EFFECTS OF SCAFFOLDING STRATEGIES EMBEDDED WITHIN WEB-BASED PEER EVALUATION SYSTEM ON PRE-SERVICE TEACHERS' REFLECTIVE THINKING AND SELF-EFFICACY

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ABSTRACT

EFFECTS OF SCAFFOLDING STRATEGIES EMBEDDED WITHIN WEB-BASED PEER EVALUATION SYSTEM ON PRE-SERVICE TEACHERS' REFLECTIVE THINKING AND SELF-EFFICACY

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The educational community is increasingly concerned about the limitations of traditional teacher education programs to support teachers' professional development. Beside the theoretical knowledge, the importance of the experience cannot be debated. The main problem of the teacher education institutions is that they fail to close the gap between the theoretical principles taught in the faculties of education and the experiences of teachers in the classrooms. Microteaching is the most popular method to prepare the PSTs for real-world teaching profession. However, literature showed that there are some barriers that PSTs face during the microteaching process, including limited and unreflective peer-feedback (Huang, 2001). In order to facilitate PSTs' peer-interaction and reflective thinking during their microteaching process, a web-based video analysis environment was designed.

In addition, in teacher education observation has a critical place. The purpose of this study is to examine the effects of question prompts embedded within this environment on PSTs' reflective thinking and self-efficacy levels. For this purpose, a true experimental study was designed and applied. 55 pre-service teachers were enrolled in this study. First finding of this study is that the use of question prompts embedded in a web-based video analysis system have a positive significant effect on pre-service teachers' reflective thinking level. Second finding of this study is that the use of question prompts embedded in a web-based video analysis system did not have a significant effect on pre-service teachers' self-efficacy. However, there was a significant linear trend indication for all types of self-efficacy factors for both control and experimental group over the time. For both groups this linear trend showed that self-efficacy scores of instructional strategies, classroom management, and student engagement developed over the time.

Keywords: Question Prompts, Scaffolding, Microteaching, Web Based Peer Evaluation Tool, Peer Feedback, Self-efficacy, Observation

ÖZ

WEB TABANLI AKRAN DEĞERLENDİRME SİSTEMİNE YERLEŞTİRİLMİŞ YÖNLENDİRİCİ YARDIM STRATEJİLERİNİN HİZMET ÖNCESİ ÖĞRETMENLERİN YANSITICI DÜŞÜNME VE ÖĞRETMEN ÖZYETERLİLİKLERİ ÜZERİNDEKİ ETKİSİ

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Eğitim toplumu öğretmenlerin mesleki gelişimlerini desteklemek için geleneksel öğretmen eğitim programlarının sınırlılıkları hakkında kaygı duymaktadır. Teorik bilginin yanında tecrubenin önemi kesinlikle tartışılamaz. Öğretmen eğitim kurumlarının temel sorunlarından bir tanesi de sınıf içideki öğretmenlerin deneyimleri ile eğitim fakültelerinde okutulan teorik ilkeler arasındaki boşluğu kapatmadaki eksikliğidir. Mikroöğretim metodu hizmet öncesi öğretmelerin gerçek sınıf ortamındaki öğretmenlik mesleğine hazırlanmasında kullanılan en yaygın metoddur. Bunula birlikte, literatür mikroöğretim sürecinde hizmet öncesi öğretmenlerin karşılaştıkları, sınırlı ve düşünce ürünü olmayan akran geri bildirimi gibi bazı problemler oduğunu göstermiştir (Huang, 2001). Hizmet öncesi öğretmenlerinin mikroöğretim sürecinde akran-etkileşimi, yansıtıcı

düşünme eğlemlerinin kolaylaştırılması için web tabanlı bir video analiz ortamı tasarlanmıştır.

Ayrıca, öğretmen eğitiminde gözlem, kritik bir yere sahiptir. Bu çalışmanın amacı, bu ortam içine yerleştirilmiş soru promptlarının hizmet öncesi öğretmenlerin yasıtıcı düşünme ve öğretmen özyeterlilik seviyeleri üzerine etkilerini araştırmaktır. Bu sebeple, tam deneysel bir çalışma gerçekleştirilmiştir. Bu çalışmaya 55 servis öncesi öğretmen katılmıştır. Çalışmanın ilk bulgusu, ağ tabanlı video analiz sistemine yerleştirilmiş soru uyaranlarının servis öncesi öğretmenlerin yansıtıcı düşünme seviyelerine olumlu yönde anlamlı bir etkisi olduğunu göstermiştir. İkinci bulgusu da, ağ tabanlı video analiz sistemine yerleştirilmiş soru uyaranlarının servis öncesi öğretmenlerin öz-yeterliliklerine anlamlı bir etkisi olmadığını göstermiştir. Fakat her iki grupta da öz-yeterlilik alt faktörleri zaman içinde anlamlı bir artış eğilimi göstermiştir. Her iki grup için de bu doğrusal artış öz-yeterlilik alt faktörleri olan öğretim stratejileri, sınıf yönetimi ve öğrenci katılımı zaman içinde gelişmiştir.

Anahtar Kelimeler: Yönlendirici Soru Sorma, Destekleyici, Mikroöğrenme, Web Tabanlı Video Değerlendirme Aracı, Akran geribildirimi, Özyeterlilik, Gözlem

To my family, parents and friends

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LIST OF ABBREVIARATION

CEIT:	Computer Education and Instructıonal Tecnology
CM:	Classroom Management
IS:	Instructional Strategies
M:	Mean
MANOVA:	Multivariate Analysis of Variance
MEB:	Ministry of National Education
METU:	Middle East Technical University
N:	Sample Size
PST:	Pre-service Computer Education Teacher
QP:	Question Prompt
RT:	Reflective Thinking
SD:	Standard Deviation
SE:	Self-Efficacy
WBPES:	Web-Base Peer Evaluation System
ZPD:	Zone of Proximal Development
η^2:	Eta Squared

CHAPTER 1

INTRODUCTION

In this part, background of the study, problem statement, purpose of the study, significance of the study, and definitions of terms will be explained in a detailed way.

1.1 Background of the Study

Teachers are one of the most important components of the educational systems. The effects of the teachers on developing new generations is undisbutable. Therefore, teacher education programs where teachers are prepared for the profession should be structured carefully. They should be equiped with requirements of the conditions of changing world. In this sense teacher training institutions have a vital responsibility for preparing highly qualified prospective teachers. However, one of the greatest challenges teacher educators have is how to help preservice teachers to implement theoretical knowledge taught in the university into the real world of teaching.

In almost all of the educational training programs, PSTs engage in field experiences. Especially they have a chance of teaching experiences once or twice. As stated by Greene (2003), for a variety of reasons, it is often difficult to find placements for teacher candidates in local schools for field

experiences (Greene, 2003, p. 22). Also, student teachers have little opportunity to observe effective teaching in actual classroom (Gayle, 2002). As Paker (2000) stated "Student teachers have not been exposed to various teachers' teaching styles" (p.115), there are still several problems pertaining to these school experience courses. In a study, Yapici & Yapici (2004) mentioned about following problems that number of the student teachers per university advisor guiding PST is high and in order to train the PST for the professional life, it is required to use some new aproaches.

Along with the theoretical knowledge, the importance of the experience is not debatable. The educational community is increasingly concerned about the limitations of traditional teacher education programs to support teachers' professional development. Therefore, in teacher education programs, microteaching technique as a way of providing real life experience has been used for many years, all over the world it is widely in use for different ELT Masters, in teaching assistant training, and FLE teacher education settings. Microteaching technique plays an important role on determining the inadequate and absent sides of the pre-service teaching related with their teaching profession (Kuran, 2009). This technique was used for training of the PSTs in the cotrolled classroom in a simplified way. The first aim of this technique was to train the PST in a rappid way in order to close the gap between practice and theory (Tochon, 2008). The intended aim is to prepare the PSTs to professional development.

During the microteaching process peers obseve the performer. Observation is an important process for the microteaching technique. For observation PSTs spent very large amount of time in order to gain teaching experience. Bandura (1969,1977,1986) claims that, in teacher education observation is

important because most of the individuals learn by observation through modeling and it is important while learning to teach (Young et. al., 2011). By watching the others' performances can generate expectations from the reviewers' side it means, others' performance encourages them and they feel they could achieve improvement in their self-performance (Bandura & Barab, 1973). By this way observation triggers the activation of self-efficacy (Bandura, 1977). In the literature, two types of observation technique were used as guided and unguided observatin (Anderson et. al., 2005). Anderson et. al. (2005) explain that in unguided observation, pre-service teachers are not or little guided by the direction in what to observe, while in guided as called focused observation the observers are directed to behaviors of teacher. Anderson et al. (2005) also add that guided observation may limit the range of observation behaviors. On the other hand Waxman (1988) stated that guided observation support helps preservice teachers become more aware of the social reality of teaching. PSTs in unguided observation can see anything interesting in the classroom setting or they may look at the teaching from a general foci (Anderson et. al., 2005). So guiding the PSTs by specific questions which focus on the important points of a lesson or allowing the PSTs free to observe others' teaching can make different contributions on the PTS' self-efficacy levels.

In teacher training programs, PSTs can take a limited feedback from the superviser teacher(Rorrison, 2005). However, it is known that divergent and multiple perspective feedbacks are really beneficial for PSTs' professional development (Huang, 2001). In recent years the importance of the reflective practice (Schön, 1983; 1987) has taken attention in preparing the individuals for professional environment. Dealing with the difficulties have positive

effects of the critical thinking in classroom setting (Dewey, 1933; Schön, 1987; Hulfish&Smith, 1961; Van Manen, 1977).

The importance of reflective thinking in teacher education programs have been emphasized by significant educational researchers (Dewey, 1933; Schön, 1987; Shulman, 1987). As an important skills of the changing world, reflective thinking skill acquisition should be integrated in these programs. Thinking on the teaching and learning process in deep way helps them to improve the teaching professional skills. Reflection during the PSTs' professional development gives chances to teachers to think on their work, and understanding view of what the students and they do and by the way they can improve the teaching and learning quality (A'Dhahab & Region, 2009; Akbari, 2007).

In previous years, microteaching sessions were conducted in Teaching Methods and Computer Education course at METU and in these sessions paper based peer evaluation forms had been used. In these forms, PSTs were expected to complete checklist and give written feedbacks. It was expected from the peers to write down reflections on the paper-based forms while watching the microteaching performance It was realized that although, PSTs completed the checklist, most of them did not provide written feedback or they only reported what they see without making higher order thinking. Huang (2001) was conducted a study in order to explore the PSTs' reflective practice during the microteaching peer feedback session. The findings of the study shows that reflective level of the participants were at the reporting level, and explains what had been done instead analyzing the related issues. In the conclusion author discover that

reflection contents and the reflective thinking issues needed to improvement.

According to observation of the researcher, this problem can arise because of a number of possible reasons. The first possible reason is that they had to complete these peer feedbacks during the microteaching sessions which was about only twenty minutes for each performer. The second one is that they had to give feedbacks while they were watching microteaching performance. In addition to peer side problems, administration of the paper based system was very problematical for the instructor.

In order to overcome these types of problems, it is necessary to use technology based solutions to enhance learning enviroments. In order to improve the microteaching technique and consequently, enhance the teaching experiences of PSTs, some new approaches can be adopted into these environments. By promoting the reflective thinking level of the PSTs, they can make more reflective peer feedbacks. In addition, it is aimed to refine reflection quality and quantity of peer evaluation. Also, guiding the microteaching observation process may effect the PSTs' self-efficacy levels. In this point, combining microteaching videos of PSTs and technological opportunities can be seen as one of the alternative to overcome mentioned problems. Because of all these problematical issues about the paper-based system, a Web-based Peer Evaluation System (WBPES) developed by the researchers specifically for this study. This supporting tool was designed in order to use for observation and peer evaluation of the microteaching sessions to facilitate the management workload and peer feedback process. In addition to technical support, PSTs are needed to be trained in order to

be critical and reflective thinking teachers. In this environment PSTs can be forced to be more reflective by using different techniques.

In the WBPES, question prompts as a scaffold has been used in order to enhence the reflective thinking level of the PSTs and guided them while observing the peers. In order to acquire much more experience, with the help of the technological adoptations, PSTs can be supported to be more reflective thinkers and observers. Question prompts are used to trigger the learner's response by using different question types for different cognitive levels. (Wandberg & Rohwer, 2010) These cognitive levels as defined by Bloom's taxonomic levels (1956) could be supported by using different question prompts. In promoting the higher levels of reflection, prompts and questioning as scaffolding strategy has been most widely in use(Lai, 2008). Question promps were embedded in this WBPES in order to support the PSTs during the peer evaluation process. In the literature technology based tools have been used to enhance the learners during the cognitive and metacognitive processes. As Sharma and Hannafin (2007) claimed that in order to direct and enhance the learning via the use of the computers the technology-based scaffolds can be used. Metacognitive scaffolds guide the learners while learning in terms of how to think by modeling cognitive strategies and self-regulatory processes. To support the learners' reflective skills on the process of planing, monitoring, and evaluation technology based tools have been used. These tools have been used to help the leaners to see their thinking and learning process explicitly (Lin, Hmelo, Kinzer, and Secules, 1999). Technology based scaffolds have been used to prepare the learners for the learning environment by giving guidances and making connections to existing ones and personal experiences. For instance Edelson et al. (1999) designed "staging activities" used for sequences of structured

investigations and used the "bridging activities" which is a type of visualization method have been used to articulate the learners' initial conceptions. Kolodner et al. (2003) used a tool named "messin about" which enables the learners to design and build an initial model depend on their prior knowledge.

1.2 Purpose of the Study

The main purpose of this study is to examine the effects of question prompts (QPs) as scaffolding tools embedded within web-based video analysis system on PSTs' reflective thinking. In addition to this, how the use of QPs embedded in a web-based video analysis system have an effect on PSTs' self-efficacy levels is another aim of the present study.

1.2.1 Research Questions

The main focus of this study is to investigate whether QPs as scaffold improve the reflective thinking levels of the PSTs and effects of reflective thinking on the self-efficacy levels of the PSTs. In this sense, research questions can be categorized under two main topics, reflective thinking level and self-efficacy of PSTs. First research question investigates the effects of the QPs on PSTs' reflective thinking level by analyzing peer feedbacks. The second research question is about the effects of the QPs on PSTs' self-efficacy levels.

Research Question 1: Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service teachers' reflective thinking level over the peer assessment sessions?

H_0 = There is no statistically significant difference between the pre-service teachers' reflective thinking levels before and after the use of question prompts embedded in a web-based video analysis system.

Research Question 2: Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service teachers' PSTs' self-efficacy levels?

H_0 = There is no statistically significant difference between the pre-service teachers' self-efficacy levels before and after the use of question prompts embedded in a web-based video analysis system.

1.3 Significance of the Study

In microteaching environment PSTs have a valuable opportunity, because they have a chance of receiving comments from the peers. By practicing how on learning to teach, they could learn about how teaching occurs (Darling-Hammond, 2006). The simulated micro-teaching environment provides an opportunity of closing the gap between learning and practice before they step into the real classroom setting (So, 2009). In this environment reflective thinking is very important because asking questions, critiquing, and evaluating knowledge help the learners close the gap between their beliefs and relatives of teaching (Lee, 2008).

Reflective thinking helps the learner reach the higher order thinking level and help develop higher order reflective thinking skills (Song et. al, 2005). In literature there are studies about the effects of the QPs on reflective thinking. In promoting the higher levels of reflection, prompts and questioning as scaffolding strategy has been most widely used (Lai, 2008). However in literature, it is little known how the reflection promotes the learner best (Davis, 2003). In some cases learners who received generic

prompts develop more coherent understandings than do peers who receive directed prompts (Davis, 2003). However, Jonassen (2010, p.303) claims that "students under the guided questioning treatment gave significant more explanations than the students who are not guided with questions". There are some evidences about the effects of the question prompts on self-monitoring and reflection process (Lin & Lehman, 1999). In a study conducted by Davis (2003) in order to investigate the ways of prompting students for reflection, researchers tried to find answer to the question "Do students merely need to be prompted to reflect, or do they need guidance in reflecting productively?" In that study generic and directed question prompts were contrasted. The results showed that students in the generic prompt condition developed more coherent understandings, also students reflected unproductively to the generic question than the directed prompts.

This study was conducted to understand whether providing guidence with QPs increases reflective level of PSTs during peer assesment sessions. In addition to this, it was also investigated whether use of QPs embedded in a web-based video analysis system have an effect on PSTs' self-efficacy. This study is important because, the results of this study may help to enlighten this disscusion.

For this study WBPES (Web-Based Peer Evaluation System) was developed. This tool has contributed valuable facilities into peer observation and evaluation processes. PSTs conducted the peer observation and evaluation anywhere and anytime. They found chance to receive their feedbacks to the peers. They could watch the microteaching videos by synchronously nvestigating the lesson plan, teaching materials and evaluation forms. From

the instructor side, WBPES reduced the workload and gave chance to manage the peer evaluation and self-evaluation parts of the microteaching.

This study was rooted from a real problem encountered in the CEIT382 course, at METU. In this course the peers were supposed to write down reflections on the paper-based forms while watching the microteaching performance, but it was realized that PSTs only completed the checklist and most of them did not provide written feedbacks or they only reported what they see without making higher order thinking. In order to solve this problem, a scaffold strategy of question prompts were used with the help of this WBPES. The findings of the study showed that the QPs embedded in a WBPES have a possitive effect on the PSTs reflective thinkling level. This study is important because the study find a solution to the low level of refletive thinking problem of the CEIT382 students. It is also important because a solution method was suggested to the literature in order to enhance the reflective thinking level of PSTs during peer evaluation.

The results of this research could be used in the teacher educatiın programs in order to promote reflective thinking while preparing the PSTs for real classroom setting. In general scope, becaming more reflective in peer evaluation brings benefits for both reviewer and performer. When we look the reviewer side, while making peer evaluation reviewers try to make more reflective evaluations and they try to criticize important points of being a good teacher, and try to make justifications about their cliams and also try to look from multiple perspective by providing reasions. These higher order thinking processes may result in valuable experiences for becoming an experienced teacher. On the other hand receiving meaningful and evidence based feedbacks, help the performers to see and evaluate

themself from the others' eyes and also gain valuable experiences about the teaching profession.

1.4 Definition of Terms

Reflective Thinking (RT): Reflective thinking is as a kind of better way of thinking that consists in turning a subject over in the mind by giving it serious and consecutive consideration (Dewey, 1933).

Preservice Teacher (PST): Preservice teachers are the who enrolled in the Computer Education Teaching Methods Course at Department of Computer Education and Instructional Technology at METU during 2009-2010 spring semester.

Self Efficay (SE): Beliefs of one's capacity to organize and execute the people manner in a high sense of courses of action required to produce given attainments'' (Bandura, 1997, p. 3).

Peer Evaluation: For this study peer evaluation is a process of giving feedback to the video of the microteaching performer.

Microteaching: Microteaching is a different teaching situation in terms of time and number of students which changes from 5 to 20 minutes in where one of the pre-service students act as a teacher and the others act as students. Microteaching consists of two main components of teaching a lesson and feedback sessions.

Scaffolding: Scaffolding is a metaphor for a structure which is putted in a place in order to help learners reach their goals in educational environment and removed time by time until no need to its existance (Dennen, 2004).

CHAPTER 2

LITERATURE REVIEW

In order to reach a deep understanding of the place of scaffolding in reflective thinking and their effects on the teacher education and self efficacy, this chapter provides an exhausting explanations and relations about the microteaching, self-efficacy(SE), reflective thinking (RT), and scaffolding issues.

2.1 Microteaching

Microteaching developed and firstly used at Standford University in 1963 in order to find out a new and effective training method for PSTs (Allen & Cooper, 1970). This environment serves a very convenient environment to PSTs in order to gain experiences on teaching skills in controlled classroom environment. In this environment the real classroom difficulties are reduced for the practitioners and the teacher candidates receives great deal of feedbacks (Allen, and Ryan,1969).

All over the world microteaching technique is widely in use for different ELT Masters, in teaching assistant training, and FLE teacher education settings. In the UK, for example, it is currently used at Bristol, Cambridge, Edinburgh, Indiana, Lancaster, London, Nottingham, Oxford, Roehampton, and Wales. In the US, ESL, SLA and FLE microteaching programs exist in

universities such as Boston University; Ball State University; Cleveland State University; Colorado State University; California State University, Chico; California State University, Fresno; George Washington University; University of Iowa; New York University; Seattle Pacific University; St. Olaf College; University of California, Los Angeles; University of Minnesota; University of Massachusetts; University of Pennsylvania; University of Wisconsin-Madison, University of Wisconsin-Milwaukee, Winston Salem State University, and so on. Other institutions provide microteaching among many other SLA and FLE settings that may not advertise it or may use variations with other names. We find ESL, FLS, TESL/TEFL/TESOL, SLA, FLE/WLE microteaching in Canada (e.g., Dalhousie University, Concordia University, and Lakehead University), in Australia (e.g., University of Southern Queensland, Charles Sturt University, and Monash University), in Japan (e.g., Kanda University) as well as France (e.g., Institute for Applied Language), Netherlands (University of Amsterdam), Turkey (e.g., Eastern Mediterranean University, Hacettepe University and Anadolu University), and in numerous other places (e.g., National University of Lesotho; City University of Hong-Kong, etc.) (Tochon, 2008).

Microteaching is a different teaching situation in terms of time and number of students from the macroteaching. Macroteaching lesson time period is generally 40 minutes; on the other hand in microteaching this period changes from 5 to 20 minutes. (Sadker, M., Cooper, J.M., 1972 Cooper, J.M., Allen, D.W., 1970). The microteaching period is limited 5 to 20 minutes because of eliminating the difficulties and complexities of the teaching situation; by the way PST can concentrate on the selected skills (Sadker, M., Cooper, J.M., 1972). One of the pre-service students act as a teacher and the others act as students. Microteaching consists of teaching a lesson and

feedback. For feedback acquisition video or audio tape recordings were used by supervisors, colleagues, pupils, and teachers (Cooper, J.M., Allen, D.W., 1970).

Microteaching technique plays an important role on determining the inadequate and absent sides of the pre-service teaching related with their teaching profession (Kuran, 2009). This technique was used for training of the PSTs in the classroom in a simplified way by using video technology. The first aim of this technique was to train the PST in a rappid way in order to close the gap between practice and theory (Tochon, 2008).

Microteaching has been used for many studies, especially for the PSTs' training. Allen & Cooper (1970, p. 6) synthesized several rationales for microteaching as a teacher training technique, and these rationales are typed here:

- *The fact that microteaching is real teaching, albeit constructed in the sense that teacher and students work together in a practice situation, is a point made by several authors (Allen and Ryan,1969; Allen and Clark, 1967).*

- *Microteaching reduces the complexity of normal classroom teaching, thus allowing the teacher to concentrate on the acquisition of a teaching skill. (Cooper, 1967; Allen and Ryan, 1969; Bush, 1966).*

- *Knowledge and information about performance aid the learner (in this case the teacher) to acquire a teaching skill. The immediate feedback from videotape records, supervisors, pupils, and colleagues provides a critique of the lesson which will help the teacher constructively modify his behavior (Meier, summer 1968).*

- *Microteaching considers the trainee's capacities by allowing him to select the content of the lesson from the area of his greatest competence (Meier, Summer 1968).*

- *Microteaching permits greater control over the trainee's with the regard to students, methods of feedback, supervision, and many other manipulatable variables (Allen and Ryan, 1969).*

- *Microteaching provides a low threat situation in which to practice teaching skills, a situation which should be more conductive to learning than the high anxiety level exhibited by many beginning teachers when practicing in actual classrooms (Allen and Clark, 1967).*

- *Microteaaching is a low risk situation for both teacher and pupils. Microteaching is not part of the pupils' regular curriculum; therefore, their learning is not endangered. Similarly, the teacher need not fear failure for precisely the same reason (Allen and Clark, 1967).*

- *Since active participation by the trainee is preferred, and meaningful materials and tasks desirable for optimal learning to occur, the microteaching setting allows the student to perfect certain skills that he will subsequently be expected to perform in the regular classroom (Meier, Summer 1968).*

- *Microteaching allows for the repetitive practice necessary to overlearn skills which will be used during regular reaching (Meier, Summer 1968).*

A study conducted Kupper (2001) and he assessed the students' perspectives about the their microteaching experiences. Survey rating results indicate that microteaching application appreciated by most of the students and they find the microteaching application method very effective.

In another study Kuran (2009) investigated the effects of the microteaching on the acquisition of knowledge and technique about the teaching profession. 50 students participated to the study. Participants conducted microteaching twice. Researcher compared these two microteaching scores and 93% of the students found the microteaching technique effective.

Çakir (2000) conducted a study at three universities' teacher education department in Turkey context. She investigated the existing position and the perceptions of the instructor to the microteaching technique. She conducted a survey on 41 faculty members. All of the participants thought that the microteaching technique should be used.

Microteaching consists of four main parts. These are planning, teaching, feedback, and re-planning.

Plan: In the planning sessions PSTs supposed to prepare microteaching lesson plans. This step is very important because PST as a microteaching performer determines lesson topic, objectives, the teaching methods, evaluation criteria, required instructional materials etc.

Teach: At the next step, PST performs microteaching. Microteaching environment gives chance to the PSTs to practice teaching situations and improve their reflective thinking skills, so they are supposed to give their

attention on the processes in order to advance the teaching and learning understandings (Huang, 2001).

Feedback: The other step is the feedback part. In this part except the microteaching performer, other PSTs evaluate the microteaching performer's teaching performance. Shulman (1986) claims that in some situations the teaching capacity is considered for evaluating teacher on the other hand, assessment could be considered as the criteria for teacher evaluation and the following points were proposed for the teachers' review and evaluation (p. 5). This step is explained under the caption of "Peer Evaluation" in this part.

Re-Plan: After the feedback session, PSTs will prepare the microteaching lesson plan again by correcting the improper parts of the instructional plan. The evidence based meaningful self-evaluation and peer-evaluation are the most important parts of the microteaching, because these findings will be beneficial for PSTs' teaching skill improvement.

Microteaching environmenst allows the PST to gain experience on the teaching skills and to cultivate the reflective thinking.(Huang, 2001). In microteaching sessions PSTs can learn many useful new things, especially they can learn the application of the teaching skills in the classroom environment. For instance fluency in asking questions, probing questions, higher order questions, divergent questions, reinforcement, recognizing attention behavior, silence and nonverbal cues, closure, lecturing, use of examples, planned repetition, completeness of communication (Allen and Cooper, 1970).

2.1.1 Peer Evaluation

In order to increase the understanding of teaching and learning PSTs are expected to give careful and thoughtful deliberation to microteaching environments (Huang, 2001). Especially the feedback part is important in microteaching process, because in the feedback part microteaching performers could find the chance of how their performance qualified in the evaluators' side. Evaluators give feedback by making reflection while watching the performers' video. Reflection is used for PSTs both consider their own learning and encountered problems; in addition reflection is considered the main component of peer evaluation (Roberts, 2006).

Zink (2010), claims that reflection is a key part of the teaching process because making reflection, students talk on which experince is meaningful and how this learning can be applied in the future. In the microteaching session, besides importance of performing microteaching, feedback session part bring in valuable results both performer and evaluator. In this way, peer evaluation is important because, while peer is watching the microteaching video s/he can model the successful sides of the performer's act and they can take the positive and useful vicarious experiences and refuse the useless ones. In addititon, by making peer evaluation, peers give feedback. Feedback step comes after the teaching part and the PSTs give this feedback by answering different questions which are attached to the related parts of the microteaching (Baird, Belt,Webb, 1967). A study was conducted by Huang (2001) aimed to the explore the PSTs' reflective practice. The reflection of the PSTs' focus on the following eight points: teacher characteristics (82%), delivery of instruction (78%), classroom interaction (40%), subject content knowledge (25%), questioning techniques (23%), instructional aids (15%), students (9%), and general education issues (4%).

About the reflections, the findings of the study shows that the reflective level of the participants are at the reporting level, and explains what had been done instead analyzing the related issues. In the conclusion author discover that reflection contents and the reflective thinking issues was needful to improvement. To supply meaningful reflection support systems in this context recommended. In literature some research results claim that evaluation criteria is needed while generating feedback for microteaching sessions (Subramaniam, 2006). Benton-Kupper (2001) claims that instead of general nature, feedback would be in a detailed way (Subramaniam, 2006, p.667). In order to get evidence based and meaningful feedback, it is required to support the peer evaluators in order to reach them higher order thinking levels, by higher order questions can not be answered directly from the memory or simply and in this point, critical thinking questions prompt the students in order to use ideas instead of remember them (Cooper, J.M., Allen, D.W., 1970).

Reflective thoughts constructs base for the next reflective thought and reflective thought could be considered as a chain (Dewey,1933), so the peer evaluation questions could be asked logical arrangement. Using the cognitive skills and strategies increases the probability of intended learning outcome and the focus of reflective thinking is these learning outcomes. (Halpern, 1996).

2.2 Leraning From Experience

Experince has an important place in learning. In literature, it is mostly claimed that individual can learn from the experinces (Kolb, 1984; Shulman, 1987). Kolb (1987) within the experiential learning theory defines learning as;

"the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience"(Kolb 1984, p. 41)

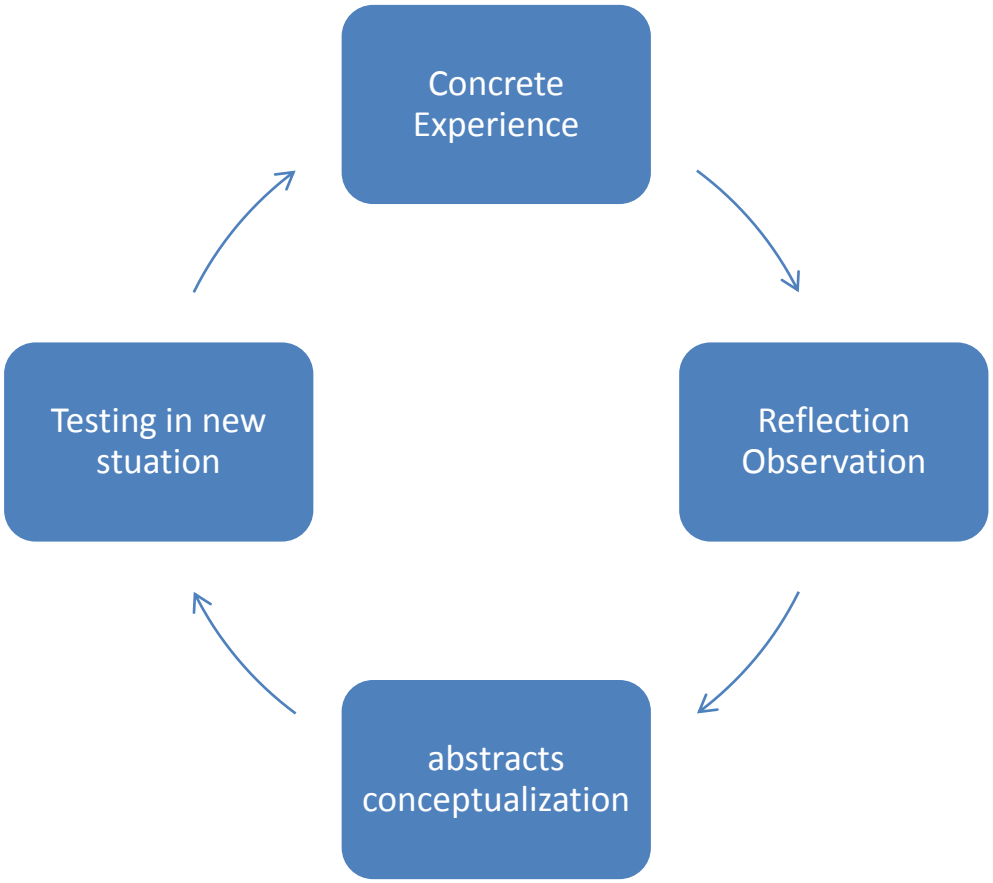


Figure 1 Kolb's Experiential Learning Cycle

Figure 1 illustrates two grasping experience modes of Concrete experience and apstract concepts and two trasforming experince of reflective observation and active experientation. In summary theory shows that the concreate experince forms base for the observation and reflection. The result

of the observation and reflection creates abstract concepts. By the way actively testing this new sutuation can result in creating new experiences. Reflecition is a process in which a professional learns from experiences (Boud & Walker, 1990; Kolb, 1984; Shulman, 1987). Also Bandura (1977, 1981) cliams that from the experinces people developes a universal hope and beliefs in order to compete with the different situations, as called self-efficacy.

2.2.1 Self Efficacy

Self-efficacy notion was rooted from the Bandura' Social Cognitive Theory (1977). Bandura defined the self-efficacy as ''beliefs in one's capacity to organize and execute the people manner in a high sense of courses of action required to produce given attainments'' (Bandura, 1997, p. 3). Bandura (1997) define an integrative theoretical framework to explain and to predict psychological changes achieved by different modes of treatment. In this theory it was stated that no matter in what form, psychological procedures changes the level and the strength of self-efficacy. In this model expectations of personal efficacy were derived from following four mode of information sources; performance accomplishments, vicarious experience, verbal persuasion, and physiological states. Bandura (1977) stated that the self-efficacy not stand on only the individuals' experienced masteries, also vicarious experiences have a great effect on the self-efficacy. By watching the others performances can generate expectations from the reviewers' side. Others' performance encourages them and they feel they could achieve improvement in their self-performance (Bandura & Barab, 1973). While peer is watching the microteaching video s/he can model the successful sides of the performer's act. As Wang et al. sited (2004) Neck and Manz (1992) stated that, mentally to rehearse a task then they are exposed the positive effect of

the task, and this means learn through vicarious experiences. From this looking side it is expected that the PSTs while watching the performer's microteaching, can take the positive and useful vicarious experiences and refuse the useless ones.

2.2.2 Unguided Vs. Ungided Observation of Teaching Experience

Observation is an important process for in teacher. For observation teacher candidates spent very large amount of time in order to gain teaching experience. Bandura (1977,1986) claims that, in teacher education observation is important because most of the individuals learn by observation through modeling. Also, observation is important while learning to teach (Young et. al., 2011). By watching the others' performances can generate expectations from the reviewers' side it means, others' performance encourages them and they feel they could achieve improvement in their self-performance (Bandura & Barab, 1973). By the way observation triggers the activation of self-efficacy (Bandura, 1977). In literature, two types of observation technique were used as guided and unguided observatin (Anderson et. al., 2005). Anderson et. al. (2005) explains that in unguided observation, pre-service teachers are not or little guided by the direction in what to observe, on the other hand, in guided as called focused observation, observer is directed on specific points of teacher and pupil behaviors. Anderson et. al. (2005) claimed that guided observation may limit the ranage of behaviors observation, on the other hand Waxman (1988) stated that guided observation support helps preservice teachers become more aware of the social reality of teaching. However, PSTs in unguided observation can see anythink interesting the classroom setting or they may look to the teaching from a general foci (Anderson et. al., 2005). So guiding the PSTs by specific questions which

focus on the important points of a lesson or allowing the PSTs free to observe can make different contributions on the PTS' self-efficacy levels.

2.3 Reflective Thinking

Reflection has a widespread usage area in educational settings. Dewey focused the attentions on the reflective thinking concept with the book of "How We Think". Then many researcher worked on the reflective thinking issue from different perspectives. Also, Shön, improved the popularity of the reflective thinking concept. There are so many claims in literature on the importance of the reflection while the individual's learning (Bloom, 1956; Dewey, 1933; Rodhkopf, 1966). Dewey (1933) defined the reflective thinking as a kind of better way of thinking that consists in turning a subject over in the mind by giving it serious and consecutive consideration. Shön (1983), explained a connection between reflection and action. He defined this issue in two types of reflection as reflection-in-action and reflection-on-action. According to Schön(1983), reflection in action occures during the event while evaluating and making changes consciously. On the other hand, refleciton-on-action accures before or after the action take place (Freese, 1999). Schön claims that "some of the most interesting examples of reflection in action occur in the midst of a performance"(Shön, 1983, p.54). From this approach, it can be assumed that while teaching process thinking on the existing action and reaction may result in teaching (Freese, 1999). Zeichner and Liston (1996) arguied that while bringing the understanding to the complex situations in the calssroom, reflection plays an important role, in addition, Munby and Russell (1990) think that, by reflective practice, teachers can find the chance of reframing and reinterpreting their experiences from a different looking side. Like this, in most of the studies

researchers claimed the crucial role of the reflection while teaching and leraning processes.

Taggart and Wilson (2005) reflected the prominent reflective thinking definitions:

- *Reflective learning is a problem raising and problem solving. Fact-gathering is combined with deductive processes to construct, elaborate and test hypothesis (Bigge and Shermis, 1992).*
- *[Reflective thinking is] our attempts to understand and make sense of the world (Brubacher, Case, and Reagan,1994, p. 36).*
- *[Reflective thinking is] active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tents (Dewey, 1933, p. 9).*
- *Reflection... refers to the capacity of a teacher to think creatively, imaginatively and at times, self-critically about classroom practice (Lasley, 1992, p. 24).*
- *[Reflective thinking is] a disciplined inquiry into the movies, methods, materials and consequences of education practice. It enables practitioners to thoughtfully examine conditions and attributes which impede or enhance student achievement (Norton, 1914, p. 139).*
- *[Reflective thinking is] a way of thinking about educational matters that involves the ability to make rational choices and to assume responsibility for those choices (Ross, 1989, p22).*

- *[Reflective thinking is] a process involving decision-making in a social political context, identification of problems, a search for satisfactory answers, and investigation of social problems realized in living (Foss and Hannay, 1986).*

- *It [the cycle of inquiry] is initiated by the perception of something troubling or promising, and it is determined by the production of changes one finds on the whole of satisfactory or by the discovery of new features which give the situation new meaning and change the nature of question to be explored (Schön, 1983, p. 151).*

Reflection is important for PSTs' professional development. It gives chances to teachers to think on their work, and understanding view of what the students and they do and by the way they can improve the teaching and learning quality. (A'Dhahab & Region, 2009)(Akbari, 2007). By asking questions, making critics, evaluating learners construct their own knowledge in the situation of perfective thinking help them to construct a bridge between the belief and relatives of teaching (Lee, 2008). By linking the theory and practice reflective thinking helps to make mental activities on the educational issues. (Taggart, & Wilson, 2005).

Although it is known the reflective thinking in learning is very important, but how it can lead to learning is very little known (Resnik, 1987). Also how it can be best promoted in the classroom needs to be investigated (Davis, 2003). Reflection orient can depend on the learners' own thinking and reflection helps learners set goals and improve the understanding (Davis, 2003) and it is a very crutial comonent for teachers' professional development (Dewey, 1933; Schon, 1987; Shulman, 1987).

2.3.1 Questioning

Taggart and Wilson (2005, p.12) sited Heathcoat (1980) stated that by asking effective questions, helps the learner to meet several golas. These questioning approaches listed below:

- Bring focus to an activity
- Cause group members to reflect on alternatives not otherwise discussed
- Promote identification of issues in more depth
- Control the direction of mood of practitioners
- Promote beliefs and values clarification
- Deepen insight of practitioners.

In addition Taggart and Wilson (2005, p.15) sited Heathcoat (1980) stated that real questions must be asked to the practitioners in order to help them to focus on where they are, what and why they are doing it. Also these are the some kinds of effective questions:

- Information seeking questions
- Questions that encourage research
- Questioning that support information
- Questioning that require group decision making
- Class-controlling questions
- Questions that establish mood and feeling
- Questions that foster beliefs and values
- Questions that foster insight

2.3.2 Level of Reflective Thinking

There are different rubrics in literature used in order to determine the reflective thinking levels of the practitioners developed by the scholars depended on the requirements of the contexts. Taggard and Wilson claimed

that the scholars have not been in agreement on the hierarchical nature of reflective thinking, and by considering the different researchers approaches, they clasified the reflection into three modes or levels as technical, contextual, and dialectical and it is illustrated at Figure 2.

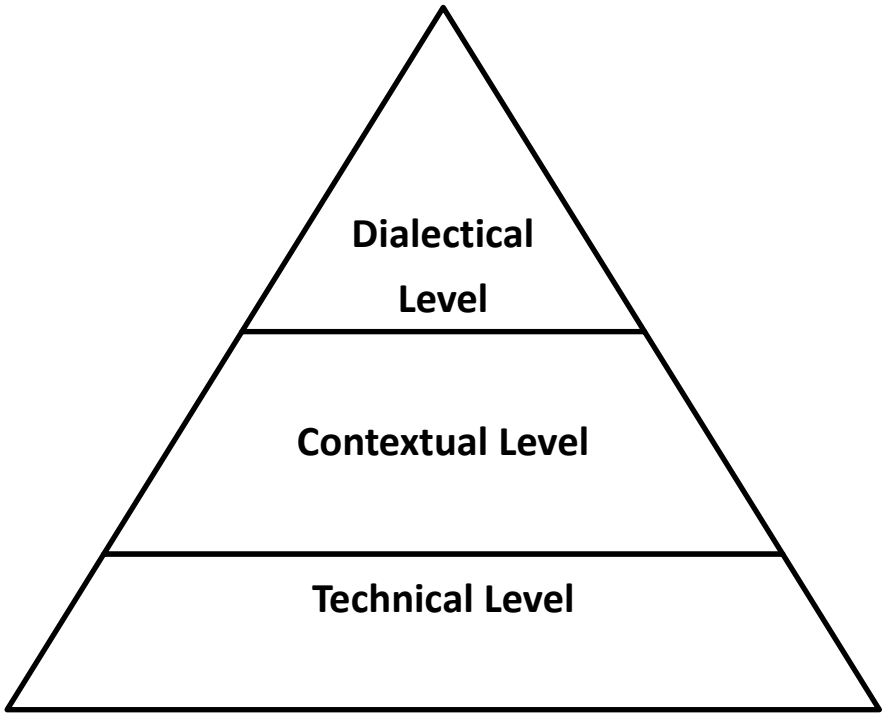


Figure 2 Reflective Thinking Pyramid (Taggart&Wilson, 2005)

Technical Level: Preference past experience; teacher competency towards meeting outcomes; focus on behavior/content/skill; simple, theoretical description.

Contextual Level: Looks at alternative practices; choices based on knowledge and value commitments; content related to context/student needs; analysis, clarification; validation of principles.

Dialectical Level: Addresses moral, ethical, or sociopolitical issues; disciplined inquiry; individual autonomy; self-undenstanding

To systematically assess the reflective thinking little studies has been conducted (Taggart and Wilson, 2005). Thinking under this scope some different classifications of reflective thinking level approaces listed below.

Grimmett et al. (1990) defined the levels of reflection in three levels as technical, deliberative and dialectical. Mezirow (1981) defined the reflecitve thinking in five levels of non-reflective action, habitual action, thoughtful action, introspection, and reflective aciton Lasley (1992) and Taggart (1996) defined the reflective thinking in three levels of technical, contectual, and dialectical. Bain et al.(1999) divided the reflecion into five levels and these levels are reporting, responding, relating, reasoning, reconstructing. Ward and McCotter (2004) served reflective thinking in four levels of routine, technical, dialogic, and trasnformative. Hattan and Smith (1994, 1995) divided the reflection in to four levels. These are descriptive wiriting, descriptive reflection, dialogic reflection and critical reflection. It is possible to give more rubric on reflective thinking levels.

2.4 Scaffolding

The phase of scaffold was first coined by Wood, Bruner and Ross in 1976 (Holton and Clarke, 2006). Wood, Bruner and Ross worked on the

scaffolding. They used and developed this idea. They defined the scaffolding as:

> *"Discussion of problem or skill acquisition are usually premised on the assumption that the assumption that the learner is alone and unassisted. If the social context is taken into account, it is usually treated as an instance of modeling and imitation. But the intervention of a tutor may involve much more than this. More often than not, it involves a kind of "scaffolding" process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts." (Wood, Bruner and Ross, 1976, p.90)*

One of the important point of scaffolding is the supporting of the learner by an expert or a tutor until s/he could perform independently (Puntambekar & Hubscher, 2005). Scaffolding both assists the lerning while working on a complex task and creates an environment for leaning from experience (Reiser, 2004).

Concept of the scaffolding was rooted by the Vygotsky with the idea of Zone of Proximal Development (ZPD). Vygotsky, defined the ZPD as;

> *"The distance between the actual development level a determined by independent problem solving and the levedl of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers." (Vygotsky, 1978, p.86)*

Dennen (2004), defined the scaffolding as a metaphor for a structure which is putted in a place in order to help learners reach their goals in educational environment and removed time by time until no need to its existance. In the educational setting structures can be construted by the achiving the

required learning tasks. According to Sharma and Hannafin (2007), while selecting the learning tasks for individuals the ZPD provides a conceptual framework, on the other hand to support the specific learning scaffolding provides a strategic framework while selecting and implementing the strategies. For this strategies depend on the specifications, different scaffolds can be used depend on their functions. In 1976 Wood at all stated and Holton and Clarke (2006) cited the six key functions of the scaffolding as;

- *recruitment: engaging the child in an interesting and meaningful activity;*
- *reduction: developing the activity around manageable components;*
- *maintenance: ensuring that the child is on-task and on-task for a solution;*
- *marking: accentuating the main parts of the activity;*
- *control: reducing the frustration level of the activity;*
- *demonstration: providing a model of the solution method for the child.*

2.4.1 Purpose of the Scaffolds

Scaffolds have been used for different purposes including reflection and inquiring. The key question here is the what to scaffold. This question is used in order to focus the leaner on the topic or domain or on the learning process which are the metacognitive processes like problem solving and self regulatory processes (Azevedo & Jacobson, 2008). In literature scaffolding can be used for different aims depend on their functions and mechanisms.

Hannafin, Land, and Oliver (1999) expressed the types of scaffolds and their functions in four types. They called these scaffold types as conceptual, metacognitive, procedural, and strategic. To support the learners in technology based environments these four types of scaffolds have potential usage areas.

Conceptual scaffolds are used to guide the learner when solving a problem in terms of what to consider. This approach can be achived by using of certain tools for particular strategies or providing needed hints and prompts, and also giving stracture maps and content trees.

Metacognitive scaffolds guide the learner while learning in terms of how to think by modeling cognitive strategies and self-regulatory processes. This type of scaffold also reminds learners for reflection about the goals of the instruction and prompts the learner in order to direct for using the resources.

Procedural scaffolds are used how to utilize the available recourses and tools. This scaffolding type is used in order to aid the learner in the open lerning environment by orienting the system features and functions. By the way learner can be returned to a desired location.

Strategic scaffolds emphasizes alternative approaches in order to support analysis, planning, strategy and tactical decisions in the open ended learning environment. It rovides alternative approach in order to identify and select the needed information, and also for evaluating available resources and making connection with the existing knowledge to new one and experince. This type of scaffold uses the start-up questions to triger the

learners in order to provide an explicit strategic clue for the learners who need a place to begin.

2.4.1.1 Cognitive-metacognitive Scaffolds

For cognitive and metacognitive purposes scaffolding has a widerange of usage. In order to scaffold the learner in the positions of "what to", "when" and "how to", cognitive and metacognitive scaffolds can be used. (Azevedo and Jacobson, 2008). The effect of the scaffolds differs among the different learners, depens on their the exisiting cognitive and metacognitive skills so while determing the type of the scaffold, the learner characteristic becomes very important. Reseach suggests that lack of prior knowledge learner needs both content and process scaffold on the other hand high prior knowledge learners may need process scaffolds more than content (Azevedo, Jacobson, 2008). In this scope, domain-general and domain specific scaffolds have a widely usage area for supporting the different cognitive and metacognite levels of the learners.

Hattan and Smith (1994) cited that Gore and Zeichner (1991) and Pugach (1990) emphasised the importance of links between metacognition and critical reflection in interpreting their findings and they claimed to that in scope of teacher education programs the literature of critical reflection must be included. Also Hattan and Smith (1994) cited and Palinscar (1986) stated that in teacher education programs scaffolded interaction is needed to develop in terms of modelling the skills of self-monitoring which is needed to critical reflection.

In a study, McNeill and Krajcik (2006) investigated whether provided context-specific or generic written curricular scaffolds best support the middle

school students while they are writing scientific explanation. Results revealed that the context-specific scaffolds resulted in greater student improvement on the students' scientific explanations and understanding level of their science content.

In another study Bell and Davis (2000) claims that using generic prompts allow or force the learner to reflect in their own ways, in addition help the students to understand their weaknesses in their existing knowledge and they could find more opporunities to integrate their knowledge.

2.4.2 Types of the Scaffolds

After the scaffolding concepts were coined, by the years new scaffolding types have been introduced. In literature the first version of the scaffolding mostly focus on the parent interaction with the children and then focus shifted to teacher-student interaction in the classroom which is called by Saye and Brush (2002) as "soft scaffold". It can be seen on the last studies, with the opportunities of the technological development, in technology supported learning environment scaffolding has not restricted to individual interaction form, and can be used in the mutimaedia and hypermedia embedded environments. Saye and Brush (2002) called this types of scaffolds as "hard scaffolds". In literature there has been different types of scaffolds defined and used. By Bereiter and Scardamalia (1987) two types of scaffold, procedural facilitation and substantive facilitation, have been defined.

2.4.2.1 Technology-Based Scaffolds

Technology based scaffolds are used for variety of environments in the educational settings and there has been so many studies conducted about

this issue. As Sharma and Hannafin (2007) claimed that in order to direct and enhance the learning via the use of the computers the technology-based scaffolds can be used.

Different types of scaffolds have been adopted in technology enhanced learning environments (TELEs). TELEs are different from the traditional learning environments in terms of usage of computers to direct and enhance learning (Sharma and Hannafin, 2007). In computer-madiated learning environment, Ping and Swe (2004) made a categorization on the exsting scaffolding startegies as orienting strategies, peer interaction, prompts, and modeling.

Technology based scaffolds have been used to prepare the learners for the learning environment by giving guidances and making connections to existing ones and personal experiences. For instance Edelson et al. (1999) designed "staging activities" used for sequences of structured investigations and used the "bridging activities" which is a type of visualization method used to articulate the learners' initial conceptions. Kolodner et al. (2003) used a tool named "messing about" which enables the learners to design and buld an initial model depend on their prior knowledge.

Technology based tools have been used to help the learners to understand a task, decompise a problems, and gain strategies by displaing dicipninary strategies (Edelson et al., 1999, Quintana et al., 2004). Tehnology is a general concept and this concept includes especially computers supported learning environments. Jonassen (1999) called these computer based learning environments as Mindtools and claims that Mindtools are used in order to engage the leaners in constructive, higer-order thinking and critical thinking

on the studying subjects. Midtools for scaffolding are used to assist the students while they are interpreting and organizing their personal knowledge within a complex content (Hwang, Shi and Chu, 2011).

To support the learners' reflective skills on the process of planing, monitoring, and evaluation technology based tools have been used. These tools have been used to help the leaners to see their thinking and learning process explicitly (Lin, Hmelo, Kinzer, and Secules, 1999).

In literature, video-based teacher education pedagogy can be collect on teo topics of learning from exemplars, and self-reflection (Lee and Wu, 2006). With the help of watching video PSTs could analyze, evaluate, and improve their teaching performance (Lee and Wu, 2006). And in the online environment reviewing the peers videos gives an opportunity of receiving teaching tips from their peers (So, 2009).

In addititon, embedded computer-based scaffolds have been used to enhace the PSTs' reflective practice. In order to support the PSTs reflection, Lin at al. (1999) declared four types of computer based scaffolding strategies. First one is the process prompts which were used to help the PSTs to track and understand their process by reveailing appropriate questions. The second one is the process displays which were used to make the tacit learning process explicit and overt. The third one is the process modelling which is used to make focus the leaner on the process that an expert would use in order to think about or solve specific problem. The last and the fourth one is the reflective social discourse which is used for creating community-based discourse in order to provide multible perspective and feedback for making reflection.

2.4.2.2 Prompt Scaffolds

Prompt scaffolds have been used in different environment for different purposes. For instance used in softwares enable the learner to track and understand their learning process. In specific, prompts are important for the learners in the situation of problem solving task (Lin at al., 1999). In literature prompts have been used in the forms of hints, reminders, sentence starters and questions.

To support the scientific explanation and argumentation, prompts have been used (Bell and Davis, 2000). Sandoval provided the prompts in BGuILE environment by using Explanation Constructor software (1998;2003). Research gave hints to learners about what they could include in their explanations.

Lee and Songer (2004) conducted a study on the prompts in the forms of exemplars, questions, and sentence starters provided to forty-eight students in two fifth and sixth combined classes. Analysis of pre-post tests, written explanations, and post interview transcripts of selected students showed that diversity knowledge of the students and their explanation ability to match given evidence to a claim become stronger.

Question prompts are used to trigger the learner's response by using different question types for different cognitive levels. (Wandberg & Rohwer, 2010) These cognitive levels as defined by Bloom's taxonomic levels (1956) could be supported by using different question prompts. In promoting the higher levels of reflection, prompts and questioning as scaffolding strategy has been most widely in used (Lai, 2008). Lin et al. defined the aim of the questions as;

> *"Questions prompt students to articulate the steps they have taken and decisions they have made, facilitating their understanding of the reasons behind actions" (Linn el al., 1999, p.49).*

To facilitate the construction of the knowledge for the leaner, the open questions have been in usage (Holton and Clarke, 2002).

A study was conducted by Xie and Bradshaw (2008) to investigate the effects of the question prompts and online peer collaboration on solving ill-structured problems. In to this experimental study sixty undergraduate students were assigned into four groups named collaboration with question prompts, individual with question prompts, collaboration without question prompts, and individual without question prompts. In the study they were asked to solve real world ill-structured problems and the results revealed significant effects of question prompts in ill-structured problem solving at both overall and univariate levels.

In another study conducted by Chen and Bradshow (2007), question prompts were used to examine the effects of question prompts, knowledge integration prompts, and problem solving prompts, embedded in a Web-based learning environment in scaffolding preservice teachers' conceptual understanding and problem solving in an ill-structured domain. From the quantitative analysis, results showed that that in overall problem solving performance, students received knowledge integration prompts had significantly higher scores, on the other hand the same was not true for prompts focused on conceptual knowledge.

2.4.2.3 Peer and Teacher Based Scaffolds

For fostering cognitive and metacognitive thinking peer interaction has been come into prominence in the literature. It was claimed that to promote reflective and develop thinking, the peers could give effective scaffolds (Tudge, 2000). King conducted studies on peer questioning and put forth that information, explanations, and feedbacks given by the peers create valuable results for the learners in terms of activation prior knowledge and enhancing learning (1991; 1992; 1994). Greene and Land (2000) found the effective side of the peer interaction if suggested groups members were ready to negotiate ideas and share their experiences.

On the other hand teachers are the important factors while arranging of learning elements and included values of psychology, pedagogy, technology in the learning environment (Hannafin et al., 1999; Saye and Brush, 2002). Through the investigation teacher can scaffold the learners by using conceptual modeling tools, closing the content knowledge gaps, and giving reminders for investigations (Fretz et al., 2001). Teachers can prompt the learners to make reflections by asking questions.

2.4.3 Format of the Scaffolds

In literature scaffolds were used in different forms. Timing of the scaffold and their durations are important. For instance White and Frederiksen (1998), used the prompts after each activity, on the other hand, Davis (2003) gave some prompts before the activity and some of the others after the activity and also she found that the students were more reflective to the prompts when the directed prompts were given before the activity. In this part scaffolds will be explained in three main forms of soft-hard, continuous-faided and guided-unguided.

In literature the first version of the scaffolding mostly focus on the parent interaction with the children and then focus shifted to teacher-student interaction in the classroom which is called bye Saye and Brush (2002) as "soft scaffold". It can be seen on the last studies, with the opportunities of the technological development, in technology supported learning environment scaffolding has not restricted to individual interaction form, and can be used in the mutimedia and hypermedia embedded environments. Saye and Brush (2002) called this stypes of scaffolds as "hard scaffolds".

In other words soft scaffolds can be called as dynamic scaffolds. Dynamic scaffold has a flexible structure that can adapt to a dynamic environment. They are used in divergent situations depends on the learner's existing background knowledge and responses, on the other hand static scaffold have not carry a flexible structure. In all positions static scaffolds make the same effect to the learning environment.

Although Saye (2002) classified the technology based scaffolds "hard" and others "soft", in technology based environments soft scaffolds can be used by adoptive approaches. In addition, a teacher without any technology enhancement can use a hard scaffold as statically in the classroom environment.

After the learner reached the intended learning level, it is expected that learners could continue their way without any support so by fading the scaffold, its effect removes form the learning environment gradually. By fading the scaffold, control of the learning environment could transfer to the learner's responsibility (Puntambekar & Hubscher, 2005; Stone, 1998; Wood

et al., 1976; Vygotsky, 1978). Via the cognitive scaffolding, learner could reach a place where they could not achieve to reach by stimulating the learner actively in the zone of proximal development and after the learner reached to intended learning outcomes, the scaffold can be removed from the environment, however, the 'memory' of the scaffolding may still remain (Holton and Clarke, 2006).

After the learner gains independence, and no longer needs to complete the desired task, so this form fading of scaffolds occure (Dennen, 2004). As Sharma & Hannafin (2007) cited Leper, Dake O'Donnell-Johnson (1997) stated that after the scaffolding removed from the environment, without support structure stands on and they explained the scaffolding interaction in three points:

a) For the achievement of the related task the scaffolding supports the learner beyond the unassisted capacity of the learners.
b) After the support removed from the environment the learners can continue on the process their own.
c) There is no change on learning of functioning after the scaffold removed, on the contrary, they can function on the process.

In literature there were studies found different result on which the researches compared the continuous and the fading approaches. Lee and Songer (2004) compare the continuous and fading prompts in the domain specific support condition. Results showed that the both groups learners represent knowledge gain, but in the writing scientific explanations continous domain-specific support group members were bether than the fading domain-specific support group members. On the other hand NcNeil el al. (2006) conducted conducted a study compared the effect of the fading

and continuous prompts on domain-general and domain specific environments and the results showed that the faded group learners were better than the continuous supported group in terms of learning of scientific explanations.

On the other hand, in order to construct the learning, guidance is an important approach in the TELEs. Learning is a complex issue and includes so different mental processes. Peer analyzing, peer assessment, decision making are requires more cognitive processing, critical thinking, and decision making processes (King, 2002). For promoting the different kinds of the cognitive processing is needed to ask different sort of questions, so engaging in these types of processes strengthens the understanding (king, 2002). In order to direct the learner on the specific point about to reach the appropriate leaning goals, question prompts are used as scaffolds. (Azevedo and Hadwin, 2005)

Ge and Land (2003) conducted a study on the effects of the question prompts and peer interaction in an ill structured task in problem presentation. They found that the significant effect of the question prompts in a positive way on students' problem solving performance.

In one study, King (1991) compared the 3 groups of 5th grade students. Groups are guided group, unguided group, and control group. While guiding the group peer questioning strategy was used. The guided group students asked more strategic questions, and they were better than the unguided questioners and control group students on problem solving and novel computer test. Using guided questioning promts the students to create their own questions in higher order level. By asking and receiving

these types of questions helped the students to construct the knowledge in long term memory.

Davis (2003) conducted a study in order to investigate the way of prompting students for reflection. She investigated the research question of "Do students merely need to be prompted to reflect, or do they need guidance in reflecting productively?" In the study two types of scaffolds, generic and directed, were contrasted. The results of the study show that the directed group students reflected unproductively responded to the prompts than the generic group. Also, the generic prompt students developed more coherent understandings than the directed group students.

At the suggestions part of the article for the future researches Chin and Osborne (2008) claims that in recent years studies on the students' questions drawing an increase diagram, and add that the conditions requirea< to the using of the question prompts so findings take us to investigate the following question:

> *"How can questioning scaffolds (such as question prompts, curiosity-provoking stimuli and computer-based supports) be used to foster students' questions in a variety of specific science learning contexts?" (Chin and Osborne, 2008, p. 32).*

These studies shows that in this situation using scaffolds is required. It is a really hard work to evaluate someone, so in this situation it is required to scaffold the peers in order to help to think higher order thinking level and by the way they can make valuable and evidence based critical thinking while evaluating the peers. The reflection process could give chance of to monitor their own knowledge construction and make a connection with new ideas to the existing ones and generates new ones for self-reflection

and evaluation. Most of the studies in literature are on the effects of the scaffolds on the problem solving skills and science learning there was not enough studies looked at how question prompts can be used to foster reflective thinking while pre-service teachers are giving feedback to their peers.

CHAPTER 3

METHOD

In this chapter, research method and design of the study for investigating the effects of question prompts on preservice teachers' (PSTs) reflective thinking levels and self-efficacy is explained in a detailed way. In addition the research design, setting of the WBPES, data collection procedures, analysis procedures, and data collection instruments are described.

3.1 Research Design

The aim of this study is to explore the effects of the web-based video embedded question prompts on PSTs' reflective thinking and the self-efficacy levels. For this purpose, a true experimental study was designed and applied.

Fraenkel and Wallen (2006) claimed that the experimental study is the one of the most powerful research method for researchers and they also stated that in order to establish cause and effect relationship among the variables the experiment was the best way. This method allows researchers make observation under a controlled environment about the effects of systematical change on one or more variables by manipulating the independent variables (Johnson & Christensen, 2004). Because of these

active manipulation properties, experimental design best suited requirements of this study.

Since the amount of the change over the time was assessed in the study, it is necessary to use pretest-posttest design (Fraenkel & Wallen, 2006). As shown on Table 1, the randomized pretest-posttest control-group design was constructed for this study. In this research design two subject groups were used as treatment group and control group. Participants were randomly assigned to each group and both groups were measured before and after the study for dependent variables of reflective thinking and self-efficacy.

Table 1 Design of the Study

The Randomized Pretest-Posttest Control Group Design				
Treatment Group	R	O	X	O
Control Group	R	O	C	O

3.1.1 Research Questions

This study investigated the following research questions:

Research Question 1: Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service teachers' (PSTs) reflective thinking level over the peer assessment sessions?

> H_0 = There is no statistically significant difference between the pre-service teachers' (PSTs') reflective thinking levels before and after the use of question prompts embedded in a web-based video analysis system.

Research Question 2: Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service teachers' (PSTs') self-efficacy levels?

> H_0 = There is no statistically significant difference between the pre-service teachers' (PSTs') self-efficacy levels before and after the use of question prompts embedded in a web-based video analysis system.

In Table 2, research questions, instrumentations, and analysis methods are summarized for each research question.

Table 2 Summary of Research Questions, Instrumentations, and Analysis Methods

Research Questions	**Design**	**Instrumentation**	**Analysis**	**Validity Reliability**
Research Question 1: Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service computer education teachers' reflective thinking level over the peer assessment sessions?	Randomized pre-test post-test design	**Data Collection:** Analysis of the *Pre-test:* Microteaching Video Evaluation Reports *Post-Test:* Microteaching Video Evaluation Reports (same video) **Rubric:** Pretest and posttest of Reflective Thinking Evaluation	ANOVA	Inter-rater reliability
Research Question 2: Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service computer education teachers' PSTs' self-efficacy levels?	Randomized pre-test post-test design	**Data Collection:** Pretest-Posttest of Turkish version of Teachers' Sense of Efficacy Scale Test (TTSEST)	Repeated MANOVA	Valid and Reliable Test

3.2 Sample

Participants included 55 PSTs enrolled in the Computer Education Teaching Methods Course at Department of Computer Education and Instructional Technology at METU during 2009-2010 spring semester. Computer Education Teaching Methods course is a must course and aim to provide applications of the teaching methods and techniques in the classroom.

There are 45 male and 10 female students, aged between 21 to 27 years old. Because of the researchers' accessibility to the subjects, convenience sampling was used in this study. Participants were randomly assigned to control and treatment group . Table 3 shows the distribution of PSTs in terms of groups and gender.

Table 3 The Distribution of the PSTs in Control and Experimental Groups by Gender

Gender	Groups		
	Control Group (%)	Experimental Group (%)	Total
Female	7 (25.9)	3 (10.7)	10 (18.2)
Male	20 (74.1)	25 (89.3)	45 (81.8)
Total	27 (100)	28 (100)	55 (100)

Participants had not been trained on instructional planning since they took courses about preparation of lesson plan in the previous semester at the

CEIT department. Participants were not also given any training about reflective thinking, but they were familiar writing reflection.

3.3 Setting (Web-based Peer Evaluation System)

This study was conducted in Computer Education and Teaching Methods II (CEIT 382) course at Middle East Technical University during spring 2010. This course has been offered to the junior PSTs. The aim of this course is to teach the PSTs on teaching and learning process and instructional strategies in computer education and instructional technology.

In previous year, the CEIT 382 course microteaching sessions had been conducted, and in these sessions paper based peer evaluation forms had been used. It was expected from the peers to write down peer reflections on the paper-based forms, but it was realized that PSTs did not provide reflective feedbacks which means that they only reported what they see without making higher order thinking. According to observation of the researcher, this problem can be arised because of a number of possible reasons. The first possible reason is that they had to complete these peer feedbacks during the microteaching sessions which was about only twenty minutes for each performer. The second one is that they had to give feedbacks while they were watching microteaching performance. In addition to peer side problems, administration of the paper based system was very problematical for the instructor.

Because of all these problematical issues about the paper-based system, this Web-based Peer Evaluation System (WBPES) developed by the researchers specifically for this study. In addition to helping PSTs evaluate peers' microteaching videos, the system was used as a data collection environment

thoughout the study. The web address of the online system is http://www.micro-teaching.net.

WBPES includes four sections. These are Login Page, Peer Reviewer's Main Page, Peer Evaluation Page and Admin Control Panel. Details of the WBPES is described in the next section with screenshots.

3.3.1 Login Page

WBPES is an online platform that users can access after an authorization control. Specific userid and password was assigned to each participant (Figure 3).

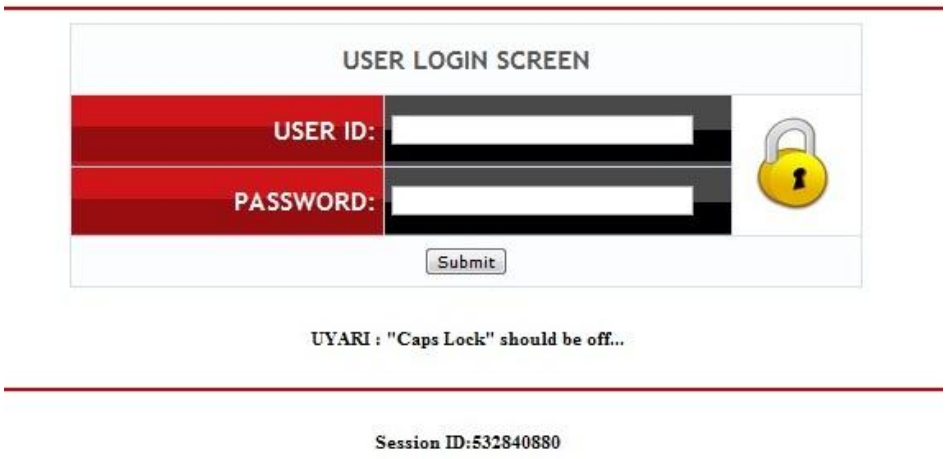


Figure 3 WBPES Login Page

3.3.2 Peer Reviewer's Main Page

After participants log in the system, they are directed to the WBPES Main Page where they can see the list of the videos that were assigned for peer revision for that week. Every week each participant were supposed to watch three microteaching videos and make reflections. Participants completed these videos anytime and anywhere in five days period. During this period they had a chance of editing their reflections. On this page, they could see the parts they had completed, labeled with green, and the parts had been missing , labeled with the red notifications (**Hata! Başvuru kaynağı bulunamadı.**).

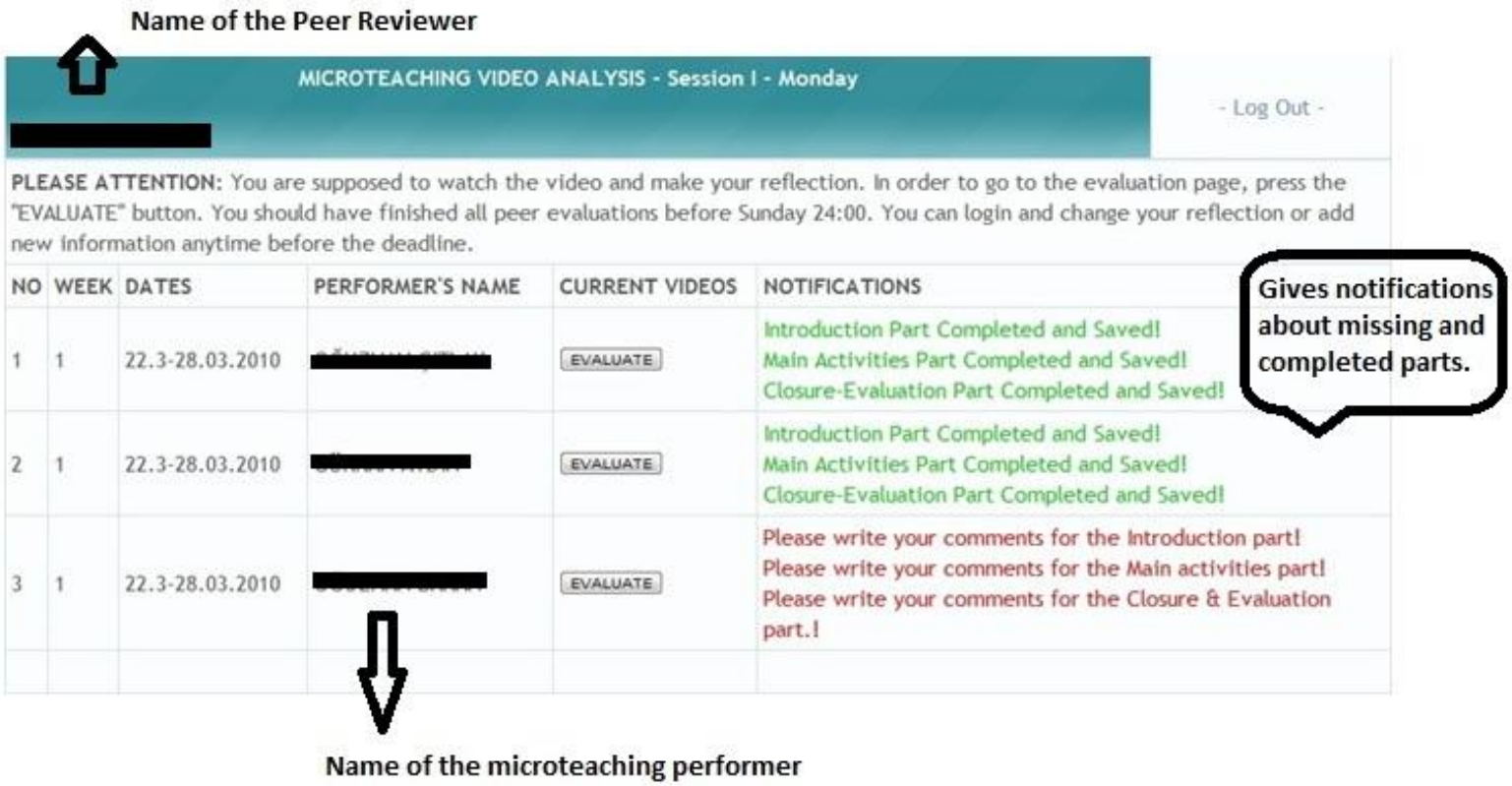


Figure 4WBPES Main Page

3.3.3 Peer Evaluation Page

After participants selected the video to evaluate on the WBPES Main Page, they were directed to the Peer Evaluation Page. Peer Evaluation Pages were designed for participants to give feedbacks on their peers' microteaching videos by writing down reflections on the reserved text areas. Microteaching videos were stored on the video server of VIMEO ®, they were protected with a password. This password was given to all participants.

Evaluation pages for both control and experimental groups included microteaching video, materials for the video (lesson plan, activity papers, and evaluation sheets), and reflection text areas. However, there are some differences between two group's Evaluation Pages, including the presentation of the video and the reflection text areas.

For the experimental group, video was divided into three parts, including introduction, main activities, and closure-evaluation. However, for the control group, microteaching video was presented as a whole. Both groupsgraded microteaching videos out of 10.

Reflection text areas for the control and experimental groups were also different. For the control group, three text boxes were provided only with headings as the introduction part, the main activities part, the closure-evaluation without question prompts (Figure 5). On the other hand, for the experimental group, participants were provided with twelve questions prompts, three for the introduction part, six for the main activities part, and three for the closure-evaluation part (Figure 6, Figure 7, and Figure 8).

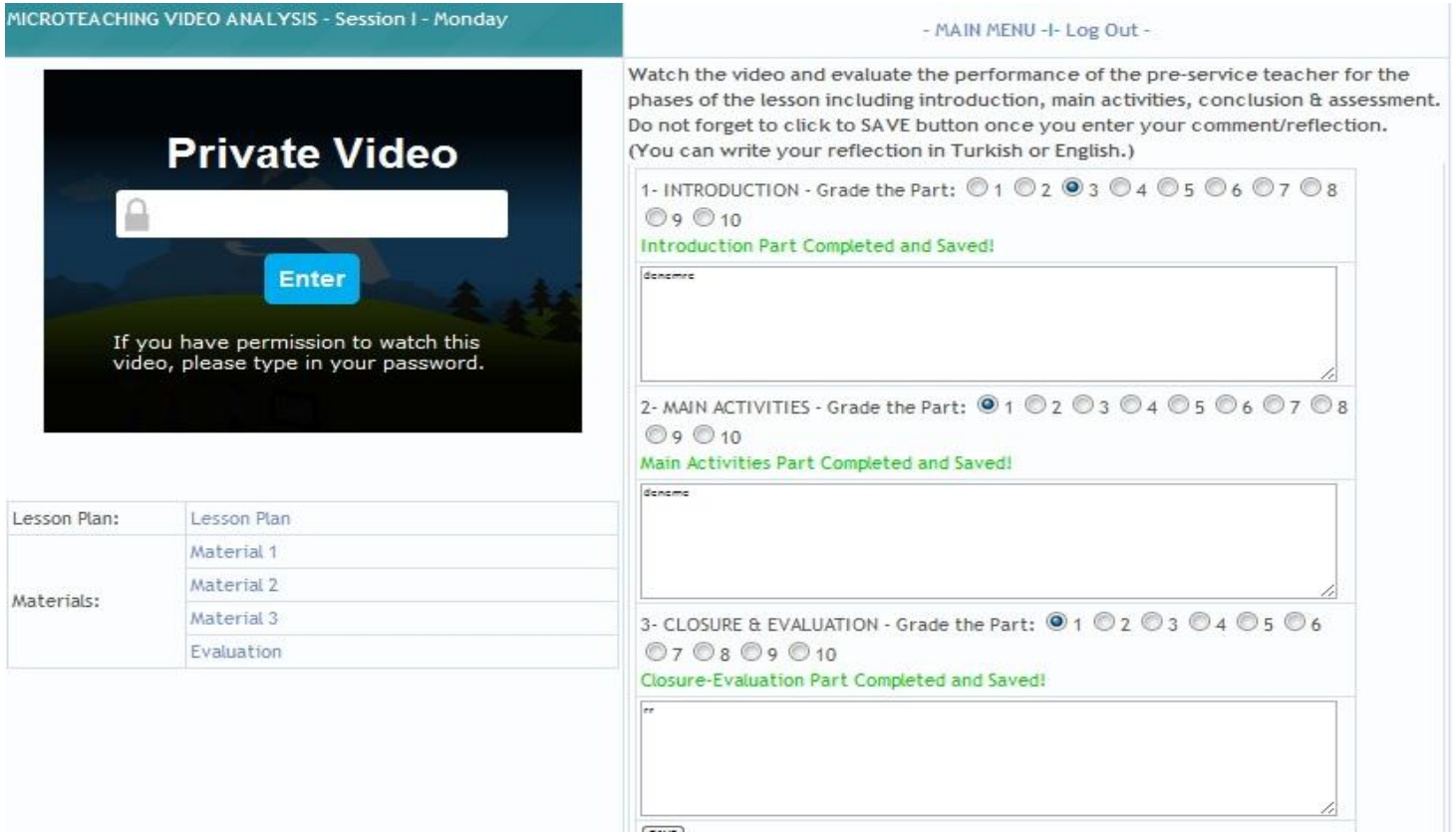


Figure 5 Unguided WBPES Screenshot

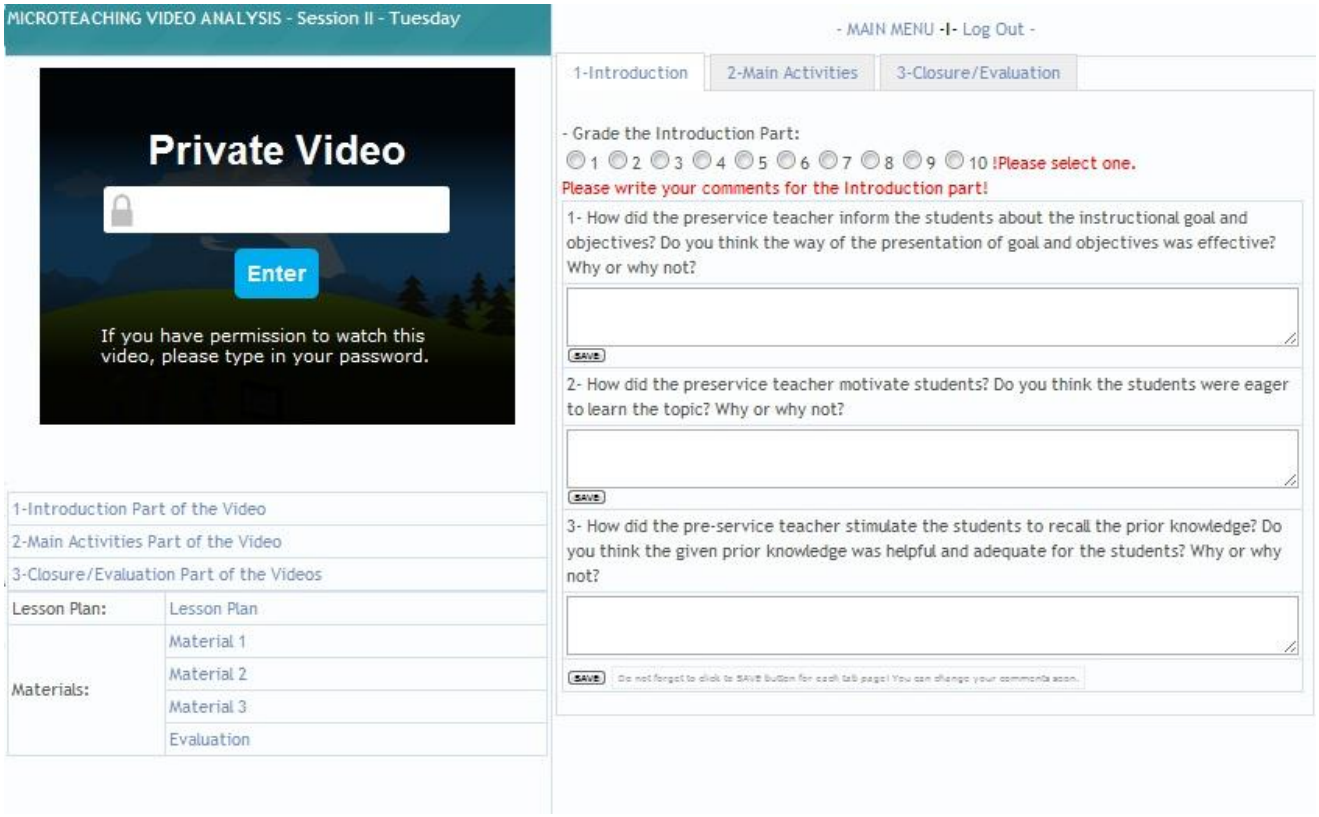


Figure 6 WBPES Experimental Group Peer Evaluation (Introduction Page)

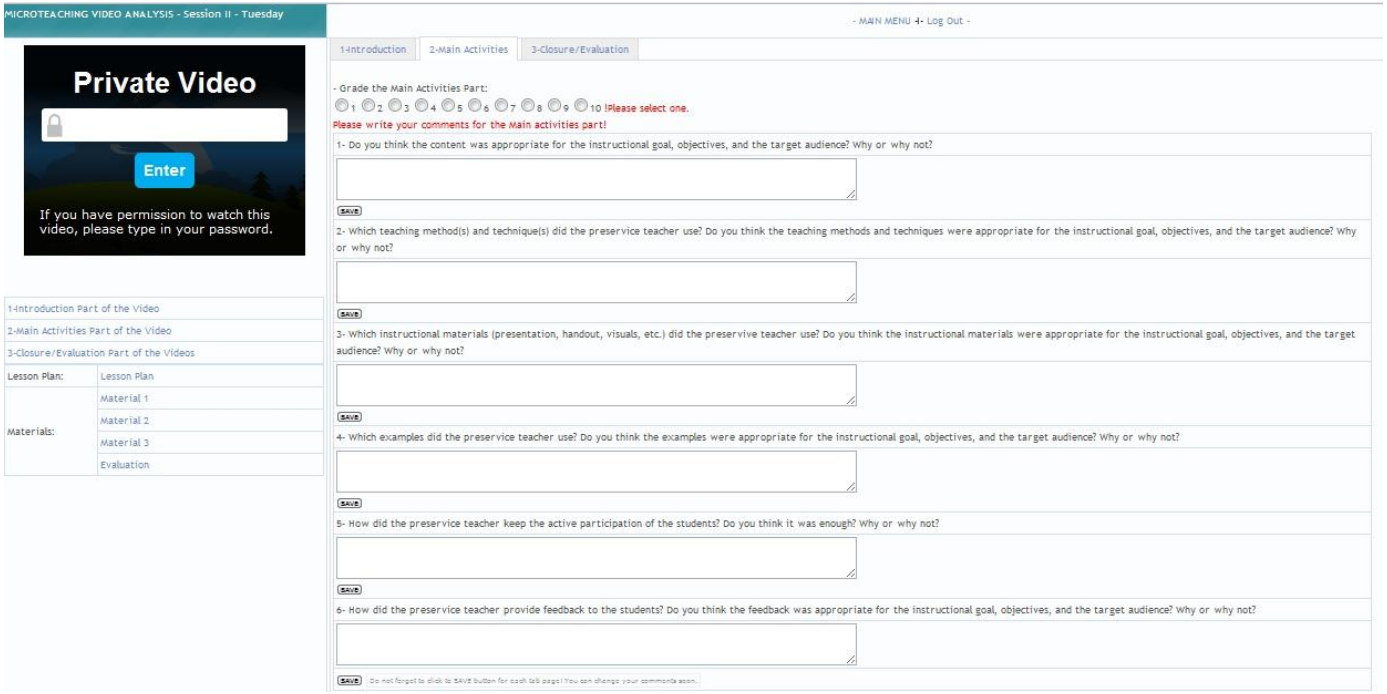


Figure 7 WBPES Experimental Group Peer Evaluation Page (Main Activities)

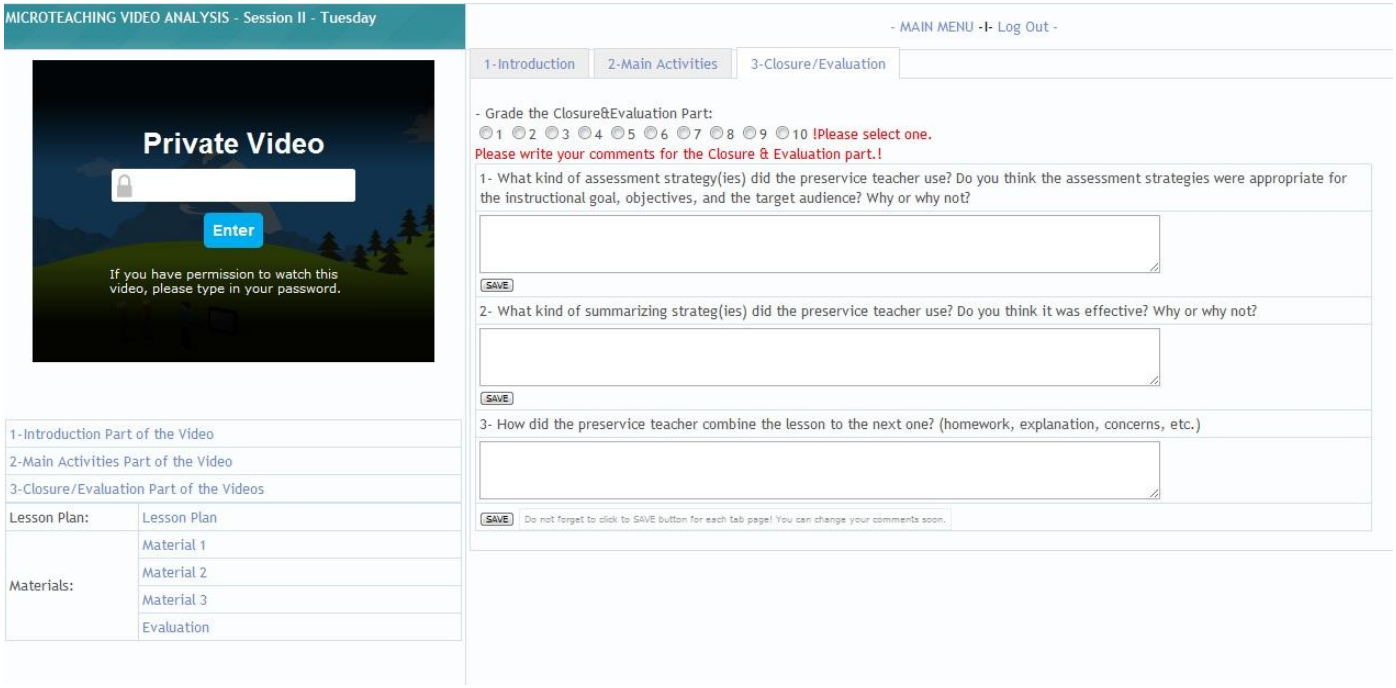


Figure 8 WBPES Experimental Group Peer Evaluation (Closure-Evaluation

3.3.4 Self-Reflection

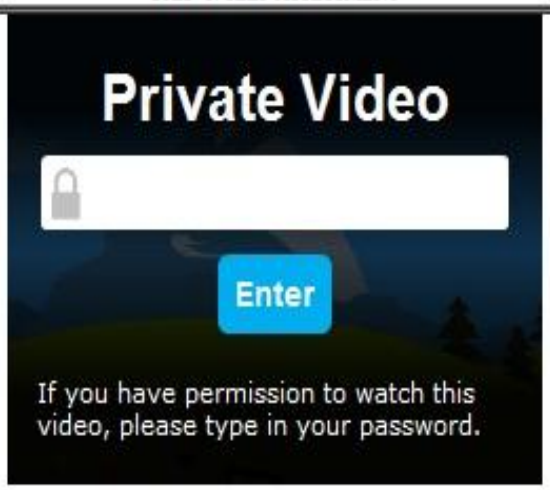
Self-reflection pages consist of three steps, Step 1, Step 2, and Step 3 which are explained in a detailed way below. Both control and experimental groups completed all three steps.

3.3.4.1 Self-Reflection: Step-1

At the first step, participants had a chance of watching their own microteaching performance video. In this step, it was expected from them to write down their most important strong aspects and the most important weak aspects about their microteaching videos. Participants were not allowed to turn back to Step 1 after completing (Figure 9).

ID: e138216

STEP-1: SELF ASSESSMENT



1-Introduction Part of the Video
2-Main Activities Part of the Video
3-Closure/Evaluation Part of the Videos

Please, watch your microteaching performence video and describe:
(You can write your reflection in Turkish or English.)

1. Describe the strong aspects of your microteaching. Please add only one aspect for each time. Click add more!

+ add more!

1	Sınıfa hakimiyet, özgüven ve emin hareket ve tavırlar yeterli ölçüde olmuştur. Buna ek olarak ses tonu, tonlama ve heyecanın makul ölçüde olup rahatsız edici bir etkisinin bulunmaması olumlu özellikler arasında sayılabilir.	EDIT	DEL
2	Ders sırasında kullanılan anlatım dili ve öğrencilerle kurulan ikili ilişkiler gayet etkili ve düzgündür.	EDIT	DEL

2. Describe the weak aspects of your microteaching. Please add only one aspect for each time. Click add more!

+ add more!

1	Dersin sunuluşu sırasında kullanılan powerpoint slaytı çok etkili ve görsel açıdan zengin olan bir sunum olmamıştır. Görsel açıdan daha zengin ve etkili bir sunum olabilirdi.	EDIT	DEL

After you click to "NEXT STEP", you will not able to find a chance to change your reflections for STEP-1, so complete your work and then click "NEXT STEP".

NEXT STEP

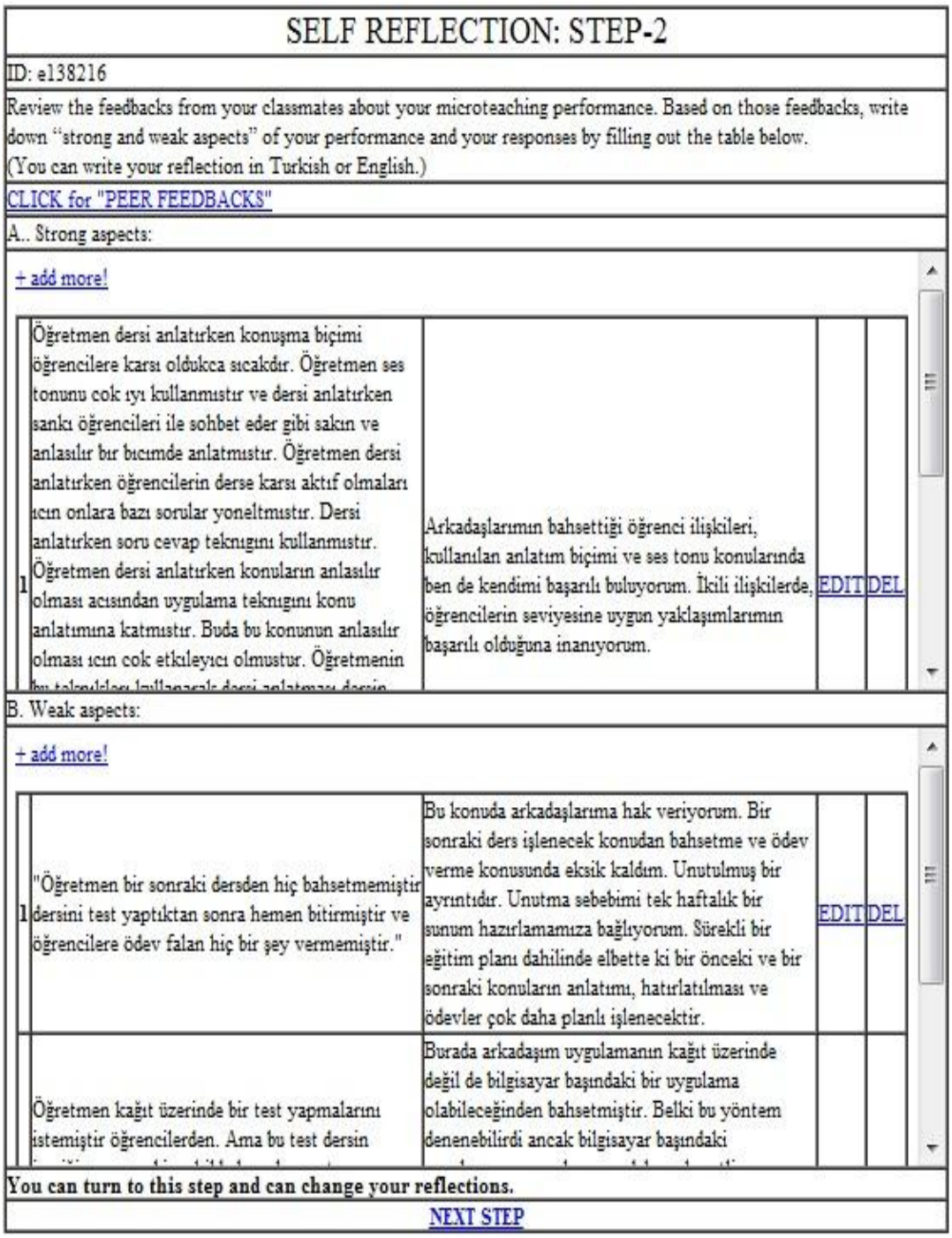
If you want you can logout and continue later.

LOGOUT

Figure 9 Self-Reflection Step 1

3.3.4.2 Self-Reflection: Step-2

After completing the Step 1, participants were directed to the next step. In step 2 the peer feedbacks made by peers were given to the participants. They criticized the feedbacks and they wrote down answers to these claims from the vision of weak and strong aspects (Figure 10).



SELF REFLECTION: STEP-2

ID: e138216

Review the feedbacks from your classmates about your microteaching performance. Based on those feedbacks, write down "strong and weak aspects" of your performance and your responses by filling out the table below.
(You can write your reflection in Turkish or English.)

CLICK for "PEER FEEDBACKS"

A.. Strong aspects:

+ add more!

1	Öğretmen dersi anlatırken konuşma biçimi öğrencilere karsı oldukca sıcakdır. Öğretmen ses tonunu cok ıyı kullanmıstır ve dersi anlatırken sankı öğrencileri ile sohbet eder gibi sakın ve anlasılır bır bıcımde anlatmıstır. Öğretmen dersi anlatırken öğrencilerin derse karsı aktıf olmaları ıcın onlara bazı sorular yoneltmıstır. Dersi anlatırken soru cevap teknıgını kullanmıstır. Öğretmen dersi anlatırken konuların anlasılır olması acısından uygulama teknıgını konu anlatımına katmıstır. Buda bu konunun anlasılır olması ıcın cok etkıleyıcı olmustur. Öğretmenin	Arkadaşlarımın bahsettiği öğrenci ilişkileri, kullanılan anlatım biçimi ve ses tonu konularında ben de kendimi başarılı buluyorum. İkili ilişkilerde, öğrencilerin seviyesine uygun yaklaşımlarımın başarılı olduğuna inanıyorum.	EDIT	DEL

B. Weak aspects:

+ add more!

1	"Öğretmen bir sonraki dersden hiç bahsetmemiştir dersini test yaptıktan sonra hemen bitirmiştir ve öğrencilere ödev falan hiç bir şey vermemiştir."	Bu konuda arkadaşlarıma hak veriyorum. Bir sonraki ders işlenecek konudan bahsetme ve ödev verme konusunda eksik kaldım. Unutulmuş bir ayrıntıdır. Unutma sebebimi tek haftalık bir sunum hazırlamamıza bağlıyorum. Sürekli bir eğitim planı dahilinde elbette ki bir önceki ve bir sonraki konuların anlatımı, hatırlatılması ve ödevler çok daha planlı işlenecektir.	EDIT	DEL
	Öğretmen kağıt üzerinde bir test yapmalarını istemiştir öğrencilerden. Ama bu test dersin	Burada arkadaşım uygulamanın kağıt üzerinde değil de bilgisayar başındaki bir uygulama olabileceğinden bahsetmiştir. Belki bu yöntem denenebilirdi ancak bilgisayar başındaki		

You can turn to this step and can change your reflections.

NEXT STEP

Figure 10 Self-Reflection Step 2

3.3.4.3 Self-Reflection: Step-3

In step 3, participants were provided with 3 questions. General questions were asked. In the first question they were asked in order to improve your teaching performance, how they would design and present their instructional planning and microteaching respectively in terms of the active learning strategies, teaching methods, materials, assessment, and general communication skills. At the second question they were asked to define the similarities and differences between their intentions and actual implementation in their microteaching. At the third and the last questions they were asked think on the effect of this microteaching experience on their future lessons and wanted to write their new learning, discoveries, and insights (Figure 11).

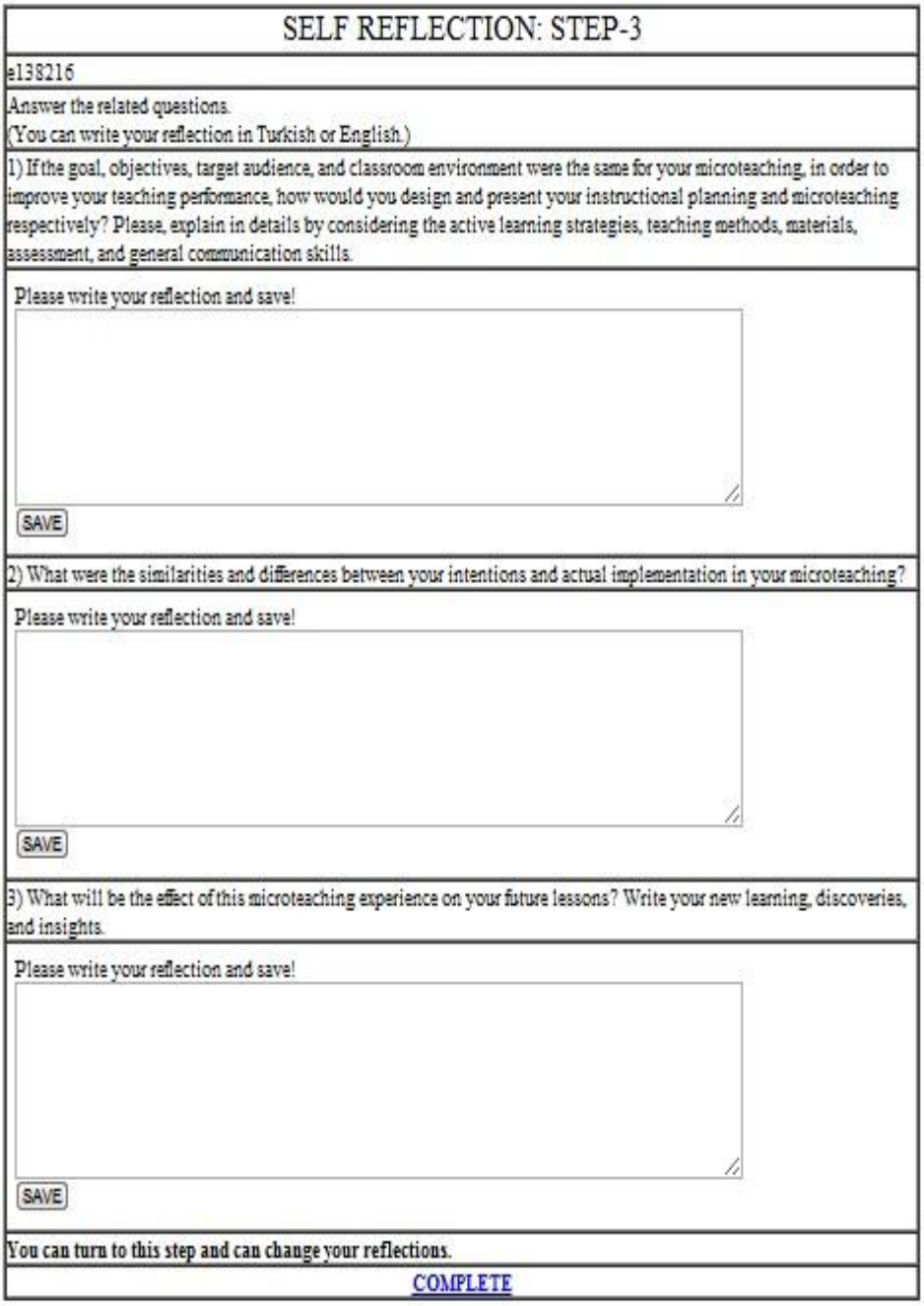


Figure 11 Self-Reflection Step 3

3.3.5 Admin Control Panel

Researchers controlled pretests, posttests, and peer evaluation sessions from this panel. Every week microteaching videos uploaded and these videos were assigned to the related groups. By the help of this pannel it is possible to reach to all data related with the PSTs, videos, materials, and peerfeedback (Figure 12).

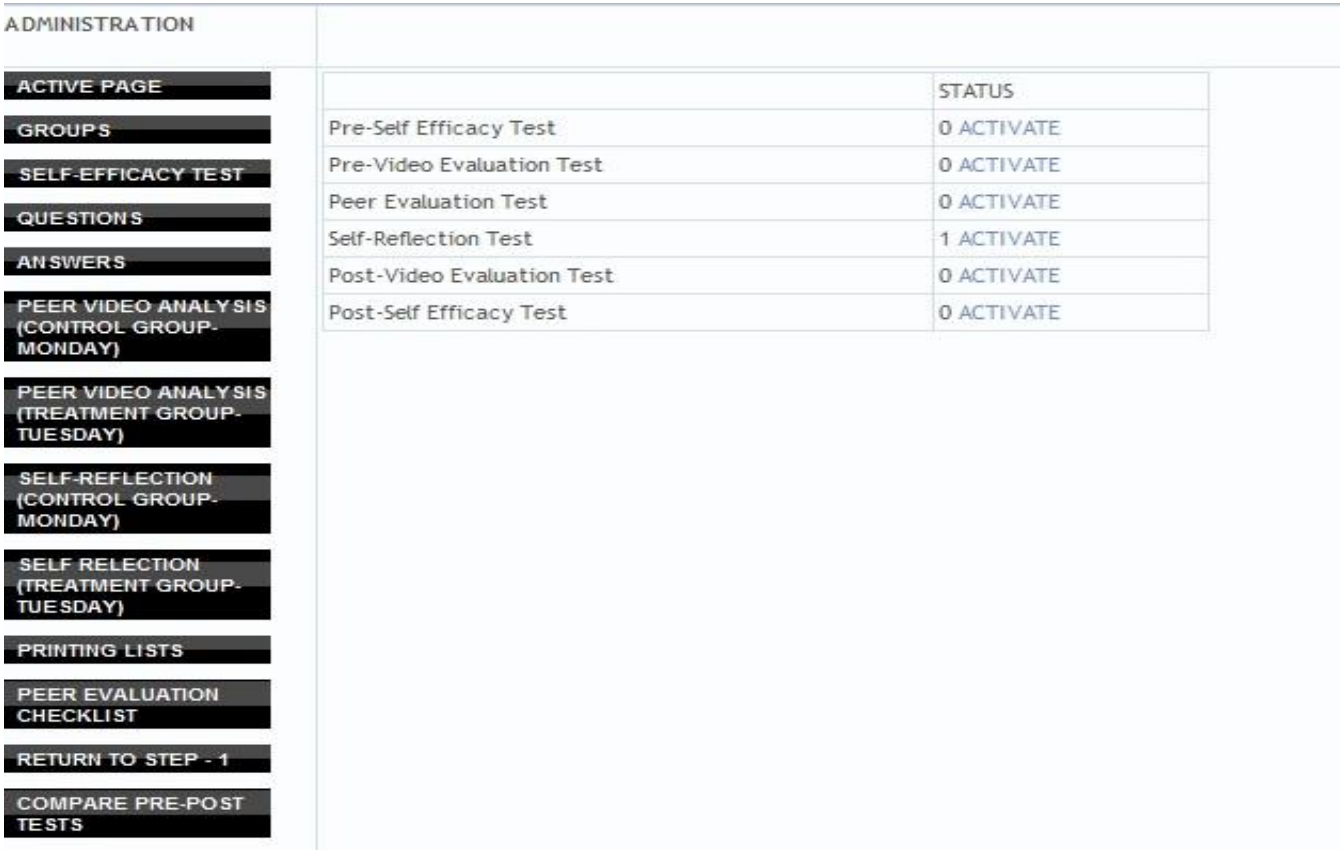


Figure 12 Admin Control Panel

3.3.6 Preparation of Materials for WBPES

Video Editing: Each student's microteaching performance was recorded in video format. These videos were edited by using Corel Video Studio Pro X3® software. In video editing process, name of the microteaching performer, objectives of the lesson were inserted to beginning of the microteaching video. In contrast to control group videos, the experimental group videos were divided into three parts and sequentially labeled as introduction part, main activities part, and closure-evaluation part. By dividing the videos, a static scaffold environemnt was prepared for the treatment group PSTs. For this process each video watched by the researcher and according to flow of lesson plan the cut points were determined and by the help of the software videos were divided into three slices.

Course Materials: In addition to video editing, prepared course materials were converted into digital format. These materials composed of lesson plan sheet, activity sheets, interactive programs, motivation videos, and evaluation sheets. For both control and the experimental groups, all these materials were attached into the WBPES.

3.3.7 Pilot Test of the WBPES

In order to test the WBPES was working in an intended way, a pilot test was conducted with three experts who were experienced on usability on human computer interaction. Experts used the WBPES and passed all over the steps within the system. In order to assess the web-based system observation, interview and thinking aloud procedure was conducted. The necessary revisions were made on the system based on the result of the pilot study.

3.4 Data Collection Instruments

The nature of the experimental study require data collection at specific times with different instruments. shows the usage time, group and aim of the instruments.

Instruments used during the study

- Unguided Web-based Video Embedded Peer Evaluation Form: to collect data from the control group PSTs.
- Guided Web-based Video Embedded Peer Evaluation Form: to collect data from the control group PSTs.

Instruments used as pretest and posttest

- Unguided Web-based Video Embedded Peer Evaluation Form: to collect data from the
- Turkish version of Teachers' Sense of Efficacy Scale(TTSES): to measure the progress of self-efficacy levels.

Follow-up Data Collection:

- Interview protocol: to support the findings of the experimental study.
- Open-ended Question

Rubric:

- Reflective Thinking Evaluation Rubric: to measure the progress of reflective thinking levels of PSTs.

In this section these instruments described in a detailed way.

For this study several data collection instruments were used. First one is

3.4.1 Unguided Web-based Video Embedded Peer Evaluation Form

Aim of the Instrument: The aim of this instrument is to collect peer feedbacks of the PSTs under an unguided WBPES.

Structure of the Instrument: This instrument consists of three parts, labeled as introduction, main activities, and closure-evaluation (See APPENDIX B). Participants reflected on these three parts without any scaffold, they wrote down reflections in to the text boxes which were only captioned by the name of the part as introduction part, main activities part, closure-evaluation part (see Figure 5). This form was used inside the WBPES. On this system PSTs made reflections by watching the microteaching performer's video. System also gives chance to evaluators to check out the materials used during the microteaching performance.

Administration Time and Groups of the Instrument: This instrument was designed to use several times for the study. First of all, the instrument was used for pretest of control and experimental group. Then, it was used by control group, while they were reflecting their peers' microteaching performance on the WBPES. Finally, the instrument was used for posttest of both groups. Table 2 summarizes data collection instruments' usage aim, group, time.

3.4.2 Guided with Question Prompts Web-based Video Embedded Peer Evaluation Form

Aim of the Instrument: The aim of this instrument is to collect peer feedbacks of the PSTs under an guided with QPs in WBPES. QPs were used as a scaffold to direct the learner on the specific point about to reach the appropriate leaning goals (Azevedo & Hadwin, 2005).

In order to guidace the treatment group, domain-specific QPs were asked. QPs were prepared based on the aspects of a lesson plan.

Structure of the Instrument: This instrument consists of three main parts. These are introduction, main activities and closure-evaluation parts (see APPENDIX A). On this system PSTs made reflections by watching the microteaching performer's video. The microteaching video was divided into three parts as named introduction, main activities, and closure-evaluation. By dividing the video slices, it was aimed to make easier finding the answers for QPs. System gives chance to evaluators to check out the materials used during the microteaching performance by the microteaching performer.

In the introduction part three QPs were asked. Fist QP is about the instructional goals and objective; the second QP is about the motivation of the students; the third and the last QP is about the recall of the prior knowledge. In the main activities part six QPs were asked. The fist one is about the consistancy of the content with the instructional goal, objectives, and the target audience, the second RQs is about the appropriateness of the used method and technique, the third RQ is about the appropriateness of the instructional matrials. The forth QP is about the appropriateness of the used examples. The fith RQ is about keeping the participants active. The sixth and the last quesiton in this part is about appropriateness of the given feedbacks. In the closure-evaluation part three QP is asked. The first RQ is about the appropriatesness of the assessment strategies. The second RQ is about the summarizing strategies. The third and the last QP in this part is about combination of the lesson to the next one.

Administration Time and Groups of the Instrument: This instrument was only used by experimental group, while they were reflecting their peers' microteaching performance in the guided WBPES.

3.4.3 Teachers Sense of Efficacy Scale Test

Aim of the Instrument: In order to assess the self-efficacy levels of the PSTs, the test of "Turkish version of the teachers' sense of efficacy scale (TTSES) developed by Çapa et. al (2005) was used before and after the implementation of the study.

Structure of the Instrument: This test was translated from English into Turkish and reviewed by the qualified researchers. This scale consists of 24 items and these items composed of three subscales. The subscales and related items were grouped below:

- Efficacy in Student Engagement
    - Items 1, 2, 4, 6, 9, 12, 14, 22
- Efficacy in Instructional Strategies
    - Items 7, 10, 11, 17, 18, 20, 23, 24
- Efficacy in Classroom Management
    - Items 3, 5, 8, 13, 15, 16, 19, 21

Validity and reliability issues: For the Turkish version of Teachers' sense of Efficacy Scale, content validity and reliability issues were successfully managed by the developers of the scale. Çapa et. al (2005) stated that the scale translated in to Turkish by the qualified translators by the experienced researchers on teacher efficacy topic. Clarity of the statements was field-tested by four high-school teachers and minimal changes were conducted on the scale based on the feedbacks. The scale was tested with 97 PSTs in

Turkey. Through the use of confirmatory factor analysis and Rash measurement, the construct validity of three-factor subscale scores were conducted with on 628 PSTs from six different universities which were located on different four cities. For the Turkish preservice teachers, the coefficient alpha values were .82 for *SE*, .86 for *IS*, and .84 for *CM*. The reliability of the whole scale efficacy scores was .93. All items were contributing to the reliability with high item-total correlations (See APPENDIX D). In order to use the TTSES test, the permisson was taken from the researcher (Çapa, Çakıroğlu, & Sarıkaya, 2005).

Administration Time and Groups of the Instrument: This instrument was used for pretest and posttest of control and experimental group.
summarizes data collection instruments' usage aim, groups, and time.

3.4.4 Follow up Interview Protocol

Aim of the Instrument: This instrument was designed to collect qualitative data to support the experimental results of the study.

Structure of the Instrument: Interview protocol consists of three open ended main questions. These are web-based video evaluation system, microteaching, and school experience. All questions have sub-questions and prompts questions (See APPENDIX C).

Administration Time and Groups of the Instrument: This protocol was used after the study conducted with two PSTs from both groups. These four PSTs were selected from participants who have the highest and lowest reflective thinking score.

3.4.5 Follow up Open-ended Question

Aim of the Instrument: This instrument was designed to collect qualitative data to support the experimental results of the research question 2 which is related with the self-efficacy level.

Structure of the Instrument: This instrument includes only one open ended question. (See APPENDIX I).

Administration Time and Groups of the Instrument: This open-ended question was given to all participants of the study.

3.5 Data Collection Procedures

Before the study started, PSTs had randomly assigned into two sections. In recitation times, each group came together in classroom every week. Every week during the recitation hours in each section, three PSTs performed microteaching. Before the microteaching session, PSTs were supposed to prepare a twenty minutes microteaching lesson plan. With the guidance of these lesson plans they conducted the microteaching sessions.

Table 4 shows the data collection instruments and the specific usage times. Also on Figure 13all steps of the study were illustrated.

Table 4 Data Collection Calendar

Weeks	**Date**	**Data collection Parts**	**Name of Instrumentation**	**Explanation**
1	1-5.03.2010	Pretest (Self-Efficacy Scale)	Teachers' Sense of Self-Efficacy Scale	
2	1-5.03.2010	Pretest (Reflective Thinking)	Unguided microteaching video analysis	
3	8-12.03.2010	Plan	Instructional Planning	
4	15-19.032010	Teach Feedback	Peer Evaluation Questionnaire	Each week 6 PSTs individually will perform microteaching lesson.
5	22-26.03.2010	Teach Feedback	Peer Evaluation Questionnaire	
6	29-2.04.2010	Teach Feedback	Peer Evaluation Questionnaire	
7	5-9.04.2010	Teach Feedback	Peer Evaluation Questionnaire	
8	12-16.04.2010	Teach Feedback	Peer Evaluation Questionnaire	Except the microteaching performer, all other PSTs will evaluate performers at the web-based environment.
9	19-23.04.2010	Teach Feedback	Peer Evaluation Questionnaire	
10	26-30.04.2010	Teach Feedback	Peer Evaluation Questionnaire	
11	3-7.05.2010	Teach Feedback	Peer Evaluation Questionnaire	
12	10-14.05.2010	Teach Feedback	Peer Evaluation Questionnaire	
13	17-21.05.2010	-	-	-
14	24-28.05.2010	Self-Reflection	Self-Reflection questionnaire (Open ended question included)	
15	31-4.06.2010	Re-plan	Instructional Planning	
16	7-11.06.2010	Posttest (Reflective Thinking)	Unguided microteaching video analysis	Individually evaluate a microteaching video
	14-18.06.2010	Posttest (Self-Efficacy Scale)	Teachers' Sense of Self-Efficacy Scale	

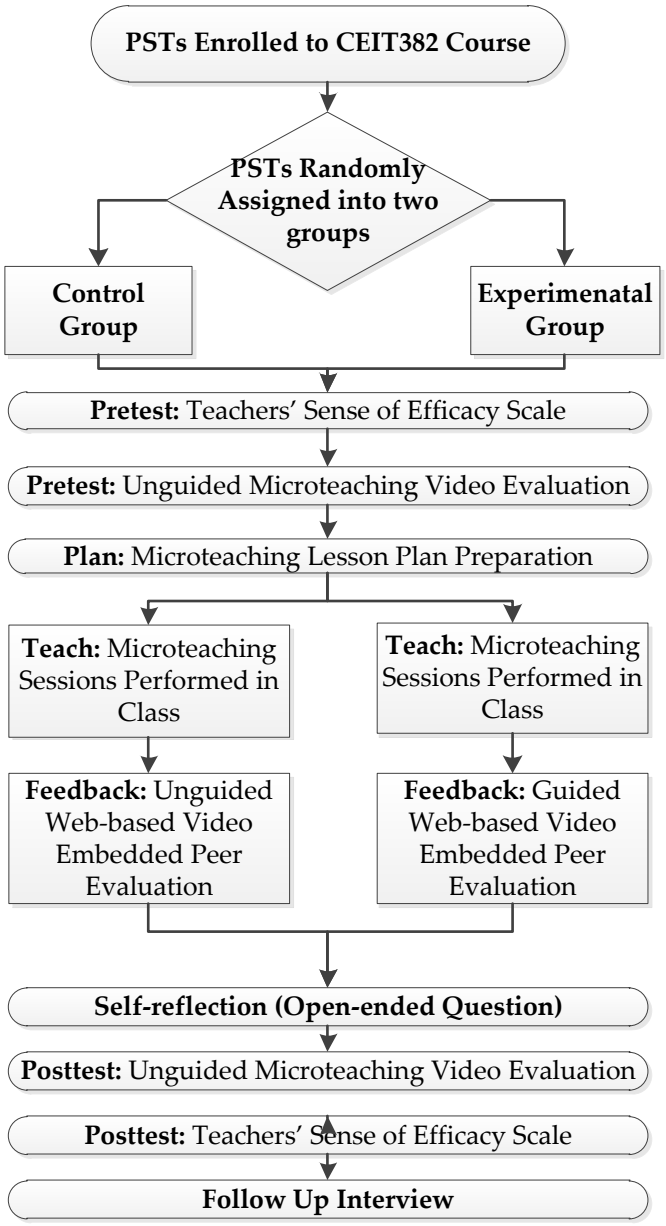


Figure 13 Flow Chart of the Study

3.5.1 Administration of Teachers' Sense of Efficacy Scale Test

After the groups were formed, Teacher' Sense of Efficacy Scale were administrated to all PSTs online by using WBPES. There were 24 items in this scale and it took about ten minutes to complete. To complete the scale, all PSTs were given two days and in this period they were logged in the WBPES and they were automatically redirected to the scale.

3.5.2 Unguided Microteaching Video Evaluation Process

The pretest were performed in order to determine PSTs initial reflective thinking levels before the study. This test was also integrated in the WBPES. In this environment all of the PSTs made their reflections without any scaffold. Both groups' login to WBPES and they watched the given sample microteaching video. They were able to see the lesson plan, used materials, and evaluation form attached to microteaching video. By using unguided web-based video evaluation form, all PSTs write down reflections about the sample microteaching video. This test was used before the microteaching sessions begin and after the microteaching session completed.

3.5.3 Microteaching Framework

Microteaching provides convenient environment to PSTs in order to gain experiences on teaching skills in a classroom setting. In this environment, the real classroom difficulties are reduced for the practitioners and teacher candidates receives great deal of feedbacks (Allen & Ryan, 1969). So in the scope of this course, microteaching method was used.

As seen on Figure 14, microteaching part consists of four main parts. These are planning, teaching, feedback, and re-plan. All students were supposed

to pass over these steps. These steps were explained at the microteaching flow chart below.

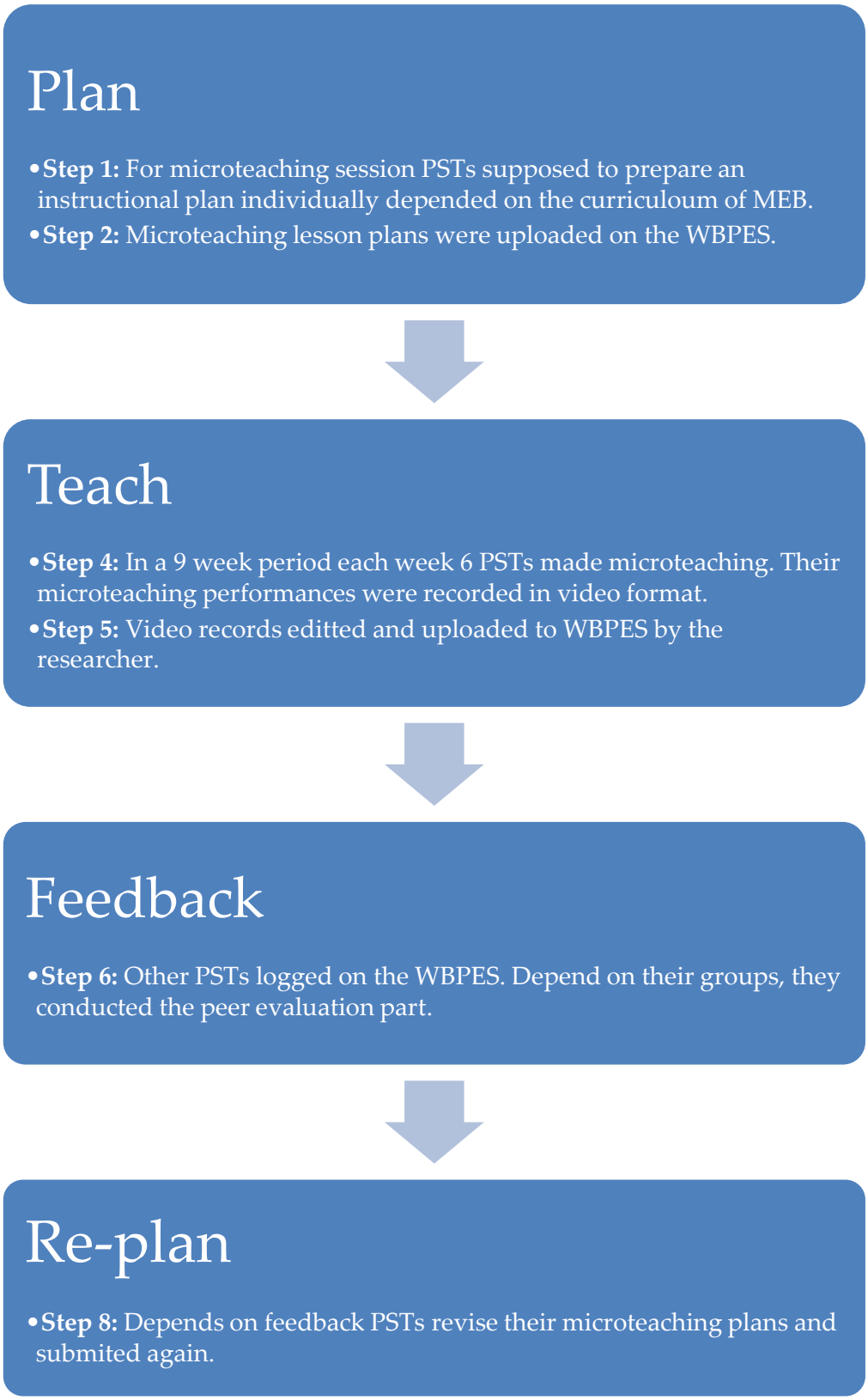


Figure 14 Microteaching Flow Chart

3.5.3.1 Plan: Microteaching Lesson Plan Preparation

At the beginning of the study, all PSTs selected objectives for their microteaching session from the curriculum of primary school which is prepared by Ministry of National Education (MEB). Without any guidance all PSTsprepared their microteaching lesson plans and required lesson plan materials. They performed the microteaching in the light of this plan. On the WBPES, peers were able to access these lesson plans while they were providing feedbacks to related microteaching performance . Both section members had submitted these documents before the first microteaching sessions started.

3.5.3.2 Teach: Microteaching sessions:

In both sections, all PSTs individually conducted a microteaching performance in the classroom environment. Before the microteaching performance, classroom was designed according to requirements of the microteaching to be conducted. In order to give a feeling of real classroom, chairs were designed for 6 students. Inside from the related groups, six volunteer PSTs were performed like the students of this classroom. They tried to act as a primary school student, depends on requirements of the class levels of the microteaching classroom. Camera was settled down to record the microteaching lesson. Microteaching performer's get dressed depends on the requirements of the MEB clothing regulations. In twenty minutes period they conducted the microteaching performance in this classroom setting with the guidance of their lesson plans. The other class mates watched this performance.

The video recorded microteaching video was edited by the researcher and uploaded along with the lesson plan and used course materials to the

WBPES. Except the microteaching performers, all PSTs gave peer feedbacks by using this WBPES. This system was explained in the "Setting (Web-based Peer Evaluation System)" part in detailed.

3.5.3.3 Feedback: Microteaching feedback session

3.5.3.3.1 Peer-Evaluator:

After the microteaching videos uploaded on the web-based peer evaluation system, except that the microteaching performers, all PSTs evaluated the microteaching performers' microteaching video. They were not given any instruction about peer evaluation. They made the reflections in the guidance of the WBPES.

3.5.3.3.2 Peer-Evaluation

Peer evaluation is the assessment part of the microteaching sessions. In this part, PSTs gave feedbacks to microteaching performer. The experimental and the control group completed this part in different designed conditions. Treatment group gave feedbacks under the use of question prompts embedded in a WBPES on the other hand control group PSTs made the peer feedback session under the use of unguided environment embedded in the WBPES.

3.5.3.3.3 Guided vs. Unguided Web-based Video Embedded Peer Evaluation Process:

Peer evaluation is the assessment part of the microteaching sessions. In this part, PSTs gave feedbacks to microteaching performer. The experimental and the control group completed this part in different designed conditions. Treatment group gave feedbacks under the use of question prompts embedded in a WBPES on the other hand control group PSTs made the peer

feedback session under the use of unguided environment embedded in the WBPES.

3.5.3.4 Follow-up Open-ended Question:

After all the nine weeks microteaching and peer evaluation period, all PSTs took the follow up open ended question. This question integrated in WBPES. Question was about the effects of this microteaching experiences on their future lessons (See APPENDIX I).

3.5.3.5 Re-Plan:

When the microteaching sessions completed and all PSTs conducted the self-reflection step, it is expected PSTs to make revisions on the microteaching lesson plan. The aim of this step is to investigate their reflection of changing habits on the microteaching lesson plan.

3.5.4 Post-Tests:

After these procedures completed two posttests, Unguided Microteaching Video Evaluation and Teachers' Sense of Efficacy Scale, were applied to both groups of PSTs. Date of the each test was represented on the Table 4.

3.5.5 Follow up Interview

PSTs took this CEIT382 course on their third year of undergraduate education and following year they took the school experience course, so after they completed the school experience course four PSTs selected for the follow up interview. These four PSTs were selected depends on their reflective thinking level scores. From both group, the highest and lowest score owners selected and they were asked these follow up interview questions (See APPENDIX C). The aim of the follow up study is depends on

three main points of web-based online peer evaluation system, microteaching, and self-efficacy issue. Students were asked questions about CEIT382 course and their reflections on school experience course.

Each interview was conducted in a silent and empty room and recorded with a voice recorder. Because after a one year later the follow up interview conducted, they answered the questions without any pressure of grading for this interview related with the course. After the general questions, they were asked more specific prompts questions. Interview durations changed between 25 to 35 minutes so for four participants about 120 minutes of interview records were recorded.

3.6 Data Analysis

In this study, to answer the research questions, quantitative data analysis methods were used. To support the quantitative results, a follow up interview was conducted and an open-ended question was asked. Before analyzing the data, first of all, missing values were detected for pretest and posttest scores. Because of self-efficacy survey was conducted online and results directly transferred into SPSS, there was not any outlier for this instrument. If one of the test scores for any participant was missing, this data was removed from the data set. After data cleaning, descriptive statistics of data were declared by using IBM SPSS software 20. One way ANOVA was conducted to answer the first research question. Answering the second research question, doubly MANOVA was performed. For analysis interview transcript content analysis method was utilized.

3.6.1 Analysis of RQ1

In order to address the first research question about effects of the question prompts embedded within WBPES on PSTs' reflective thinking level, one way analysis of variance (ANOVA) was conducted. PSTs' pretest and posttest results were treated as dependent variables. Scores of 48 PSTs, who were completed both pretest-posttest, were included to analysis. All peer feedbacks, given during the pretest and posttest of "Unguided Microteaching Video Evaluation Form", were analyzed and scored by using "Reflective Thinking Evaluation Rubric" by the researcher. Incompleted pretest and posttest scores were removed so for control group 22 participants' results and for experimental group 26 participants' results were included into the analysis.

3.6.1.1 Reflective Thinking Evaluation Rubric

In order to analysis the reflective thinking levels of the PSTs, different reflective thinking level evaluation rubrics were investigated. For this study to assess the reflective thinking levels of PSTs, a four scale rubric developed by Hatton and Smith's (1992, 1994, 1995) named "Criteria for the Recognition of Evidence for Different Types of Reflective Writing" was used. This scale consisted of four levels which are descriptive writing, descriptive reflection, dialogic reflection, and critical reflection. They categorized these levels according to characteritics of the reflecter's writing. The first level is descriptive writing. This level is not considered as a reflection, but just reporting or describing events occurred. In this level individual does not have any attempt to provide reasons or justifications. The second level is the descriptive reflection. In this level, individual not only make a description of events, but also makes some attempt to provide reason for events or actions but still in a reportive or descriptive way. As a

third level, dialogic reflection, individual thinks on the events and makes qualities of judgement and possible alternatives for explaining and hypothesing by exploring the experience, events and actions. The forth and the last level is critical reflection. In this level, individual demonstrates an awareness of events and actions and can looks from the multiple perspectives (See APPENDIX H).

For this study levels of the rubric was gradually score from 1 to 4. The lowest reflective thinking level was scored as 1 and the highest reflective thinking level was scored as 4. Scores given gradually, but PST whose score is 4 does not twice reflecter than the PSTs whoes score is 2. These sorec were given to the levels of the rubric.

3.6.1.1.1 Validity an Reliabilty of The Reflective Thinking Evaluation Rubric

As explained at the reflective thinking evaluation rubric topic, this rubric was developed by the researchers of Hattan and Smith (1992). Without any changes, Hattan & Smith's "Criteria for the Recognition of Evidence for Different Types of Reflective Writing" rubric was used for this study. This rubric was used for different studies in literature. With the guidance of this rubric the data were analyzed by two researchers, who have PhD degree in Computer Education and Instructional Technology field. An inter-rater realiability analysis was conducted and the reliability score of alpha=.89 which means good level of agreement was obtained.

3.6.2 Internal Validity Threats

As it is an experimental study, there are two groups of experimental and control groups. In literature there are threats widely discussed in experimental designs.

Resentful Demoralization: This threat is occurs when the control group members feel themselves less important because of receiving less treatment than the experimental group (Creswell, 2012). In this study, researcher did not realize any problem about this threat. Control group PSTs were not complained from their situation, because the control group supposed to reflect in the unguided question prompts, their workload was very low than the experimental group PSTs so In this case it is assumed this threat has not been effected the results of the experimental study.

3.6.2.1 Assumptions of ANOVA

In order to control the data whether it is ready for running one-way ANOVA, the required assumptions of independent observation, normality, and homogeneity of variance were checked and they were explained in detailed below.

It is not possible to practically test the independent observation assumption, which tests whether data are collected independent of each other. According to Gravetter and Wallnau (2004), independent observation assumption is not violated if data are randomly selected from the population. In our case the data were randomly selected from the population, so independent observation assumption were provided.

It is expected that the dependent variable is normally distributed for each of the level of the independent variable. In order to check normality assumption, Skewness and Kurtosis values were examined and their values should not exceed +2.00 and -2.00 to provide normality assumption (Fouladi, 1998). Our values do not exceed +2.00 and -2.00. In addition, for pretest and posttest, the histogram checked with normal curves, so normality assumption was not violated.

In order to provide homogeneity of variances, it is expected that Levene's Test value was not significant. Since Levene's Test is not significant, F (1, 46) = 1.639, $p > .05$, homogeneity of variance assumption is provided as well. It indicates that differences among two groups' variances are not significantly different.

Design, instruments, data analysis techniques, and the validity and reliability issues were illustrated on .

3.6.3 Analysis of RQ2

In order to address the second research question about the effects of the questions prompts on PSTs' self-efficacy levels, repeated measure multivariate analysis of variance (MANOVA) was conducted. This analysis also known as doubly multivariate repeated measure is used when the same subjects measured at multiple times on the same variables (Kerr, Hall & Kozub, 2002; Stevens, 2002). In this study PSTs were measured on three dependent variables including instructional strategies, student engagement, and classroom management for each of the two groups in time. Fourty nine pre-service students were completed both pretest and posttest and were included in the analysis.

3.6.3.1 Assumptions of MANOVA

As it can be seen on Table 7 sample size was enough for running repeated MAVOVA. Tabachnick and Fidell (1996) claims that at least twenty samples in each group makes the data robustness. In addition to that, univariate normality was checked within each group by using Skewness and Kurtosis values, and histograms. According to these values and histograms, it can be said that normality assumption was not violated.

The critical value determined by using critical values of Chi-square table, with the number of dependent variables. So maximum value obtained from the output should not be larger than 16.27. In this situation maximum value of Mahal. Distance was 16.92. Because it is not too high, this PST's score was left in the data file.

The plots were investigated and did not see any evidence of non-linearity, therefore it can be said that our assumption of linearity is satisfied. In this case Box's M sig. value is .078, therefore we have not violated the homogeneity of variance-covariance matrices assumption. Descriptive results on Table 7 shows that the numbers of subject in each groups were seen enough to overcome the problems related with the normality or equality of variance. By looking to Levene's Test of Equality of Error Variance for all dependent variables not recorded any significant value, so that it can be assumed variances are equal to each other.

3.6.4 Analysis of the Interviews

Follow up interviews conducted with four PSTs. This data was analyzed with the content analysis method. As Yıldırım and Şimşek (2008) explained the stages of the content analysis, data coded, themes developed, these

themes and codes organized, and the findings and interpretations defined and described.

3.6.5 Ethical Consideration

Before the study began, from the Research Center for Applied Ethics at Middle East Technical University an official permission was taken for the application, data collection instruments, and consent forms. (SEE APPENDIX D) The Ethic Committee investigated documents and approved them in order to use for this study. Before the study begins, all participants informed about this study. By this consent form they were informed about the study and their liberties were explained. Volunteer ones signed hard copy of the consent form and they were become the participants of this study.

3.7 Researcher's Role

In this study researcher was at the same time teaching assistant of the CEIT 382 course. For seven years he has been working as a research and teaching assistant at the department of computer education and instructional technology. For last four years he had been the teaching assistant of this course. Also the videos of microteaching sessions were recorded by the researcher.

3.8 Assumptions

- The participants were assumed to response accurately to all measure.
- The data would be accurately recorded and analyzed.
- The researcher assumed that the reading ability of participants was adequate for comprehending and responding to all written instructions provided in this study.

- The reflections written by the PSTs are an accurate indicator of student thinking.

3.9 Delimitations and Limitations of the Study

Every study has some delimitations and limitations. This study confines itself to data collection by the online instrument for reflective thinking and self-efficacy, questioning, and interviewing the junior PSTs at the department of the Computer Education and Instructional Technology at the Middle East Technical University.

Convenience sampling was used for this study, so the results of this study can be generalized for the same studies.

CHAPTER 4

RESULTS

The purpose of this study is to examine the effects of different scaffolding strategies, embedded within a web-based video analysis environment, on PSTs' reflective thinking and teachers' self-efficacy levels. This chapter consists of both qualitative and quantitative results. The data collection instruments were explained in the chapter three. The quantitative data was derived from online peer feedbacks and questionnaires while qualitative data was collected by the interview procedures. In this chapter description of the participants and the results of the study will be presented according to the research questions. Firstly descriptive statistics regarding both control group and the experimental group students' reflective thinking level scores will be given.

4.1 Question Prompts and Reflective Thinking

Research Question 1 : *Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service computer education teachers' reflective thinking level over the peer assessment sessions?*

By this research question, it is aimed to investigate the effects of the question prompts on the PSTs' reflective thinking level. For the analysis of variables one-way ANOVA was administrated. The independent variable is

group and the dependent variable is mean difference of pretest and the posttest.

Number of the items, mean, standard deviation, minimum and maximum values of reflective thinking levels about pretest and posttest scores were computed and displayed in Table 5.

Table 5 Group Statistics of PTSs' on RTLs

	Group	*n*	*M*	*SD*	*Min*	*Max*
Pretest	Control Group	22	2.48	.60	1.67	3.67
	Experimental Group	26	2.19	.69	1.00	3.67
Posttest	Control Group	22	2.80	.73	1.00	4.00
	Experimental Group	26	3.12	.60	1.67	4.00

Descriptive statistics indicated that for the pretest the mean scores of PSTs' reflective thinking levels for control group (*M* = 2.48) and experimental (*M* = 2.19) group are approximate to each other. The variations for control group (*SD* = .60) and experimental group (*SD* = .69) pretest have approximately the same.

When the posttest scores investigated, the experimental group's mean score (*M* = 3.12) is a bit greater than the control group's one (*M* = 2.80). The variations for control group (*SD* = .73) and experimental group (*SD* = .60) posttest have approximately the same.

A one-way ANOVA was conducted to compare the effect of the use of question prompts embedded in a web-based video analysis system have an effect on PSTs' reflective thinking level. Our dependent variable is reflective thinking level of PSTs. The means and standard deviations for PSTs' reflective thinking level related with pretest and posttest are presented in Table 5. The ANOVA results indicates a significant difference between the experimental group and the control group, F (1, 46) =12.401, p = .001. The strength of the relationship between the guided and unguided group, as assessed by partial η^2 = 0.21, which in Cohen's (1988) terms would be considered a large effect size. This result suggests that differences in the mean across time depended on the scaffolding conditions. Result shows that group under the use of question prompts embedded in a web-based video analysis system let to a greater improvement in PSTs' reflective thinking levels from pretest to posttest than the group under the use of unguided environment embedded in a web-based video analysis system.

Table 6 Anova Table of PSTs' RTLs

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	4.360	1	4.360	12.401	.001
Within Groups	16.174	46	.352		
Total	20.535	47			

4.2 Self-efficacy and Reflective Thinking

Research Question 2: *Does the use of question prompts embedded in a web-based video analysis system have an effect on pre-service computer education teachers' PSTs' self-efficacy levels?*

A doubly multivariate analysis was conducted to examine the effects of the web-based video embedded scaffolding strategies on the PSTs' self-efficacy levels including instructional strategies, student engagement, and classroom management over the time. Forty-eight PSTs randomly assigned into each groups. The sample size for each group was equal. Table 7 summarizes the descriptive statistics of pretest and the posttest scores. The independent variables include between subject variables (time1 and time2) and with-in subject variables (Experimental and Control). PSTs scores on SE, IS, and CM were the dependent variables.

Table 7 Descriptive Statistics of PSTs' Self-efficacy Levels

		Pretest			Posttest		
Factors	Groups	*M*	*SD*	*n*	*M*	*SD*	*n*
Student Engagement	Experimental Group	6.23	1.27	24	7.41	.83	24
	Control Group	6.69	.89	24	7.62	.70	24
Instructional Strategies	Experimental Group	6.55	1.37	24	7.42	.83	24
	Control Group	6.88	.93	24	7.73	.59	24
Classroom Management	Experimental Group	6.35	1.44	24	7.54	.94	24
	Control Group	6.86	.98	24	7.72	.59	24

As illustrated on the Table 8 Multivariate Test Results for the Doubly MANOVA, a doubly multivariate analysis was conducted to assess if there was a difference between PSTs in the experimental group and PSTs in the control group in the amount of change in their self-efficacy scores on the three outcome measures. Significant multivariate effects were not found for the main effects of group $F(3, 44) = .707$, $p > .55$, partial $\eta^2 = .046$ on the other hand for during time $F(3,44) = 24,11$, $p < .00$, partial $\eta^2 = .622$ there was a significant differences but there was not a significant interaction between group and time, $F(3,44) = .756$, $p = .525$, partial $\eta^2 = .049$. Because there was not interaction effect between the experimental and control group, this means that on the linear combination three dependent variables were not significantly different between at pretest then it is at posttest. The examination of the means suggest that this is because groups do not differ on either dependent variable at the time of pretest and posttest. For both groups, the change from pretest to posttest was significant for the three dependent variables. For IS, $F(1,46) = 45.29$, $p < .00$, partial $\eta^2 = .496$ for CM $F(1,46) = 62.26$, $p < .00$, partial $\eta^2 = .575$ and for SE, $F(1,46) = 68.09$, $p < .00$, partial $\eta^2 = .597$ but on the other hand the change of any dependent variable was not statistically significant from each other (IS $F(1,46) = .421$, $p = .52$, partial $\eta^2 = .009$, CM $F(1,46) = 1,616$, $p = .210$, partial $\eta^2 = .034$, SE $F(1,46) = 1,033$, $p = .315$, partial $\eta^2 = .022$). After the examination of means it could be said that the change among the dependent variables are not significantly different from each other.

Table 8 Multivariate Test Results for the Doubly MANOVA

Effect	Wilks' Lamda	*F*	Hypothesis df	Error df	Sig.	Partial Eta Squared	Observed Power
Group	.954	.707	3	44	.553	.046	.188
Time	.378	24.113	3	44	.000	.622	1.000
Time* Group	.951	.756	3	44	.525	.049	.198

The results indicated that self-efficacy levels of the PSTs on instructional strategies, classroom management, and student engagement were changed from pretest to posttest over time. Table 9 represents the results of within-subject contrasts of all dependent variables. Also Figure 15, Figure 16, and Figure 17 illustrates the profile plots of self-efficacy levels on three factors.

The change tendency of self-efficacy scores illustrated on the Table 9 Tests of Within-Subjects Contrasts that there was a significant linear trend indication for all types of self-efficacy factors for both control and experimental group over the time. For both groups this linear trend showed that self-efficacy scores of instructional strategies, classroom management, and student engagement developed over the time. Also it can be seen on the profile plots of each self-efficacy factor indicates a linear increasement trend over the time. In addition even though both group scores were increased over the time significantly, there was not a significant interaction between group and time.

Table 9 Tests of Within-Subjects Contrasts

Source	Measure	time	*df*	*F*	*Sig.*	Partial Eta Squared
time	IS	Linear	1	45,289	,000	,496
	CM	Linear	1	62,258	,000	,575
	SE	Linear	1	68,094	,000	,597
time * Group	IS	Linear	1	,421	,520	,009
	CM	Linear	1	1,616	,210	,034
	SE	Linear	1	1,033	,315	,022
Error(time)	IS	Linear	46			
	CM	Linear	46			
	SE	Linear	46			

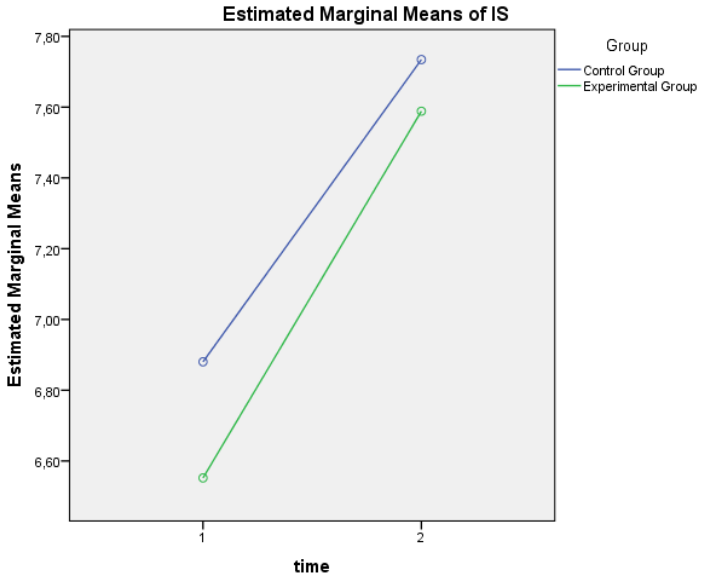


Figure 15 Estimated Marginal Means of IS

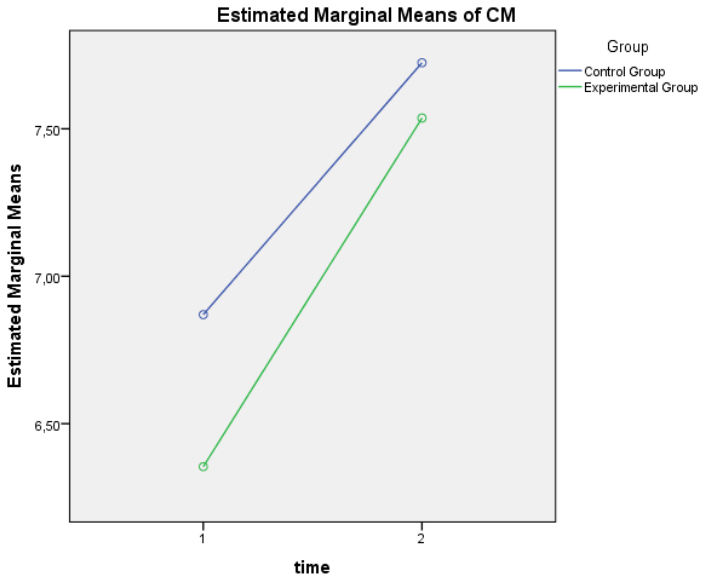


Figure 16 Estimated Marginal Means of Cm

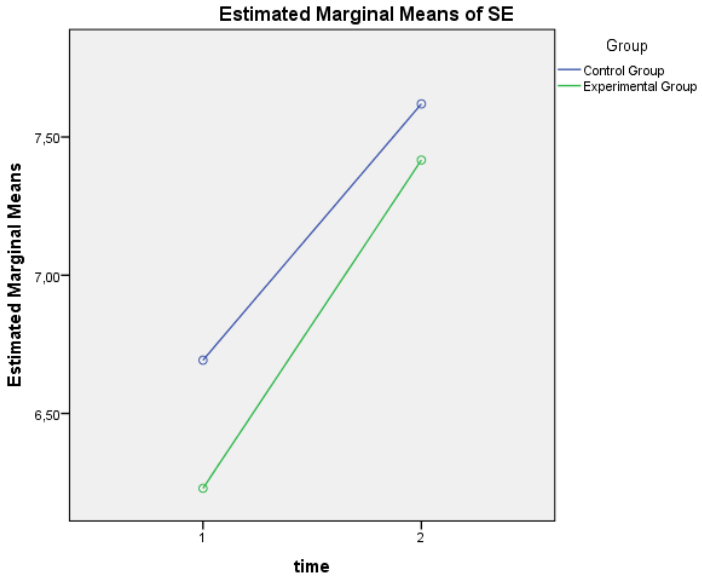


Figure 17 Estimated Marginal Means of SE

4.3 Open-Ended Question Results

After the study completed, PSTs are asked an open-ended question, which is aimed to investigate the effects of this microteaching experience on their future lessons in terms of their new learning outcomes, discoveries, and insights. It is aimed to investigate which components have affected the PSTs self-efficacy levels.

Table 10 Frequency Table of Themes for Open-ended Question

Themes	**Frequency**
Planning of the lesson	22
Experience	17
Effects of the teaching methods	10
Appearance-Diction-Oratory	9
Self-Exploring	4
Theory – practice difference	4
Self-confidence	3
Importance of Motivation	3
Timing management	3
Classroom-management	3

Most of the PSTs expressed that they learned the importance of planning of the lesson. They claimed that without a lesson plan it is not possible to complete the lesson through the intended way and reach the students intended learning outcomes. As one of the PSTs said that

> *Bence iyi bir tecrübe oldu biz öğretmen adayları için. Her ne kadar gerçek öğrencilerle etkileşim içinde olmasak da, belli bir plan ışığında ders anlatmak*

gerçekten çok güzeldi. Belirlediğiniz plandan ders içerisinde çok az sapmalar yapmanız. Dersin sonunda istediğiniz verimi anlamanızı sağlıyor. Bu aradan sunu keşfettim diyebilirim, planlı bir şekilde ders anlatıldığında istenilen sonuç bir şekilde elde ediliyor, ayrıca gelecekteki dersler için, derse girmeden önce iyi hazırlanmamız gerektiği kanısına vardım. Yani tamamen doğaçlama yapılarak dersin anlatılamayacağını anladım. OEQ-ID24

As a teacher candidate, it was very good experience. Even though we did not interact with the real students, it was very good to teach with the guidance of a lesson plan. Very little deviations from the plan provided to get the intended performance. I explored that, when give a lesson in a planned way, in a manner you get the intended result. Also, I realized that for the future lessons it is required to be prepared hard. In other words, I understand it is not possible to give lesson in an improvised manner. OEQ-ID24

Another finding indicated that most of the PSTs stated that they got valuable experience from this environment. They expressed that they were feeling more experienced for the future real classroom lessons. One of the PSTs stated that;

İlk olarak, yapmış olduğum bu micro-teaching öğretmenlik için iyi bir deneyim oldu. Çünkü ortam gerçeğine çok yakındı. Gerçek bir ders gibi ciddiye aldım ve ona göre davrandım. Micro-teaching in gelecek derslerime etkisi olacağını düşünüyorum. Bu sayede heyecanımı yenmiş oldum ve aslında çok zevkli bir iş olduğunu fark ettim. OEQ-ID26

This first time microteaching was become a good experience for me, because the environment was very near to real one. As a real lesson, I took the microteaching seriously and behaved. I think microteaching will make an effect on my future lessons. By the way I have suppressed my excitement and I realized that it was very pleasant job. OEQ-ID26

The analysis showed that most of PSTs understood the importance of the teaching methods. For example one PST stated;

Bu micro-teaching deneyimi bana bir şeyi öğretmek için birden çok ve daha etkili yöntemlerin olduğunu öğretti. Arkadaşlarımdan aldığım geri dönütler ve kendimin çıkarımları sonucunda dersimi nasıl daha etkili işleyebileceğim ve öğrencilerimi nasıl daha aktif tutabileceğim konusunda yeni fikirler edindim. OEQ-ID44

This microteaching experience teach me in order to teaching one think there can more effective and different methods more than one. At the result of getting the feedbacks from my peers and my inferences from this experience, I had new ideas on how I can conduct the lesson more effective and how I can keep active the students. OEQ-ID44

Several PSTs mention about the importance of the appearance, dictation and oratory. One of the PSTs confessed that *"Aslında en önemli öğrendiğim şey ise ileride öğretmenlik yaparsam ciddi manada bir diksiyon kursuna gitmem gerektiği"OEQ-ID60.* Also another PSTs expressed that *"öğrencilerin karşısında nasıl bir görünüme sahip olunması gerektiği (saç-sakal taşından, giyim-kuşam ve konuşma-mimiklere kadar)"OEQ-ID96.*

Several PSTs realized that microteaching helped them in order to explore themselves about the teaching profession. One of them stated that "*those*

who want to be an instructor in the future are able to see their level of teaching methods, classroom management skills, communication skills with this micro-teaching education".OEQ-ID-37

Some of the PSTs expressed the importance of the motivation in the classroom setting especially at the beginning of the lesson. One of PST claimed that depended on the interest of the students by using different materials students could be motivated.

Some other students expressed the importance of the time and classroom management skills. About the time management one of the students expressed that

> *Zamanı dilediğin gibi yönetemediğinde mutlaka bir şeyler yapman gerektiğini öğrendim. Ders esnasında karşına çıkabilecek sorunları düşünerek daha önceden derste kullanacağın materyalleri (video, animasyon internet vs.) kontrol edilmesi gerektiğini öğrendim. OEQ-ID150*
>
> *I learned that when you could not manage the time, it is required to do something. Also I learned to control the required materials related with the lesson before the lesson, by thinking the possible problems which can be occurred during the lesson. OEQ-ID150*

An another PST stated about the effects of the classroom management issue as

> *Ancak kontrolü sağlanan bir sınıfta öğrenmenin de en üst düzeyde gerçekleşebileceğini düşünüyorum. Gelecek için büyük bir deneyim olduğunu söyleyebilirim. OEQ-ID-157*

Highest level of learning can occur, when the control of the classroom was provided. I can say it was a very big experience for the future. OEQ-ID-157

4.4 Follow-Up Interview Results

After the study PSTs were asked the related interview questions. In order to support the findings of the quantitative results, the interpretations were given in this section.

First of all PSTs were asked whether analyzing the videos of peers and making peer feedbacks with the help of the question prompts were beneficial for them or not. Students claimed the quantity of the questions. They did not want to complete so many detailed questions very week. One of the suggested that questions could be changed week by week. One of the PSTs stated that;

Soruların sayısı bence çok fazlaydı bence…Bir sure sonar yazdığınız şey de aynılaşmaya başlıyor. Belki sayısı biraz azaltılabilir diye düşünüyorum…Bir süre sonra artık ne yaptığınız otomatikleşmeye başladı…Sorular değiştirilmeli belki belli bir sure sonra. Tint01

I think there were so many questions…After a while, I started to write the same things. I think the number of the questions can be reduced. After a period, what I did was become automatic…Maybe after a period questions may be change. Tint01

An another PST responded to the interview question of effect of the unguided questions on his reflection, and did he prefer to answer to the guided questions, and he responded that the advantage and disadvantages of both method and made a suggestion of using mix method which includes guided and unguided prompts. He said that;

Genel sorular olduğu zaman aklımda çok fazla yazacak birşey olmuyor. Spesifik sorularda o soruyu düşünüyorsunuz. Çok daha özel yorumlar yapabiliyorsunuz. Genel olunca çok daha kısa olsun istiyorsunuz. Belki öyle bir dezavantajı olmuş olabilir. Ama şöyle bir avantajı olabilir. O sorulara bağlı olmadan aklınıza gelen şeyleri de ifade edebiliyorsunuz. Genel soru olması biraz daha iyi oluyor. Biz öğrenciler kısa tutmaya çalıştığımız için. Ama yönlendirme olsa çok daha fazla feedback verebiliriz. İkisinin de aslında avataj ve dez avantajları var ama belki ikisinin de bir arada olduğu birşey olabilir, önce sorulan sorular sonra ayrıca genel eklemek istediğiniz şeyler olabilir.

I do not have so much things to write to the general questions. In specific questions you thinkg on that question. You can do more specific comments. In general you give shorter answers. Maybe it can be disadvantage. Not depend on that question, you can express what come to your mind. General questions may be better. Because as a student, we tend to give shorter answers. But with guidance we can give more feedback. Both of them have advantages and disadvantages, maybe both of them can be given together. Fist the specific questions than general questions.

One year later, students were enrolled to school experience course and they went to the real classrooms. PST were asked how they feel themselfs when they conducted the fist time real teaching experience in the real classroom setting and how the microteaching effected their real classroom experience. One of the PSTs, explained the differences of the microteaching environment ansd real classroom setting. In microteaching setting they did not encpuntered any problem out of their plan, because it was an controlled environment, but in the real classroom setting may be the main problem was the classroom management, but it was not most frequently expressed

by the PSTs in the open-ended question, also an another PST's oppinions support this claim as:

> *Ben gerçek sınıf ortamına girdiğimde öğrenciler birden bağırıp çağırmaya başladılar birbirlerine. O çok büyük bir eksiklik bence, çünkü gerçek sınıfta hiç böyle olmuyor çocuklar. Bilgisayarlar bozuluyor, çocukalrı başka bilgisayarlara oturtmamız gerekiyor, aktivite yürümüyor, ve birşeyler çalışmıyor…Microteaching bu gibi şeylerin eksiklikleri vardı, ama deneyim oldu en azından.* Cint04

> *When I entered in to the real classroom setting, students suddenly started to scream one to another.I was really a deficiency, because in the real claassroom students are not in thi manner. Sometimes computers can give errors, and in this possitions it is needed to sit the student to an another place, so the activity can not complete and somethink does not work. In microteaching includes similar problems but it was an experience.* Cint04

PSTs also were sked the effects of the various microteaching video observation and analysis on their teaching experience acquisition. All of them were found the it very benefical while preparing for their professional life. One of the PSTs expressed that

> *Tabi ki, daha çok yapamayanlardan ziyade sunumu iyi yapan arkadaşları, o sunumu yaparken ki teknikleri, kullandıkları teknikler falan, onları mutlaka not alıyordum bir tarafa veya kafama not ediyordum. Ders verirken ben de bunları kullanabilirim diyordum. Bazı arkadaşlar gerçekten çok iyi sunum yaptı. Bazılarının konuşması çok iyiydi, bazılarının materyalleri çok güzeldi…dersin gidişatında verdikleri örnekleri falan farklı farklı özellikleri kafamda yer ettirdim.*Tint02

Of course, more than the bad ones, I took notes about the techniques of the good presenters. I thought I can use these techniques when I giving my lessons. Some of the friends conducted really good presentations. Some of them had good diction, and some of them had good materials…Some of the examples and different properties impressed me. Tint02

PSTs were asked the effects of the microteaching on their self-efficacy feeling about being a teacher. One of the PST

*Ben çok kaygılanırım diye düşünüyordum ama kendime ama biraz da kendime güven vardı. Bu dersten dolayı kendime güven vardı, çünkü ne yapacağımı biliyordum. Ama hep şey düşünmüştüm, dersi anlatırken elektrik kesilirse ne yaparım diye düşündüm. Şey dedim sonra elektrik kesilirse, gelinceye kadar şöyle desem dedim. 'Arkadaşalar elektrik kesildi, bilgisayar elektrikle çalışan bir alet' Hemen bir şekilde dersi dağıtmadan, öğrencilerin dağılmasına izin vermeden bir şekilde dersi çevirip kendi doğru yönlendirmeyi düşündüm …*Cint03

I thought, I could become worried but I trusted myself. I have a self-efficacy because of this course, because I was aware I would I do. But, always I think, what I do if the power cut. Than I thought I could say "Hey all, power has just cut, so computer is a device which works with power". Without disturbing the students' attention, I thought to turn their attention to the aims of the lesson. Cint03

One of the PST indicate that "*Öğretmenlik için en önemli etkenlerin kendine güven, öğrencilerle iletişim ve ders materyalleri üzerinde yeterli şekilde çalışmak olduğunu öğrendim*".(ID1)

Almost all PSTs expressed that microteaching experience has a positive effect on their future lessons. One of the PSTs expressed the effects of the micro-teaching on their future professions as;

> *The implementation of the course CEIT382 and microteaching are really effective. Those who want to be an instructor in the future are able to see their level of teaching methods, classroom management skills, communication skills with this micro-teaching.* (ID6)

CHAPTER 5

DISCUSSION

Fist finding of this study is that the use of question prompts embedded in a web-based video analysis system have an signiticant effect on pre-service teachers' reflective thinking level. That is, PSTs, guided with questions prompts which were used for directing the learner on the specific point to reach the appropriate leaning goals, gave more critical and reflective feedbacks to their peers' microteaching videos than those who did not guided with these question prompts.

The second finding of this study is that the use of question prompts embedded in a web-based video analysis system did not have a signiticant effect on pre-service teachers' self-efficacy levels. However, there was a significant linear trend indication for all types of self-efficacy factors for both control and experimental group over the time. For both groups this linear trend showed that self-efficacy scores of instructional strategies, classroom management, and student engagement developed over the time.

5.1 Effects of Question Prompts and Reflective Thinking

Improvement the affordance of to prepare qualified teacher candidates with highly critical thinking capacity is an active debate (Lai, 2008). It is claimed that the preservice teachers did not have a chance of long-term classroom

teaching experinces and problems about improving their metacoginitive skills, affecting the improvement of PSTs reflcetive thinking skills (Rudduck, 1989). In the preparation of the teachers, early field experiences acts an important role (Gutton & McIntyre, 1990). In these field experinces, teacher education programs have been widely using the microteaching technique in order to prepare the PSTs for the real classroom setting. Microteaching environments serve a very convenient environment to PSTs in order to gain experiences on teaching skills in the classroom environment. In this environment the real classroom difficulties are reduced for the practitioners and the teacher candidates receives great deal of feedbacks (Allen & Ryan, 1969). These environments allow the PST to gain experience on the teaching skills and to cultivate the reflective thinking (Huang, 2001). Reflective thinking is important for professional development (Schön, 1987). With the help of the cognitive scaffolds, learners could reach places that they could not achieve without it (Holton and Clarke, 2002). After the learner reach to intended point then it is expected the learner may represent the specifications gained with the help of scaffolds (Holton and Clarke, 2002). In the teaching process reflection takes a key part and the learner need to think on the means of each experiences to them and how this acquisition can be applied in the future positions (Zink, 2010). While watching the microteaching videos, PSTs spends many times. Anderson et al. (2005) claimed that a few research focused on the PSTs observation of teaching. For professional development, observation of teaching plays an important role (Dewey, 1974). While observing the microteaching videos, PSTs can give feedback to the peers. In this environment, by icreasing the reflective thinking level of the PSTs would result in the more qualified feedbacks. So in this study, it is aimed to

investigate the effects of the QPs on the PSTs reflective thinking levels, while they are observing their peers' microteaching videos at WBPES.

Overall findings of this study indicates that in both experimental and the control group, PSTs' reflective thinking levels have increased. Despite the overall learning gain, the results suggested that the group under the use of question prompts embedded in a web-based video analysis system could better assist PSTs in learning and integrating knowledge compared to the group under the use of unguided reflection environment embedded in a WBPES.

In litearture different studies were conducted on the guidance of the learner while thinking cognitively and metaconitivly. Some studies resulted that guidance improves the reflective thinking level and learning on the orher hand some other studies advocated that minimal or lack of guidance of learner result in more reflective thinking level. Jonassen, 2010 claimed that questions are effective for eliciting metacognition activities such as planning and reflection. In this study, with regard to scaffolded PSTs, peer feedbacks showed that they are more succesful on explaining the actions and events. Some of them could achieve to look action and events from multible perspective and they are more succesful than the unguied PSTs on prividing reasons and making justification about the events or actions. But it is possible to say that some of the unguied PSTs were represented high reflective thinking level, but in this group most of the PSTs are at the discirptive writing or discriptive refleclection level which are the fist and the second level of the "Criteria for the Recognition of Evidence for Different Types of Reflective Writing" rubric.

Findings of this study about the effects of the QPs on reflective thinking was supported by different studies in literature. In their study, NcNeill and Krajcik (2006) contrasted the effects of domain-specific and domain-generic scaffolds and they found that domain-specific scaffolds are more effective than the domain generic scaffolds in terms of understanding the content. Also in another study it was found that domain specific scaffolds can achive to start the knowledge integration process but they are not capable in knowledge fostering alone (Bell & Davis, 2000; Kyza & Edelson, 2003).

By scaffold the experimental group with question prompts could force them to find out an answer to question prompts from the video parts and the related materials, on the other hand, in control group because the PSTs were free to answer the general questions without any stress of finding specific answers, they wrote down what they saw in the video. So this feeling could make unwillingness for making reflection. From the interview results, it can be interpreted that the question prompts forced the PSTs reflect on the specific points. One of the PST in the treatment group confessed that after the couple of weeks, he did not need to read the questions, but automatically answered the question relevantly. After the learner gains independence, and no longer needs to complete the desired task, so this form fading of scaffolds occure (Dennen, 2004). By the time individual gradually faded the scaffold byself, and does not feel any requirement to it. This finding is also important for this study, because gaining the PSTs, the ability of reflective thinking, is a desired behavior change. The results also prove this hypothesis.

As Albrecht and Carnes (2006) sited Dunkin, Precians, & Nettle (1994) stated that studies in which the PSTs involve in reflective inquiry point out

significant effect on the cognitive development of the PSTs. As Subramaniam (2006) cited Danielson and McGreal (2000) stated that for teaching actions, the initial role of the evaluation criteria is supply evidence and determining which evidence is relevant for the evaluation criteria is the the evaluator's skill. After the microteaching session conducted at the peer evaluation process, it is expected from the evaluator to make meaningful and evidence based evaluation, so that the microteaching performer could take the optimum benefit from the evaluation.

As mentioned, this study is intended to gain a reflective thinking skill to the PSTs. It is expected that the PSTs think on the teaching skills, evaluation processes, classroom environment, student interaction, classroom management, etc. After the scaffolding removed from the environment, their functionality on these process were evaluated. In scaffolding learner's success depends on the adaptation of the learner centered strategies on the learner's needs (Dennen, 2004). Learner effected scaffolding both cognitively and emotionally, in explanation it is not only impact learner skills and knowledge but also learner motivation and confidence (Dennen, 2004). Question prompts are used for scaffold the learners in different situations.

For the novice learners, guided instructional approaches are more effecteive than the unguided or minimal guided ones (Kirschner et. al., 2006). All the participants of the study were the novice PSTs. Also, the results of the study showed that novice PSTs needed to guieded instructional aproaches. But after they learned how to deal with the obstacles they automatically remove the guidance, in other words they unintentionally faded the scaffolds.

King (2002) argues that for promoting the different kinds of cognitive processing, it is necessary to ask different sort of questions. Therefore, engaging in these cognitive processes strengthen the understanding (King, 2002). In the literature there were some studies, claimed that "People can sometimes learn very well through unguided exploration, and can also learn by listening passively to lectures or stories or by being directly instructed" (Mercer, 1995). Bu in this context guided PST performed more reflective results than the unguided group.

5.2 Self-Efficacy and Guided and Unguided Observation

In this study question prompts were used to guide the PSTs while they were observing their peers. In literature there are divergent approaches among the researchers about the effects of guided and unguided observation technique.

Observation is an important process for the microteaching technique. For observation PSTs spent very large amount of time in order to gain teaching experience. Bandura (1977,1986) claims that, in teacher education observation is important because most of the individuals learn by observation through modeling. Observation is important while learning to teach (Young et. al., 2011). By watching the others' performances can generate expectations from the reviewers' side it means, others' performance encourages them and they feel they could achieve improvement in their self-performance (Bandura & Barab, 1973). By the way observation triggers the activation of self-efficacy (Bandura, 1977). In literature, two types of observation technique were used as guided and unguided observatin (Anderson et. al., 2005). Anderson et. al. (2005) explains that in unguided observation, pre-service teachers are not or little

guided by the direction in what to observe, on the other hand, in guided as called focused observation the directed points of teacher of pupil behaviors adds that guided observation may limit the ranage of behaviors observation, on the other hand Waxman (1988) stated that guided observation support helps preservice teachers become more aware of the social reality of teaching. PSTs in unguided observation can see anythink interesting the classroom setting or they may look to the teaching from a general foci (Anderson et. al., 2005). So guiding the PSTs by specific questions which focus on the important points of a lesson or allowing the PSTs free to observe can make different contributions on the PTS' self-efficacy levels. The results of the study showed that the use of question prompts embedded in a WBPES did not have a signiticant effect on pre-service teachers' self-efficacy levels.

As the results of the study showed that the use of question prompts embedded in a web-based video analysis system did not have a signiticant effect on pre-service teachers' self-efficacy levels. However, there was a significant linear trend indication for all types of self-efficacy factors for both control and experimental group over the time. The reason could be based on the micorteaching experineces. Because both of the groups conducted the microteaching session and both PSTs observed the microteaching videos. In microteaching environment, while PSTs watching their peers microteaching performance, they can get valuable experinces. Bandura (1977) stated that the self-efficacy not stand on only the individuals' experienced masteries, also vicarious experiences have a great effect on the self-efficacy. By watching the others' performances can generate expectations from the reviewers' side it means, others' performance encourages them and they feel they could achieve

improvement in their self-performance (Bandura & Barab, 1973). While peer is watching the microteaching video s/he can model the successful sides of the performer's act. As Wang et al. sited (2004) Neck and Manz (1992) stated that, mentally to rehearse a task then they are exposed the positive effect of the task, and this means learn through vicarious experiences. From this looking side it is expected that the PSTs while watching the microteaching performer, they can take the positive and useful vicarious experiences and refuse the useless ones. The related results from the intewiew data supports the effects of the watching microetaching videos and performing microteaching on the PSTs self-efficacy levels.

A student was asked that the watching the online videos and writing feedbacks did have an posisitve effect from your side and she answered that;

> Interviewee: *Oldu hocam. Ben en son anlatılan haftadaydım. Onlara[peer microteaching videos] yorum yaptım. Direk peer evaluation yaptık birbirimize. Açıkları gördük. Kendim ben olsam nasıl yapardım dedim ilk başta ben yorum yaparken, arkadaşın ders planlarını inceliyordum, daha sonra arkadaşı izliyordum uygun oldumu ders planına bakıyordum…Cint03*

> *Yes, sir. My microteaching turn was last week. I gave feedback to the peer's microteaching videos. Directly we made peer evaluation one to another. While I was giving peer feedback I though If I were him, what would I do? While evaluation the microteaching, I investigate the lesson plan and then I watch the microteaching video by the way I could have chance whether it was consistent with the lesson plan.*

This answer shows that microetaching videos effected the peer. Cint03 put himself place of the microetaching performer and thought on the specific acitions by the way this interaction could gain valuable experiecens about the teaching profession.

In another question PST asked did your microteaching experience effect your real classroom teaching experience, he explained the positive effects of the miroteaching as;

> Interviewee: *Tamamen bu tecrübelerime (microteaching) dayanarak anlattım diyebilirim size. Beş dönem[He took this course in his sixth term] boyunca biz teorik olarak gördük ders anlatmayı. Hicbir zaman uygulamaya geçmemiştik. Bu dersin de bana en büyük artısı bunu uygulamaya geçirmek oldu. Tam olarak orada[microteaching] ne yaptıysam sınıfta da aynısını yaptım. Teknik olarak aynısını kullandım…Arkadaşlarımla konuştum onlar da bu derste öğrendiklerini aynen uygulayacaklarını söylediler. Bu dersin yararı çok oldu.(Cint4)*
>
> *I can say that I gave my lecture deped on my experiences(microteaching). We have been trained about lecturing on the theoric knowledge for five terms. We could not have a chance to make practice. It was the biggest advantage of this course is getting into practice. Exactly what I do at microteaching, I did the same in the classroom. I use the same techniques…Also my friends expressed that they will use that they have learned from this course. This course has many benefits.*

As the interview and open ended question results show that the microteaching experince has an powerful positive effect on the PSTs self-efficacy levels. Because both groups PSTs were conducted the

microteaching, and watched their peer microteaching videos, self-efficacy test did not found any significant differences between the gorups.

Self-efficacy has three dimentions as student engagement (SE), instructional strategies (IS), and classroom management (CM). For both groups, the change from pretest to posttest was significant for the three dependent variables but on the other hand the change of any dependent variable was not statistically significant from each other. After the examination of means it could be said that the change among the dependent variables are not significantly different from each other. It can be said that all PSTs experienced about each dependent variables while conducting the microteaching and peer evaluation sessions. In microteaching environment, they lectured to their friends who made role of real students, so practicing on this environment may help them to improve their self efficacy about the student engagement issue. Each of the PSTs prepared lesson plan before the microteaching application and they conducted the microteaching with the guidace of these plans so they could have a chance to apply the planned instructional strategies in the microteaching classroom setting. By the way they could see effects of the instructional strategies during lecturing and these experiences may effect their self efficacy about the IS. Up to this course, they had not been any chance of lecturing. In microteaching setting they could have chance to manage a classroom. In addition while they were watching the peer videos they exposed to different classroom managent samples. So these experience may effect their self efficacy about the classroom management.

5.3 Concluson and Recommendations

The result of this study gives clues to the instructional designers, educators, and teachers about effects of scaffolds in order to facilitate the peer evaluation and improve the reflective thinking process. However scaffolds can be used in different learning environments, the result of this study is concentrate on the reflective thinking process. The result of the study shows that the guiding the learner with QP as a scaffold enhances the reflective thinking and results in greater knowledge acquisition.

From the interview results, it was understood that PSTs did not want to evaluate more than one microteaching video every week, so like these environment in order not to make PST bored, one peer can be adequate for peer evaluation.

It can be recommended that rather than the static scaffolds, dynamic scaffolds can be used in order to facilitate the peer feedback process by using adoptive systems. By the way PST do not guess which type of QP will be assessed and thus they can concentrate to the different points in their every peer evaluation.

It is interpreted from the interview data, some of the students think that both guided and unduided question prompts could best suits the requirements of the WBPES. Because after giving specific answers to the guided question prompts, they some times wanted to make reflections about an unlisted topic, but in the guided environmet they could not find a chance in this WBPES, so it is recommended while designing similar systems this detail might be considered.

From the interview data, some PSTs expressed that, watching the other PSTs microteaching videos, especially the good examples gave them valuable clues about gaining experience about the teaching profession. This finding shows that the good examples are more benefical than the bad ones, because the PSTs are tent to learn from the god examples. They are looking for the specific applications of teaching methods in the classroom setting, so in this area conducting new studies can be more benefical while preparing them for the professional teaching life.

5.4 Implications for the Futher Researches

It is clearly known that preservice teachers need to be supported for being reflective practitipners. In order to gain more experience about the teaching profession, teacher education programs should encourage and give more opportunities to the pre-service teachers. Because the reflection and reflective practice and observation are the very improtant components for teacher training programs, it is needed to make more qualitative and quantitative studies to enlighten which different dependent components that effects the teachers during the reflection and observation process.

Technology developing so quickly. By adapting these developments to teacher training environments, can make it possible to prevent deficiencies orginated from lack of time and lack of opportunity for making more practice and observation in order to gain experience.

While training the teachers individuals may not be at the same cognitive level, so at this point individaul requirement may chance from the individual to individual, so individaul differences should be considered while training the teachers for being more reflective teachers. For this

positions, rather than the static scaffolds adaptive systems can be used for supporting the pre-service teachers in order to make more reflective practitioners. Adaptive systems give more opportunities to manipulate different components while supporting the individual needs of the participants, so new studies can focus on the individual requirements by the help fo the technology.

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APPENDIX A

GUIDED WEB-BASED VIDEO EMBEDED PEER EVALUATION FORM

Watch the video and evaluate the performance of the PST for the phases of the lesson including introduction, main activities, conclusion & assessment. Do not forget to click to SAVE button once you enter your comment/reflection. (You can write your reflection in Turkish or English.)

INTRODUCTION

1. How did the PST inform the students about the instructional goal and objectives? Do you think the way of the presentation of goal and objectives was effective? Why or why not?
2. How did the PST motivate students? Do you think the students were eager to learn the topic? Why or why not?
3. How did the PST stimulate the students to recall the prior knowledge? Do you think the given prior knowledge was helpful and adequate for the students? Why or why not?

MAIN ACTIVITIES

1. Do you think the content was appropriate for the instructional goal, objectives, and the target audience? Why or why not?

2. Which teaching method(s) and technique(s) did the PST use? Do you think the teaching methods and techniques were appropriate for the instructional goal, objectives, and the target audience? Why or why not?

3. Which instructional materials (presentation, handout, visuals, etc.) did the pre-servive teacher use? Do you think the instructional materials were appropriate for the instructional goal, objectives, and the target audience? Why or why not?

4. Which examples did the PST use? Do you think the examples were appropriate for the instructional goal, objectives, and the target audience? Why or why not?

5. How did the PST keep the active participation of the students? Do you think it was enough? Why or why not?

6. How did the PST provide feedback to the students? Do you think the feedback was appropriate for the instructional goal, objectives, and the target audience? Why or why not?

CLOSURE / CONCLUSION

1. What kind of assessment strategy(ies) did the PST use? Do you think the assessment strategies were appropriate for the instructional goal, objectives, and the target audience? Why or why not?
2. What kind of summarizing strateg(ies) did the PST use? Do you think it was effective? Why or why not?
3. How did the PST combine the lesson to the next one? (homework, explanation, concerns, etc.)

APPENDIX B

UNGUIDED WEB-BASED VIDEO EMBEDED PEER EVALUATION FORM

Watch the video and evaluate the performance of the PST for the phases of the lesson including introduction, main activities, conclusion & assessment. Do not forget to click to SAVE button once you enter your comment/reflection. (You can write your reflection in Turkish or English.)

INTRODUCTION
MAIN ACTIVITIES
CLOSURE & EVALUATION

APPENDIX C

INTERVIEW QUESTIONS

Görüşülen Kişi(ler) **:** ……

Görüşmeyi Yapan **:** ……

Tarih & Saat **:** …..…/…..…/ 2010 & ...… : …...

Görüşme Süresi **:** …….....

Görüşmenin Yapıldığı yer **:** …….....

Giriş

Her şeyden önce bu görüşme talebine olumlu yanıt verip katıldığın için teşekkür ederim. Ceit382 dersinde bir dönem boyunca micro-teaching, video analizi, arkadaşlarınıza yorum yazmak ve self-reflection gibi bir takım uygulamalar gerçekleştirdik. Bu bağlamda seninle bu dersten edindiğin tecrübeler, karşılaştığın problemler ve olası önerilerin üzerine konuşmak istiyorum. Vereceğin geri dönütler bizim için çok değerli, bu konuda tamamen özgür ve samimi cevaplar verebilirsin. Verdiğin cevaplar kişisel kimliğin açıklanmadan bilimsel çalışmalarda kullanılabilir. Tüm görüşmeyi ses kayıt cihazına kaydedeceğim, görüşmeden sonra kullanılmasını istemediğin konuşmaların olursa o kısımları sildirebilirsin. Bu görüşme yaklaşık 30dk. sürecek. Eğer herhangi bir sorunuz yoksa sorulara başlayabiliriz.

Question Prompts

382 dersinde online sistem aracıyla video analiz edip, arkadaşlarına yorum yazmanın sana faydası olduğunu düşünüyor musun?

- Evet
  - Ne açıdan faydalı oldu?
  - Örnek verebilir misin?
- Hayır
  - Neden faydası olmadığını düşünüyorsun?

Streaming Video:

- Yorum yazarken videoyu izlemenin sana ne gibi katkıları oldu?
- Sistemde videosunu izlediğin arkadaşının kullandığı materyallerin sana verilmesinin bir faydası oldu mu?
  - Evet
    - Ne açıdan faydalı oldu?
  - Hayır
    - Neden faydasız olduğunu düşünüyorsun?
- Video analizi yaptığın online sistemde sana bazı yönlendirmeler verildi ve sorular soruldu. O yönlendirmeler ve sorular video analizi sırasında sana yardımcı oldu mu? (Experimental Gruba Sorulacak Soru)
  - Genel soruların sorulması yorum yazman sırasında sende kısıtlanmadan her türlü yorumu yapabileceğin izlenimi verdi mi?
- Video analizi yaparken sana sorular soruldu, bu sana yorum yazmanda yardımcı oldu mu?
  - Soruları çok detaylı olması sana yorum yaparken herhangi bir kısıtlama getirdi mi?
  - Size videolar, sorulan sorulara göre 3 parça halinde verildi, videoların bu şekilde verilmesi yorum yazarken fayda sağladı mı? (Hatırlatmak için, WBPES göster.)
    - Video içindeki cevaba ulaşmanda fayda sağladı mı?
      - Evet
        - Ne gibi faydalar sağladı? (cevaba hızlı ulaşmak, zaman kazanmak…)

SELF REFLECTION

Self Reflection:

- Arkadaşlarının senin için yazdıkları yorumların olumlu ve olumsuz yönlerini görmende faydalı olduğunu düşünüyor musun?
    - Evet: Ne açıdan faydalı oldu?
        - Sana katkı sağladığını düşünüyor musun?
        - Başka neler yapılabilirdi?
    - Hayır: Nedenini açıklar mısın?
        - Faydalı olması için farklı ne yapılabilirdi?
- Tahmin etmediğin veya kendinde bir eksiklik olarak görmedin konuları içeren yorumlar aldın mı?
    - Evet: Birkaç örnek verir misin?
- Önce kendi olumlu ve olumsuz yönlerini yazdıktan sonra sınıflan gelen yorumları okuduğunda kendin hakkında düşünmediğin olumlu/olumsuz noktaların olduğunu fark ettin mi?
- Okul deneyimi dersi (staj dersi) için gerçek sınıf ortamında ders anlatma şansın oldu mu?
    - Evet:
        - Gerçek sınıf ortamında 382 dersinde edindiğin tecrübelerin sana faydasını oldu mu?
            - Evet
                - Ne gibi faydaları oldu, açıklar mısın?
                    - Sence arkadaşlarından aldığın yorumlarında bu tecrubeye katkısı var mı? Açıklar mısın?
            - Hayır
                - Neden faydası olmadığını düşünüyorsun?

Micro-Teaching:

- Micro-teaching uygulamaları sırasında izlediğin videoların öğretmenlik deneyiminde sana faydası oldu mu? Açıklar mısın?
    - Arkadaşlarının yaptığı micro-teaching uygulamalarda gördüğün örnek olaylardan etkilenerek gerçek sınıf ortamına adapte ettiğin şeyler oldu mu?
    - İzlediğin videolardaki arkadaşlarının uygulamaları, gerçek sınıf ortamında uygulayabileceğin örnekler olarak aklına gelenler oldu mu?

SELF EFFICACY & ANXIETY

- Kendini gerçek sınıf ortamına girdiğinde nasıl hissettin? Açıklar mısın?
- Micro-teaching uygulamasının gerçek okul ortamında uygulama yapma konusundaki kaygını durumunu nasıl etkiledi?
    - Evet: Hangi açıdan faydası oldu açıklar mısın?
        - Örnek verebilir misin?
    - Hayır: Nedenini açıklar mısın?
- Micro-teaching uygulamasından sonra kendini öğretmen olma konusundaki öz güvenine etkisi nasıl oldu?
    - Evet: Örnek vererek açıklar mısın?
    - Hayır: Nedenini açıklar mısın?
- Bu dersi aldıktan sonra öğretmenlik mesleği konusundaki fikirlerinde ne gibi değişmeler oldu mu?
    - Evet
        - Olumlu/olumsuz ne yönde?
            - Sebebini açıklar mısın?
- Gerçek sınıf ortamına girdiğinde beklentilerin ile karşılaştıkların arasında nasıl bir fark/benzerlik vardı?
    - Örnek vererek açıklar mısın

APPENDIX D

TURKISH VERSION OF THE TEACHERS' SENSE OF EFFICACY SCALE (TTSES)

ÖĞRETMEN ÖZYETERLiLiK ÖLCEGi	yetersiz		çok az yeterli		biraz yeterli		oldukca yeterli		çok yeterli
1. Çalışması zor öğrencilere ulaşmayı ne kadar başarabilirsiniz?	1	2	3	4	5	6	7	8	9
2. Öğrencilerin eleştirel düşünmelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
3. Sınıfta dersi olumsuz yönde etkileyen davranışları kontrol etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
4. Derslere az ilgi gösteren öğrencileri motive etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
5. Öğrenci davranışlarıyla ilgili beklentilerinizi ne kadar açık ortaya koyabilirsiniz?	1	2	3	4	5	6	7	8	9
6. Öğrencileri okulda başarılı olabileceklerine inandırmayı ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
7. Öğrencilerin zor sorularına ne kadar iyi cevap verebilirsiniz?	1	2	3	4	5	6	7	8	9
8. Sınıfta yapılan etkinliklerin düzenli yürümesini ne kadar iyi sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
9. Öğrencilerin öğrenmeye değer vermelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
10. Öğrettiklerinizin öğrenciler tarafından kavranıp kavranmadığını ne kadar iyi değerlendirebilirsiniz?	1	2	3	4	5	6	7	8	9
11. Öğrencilerinizi iyi bir şekilde değerlendirmesine olanak sağlayacak soruları ne ölçüde hazırlayabilirsiniz?	1	2	3	4	5	6	7	8	9
12. Öğrencilerin yaratıcılığının gelişmesine ne kadar yardımcı olabilirsiniz?	1	2	3	4	5	6	7	8	9

13. Öğrencilerin sınıf kurallarına uymalarını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
14. Başarısız bir öğrencinin dersi daha iyi anlamasını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
15. Dersi olumsuz yönde etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabilirsiniz?	1	2	3	4	5	6	7	8	9
16. Farklı öğrenci gruplarına uygun sınıf yönetim sistemi ne kadar iyi oluşturabilirsiniz?	1	2	3	4	5	6	7	8	9
17. Derslerin her bir öğrencinin seviyesine uygun olmasını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
18. Farklı değerlendirme yöntemlerini ne kadar kullanabilirsiniz?	1	2	3	4	5	6	7	8	9
19. Birkaç problemli öğrencinin derse zarar vermesini ne kadar iyi engelleyebilirsiniz?	1	2	3	4	5	6	7	8	9
20. Öğrencilerin kafası karıştığında ne kadar alternatif açıklama ya da örnek sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
21. Sizi hiçe sayan davranışlar gösteren öğrencilerle ne kadar iyi baş edebilirsiniz?	1	2	3	4	5	6	7	8	9
22. Çocuklarının okulda başarılı olmalarına yardımcı olmaları için ailelere ne kadar destek olabilirsiniz?	1	2	3	4	5	6	7	8	9
23. Sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabilirsiniz?	1	2	3	4	5	6	7	8	9
24. Çok yetenekli öğrencilere uygun öğrenme ortamını ne kadar sağlıyabilirsiniz?	1	2	3	4	5	6	7	8	9
KAYDET									

APPENDIX E

INFORMED CONSENT FORM

Gönüllü Katılım Formu

Çalışmanın amacı, web tabanlı video analiz sisteminde, öğrencinin kendi akranını değerlendirirken verdiği geri dönütlerin yansıtıcı düşünme seviyelerine ve bu sürecin öğrencilerin öğretim planlama becerilerine etkisini ölçmektir. Çalışmaya katılım tamamıyla gönüllülük temelinde olmalıdır. Ankette, sizden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamamıyla gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilecek bilgiler bilimsel yayımlarda kullanılacaktır.

Anket, genel olarak kişisel rahatsızlık verecek soruları içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakıp çıkmakta serbestsiniz. Böyle bir durumda anketi uygulayan kişiye, anketi tamamlamadığınızı söylemek yeterli olacaktır. Anket sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için Bilgisayar ve Öğretim Teknolojileri Bölümü öğretim üyelerinden Yard.Doç. Dr. S. Tuğba Bulu (Oda: C114; Tel: 210 7520; E-posta: stugba@metu.edu.tr) ya da araştırma görevlisi İsmail Yıldız (Oda: C105; Tel: 210 4183; E-posta: ismaily@metu.edu.tr) ile iletişim kurabilirsiniz.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyadı Tarih

İmza

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APPENDIX F

SCREENSHOT FROM AN EXAMPLE OF THE GUIDED WEB-BASED VIDEO EMBEDED VIDEO EVALUATIN SYSTEM

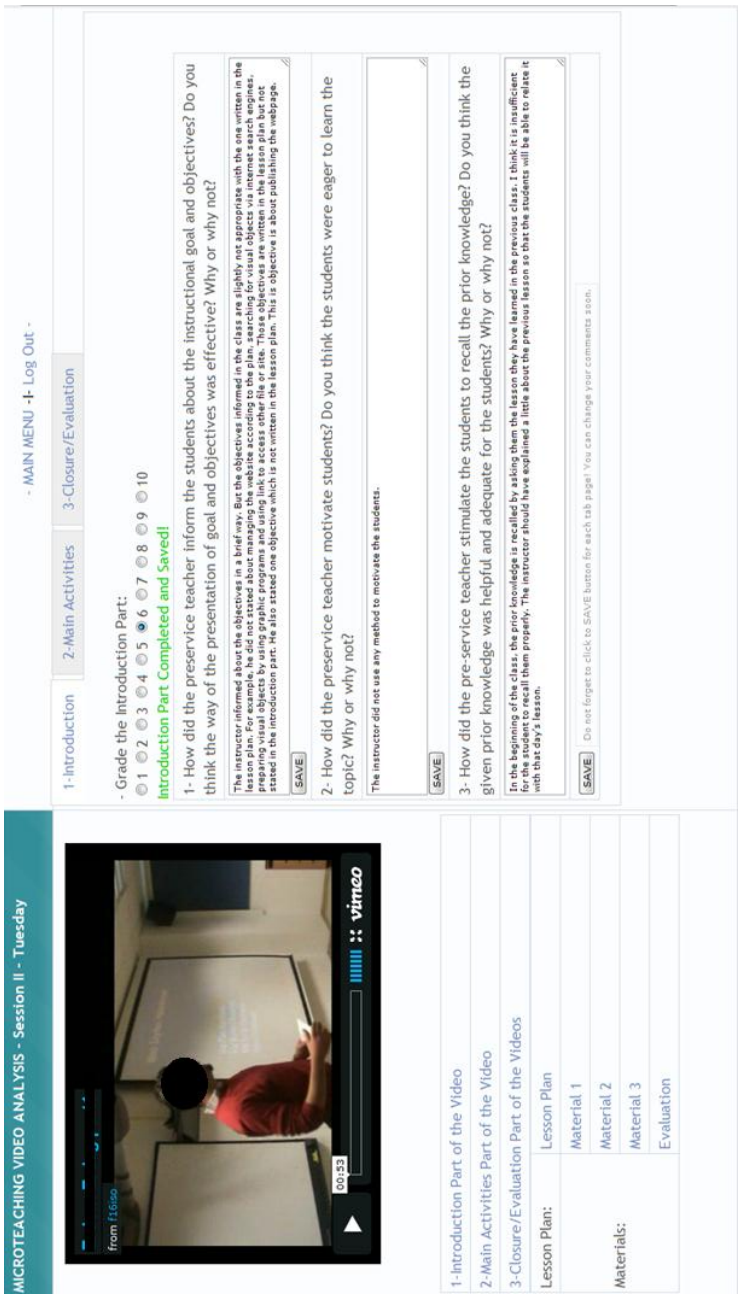

Figure 18 An Example of Guided WBPES**Hata! Başvuru kaynağı bulunamadı.**

APPENDIX G

SCREENSHOOT FROM AN EXAMPLE OF THE UNGUIDED WEB-BASED VIDEO EMBEDED VIDEO EVALUATIN SYSTEM

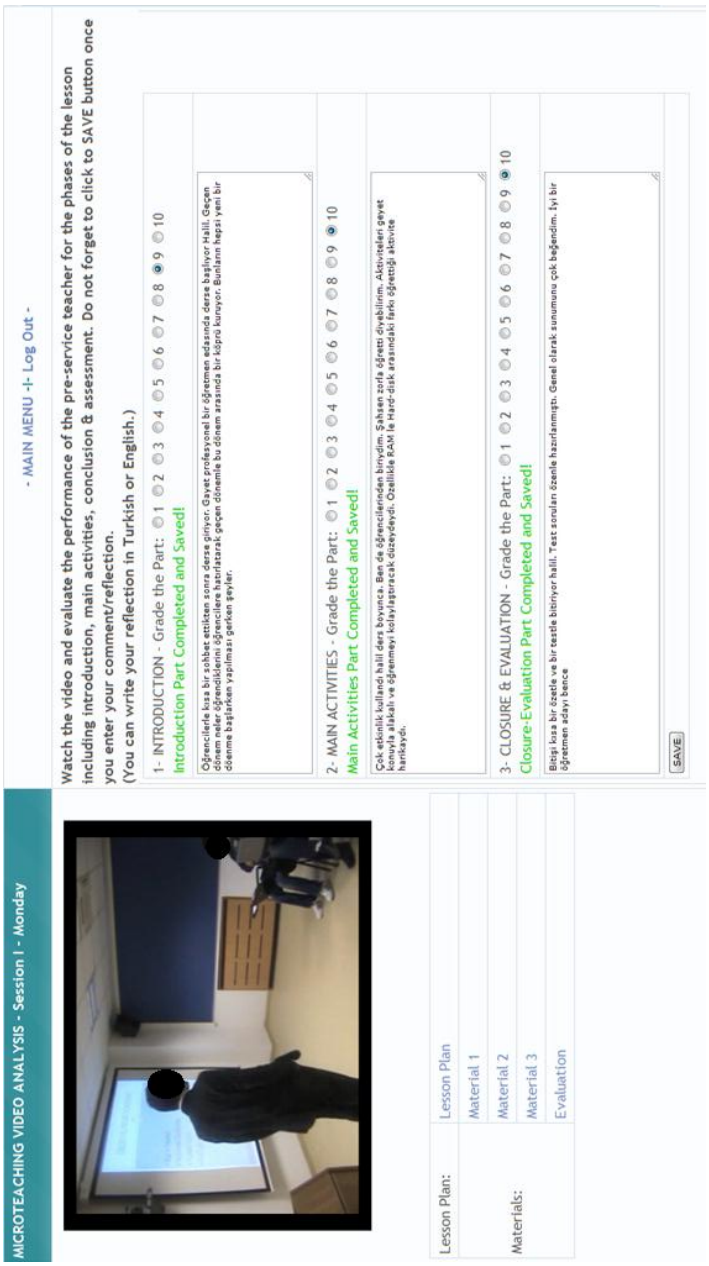

Figure 19 An Example of Unguided WBPES**Hata! Başvuru kaynağı**

APPENDIX H

CRITERIA FOR THE RECOGNITION OF EVIDENCE FOR DIFFERENT TYPES OF REFLECTIVE WRITING

Table 11 Criteria for the Recognition of Evidence for Different Types of Reflective Writing

1p	Descriptive writing	- Not reflective. - Description of events that occurred/report of literature. - No attempt to provide reasons/justification for events.
2p	Descriptive reflection	- Reflective, not only a description of events but some attempt to provide reason/justification for events or actions but in a reportive or descriptive way. eg, 'I chose this problem solving activity because I believe that students should be active rather than passive leaners'. - Recognition of alternate viewpoints in the research and literature which are reported. eg, "Tyler (1949), because of the assumptions on which his approach rests suggests that the curriculum process should begin with objectives. Yinger (1979), on the other hand argues that the 'task' is the starting point." Two forms:- a- Reflection based generally on one perspective/factor as rationale. b- Reflection is based on the recognition of multiple factors and perspectives.

Table 11 Criteria for the Recognition of Evidence for Different Types of Reflective Writing (Continue)

3p	Dialogic reflection	- Demonstrates a "stepping back" from the events/actions leading to a different level of mulling about, discourse with self and exploring the experience, events and actions using qualities of judgement and possible alternatives for explaining and hypothesising. - Such reflection is analytical or/and integrative of factors and perspectives and may recognise inconsistencies in attempting to provide rationales and critique, eg, 'While I had planned to use mainly written text materials I became aware very quickly that a number of students did not respond to these. Thinking about this now there may have been several reasons for this. A number of the students, while reasonably proficient in English, even though they had been NESB learners, may still have lacked some confidence in handling the level of language in the text. Alternatively a number of students may have been visual and tactile learners. In any case I found that I had to employ more concrete activities in my teaching.' - Two forms, as in (a) and (b) above
4p	Critical reflection	- Demonstrates an awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives but are located in, and influenced by, multiple historical, and socio-political contexts, eg, 'What must be recognised, however, is that the issues of student management experienced with this class can only be understood within the wider structural locations of power relationships established between teachers and students in schools as social institutions based upon the principle of control'.
	Hattan & Smith (1994)	

APPENDIX I

OPEN-ENDED QUESTION

User_id
Answer the related questions. (You can write your reflection in Turkish or English.)
3) What will be the effect of this microteaching experience on your future lessons? Write your new learning, discoveries, and insights.
You can turn to this step and can change your reflection.
COMPLETE

APPENDIX J

SELF REFLECTION STEP-I

Please watch your microteaching performance and describe:
(You can write your reflection in Turkish of English)

1. Describe the strong aspects of your microteaching. Please add only one aspect for each time. Click, add more!

2. Describe the weak aspects of your microteaching. Please add only one aspect for each time. Click, add more!

After you click the "NEXT STEP", you will not able to find a chance to change your reflections for STEP-I, so complete your work and clik "NEXT STEP".

If you want you can logout and continue later.

APPENDIX K

SELF REFLECTION STEP-II

Review the feedbacks from your classmates about your microteaching performance. Based onthose feedback, write down "Strong and Weak Aspects" of your performance and your responses by filling out the table below.

(You can write your reflection in Turkish of English)

A. Strong Aspects

B. Weak Aspects

You can turn to this step and can chance your reflections.

APPENDIX L

SELF REFLECTION STEP-III

- If the goal, objectives, target audience, and classroom environment were the same for your microteaching, in order to improve your teaching performance, how would you design and present your instructional planning and microteaching respectively? Please, explain in details by considering the active learning strategies, teaching methods, materials, assessment, and general communication skills.

- What were the similarities and differences between your intentions and actual implementation in your microteaching?

- What will be the effect of this microteaching experience on your future lessons? Write your new learning, discoveries, and insights.

CURRICULUM VITAE

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EDUCATION

- 2004- Present: Ph.D. on B.Sc. Department of Computer Education and Instructional Technology
  Faculty of Education, Middle East Technical University, Ankara
- 2003 – 2004: English Preparation School, School of Foreign Languages Department of Basic English Middle East technical University, Ankara
- 2002 – 2004: M.S. Electronics and Computer Education
  Faculty of Technical Education, Gazi University , Ankara
- 1998 – 2002: B.S. Computer Education and Instructional Technology
  Faculty of Education, Ege University , İzmir

WORK EXPERIENCE

- 2004 – Present: Research Assistant, Computer Education and Instructional Technology
  Middle East Technical University, Ankara.
- Sep 2010 – Feb 2011: Visiting Scholar, The Open University, Milton Keynes, UK.
- 2002 – 2004: Computer Teacher, Ministry of National Education, Manisa, Turkey.

TEACHING EXPERIENCE

- 2009 – 2010: CEIT 709 Virtual Worlds In Education: Theory And Design, CEIT, METU
- 2009 – 2010 : CEIT 207 Design And Use Of Instructional Material, CEIT, METU
- 2007 – Present: CEIT 382 Computer Education Teaching Methods in II, CEIT, METU
- 2007 – Present: CEIT 380 Computer Education Teaching Methods I, CEIT, METU
- 2006 – 2008: CEIT 414 School Experience, CEIT, METU
- 2007 – 2008: CEIT 410 Practice Teaching, CEIT, METU
- 2005 – 2006: CEIT314 Computer Networks and Communications, CEIT, METU
- 2004 – Present: CEIT211 Programming Languages 2, CEIT, METU
- 2004 – 2005: CEIT210 Programming Languages 1, CEIT, METU

SKILLS

- Programming Language: C, C++, Action Script 2, ASP,VB.Net, ASP.Net, Delphi, Pascal
- Web Design: Dreamweaver, FrontPage
- Image Editing: Adobe Photoshop, Macromedia Fireworks

- Animation: Adobe Flash, Adobe Captivate
- Video Editing: Corel Video Studio Pro X3.
- Game Development: Active Worlds, Torque Game Development
- Package Program: MS Office

PUBLICATIONS

Journal Paper

- Erdoğan, M., Kurşun, E., Şişman, G.T., Saltan, F., Gök, A., Yıldız, İ. Sınıf Yönetimi ve Sınıf İçi Disiplin Problemleri, Nedenleri ve Çözüm Önerileri Üzerine Nitel Bir Araştırma: Bilişim Teknolojileri Dersi Örneği, KUYEB, 10(2)

Conference Paper

- **Yıldız, I**, & Bulu, S.T. (2010). Preservice teachers' reflective thinking during microteaching sessions. *Association for Educational Communications and Technology Conference 2010, AECT Convention – Anaheim, CA*

- **Yildiz, I**., Kursun, E., Saltan, F., Gok, A. & Karaaslan, H. (2009). Using Wiki in a Collaborative Group Project: Experiences from a Distance Education Course. In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2009* (pp. 3044-3048). Chesapeake, VA: AACE.

- Arslan Ari, I., Gok, A., Uzun, E., **Yildiz, I**., Cagiltay, K. & Yildirim, S. (2008). Students' 99Suggestions about Technology Integration in Higher Education. In J. Luca & E. Weippl (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia andTelecommunications 2008* (pp. 6236-6240). Chesapeake, VA: AACE.

- Kursun, E., **Yildiz, I**. & Sumuer, E. Öğretim Tasarımcısı: An Electronic Performance Support System for Teachers in Instruction Design Process. World Conference on Educational Multimedia, Hypermedia and Telecommunications. Vancouver, Canada, June 25 - 29, 2007.

- **Yildiz, I**, Karakus, T., Kursun, E**.,** Uzun, E. & Karaaslan, H. Random Assigned Collaborative Working in A Distance Education Course: Experience and Recommendations Of Students. World Conference on Educational Multimedia, Hypermedia and Telecommunications. Vancouver, Canada, June 25 - 29, 2007.

- Sancar, H. & **Yildiz, I**. (2007). The Effects of Advanced organizers and Post Organizers on Science Achievement of Primary-Grade Students. In C. Montgomerie & J. Seale (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2007* (pp.2307-2311). Chesapeake, VA: AACE.

RESEARCH INTERESTS

- Scaffolding Strategies
- Technology Supported Learning

- Multimedia & Hypermedia Design and Development
- Video Annotation Tools
- Web-based Learning Environments
- Instructinal Design
- Game Based Learning
- Arduino
- Virtual Worlds

RESEARCH PROJECTS & GROUPS

- 2011 – Present : Virtual Worlds Research Groups
  http://vw.metu.edu.tr