Needs Analysis of Science and Technology Teachers towards Alternative Assessment Methods

Fen ve Teknoloji Öğretmenlerinin Alternatif Ölçme ve Değerlendirme Yöntemlerine Yönelik İhtiyaç Analizi

Neşet MUTLU*, M. Yaşar ÖZDEN**

Abstract: The purpose of this study is to find out science and technology teachers' perceptions about their knowledge about constructivist approach and alternative assessment and evaluation, technology use in education and their preferences about delivery of in-service trainings. 21 science and technology teachers were selected purposefully in this study. To understand their perceptions, semi-structured interviews as a qualitative method were used (Merriam, 1998). Study findings showed that both experienced and inexperienced teachers had troubles in preparation and application of alternative assessment methods. Moreover, study revealed that science and technology teachers are familiar with computers and internet applications. Lastly, science and technology teachers emphasized advantages of online training over face-to-face training such as accessibility, flexibility, and being up-to-date. There was no expression about disadvantages of online training. Most of the participants giving feedback about face-to-face training marked disadvantages of it as incompetent trainers, shallow content and lectures without practice. It is concluded that teachers needs trainings about alternative assessment and evaluation methods and they see the online in-service training method be more beneficial compared to face-to-face training method.
Keywords: Alternative assessment and evaluation techniques, technology use, online education, face to face education, in-service training

Öz: Bu çalışmanın amacı fen ve teknoloji dersi öğretmenlerinin yapılandırmacı yaklaşım ve alternatif ölçme ve değerlendirme konusundaki bilgileri, eğitimde teknoloji kullanımı ve hizmet içi eğitimlerin veriliş yöntemleri hakkındaki görüşlerini belirlemektir. Bu çalışmada 21 fen ve teknoloji öğretmeni amaçlı örnekleme yöntemiyle seçilmiştir. Öğretmenlerin görüşlerini toplamak amacıyla yarı-yapılandırılmış mülakat yöntemi kullanılmıştır (Merriam, 1998). Çalışma bulgularına göre, hem kıdemli hem de kıdemsiz öğretmenlerin alternatif ölçme ve değerlendirme araçlarının hazırlanması ve uygulanması konusunda problem yaşadıkları gözlenmiştir. Ayrıca, fen ve teknoloji öğretmenlerinin genel olarak bilgisayar ve internet teknolojilerine aşina oldukları çalışma sonucunda anlaşılmıştır. Son olarak, fen ve teknoloji öğretmenleri ulaşılabilirlik, esneklik ve güncellik gibi özellikleri dolayısıyla çevrim içi öğrenme ortamının yüz yüze öğrenme ortamına göre daha avantajlı olduğunu belirtmişlerdir. Çevrim içi eğitimin dezavantajları hakkında bir yorum yapılmamıştır. Yüz yüze hizmet içi eğitim hakkında görüş bildiren öğretmenlerin çoğunluğu gibi "niteliksiz eğiticiler", "yüzeysel içerik" ve "teori ağırlıklı öğretim" gibi özelliklerinden dolayı dezavantajlı olduğuna vurgu yapmışlardır. Son olarak, öğretmenlerin alternatif ölçme ve değerlendirme yöntemleri konusunda hizmet içi eğitime ihtiyaçları olduğu ve bu konuda yüz yüze eğitimle karşılaştırıldığında çevrim içi öğretimin daha etkili olacağını düşündükleri sonucuna varılmıştır.
Anahtar Kelimeler: Alternatif ölçme ve değerlendirme araçları, teknoloji kullanımı, çevrim içi eğitim, yüz yüze eğitim, hizmet içi eğitim

Introduction

Recent years, constructivism became very dominant in educational programs and applications of countries such as United States, Australia, Spain, England, Israel, Canada, Turkey and etc. (Çiftçi, Sünbül & Köksal, 2013). To understand the idea behind the constructivism, Duffy and Jonassen (1992) declare that objects and events around the world cannot be interpreted only with one meaning. Rather, many meanings and perspectives can be constructed for these objects and events. Construction of the knowledge lies behind this idea. If there is no exact one truth, people can construct different knowledge about an object or event on their own. Brooks and Brooks (1999) express five principles of the constructivism: (i) present problems which are relevant to the students' needs, (ii) structuring information around primary concepts, (iii) investigating students' point of view, (iv) adopting instruction to address student suppositions, and (v) assessing students in the context of teaching. Constructivism emphasizes on learning, not teaching. It accepts learning as a process. Learners' autonomy, inquiry, beliefs and attitudes are considered. It encourages good communication between the instructor and the learners. Moreover, social co-operation between the learners and with the assistance of the teacher is also important (Moll & Tomasello, 2007).

Importance and necessity of assessment and evaluation is common declaration in educational settings since it affects learning and teaching. Teachers use lots of assessment tools to evaluate their teaching and students' performances. However, different paradigms exist with their different assessment activities in education. Before constructivist learning approach, behaviorist and cognitivist approaches had pressure on teaching, learning, and assessment and evaluation procedures. Teachers mostly used objective tests to assess students since their lecture mostly based on conveying facts and information to student. Moreover, it was expected from student to memorize this knowledge to retrieve in evaluation (Ward, Stoker & Ward, 1996).

In constructivist approach, assessment is much more than assigning grades or giving positive-negatives. Assessment leads teacher in determining what kind of interventions can support students in construction of new knowledge and skills (Rahimi & Ebrahimi, 2011). In contrary to traditional assessments, constructivist assessments not rely on measuring whether behaviors and skills acquired by students, but rather it focuses on concept development, deep understanding, and active learner reorganization. There are lots of differences in assumptions of theoretical and philosophical differences between traditional and alternative assessment (Turan & Sakız, 2014). First of all, traditional assessment assumes that knowledge has universal and unique meaning. However, alternative assessment assumes that it has multiple meanings. Traditional assessment supposes learning as an individual process whereas alternative assessment sees it as a collaborative process (Temizyürek & Türkkan, 2014). Moreover, traditional assessment separates process from product while alternative assessment methods focus on both process and product (Anderson, 1998).

After diffusion of new different alternative assessment methods for teachers to use in class environment, there have been studies about their implications for education. Performance task, projects, rubric, concept map, portfolio, poster, structural communication grid, self and peer evaluation, diagnostic tree and interview can be given as examples to alternative assessment methods used by science and technology teachers (Arslan, Kaymakçı & Arslan, 2009; Çepni & Çoruhlu, 2010, Kurnaz & Pektaş, 2012). Use of these methods comes up with some problems listed below (Gelbal & Kelecioğlu, 2007):

- insufficient knowledge of teachers
- crowded classes
- in effective in-service trainings
- hard to prepare, implement and evaluate and time consuming
- not enough resources of schools
- multiple choice large-scale exams

EREDED (2006) reported that teachers have misconceptions about alternative assessment and evaluation methods. In this study, it was revealed that teachers give different

grades to members of a group work. However, they are expected to give same grades to all members of the group. Moreover, more than half of the teachers in this study see measurement and evaluation methods complicated. Reasons to these misconceptions and negative perceptions are explained in the report as:

- Teachers would not know the characteristics of the methods.
- They would not know where, when and in which purposes these assessment and evaluation methods should be used.
- How to convert assessment and evaluation results into grades.

To minimize insufficient knowledge of teachers about teaching, every year MoNE (Ministry of National Education) gives in-service trainings. All of these trainings are held face-to-face by local authorities of MoNE. Teacher professional development programs should have some characteristics to gain maximum benefit. Rasmussen (2008) listed these characteristics as focus on teaching specific content, integration of specific teaching practices or pedagogy, engagement of participants in active learning, collective participation of teachers from same grade and delivery of instruction with an extended duration. Frey (2008) also defined three important components for significant professional growth of in-service teachers engaged in online professional development experiences: using meaningful learning activities, collaborative learning communities, and structure of practicum project.

Growth of internet directed educators to use online facilities in teacher training to enhance personal development of the pre-service and in-service teachers. There are lots of studies about methods how online personal development courses should be given and what issues should be considered. Lawler and King (2000) states essential elements of development of online teacher education programs as: (a) presentation of accurate, (b) current and substantial content, (c) in-depth dialogue among participants, (d) environment that participants ask, (e) respond and share ideas easily, (f) technology working smoothly, (g) facilitation of collaborative work, and (h) development of assignments.

In this respect, researchers aimed to understand the teachers' perceptions about constructivist approach and alternative assessment and evaluation, technology use in education and their preferences about delivery of professional development. Researchers tried to answer following research questions in this study:

- What are the science and technology teachers' background about technology use, constructivist approach and alternative assessment and evaluation methods?
- What are the teachers' perceptions about comparison of online and face-to-face professional development trainings?

Method

Qualitative method was used to understand teachers' opinions about their needs on alternative assessment methods and their choice of delivery method of professional development trainings. Interviews are the most common used data collection method in qualitative studies. Interviewing have lots of advantages such as getting large amount of information which is breadth and depth, good return rate and having chance of immediate clarification of the information given by respondents (Marshall & Rossman, 1995; Meriam, 1998; Richey & Klein, 2007).

Interviews are classified as structured, semi-structured and unstructured. Structured interviews designed to ask pre-prepared and same questions to respondents and unstructured interview type which is completely different is very flexible one and this type of interviews can be defined as informal interviews. However, semi-structured ones are in the middle of these two types of interviews. Semi-structured interviews designed to ask non-standardized questions. Although researcher could have pre-prepared interview guide at the beginning of the interview, questions can be changed according to the responses of the interviewee. Researchers used semi-structured interview technique to collect data from participants since it gives opportunity to probe deeper understanding.

Participants

Population of this research was science and technology teachers having problems in assessment and evaluation in constructivist curriculum. But, it was not possible to reach the whole population. Firstly, researchers decided to collect data in the province of Ankara. Researchers aimed to reach teachers working in different parts of urban and rural districts. Diverse schools in these districts would be beneficial in choosing different kinds of samples and understanding all aspects of the problem in research. 21 science and technology teachers attended voluntarily in the research from both private and public schools.

Data Collection

Seven open-ended interview questions were prepared to find out the teachers' perceptions about technology use in education, constructivist approach and alternative assessment and evaluation, and their preferences about delivery of professional development. This first draft was evaluated with two colleagues and two assessment and evaluation experts. After the revisions, queue of the questions was changed. They are located according to logic from broader questions to specific questions. After arrangement of sequence, there have been changes according to considerations of assessment and evaluation experts. One problematic question was changed.

Data Analysis

Marshall and Rosmann (1995) described qualitative data analysis as the process of ordering, structuring and giving meaning to the mass of data collected. They divided data analysis process into five such as organizing the data, generating categories, themes and patterns, testing emergent hypotheses, searching for alternative explanations and writing the report. In this study these steps were followed. First, digital audio tapes were transcribed into digital written format in MS Word software package. Then, codes and memos were used to reveal the themes and patterns. Researchers got help from colleagues while making conclusions and alternative explanations. Lastly, the last themes and categories were reported.

Findings

Teacher's practices in technology use in education

All 21 teachers stated that they use computer and internet for educational purposes. Figure 1 presents technology use frequencies of science and technology teachers. Six out of twenty-one teachers stated that they search internet for animations and videos related to course topics and present them students in class with projector. Six teachers pointed out that they use internet and computers for doing search about science and technology course.

Use of PowerPoint presentation in classes was expressed by ten teachers. Three out of these ten teachers marked that they both prepare and present PowerPoint slides on their own. However, seven teachers expressed that they search internet for slides, download and present them to students by projector.

Technology is mostly used by teachers for following educational sites and preparing and downloading assessment activities. Fifteen out of twenty-one teachers declared that they follow educational sites related their subject in internet. Nine of these teachers expressed especially use of 'fenokulu.net' website in their courses. One of the teachers using this website marked "*Especially I follow fenokulu.net. There is a group in this web site. I am a member of this group and constantly share knowledge with group members*". Another teacher using this website, T13 declared "*I frequently follow videos and discussions in fenokulu.net. I follow these to update my knowledge according to recent and latest information*".
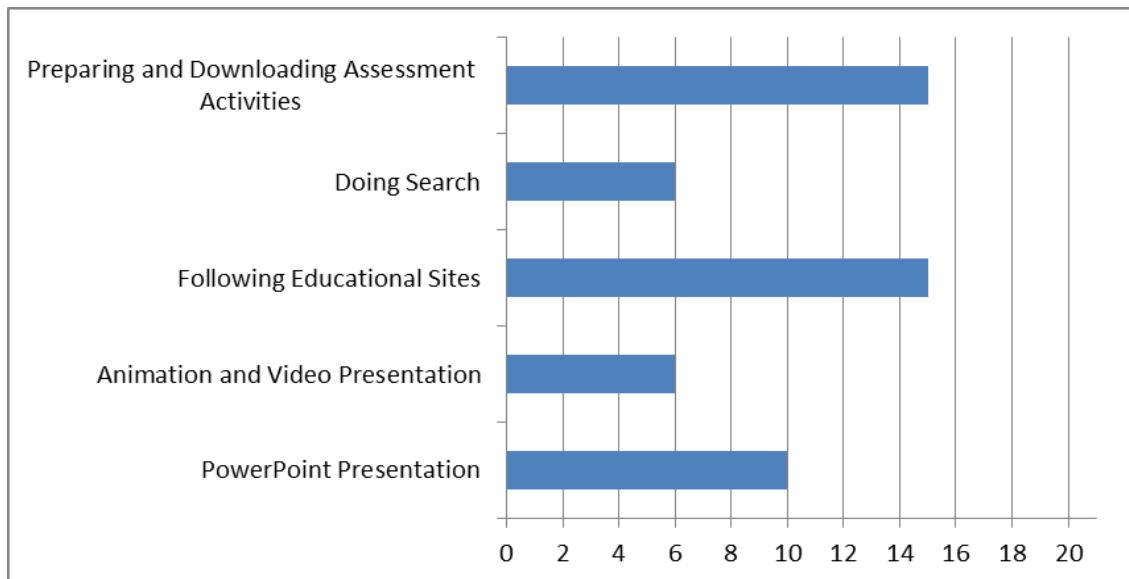
Figure 1. Technology use frequency of science and technology teachers

Fifteen teachers expressed use of computers and internet for preparing and downloading assessment activities. Eleven out of these fifteen teachers stated that they searched internet for assessment activities, exam questions and download them to conduct students. The remaining four teachers marked use of computers to prepare their own assessment activities and exam questions.

Perceptions of teachers about their background in constructivist learning approach
Twenty one science and technology teachers expressed their perceptions as to their background about new constructivist learning approach. First of all, they gave information about whether they took in-service training about constructivist learning approach, and alternative assessment and evaluation methods. Eleven out of twenty one teachers had declared that they attended in-service training about constructivist learning approach prepared by MoNE. Moreover, only five of these eleven teachers stated that alternative assessment and evaluation methods were explained in these trainings. Remaining ten teachers had never attended in-service training about both constructivist learning approach, and alternative assessment and evaluation methods. Five out of these ten teachers marked that they had learned constructivist learning approach in universities that they graduated. So, they had background about constructivist learning approach and alternative assessment and evaluation methods. Remaining five teachers reported that they could not gain information about constructivist learning approach and alternative assessment and evaluation methods neither with in-service training nor from university that they graduated from.

Next, eleven out of twenty one teachers stated that they need in-service training about alternative assessment and evaluation methods. T2 pointed out "*Because of placement test, we cannot use these alternative assessment and evaluation methods. However, we cannot assess students' performances by tests in all cases; we need to be trained about how to assess these performances* ". T6 experiencing 21 years in teaching complained about not having informed about new constructivist curriculum change and alternative assessment and evaluation methods. He marked "*In-service training was not arranged by MoNE. But, we needed to learn how to prepare activities or increase number of <constructivist> activities. Moreover, I sometimes had troubles in assessment and evaluation*". Three-year experienced teacher pointed out,

> "*I think that I have deficiencies in assessment and evaluation since I am a new teacher. I mostly use standard assessment methods. There should be seminar about different kinds of assessment techniques.*"

Perceptions about comparison of online professional development training and face-to-face training

Three main categories were constructed about comparison of online training and face-to-face training. These categories were views about online in-service training, views about face-to-face in-service training, and choice for in-service training.

Views about online in-service training.

Thirteen out of twenty-one teachers stated opinions about giving in-service training online. They all gave positive feedbacks about online in-service training. They thought that this type of training had advantages about accessibility, efficiency, and being up-to-date. T6 pointed out,

> *"It is beneficial to give training online since you can reach much more teachers. There is no problem about time issue. You can use internet whenever you want. Now, internet is accessible in all schools unrestricted and free. Teachers can access internet from schools conveniently."*

T19 marked efficiency of online in-service trainings: "*Online training can be used by teachers in free times for professional development. So, I think that this type of training is more efficient*". T3 declared another advantageous point of online in-service training as being up-to-date. He mentioned "*Online training is more beneficial (than face-to-face) that you can update training easily. In face-to-face trainings, it is hard to update information*".

Views about face-to-face in-service training

Nine out of twenty one teachers declared opinions about face-to-face in-service trainings. Seven out of these nine teachers gave negative feedbacks about these trainings. They mostly complained about incompetent trainers, taking shallow information and lectures without practice. Five out of nine teachers declared that trainers coming to give lectures were incompetent about constructivist curriculum. T5 stated "*In-service training was given but trainers coming for training are not knowledgeable for lecturing. They just lecture in order to accomplish tasks given to them*". T15 claimed that in-service training given to introduce new curriculum included too shallow information. She pointed out "*Shallow information was given in in-service training. If they could give detailed information, it would be better*". T16 mentioned another issue about face-to-face in-service training as "*We need in-service trainings having more activities. These activities should be beneficial for practices in class. We do not want text based face-to-face trainings since it would not be effective*".

Two out of nine teachers gave positive feedback about face-to-face in-service trainings. T12 marked,

> *"We had an in-service training about new curriculum on one occasion by MoNE. In this training, assessment and evaluation techniques such as Vee diagram, concept map, and structural communication grid were explained well."*

Choise of training delivery

Thirteen out of twenty-one teachers gave opinions about their choice for training. While eleven of these teachers had chosen online method for in-service training, the rest, two teachers, supported face-to-face method. T8 claimed "*In my opinion, it is advantageous to give in-service trainings online since every teacher uses internet. And we can reach internet wherever we want. So, it is compulsory to give it online to access training immediately*". Similarly, T14 pointed out "*If you give this content face-to-face, teachers would get bored*". In contrary, T12 stressed that trainings should be face-to-face because of non-participation of teachers. He declared,

> *"Teachers do their jobs well if you keep your eyes on them. There should be an officer who comes to teach, regulate and look for outcome. Otherwise, (training) would not be successful if you send just an online material."*

T11 also stated her choice of face-to-face method for in-service trainings. She pointed out "*In my opinion, in-service training should be face-to-face, not online. After face-to-face lecture is given about the topics, teachers will get more benefit from this online material*". Figure 2 shows the number of teachers according to their choice of method of training delivery.
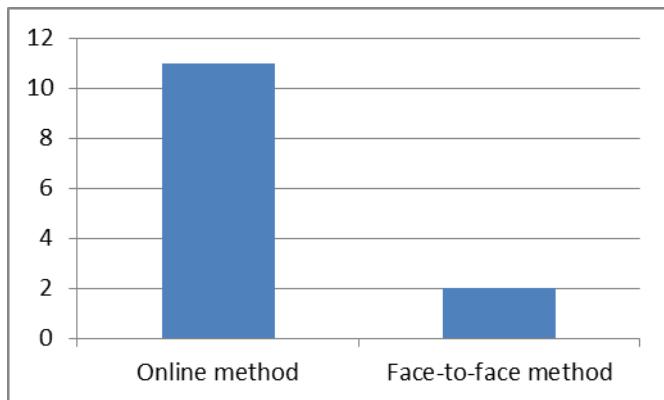

Figure 2. Science and technology teachers' choice of method of training delivery

Discussion

Background of technology use.

It can be concluded from participants' responses that most of them declared use of computer and internet to prepare or download assessment activities, and to follow educational sites. Most of these teachers declared that they mostly download assessment activities to use them in class. However, very few of these teachers prepare assessment activities on their own. Most of them just download and use these activities in their lessons. This can be resulted since preparation of these activities requires much time and effort (Çepni & Çoruhlu, 2010). Teachers mostly have lots of duties besides their teaching activities: membership of the examination commission, office meetings, school trips, competitions, conference, panel, theater work, exhibition, student clubs, ceremonies, training courses for students, lesson plan preparation, exam paper evaluations etc. (MoNE, 1992). These can take their time much and lead them to download and use ready materials and activities. Moreover, they would not know about software programs and sample documents which save time and let teachers prepare assessment activities easily. Presentation of these technologies to teachers would help them to prepare their own assessment activities. Furthermore, participants mostly follow educational sites. By this way, they try to follow new knowledge and skills related with their profession. In the light of these results, it can be concluded that participants of this study presented familiarity to use internet for their professional growth.

Other activities employed by teachers with computers and internet were to prepare PowerPoint presentations, animation and video presentation and doing search. These are also related with their enthusiasm to present content by using different media. Gulbahar and Guven (2008) claim that it is expected from teachers to use technology in education for growth in educational outcomes, increase in technological skills and reduction of anxiety in lesson preparation. Pringle, Dawson and Marshall (2002) state four ways to use technology in education: knowledge source, data organizer, information presenter and facilitator. This literature is also in line with results of this study. Teachers do search and follow educational sites to gain new knowledge and skills related with their subject. Second, they use computers as data organizer by downloading animations, videos, PowerPoint slides and new assessment

activities to store. Next, they present animations, videos, and new content as a result of their research to their students by using technology as information presenter. Lastly, assessment activities used for formative evaluation and media presented can facilitate students' higher order skills such as observation, description, critical thinking and construction of examples (Pringle, Dawson & Marshall, 2002).

In the study, findings presented that all teachers had their own computers at home. This shows common use of computers among science participants. This is very encouraging for online trainings developers since teachers' familiarity with computers and internet can diminish some infrastructure problems in application of online learning. Ocak (2011) declared three barriers in diffusion of blended teaching: instructional processes, community concerns, and technical issues. He identifies technical issues in two dimensions as difficulty of adoption to new technologies and lack of electronic means (internet access, hardware software problems). Common use of computers would be encouraging for instructional designers to create online learning environments to have fewer concerns about technology adoption, and hardware-software problems.

Background of constructivist and alternative assessment and evaluation methods
About half of the seventeen teachers claimed that they had taken in-service training about constructivist learning and teaching principles. But, only five of these teachers confirmed discourse of alternative assessment and evaluation methods. This is parallel with study of Çepni and Çoruhlu (2010). They investigated barriers to the use of alternative assessment and evaluation methods with 40 science and technology teachers. 87.5 % of these participants did not attend any in-service training about these alternative assessment and evaluation methods. Besides, they claimed these in-service trainings did not meet their needs for achieving knowledge and skills required to apply new curriculum principles.

Study findings revealed that remaining half of the participants could not attend in-service trainings since these trainings were only applied between years of 2004 and 2007. Teachers occupied after 2007 would not have chance to take these in-service trainings since these trainings were not on-going trainings. They were arranged as one-shot two-day or three-day trainings. These problems showed that face-to-face one-shot trainings are not as efficient as ongoing trainings over different times (Çepni & Çoruhlu, 2010). Online trainings give opportunity to train developers to discourse of the professional development content ongoing. Growth and use of online trainings can be solution for deficiencies of face-to-face one-shot trainings.

Yayla (2011) investigated self-efficacy of science and technology teachers towards alternative assessment and evaluation methods. She found that especially experienced teachers could not get to know these alternative methods because of inadequate pre-service and in-service trainings. She advised in-service trainings to acquaint these teachers of alternative assessment methods. Moreover, Kilic, Kaya and Kurt (2012) also marked that teachers does not prefer to use alternative assessment and evaluation instead of standard ones and they should be informed about these methods. Finding of this study also presented similar results with literature discussed above. About half of the seventeen participants declared need for in-service training about alternative assessment techniques. Both experienced and inexperienced teachers expressed that they had troubles in preparation and application of these alternative assessment methods.

Preferences about delivery of professional development training
More than half of the teachers declared their opinions about positive and negative sides of online professional development training. All of these teachers gave positive opinions about this type of training. They emphasized three main advantages of online training: accessibility, efficiency and being up-to-date. First, participants marked that further number of teachers can access online in-service trainings anytime and anywhere. Parallel to this result, there are lots of studies emphasizing flexibility of online learning environments that users can access content

whenever and wherever they have connection (Nelson, 2008; Shin & Lee, 2009; Metz, 2010). Second, participants expressed efficiency of online in-service trainings that online in-service trainings can be taken in free times. Most of the face-to-face in-service trainings are held after working hours. This may lead teachers to think in-service trainings as an extra workload. In this perspective, teachers see online in-service training effective since they can regulate training hours according to their time schedule (Metz, 2010). In line with these results, time efficiency of asynchronous online education is emphasized in another study as it is convenient for students to determine training time according to their own schedule (Nelson, 2008). Lastly, participants pointed out another advantage of online professional development training that it can be kept up-to-date frequently. However, this is much more difficult issue in face-to-face in-service trainings. Parallel to this finding, literature also supports that online in-service training products supply most up-to-date content for professional development (Baran & Cagiltay, 2010; Nelson, 2008).

Participants giving feedback about face-to-face learning expressed mostly negative opinions: incompetent trainers, shallow content, and lectures without practice. Participants of this study argued that face-to-face trainings are not given by competent trainers. This result can be explained by high number of training required for in-service teachers. After curriculum change, MoNe should have given in-service training to nearly 600,000 teachers. And, MoNE would not provide competent trainers for all of these face-to-face training sessions.

Additionally, participants expressed that shallow information was given in face-to-face in-service trainings. Training hours are also limited in these in-service trainings to distribute these trainings to high number of teachers. Limited training sessions would impede trainers to give content in detail. For example, one of the participants declared that two day in-service training was arranged to inform them about new curriculum change. In this limited time period, there is no way to expect trainers to explain content in detail. These limited one-shot trainings are not sufficient to meet teachers' needs.

Lastly, participants stated that face-to-face in-service trainings were given without practice. They did not want to be trained by direct teaching. Rather, they wanted these training to be held with activities and practices. They argued that text-based PowerPoint presentations held by trainers were not effective to teach in-service training content. They wanted to see how to apply new information into class settings in these in-service trainings. They expected to see presentation of examples related with content in these face-to-face trainings. In online professional development trainings, it is easy to add multimedia components like videos explaining how to apply all information in classroom practices. Moreover, lots of examples related with content can be put into online trainings. Online learning materials may be a solution to teachers' needs about activities and practices in trainings. They can be integrated into face-to-face training programs as supplemental material.

Although most of the participants have negative opinions about face-to-face in-service trainings, some teachers believe that these trainings were held properly. And, they pointed out that content in these trainings were explained well.

Most of the participants giving feedback about their choice of delivery method for in-service training had chosen online learning method to take in-service trainings. They expressed advantages of online learning over face-to-face learning: accessibility and flexibility. Only two teachers were against pure online in-service training. One of them pointed out that teachers cannot take responsibility for their professional development. So, there should be an authority to control and let them take in-service trainings. He expressed that effective training can be provided only by face-to-face. The other teacher who did not support pure online training stated blended use of online training materials. She insisted on use of online training materials as supplemental following face-to-face in-service training to gain maximum benefit.

To recap, participants of this study declared advantages of online in-service training over face-to-face training such as accessibility, flexibility, and being up-to-date. There was no expression about disadvantages of online training. Most of the participants giving feedback about face-to-face training marked disadvantages of it as incompetent trainers, shallow content

and lectures without practice. Moreover, most of the teachers were eager to choose online in-service training for professional development instead of face-to-face training.

References

Anderson, R. S. (1998). Why talk about different ways to grade? The shift from traditional assessment to alternative assessment. *New Directions for Teaching and Learning*, *74*, 5-16.

Arslan, A. S., Kaymakçı, Y. D., & Arslan S. (2009). Alternatif ölçme-değerlendirme etkinliklerinde karşilaşilan problemler: Fen ve teknoloji öğretmenleri örneği [Problems faced in alternative assessment activities: Example of science and technology teachers]. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 28*, 1-12.

Baran, B., & Cagiltay, K. (2010). The motivators and barriers in the development of online communities of practice. *Eurasian Journal of Educational Research, 39*, 79–96.

Brooks, M. G., & Brooks, J. G. (1999). The courage to be constructivist. *Educational Leadership, 57*(3), 18-24.

Çepni, S., & Çoruhlu, T. S. (2010). Alternatif ölçme ve değerlendirme tekniklerine yönelik hazırlanan hizmet içi eğitim kursundan öğretime yansımalar [Reflections from in-service training course on alternative measurement and evaluation techniques to instructional applications]. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *28*, 117-128.

Çiftçi, S., Sünbül, A. M., & Köksal, O. (2013). Sınıf Öğretmenlerinin yapilandirmaci yaklaşıma göre düzenlenmiş mevcut programa ilişkin yaklaşimlarinin ve uygulamalarinin eğitim müfettişlerinin görüşlerine göre değerlendirilmesi [Assessment of primary school teachers' approaches to the existing program based on the constructivism and their implementations according to the views of education inspectors]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 9*(1), 281-295. Retrieved from http://dergipark.ulakbim.gov.tr /mersinefd / article/ view/1002000381/1002000261

Duffy T. M., & Jonassen D. H. (1992). *Constructivism and the Technology of Instruction: A Conversation*. New Jersey: Lawrence Earlbaum Associates.

EREDED (2006). Temel eğitim destek programı öğretim programlarının değerlendirme raporu [Assessment report of basic education support program teaching programs]. Retrieved from http://earged.meb.gov.tr/earged/subeler/olcme_degerlendirme/dokumanlar /mufredat_degerlendirme/degerlendirme_raporu6/fen_ve_teknoloji.pdf

Frey, T. J. (2008). Determining the impact of on-line practicum facilitation for in-service teachers. *Journal of Technology and Teacher Education, 16*(2), 181-210.

Gelbal, S., & Kelecioğlu, H. (2007). Öğretmenlerin ölçme ve değerlendirme yöntemleri hakkındaki yeterlik algıları ve karşılaştıkları sorunlar [Teachers' perceptions of their competence about the measurement and evaluation methods and problems they encounter]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 33*, 135-145.

Gulbahar, Y., & Guven, I. (2008). A Survey on ICT Usage and the perceptions of social studies teachers in Turkey. *Educational Technology & Society, 11*(3), 37-51.

Kilic S., Kaya B., & Kurt H. (2012). Assessment and evaluation techniques being used in classrooms by biology teachers. *International Journal of New Trends in Arts, Sports & Science Education*, *1*(1), 111-124.

Kurnaz, M., & Pektaş, M. (2012). Fen ve teknoloji öğretmenlerinin ölçme-değerlendirmede kavram haritasi kullanim durumlari [Science and technology teachers' concept map uses on assessment and evaluation]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 9*(1), 1-10. Retrieved from http://dergipark.gov.tr/mersinefd/issue/ 17382/181563

Lawler, P. A., & King, K. P. (2000). *Planning for effective faculty development: Using adult learning strategies*. Malabar: Krieger.

Marshall, C., & Rossman, G. B. (1995). *Designing qualitative research,* (Second Edition). California: Sage Publication.

Merriam S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.

Metz, K. (2010). Benefits of online courses in career and technical education. *Techniques: Connecting Education and Careers, 85*(6), 20-23.

Moll, H.*,* & Tomasello, M. *(*2007*).* Cooperation and human cognition: The Vygotskian intelligence hypothesis. *Philosophical Transactions of the Royal Society B: Biological Sciences, 362*, 639–648.

Millî Eğitim Bakanlığının Teşkilat ve Görevleri Hakkında Kanun (30 Nisan 1992). Resmi Gazete (Sayı: 21226), Retrieved from (3 Ocak 2012): http://mevzuat.meb.gov.tr /html/73.html

Nelson, J. A. (2008). Advantages of online education. *Home Health Care Management & Practice, 20,* 501-502.

Ocak, M. A. (2011). Why are faculty members not teaching blended courses insights from faculty members. *Computers & Education, 56*, 689-699.

Pringle, R., Dawson, K., & Marshall, S. (2002). Technology, science, and preservice teachers: Creating a culture of technology-savvy elementary teachers. *Society for information Technology and Teacher Education*, Nashville.

Rahimi, A., & Ebrahimi, N. A. (2011). Constructivist vs. objectivist learning environments. *Contemporary Online Language Education Journal, 1,* 89-103.

Rasmussen, C. L. (2008). *A causal-comparative model for the examination of an online teacher professional development program for an elementary agricultural literacy curriculum.* Utah State University. ProQuest Dissertations and Theses, Retrieved from http://search.proquest.com/docview/304434655?accountid=13360

Richey, R. C., & Klein, J. D. (2007). *Design and development research: Methods, strategies and issues*. Mahwah: Lawrence Erlbaum.

Shin, M., & Yoon-Joo, L. (2009). Changing the landscape of teacher education via online teaching and learning. *Techniques: Connecting Education & Careers, 83*, 32-33.

Temizyürek, F., & Türktan, R. (2014). Yapılandırılmış grid test tekniğinin türçe eğitiminde kavram öğretimine katkısı [Contribution of the structured grid test technique to concept teaching in Turkish education]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 11*(2), 271-287. Retrieved from http://dergipark.gov.tr/mersinefd/issue/17397/181835

Turan, M., & Sakız, G. (2014). Fen ve teknoloji dersinde portfolyo kullaniminin öğrenci başarisi ve kaliciliğa etkisi [Effect of Portfolio use in science and technology course on students' success and retention]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 10*(3), 48-63. Retrieved from http://dergipark.gov.tr/mersinefd/issue/17395/181822

Ward, A., Stoker, H. W., & Murray-Ward, M. (1996). *Educational measurement: Origins, theories, and explications Volume 2*. Maryland: University Press of America.

Yayla, G. R. (2011). *Fen ve teknoloji öğretmenlerinin tecrübeleriyle alternatif ölçme ve değerlendirme yaklaşımlarına yönelik yeterlilikleri arasındaki ilişki*. 2nd International Conference on New Trends in Education and Their Implications. Retrieved from http://www.iconte.org/FileUpload/ks59689/File/155..pdf

Uzun Öz

Giriş

Ölçme ve değerlendirme her zaman eğitim ve öğretimde ana unsurlardan biri olmuştur. Hemen hemen her öğretim modelinde değerlendirme olmazsa olmaz aşama olarak sunulmaktadır. Fakat ölçme ve değerlendirmeye bakış açısı da aynen öğrenmeye bakış açısında olduğu gibi çeşitlilik göstermektedir. Yapılandırmacı yaklaşım ölçme ve değerlendirme uygulamalarını, öğrencilerin yeni bilgi ve becerileri kendi kendilerine oluşturmalarında onlara rehberlik edici unsurlar olarak görmektedir (Rahimi ve Ebrahimi, 2011). Bu bağlamda yapılandırmacı yaklaşım, geleneksel ölçme teknikleri yerine öğrencilerin öğrenmelerinde onlara rehberlik edici alternatif ölçme ve değerlendirme araçlarının kullanılmasını tavsiye eder. Fakat öğretmenlerin alternatif yapılandırmacı yaklaşım konusundaki bilgi ve beceri eksiklikleri, kalabalık sınıflar, hizmet içi

eğitimlerin yetersizliği, zaman alıcı olması, materyal eksiklikleri ve öğrencilerin bir üst öğretim kurumuna yerleşirken uygulanan standart çoktan seçmeli sınavlar bu yeni tekniklerin uygulanmasında engel olarak durmaktadır (Gelbal ve Kelecioglu, 2007).

Rasmussen (2008) hizmet içi eğitimlerin özelliklerini, özel alan bilgilerinin öğretimi, uygun öğretim uygulamalarının ve pedagojinin entegrasyonu, katılımcıların aktif öğrenme sağlayacakları düzeyde öğrenmede rol almaları, benzer konu alanda görev yapan öğretmenlerin katılımı ve yeterli zaman aralığında eğitimlerin düzenlenmesi olarak sıralamıştır.

Lawler ve King (2000) ise çevrim içi hizmet içi öğretim programlarının özelliklerini şöyle sıralamıştır: doğru, güncel ve anlamlı bilginin sunulması, katılımcılar arası etkileşimin güçlü olması, öğrencilerin sorularını rahatlıkla sorabilecekleri ve düşüncelerini kolayca paylaşabilecekleri bir ortamın hazırlanması, teknolojik alt yapının güçlü olması, grup çalışmasına elverişli bir ortamın oluşturulması ve ölçme-değerlendirme faaliyetlerinin nitelikli olması.

Araştırmanın amacı

Araştırmanın amacı fen ve teknoloji öğretmenlerinin yapılandırmacı yaklaşım ve alternatif ölçme ve değerlendirme teknikleri hakkındaki bilgi ve görüşlerini, teknoloji kullanım düzeylerini ve ihtiyaç duydukları hizmet içi eğitimin veriliş yöntemi hakkındaki tercihlerini ortaya çıkarmak olarak sıralanabilir.

Araştırmanın problemi

Bu araştırmada iki araştırma sorusuna cevap aranmıştır:

- Fen ve teknoloji öğretmenlerinin teknoloji kullanım düzeyleri, yapılandırmacı yaklaşım ve alternatif ölçme ve değerlendirme yöntemleri hakkındaki bilgi ve görüşleri nelerdir?
- Fen ve teknoloji öğretmenlerinin yöntem olarak yüz yüze veya çevrim içi verilen hizmet içi eğitimlerin karşılaştırılması konusundaki görüşleri nelerdir?

Yöntem

Araştırmada nitel araştırma metodu, nitel araştırma tekniklerinden ise yarı-yapılandırılmış mülakat tercih edilmiştir. 21 fen ve teknoloji öğretmeni ile yüz yüze görüşmeler gerçekleştirilmiştir. Bu öğretmenlerin seçiminde amaçlı örnekleme yöntemi kullanılmıştır. Maksimum çeşitlilik sağlamak için Ankara ili hem şehir merkezi hem de kırsalda görev yapan öğretmenler örnekleme dâhil edilmiştir. Fen ve teknoloji öğretmenlerinin alternatif ölçme değerlendirme, teknoloji kullanımı ve hizmet içi eğitimlerin veriliş biçimi (yüz yüze veya çevrim içi) hakkındaki görüşlerini almak için yedi açık uçlu soru hazırlanmıştır. Bu sorular iki alan uzmanı ve iki ölçme değerlendirme uzmanı tarafından değerlendirilmiştir. Soruların sırası uzman görüşlerine göre tekrar düzenlenmiş; bir soru ise yine bir uzman görüşü doğrultusunda değiştirilmiştir. Öğretmenlerin sorulara verdiği cevaplar Marshall ve Rosmann'ın (1995) nitel veri analizi süreçleri takip edilerek analiz edilmiştir.

Bulgular ve Tartışma

Fen ve teknoloji öğretmenlerinin genel olarak bilgisayar ve internet teknolojilerine aşina oldukları çalışma sonucunda anlaşılmıştır. Öğretmenler eğitsel internet sitelerini takip etmekte ve bu sitelerdeki ders ve ölçme-değerlendirme materyallerini indirip kullandıklarını ifade etmişlerdir. Öğretmenler bunun yanında bilgisayar ve internet vasıtasıyla powerpoint sunumları hazırladıklarını ve anlatacakları derslerle ilgili araştırma yaptıklarını ifade etmişlerdir. Öğretmenlerin burada çoğunlukla hazır materyalleri indirme davranışları gösterdikleri belirlenmiştir. Öğretmenlerin kendi materyallerini hazırlama yerine direkt indirme ve kullanma davranışı göstermelerinin sebebi onlara daha fazla zaman ve iş yükü getireceğini düşünmelerinden kaynaklanabilir (Çepni ve Çoruhlu, 2010).

Çalışma bulgularına göre, hem kıdemli hem de kıdemsiz öğretmenlerin alternatif ölçme ve değerlendirme araçlarının hazırlanması ve uygulanması konusunda problem yaşadıkları gözlenmiştir. Bu sonuçlara benzer şekilde, Çepni ve Çoruhlu (2010)' da yaptıkları çalışmada

araştırmaya katılan MEB öğretmenlerinin % 87.5'inin alternatif ölçme ve değerlendirme konusunda bir eğitim almadıkları sonucuna ulaşmışlardır. Öğretmenlerin hem MEB tarafından düzenlenen hizmet içi eğitim etkinliklerinin yetersizliği hem de lisans öğretimindeki yapılandırmacı yaklaşıma yönelik yeterli derslerin bulunmayışı onların bu konudaki eksikliklerinin bir sebebi olarak görülebilir. Bu kapsamda yapılan çalışmalar süreklilik arz etmeyecek şekilde düzenlenen tek seferlik hizmet içi eğitimlerin çok etkili olmadığını ortaya koymuştur (Çepni ve Çoruhlu, 2010).

Son olarak, fen ve teknoloji öğretmenleri ulaşılabilirlik, esneklik ve güncellik gibi özellikleri dolayısıyla çevrim içi öğrenme ortamının yüz yüze öğrenme ortamına göre daha avantajlı olduğunu belirtmişlerdir. Öğretmenlerin çevrim içi eğitimlere istedikleri zaman aralığında ulaşabilmeleri, içeriğinin kolayca düzenlenmesi ve güncel bilgilerle yenilenmesi, uzman kişilerce geçerli ve güvenilir bir içeriğin hazırlanması gibi avantajlarından dolayı tercih ettikleri düşünülebilir (Baran ve Cagiltay, 2010; Metz, 2010; Nelson, 2008). Bulgularda öğretmenlerin çevrim içi eğitimin dezavantajları hakkında bir yorum yapmadıkları anlaşılmıştır. Fakat yüz yüze hizmet içi eğitim hakkında görüş bildiren öğretmenlerin çoğunluğu "gelen niteliksiz eğiticiler", "yüzeysel içerik" ve "teori ağırlıklı öğretim" gibi özelliklerinden dolayı dezavantajlı olduğuna vurgu yapmışlardır. Öğretmenlerin hizmet içi eğitimler için gelen eğiticileri niteliksiz bulmasının sebebi çok fazla sayıda düzenlenmesi gereken yüz yüze hizmetiçi eğitim için MEB'nın eğitici bulmakta zorlandığı sonucuna varılabilir. Bunun yanında yüz yüze eğitimlerin sınırlı zaman aralığında verilmek istenmesi, içeriğin kapsamının daralmasına sebebiyet vermkete ve öğretmenlerin ihtiyaçlarını karşılayacak nitelikte bilgi ve becerilere ulaşamadıkları ortaya çıkmıştır. Hem zaman hem de fiziki altyapı eksiklikleri de hizmet içi eğitimlerin yaparak yaşayarak öğrenme temelinden uzak olmasını sağlamaktadır. Çevrim içi öğretim yoluyla öğretmenlere alanında uzman eğitimcilerce hazırlanmış ders videoları ve içerikleri sunulabilir, zaman sınırlaması olmayan, öğretmenlerin hem teorik bilgi edinebilecekleri hem de uygulama yapabilecekleri öğrenme ortamları oluşturulabilir.

Bu çalışma sonucunda öğretmenlerin eğitimleri sürekli takip edebilecekleri, ek materyallere ihtiyaçları olduğunda ulaşabilecekleri, istedikleri zaman aralığında yardım alabilecekleri çevrim içi öğrenme ortamlarının oluşturulması, öğretmenlerin alternatif ölçme ve değerlendirme yöntem ve tekniklerini öğrenme ve uygulama konusundaki ihtiyaçlarını karşılayacak nitelikte olduğu anlaşılmıştır.