. Also, the relationship we created in time by guarding the borders enabled more enjoyable lessons. (PT_6)
Decreasing lecturing (presentation) skill	PT_1 PT_3	I was excited; because it was my first time to lecture a class … I could not focus on the lesson. I made many mistakes while teaching the subject. I could not read even the simplest salt example. Of course, I was feeling very nervous. I realized that this decreased the confidence the students had in me ... they started to talk among themselves. I was annoyed because of this. Therefore, I always stuck to the PowerPoint presentation. (PT_1) The presence of the cameras in the study put us in an uncomfortable situation ... An environment filled with questions like, "Will I be able to finish the lesson on time?" "Will I be able to use the materials appropriately?" disturbed us a little. Honestly, it was hard for me to get used to it in the first lessons, and also to my excitement in the lessons ... therefore, this was reflected in my lecturing. (PT_3)
Decreasing worry	PT_4 PT_5 PT_6	I can give this kind of example for it: Because I was not feeling well, I was a little stagnant in my last lesson, and I was concerned that they might not listen to my lesson; but maybe because we were close with this class, they paid more attention. There was a more sincere atmosphere, such that they wanted to take photos together. (PT_4) I am relaxed in the classroom atmosphere, and I reflected this to my students, too. Because of my first encounter, I have some worries…but not so much ... meeting and getting to know the students and sometimes making them laugh clearly diminished my worries, and of course it enabled me to teach more comfortably. (PT_5) In particular, the positive atmosphere I experienced from the students in time affected me. I said to myself that I can achieve more … my concerns decreased …of course, my self-confidence was enhanced. Also, the relationship we created in time by guarding the borders enabled more enjoyable lessons. (PT_6)

Table 7: The views of the chemistry student teachers about the impact of the feedback they received in regard to physiological and emotional situations on teaching performance

Discussion of the Second Sub-problem: The Relationship between Physiological and Emotional Situations and Teaching Performance

According to the findings concerning the role of the feedback based on the physiological and emotional situation in the teaching performance of student teachers, PT_2 and PT_6 experienced a constructive classroom environment, and therefore, their self-confidence in their teaching improved, and their teaching became more effective. Researchers have emphasized that positive feelings create an opportunity for an individual to assess his or her situation realistically and to become more creative and effective, with a high degree of self-confidence; this situation has a positive impact on teaching performance. Contrary to this, it has also been asserted that an individual full of negative feelings cannot find solutions to the problems due to high anxiety, cannot assess a situation properly, and may perform poorly due to low self-confidence (Bandura, 1997; Fredrickson, 1998; Pekrun, 2006). In this study, PT_1 expressed that his first teaching experience was very stressful, and this situation negatively affected his presentation skills. Likewise, PT_3 stated that environmental factors such as cameras in the classroom caused him stress, and this had a negative effect on his presentation skills. A similar observation has been made by Hamre and Pianta (2004), who concluded that stress and excitement felt in the classroom environment was directly related to teaching performance, and that stress negatively affected performance. Bandura (1997)

likewise expressed that a negative classroom atmosphere prevented student teachers from feeling relaxed and diminished their both their self-efficacy and their presentation performances. Furthermore, when a difficult situation was encountered in a learning atmosphere, emotions affected thoughts and performance; in his view, performance is an unstable structure which can be affected by emotions. In this respect, Sutton and Wheatley (2003) contend that candidates may reflect a better performance by controlling their emotions, while Güney (2008) also stated that excitement, anxiety and fears of student teachers affect presentation performances negatively.

Another category that emerged in the current study was that the physiological and emotional situation decreased the worries of student teachers, and accordingly, their performance was improved. PT_4, PT_5 and PT_6 emphasized that the close relationship they developed with the class over time decreased their worries, and this situation was positively reflected in their performance. Many studies in the literature revealed that emotional situations of student teachers, such as stress, fear or excitement during the lessons, prevented meaningful, active and effective participation by the teacher and impaired the relationship between the student teacher and students. It was also seen that constant negative feelings caused a decrease in performance, self-efficacy belief and inner motivation and created burnout. On the contrary, student teachers who had a positive classroom environment and positive feelings resisted difficulties more, experienced enhanced motivation and attended to lessons actively. In addition, it has been stated that such feelings were reflected in candidates' personal characteristics. (Goddard, Hoy, & Woolfolk-Hoy, 2004; Ones, Dilchert, Viswervaran, & Judge, 2007; Sutton & Wheatley, 2003; Warren, 2010).

Findings of the Third Sub-problem

When the findings obtained from the chemistry student teachers concerning the third sub-problem, "What types of feedback that are based on self-efficacy sources do student teachers find to be most useful in their teaching after MRT sessions?" were analyzed, PT_1, PT_2 and PT_6 expressed that mastery experiences were the most useful. In particular, PT_1 and PT_2 emphasized that mastery experiences were useful in gaining experience. While PT_1 saw the four-week experience process as a micro-study of what could happen in a real classroom environment, PT_2 emphasized the importance of direct experiences by stating that the best way to learn was through acting and living. On the other hand, PT_6 expressed that mastery experiences were effective in calling attention to mistakes and changing an ineffective approach.

However, PT_3 and PT_4 stated that mastery experiences were not the most useful, but that verbal encouragement was more effective in their teaching. PT_4 remarked that direct experiences enhanced the degree of excitement and attention, but because he was not aware of exactly what he was doing during the lesson, it was also important to have researcher's and peers' constructive criticism. PT_5 also expressed that verbal encouragement was the most useful, emphasizing the importance of being appreciated by others and stating that this encouragement helped him to develop the question-answer technique and improve his attitude towards the teaching profession (see Table 8).

Discussion of the Third Sub-problem

When the student teachers were asked about their opinions on the most useful type(s) of feedback, all except PT_5 reported that mastery experiences were the most useful. PT_1, PT_2 and

PT_6 stated that the teaching experiences acquired in a real classroom environment were very important in learning about their own teaching methods and in gaining experience. This result reflected the study of Brand and Wilkins (2007), who analyzed the progress of student teachers who became effective science and mathematics teachers by keeping in mind Bandura's (1997) four different types of feedback that affect self-efficacy beliefs. Their study revealed that the self-efficacy and performances of the student teachers were mainly affected by their own experiences. The importance of mastery experiences in the present study also aligned with the results of the studies of Malinen et al. (2013) and Mulholland and Wallace (2001). For instance, Malinen et al. (2013) established through structural equation modeling that student teachers from different countries cited mastery experiences as the most effective precursor in professional development. Moreover, Mulholland and Wallace (2001) asserted that mastery experiences were the most effective type of feedback for enhancing feelings of efficacy and confidence.

The most useful feedback	PT	Sample views
Mastery experiences	PT_1 PT_2 PT_6	I think the mastery experiences were the most useful ones, because first of all, I believe that this study provided us with a big experience … 4 weeks of time was like a whole life. It was a micro study of "What can happen in a real classroom atmosphere by living the classroom atmosphere and also communicating with students?" For me, the most important thing that this study provided was the message "always be ready for everything". (PT_1) All of the feedback was very important, but for me, the directly acquired experiences were much more important, because the best way to learn is through living. Through these experiences, I had the opportunity to see myself and recognize my mistakes. I saw that in the very beginning of my teaching life, I acquired many experiences. (PT_2) Mastery experiences are definitely the most useful ones. Once I did lecturing in two lessons. I thought this method would be beneficial. But in those two lessons, in particular, the students got bored, and they seemed not to understand ... I could not get answers to my questions … therefore, I had to add another method. However, if I had not had these experiences, I would have continued to lecture just like in those lessons, because I would not be aware of the bad outcomes. (PT_6)
Mastery experiences and verbal persuasion	PT_3 PT_4	I can say that the biggest contributions I received are from direct experiences and your encouragements. Both enhanced my effort and helped me to develop new materials (slides, simulation, etc.) … [and] helped me to realize my deficiencies at work. Besides, the encouragement helped me actively participate in the lessons. Honestly, I can say that both of these made great contributions to my teaching efficacy. (PT_3) I can say that mostly our own experiences and others' opinions about us had primary importance. Personal experiences are important, because they are something that enhances excitement and attention … But it is not enough, because I do not know exactly what I am doing there. Therefore, your and my friends' opinions are important, as well ... These assessments made me see that I did not really pay attention to this or that, and that I also constructive … Therefore, you get support for self-confidence and self-criticism, and later, in respect to these, you set out to change yourself. (PT_4)
Verbal persuasion	PT_5	Maybe I could mainly think of mastery experiences. However, mastery experiences are visuals that I provide for myself in myself … "oh you did good, you did right or wrong" … this stays within me. Apart from this, it is more important to be appreciated by someone else … much better… for example, when using the question/answer technique, they told me that I used something good like this, and that gave me the opportunity to use it even better. So, the question/answer I used in the beginning was different from the last lesson. Being appreciated by others is much better. Of course, it also affects my attitude towards the teaching profession positively. (PT_5)

Table 8: The views of the chemistry student teachers about the most useful feedback that affected their teaching performance

Another result of this study indicated that, as PT_3 and PT_4 stated, verbal persuasions along with mastery experiences played an important role in developing the teaching performance of student teachers. These results showed parallelism with Kim's (2005) study,

which revealed that student teachers who had mastery experiences and received verbal feedback performed well in their practice.

The reason for this may be due to the existence of a sense of responsibility in the candidates developed through direct experiences in teaching, as well as the effort of reflecting a better performance by analyzing mistakes with the support of peers. One of the exciting results of this study was PT_5's proposal that verbal persuasion was the most effective feedback in terms of improving performance. From this point of view, it could be said that verbal support, apart from other types of feedback, has the most effective role in teaching performance. Numerous studies have revealed that verbal persuasion is very important in professional development (e.g., Kiraz, 2003; Zanting, Verloop, & Vermunt, 2001); existing studies have shown that verbal persuasion has a guiding effect and plays an important role in developing the thoughts, beliefs and performances of the student teachers.

Findings of the Fourth Sub-problem

In the final sub-problem, the views of the student teachers on the question "On what areas of their teaching do student teachers see different types of feedback as having the most impact?"
were explored, as shown in Table 9. According to PT_2 and PT_4, different types of feedback were more effective in the area of assessment and evaluation, and that as a result of this feedback, they were trying to be more careful while preparing questions to evaluate students. In particular, PT_4 realized that he had selected an overly difficult question by overlooking the *simple towards complicated* principle and made an effort to modify this behavior.

Area of teaching	PT	Sample views
Assessment and evaluation	PT_2	I can say that the feedback was influential mainly in the area of assessment and evaluation field, and it was helpful in creating questions at a certain level. (PT_2)
	PT_4	I saw that I could not ask sufficient questions concerning whether they had learned the subject, and it was wrong to ask a hard question instead of preparing a question based on the *simple to complicated* principle. In the last lesson, I paid a little more attention when choosing question samples. (PT_4)
Communication	PT_2	I can say that it is very influential in the area of communication, as well. Due to the feedback, I think I made quite a bit of progress in terms of communication. For example, I am careful to emphasize the important parts of the subject by raising my voice. This situation helps me maintain the relationship with the student. (PT_2)
	PT_3	Most of the feedback was about me not being able to speak fluently … for example, creating long sentences and not making eye contact with the students ... I tried to pay attention to this during the lessons. (PT_3)
	PT_5	Most of the feedback was about me standing in one position before the board, lecturing with my hands in my pockets; that is to say, having poor body language … Also, another mistake of mine was that I was looking in any direction except at the students while teaching. Of course I tried to fix these in time. (PT_5)
	PT_6	The feedback showed me that I must use my tone of voice and body language better. (PT_6)
Subject Content Knowledge	PT_1	The feedback I received mostly enhanced my effort in delivering the subject. I thought I had good subject content knowledge, but I saw that I made many mistakes. I realized that I was teaching better after the experiences, and my friends think the same. (PT_1)
	PT_3	I found out that it was difficult for me to give contemporary examples about my subject, because there were some pauses here and there. In the following lessons, I paid attention to studying my subject from different sources. (PT_3)
	PT_4	It helped me to see myself during the delivery of the subject. For example, in my second lesson, I had told students about the oxidation in a "molecule" instead of the concept of "compound". Also, they told me that I was writing the word "oxidation" without its vowels. I was also surprised at myself for doing so ... In another lesson, instead of picking an easy question for the first time, I picked a hard one, and I could not even solve it myself. Honestly, this feedback encouraged me to study harder in this field. (PT_4)

Table 9: The views of the chemistry student teachers about the area in which the feedback was the most influential

On the other hand, most of the student teachers found that feedback was most influential in the area of communication. These student teachers, especially those who had problems with tone of voice, fluent use of language, and body language, stated that they began to pay attention to these in other classes in order to improve their communication. For instance, PT_5 realized that he made very long sentences and could not make eye contact with the students; therefore, he paid extra attention to these issues. PT_1, PT_3 and PT_4 all expressed that they realized they had problems in lecturing on their subjects, and they recognized that they had to study the subjects prior to giving the lessons.

Discussion of the Fourth Sub-problem

In the final sub-problem of the study, the student teachers were asked which areas the different types of feedback based on self-efficacy beliefs impacted the most. PT_1, PT_3 and PT_4 expressed that feedback was helpful in illustrating the deficiencies in their knowledge, in accordance with Liu's (2004) study; his analysis of the self-efficacy beliefs of American and Chinese student teachers established that self-efficacy belief sources affect the content and pedagogical knowledge of student teachers. In this respect, in particular, PT_3 stated that he experienced difficulty in giving contemporary examples during his teaching, while PT_4

expressed that he could not solve the problem he gave as an example on the board. These results seemed to support Davis' (2003) contention that student teachers with limited content knowledge could not give contemporary examples, and that they were insufficient in answering students' questions; he suggested that these problems can be overcome by different approaches. According to the existing literature, student teachers struggled most frequently during their teaching practice with respect to content knowledge, and that they particularly wanted feedback about this problem (Canbazoglu, 2008; Kukanauza de Mazeika, 2001; Usak, 2005). Studies have also shown that student teachers who had problems in teaching were the ones with misconceptions.

Aside from these issues, many of the student teachers noted the effects of feedback on their communication skills. For instance, the student teachers who recognized deficiencies in their body language and tone of voice as a result of feedback, tried to implement solutions to communicate more effectively in later lessons. According to Hosgorur (2007), the degree of efficiency and effectiveness of a student teacher can be measured with the level and variety of the communication skill. Furthermore, Demiray (2011) stated that the most important tools for carrying messages between teachers and students in a healthy way include the voice and the body language of the teacher. In this study, PT_2 and PT_4, who benefited from assessment and evaluation, felt that their skills in asking more efficient and better questions were improved. In this respect, it can be said that it was necessary to provide the student teachers with resources such feedback and environment in order to help them reflect the assessment and evaluation methods they know in theory. Berberoglu (2006) indicated that student teachers who use appropriate assessment methods during the learning process can enhance their students' learning and provide a more fruitful learning environment.

Conclusions

This study, in which sources based on self-efficacy beliefs were used as feedback, was conducted for the purpose of exploring how the teaching performance and self-efficacy beliefs of student teachers were affected by this feedback. As a result, it was revealed that feedback affected student teachers' self-efficacy beliefs. In particular, successful experiences, a constructive classroom environment and working in a cooperative environment with their peers increased their self-efficacy beliefs. In this respect, it can be said that their self-efficacy beliefs were positively affected overall.

Mastery experiences contributed to the performances of the student teachers, who had enhanced self-efficacy towards teaching, in terms of the recognition of their deficiencies in teaching and the implementation of theory. At the same time, the experiences revealed that some of the student teachers had the ability to reflect during lessons. This skill may have been developed as a result of the student teachers' past experiences. However, it was also revealed that vicarious experiences, which were one of the sources of feedback, enabled the student teachers see their similar mistakes and take admirable behaviors as examples; thus, the vicarious experiences were effective in enhancing their self-confidence, as well as improving their performance.

The student teachers were able to observe both their peers' and their own performance through indirect experiences. Similarly, verbal persuasion enhanced critical thinking among the participants. The detailed verbal statements provided by their peers and the researcher in the micro-reflective sessions enabled the student teachers to analyze their teaching and to look at it from a different point of view, as with Bandura (1997), who concluded that verbal statements about teaching experiences given in long-term and safe environments enhanced critical thinking in student teachers and made their teaching experiences more effective. This

study, which revealed that verbal persuasion was also important for motivation, likewise confirmed the direct relationship between motivation and performance.

In addition, the present study revealed that experiencing a positive class environment was important for performance; and furthermore, emotions were reflected in student teachers' levels of self-confidence, anxiety and presentation abilities. While negative feelings caused underperformance in presentation skills, positive feelings enhanced the student teachers' self-confidence and therefore contributed to their active participation in the lessons. The student teachers also stated that apart from this, the most useful types of feedback in terms of their performance were the mastery experiences and verbal persuasion; they also underlined the importance of feedback that affected their self-efficacy beliefs. Accordingly, it can be concluded that all of these types of feedback played an important role in both the self-efficacy beliefs and performance of the student teachers. This situation can be related to the self-confidence and motivation that were acquired by the student teachers over time. Additionally, student teachers who struggled with subject content knowledge had difficulty in lecturing on those subjects, creating obstacles to communication. So, each of the student teachers stated that different types of feedback were useful with respect to subject content knowledge, assessment and evaluation methods and communication. During the reflections, it was seen that student teachers focused mainly on the areas where they were criticized by their peers and the expert researcher.

In conclusion, it can be said that feedback from different sources plays a major role in the behaviors, and therefore the performance, of student teachers. Furthermore, self-efficacy belief is in important aspect of this relationship. At this point, the positive increase in the self-efficacy beliefs of the student teachers, who were also positively affected by the feedback on their performance, confirms the reciprocal relationship between all of these factors.

Implications

The results of this study illustrate that providing student teachers with different types of feedback is important in developing awareness of their strengths and weaknesses, as well as enhancing their self-efficacy and improving their performance. Additional studies may highlight how different types of feedback affect the relationship between student teachers' self-efficacy and performance, as well as which types of feedback are most effective. While the present study was more appropriate for a small sample size, the reciprocal relationship between self-efficacy belief, teaching performance and feedback may be analyzed on a larger scale using a scalar survey instrument.

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