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BİR ÇEVRİMİÇİ ÖĞRENME ORTAMININ KULLANILMASI: BAŞLICA STRATEJİLER VE OLANAK SAĞLAYICILAR*

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ÖZ

Teknoloji bütünleşme sürecine odaklanılması teknolojinin öğretim için kullanılmasına yönelik stratejileri ve ilgili faktörleri anlamaya yönelik farklı bir bakış açısı ve katkı sağlayabilir. Bu çalışmanın amacı bir bilgisayar öğretmeninin çevrimiçi öğrenme ortamını nasıl kullandığını anlamaya çalışmak ve olası stratejiler ile kullanma sürecine katkı sağlayan olanakları ortaya çıkartmaktır. Çevrimiçi öğrenme ortamı müfredatın çerçevesini çizdiği aktiviteler göz önünde bulundurularak geliştirilmiştir. Nitel araştırma paradigması benimsenen çalışmada amaçsal örnekleme tekniği kullanılmıştır. Çalışmanın amacı doğrultusunda, teknoloji erişiminde sorun yaşamayacak, bilgi ve iletişim teknolojilerinin kullanımı konusunda bilgi sahibi, öğretim teknolojileri alanı odaklı eğitim aldığı için bilgisayar öğretmeni örneklem hedefi olarak belirlenmiştir. Çalışmanın verileri araştırmacılar tarafından geliştirilen yarı yapılandırılmış görüş formu ile toplanmıştır. Çalışmanın ana bulgusu öğretmenin çevrimiçi öğrenme ortamını öğretim sürecinin ön-çalışmaları ve öğretim sürecini desteklemek için kullandığını göstermektedir. Kullanım sürecinde, aktiviteler, gösterimler, tartışma ortamı, içerik açıklamaları ve değerlendirmeler sıklıkla kullanılmıştır. Çevrimiçi öğrenme ortamının kullanması öğretmene öğrencileri ile bireysel ilgilenebilmesini adına zaman kazandırmış, öğrencilerin derslere karşı ilgisini arttırmış ve öğrencilere farklı bir bilgi kaynağı sunmasına katkı sağlamıştır. Öğretmene göre öğrencileri kendi öğrenme sorumluluklarının, bilginin başka kaynaklardan da edinilebileceklerinin farkına varmışlardır. Ayrıca öğrenciler daha aktif bir şekilde ders süreçlerine katılım sağlamaya başlamışlardır.

Anahtar Kelimeler: Çevrimiçi öğrenme ortamı, öğretim süreci, teknoloji entegrasyonu, bilgisayar bilimi eğitimi

UTILIZING AN ONLINE LEARNING ENVIRONMENT: MAIN STRATEGIES AND ENABLERS

ABSTRACT

Focusing on the technology integration process can offer another perspective and a contribution towards understanding the related factors and strategies of utilization of technology for instruction. The purpose of this study was to understand how a computer science teacher utilized an online learning environment and to reveal possible strategies and enablers of utilization process. The online learning environment was developed taking into account the activities outlined in the curriculum. Purposive sampling technique was used as qualitative research paradigm. In line with the purpose of the study, a computer teacher was selected as the sample target because a computer teacher had no problems in access to technology, knowledge about the use of information and communication technologies, and been trained on the field of instructional technologies. The data of the study was collected with a semi-structured interview form developed by the researchers. Results showed that the teacher utilized the online learning environment for preparing and supporting classroom instruction. During the utilization process activities, demonstrations, discussions, content explanations and evaluations were frequently used. Use of the online learning environment enabled the teacher spare much time for dealing with students individually, provide alternative information source and increase students' interest towards lessons. The teacher perceived that his students became aware of responsibility for their own learning, became aware that information can be accessed from other sources and were much active and participated more to the lessons.

Keywords: Online learning environment, instructional process, technology integration, computer science education

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1. INTRODUCTION

Equipping schools with computers is presented as success and modernity, and integrating information systems into schools is presented as an effective way of providing solutions to some educational problems. Although, physically placing computers in schools does not guarantee effective use of computers, it is one of the early steps of the entire integration process. For example, within the European Union, Flash 101 project aimed to reveal (a) use level and quality of computers for education in schools within EU countries, (b) the Internet connection availability in schools of EU countries (European Commission, 2016). In the USA, similar research reports have been published systematically (e.g., NCTAF, 1996; NCES, 2000a, 2000b, 2009).

There are different factors that affect teachers' adoption and integration of technology into their teaching (Buabeng-Andoh, 2012). Availability and access to technology are important factors affecting use of technologies in classrooms (Cubukcuoglu, 2013; Goktas, Yildirim & Yildirim, 2009; Mumtaz, 2000; Topp, Mortensen, and Grandgenett, 1995). Gulbahar and Guven (2008) conducted a research to shed light on ICT usage and perceptions of teachers. 326 teachers were surveyed at primary level. Their results show that inaccessibility to ICT resources is an important factor inhibits use of technology in classrooms. More specifically 70.6% of the teachers agree that they are having problems about accessing to existing hardware (computer, overhead projector, etc.). Similarly, Barnett (2000) explains that for technology to affect learning there must be appropriate resources and 24/7 technical support. Similarly, school managers must provide technical and personnel support for teachers so that teachers can integrate computers into teaching and learning (Hsu, Wu & Hwang, 2007).

The investments made by governments to increase use of computers and the Internet in schools were explained and discussed by many authors over the last two decades (Amiel & Reeves, 2008; Donnelly, McGarr & O'Reilly, 2011; Piciano, 1994). It was Ely's (1991) visioning that in the United States there will be computers in every public school which has come to be true today. On the other hand, there have been many research studies that showed the integration of computers in schools failed to present satisfactory results (Shi & Bichelmeyer, 2007). Shi and Bichelmeyer (2007) questioned teachers' underuse of computers, money spent on computers and Internet access, and progress of teachers and students in the educational settings. Another paper written by Amiel and Reeves (2008) critically discussed the policies and especially the funds invested by governments in order to encourage use of information technologies in schools. The critical question that can be interpreted from the authors' discussion is that; is it worth of investing such too much money? Indeed, this question hasn't been changed for a very long time. Tickton and Kohn asked the same question "the new instructional technologies: are they worth it?" as early as 1971.

The problem of low use of technology and continuation of technology use in teaching has been pursued from different perspectives (Kafyulilo, Fisser, & Voogt, 2016). Papanastasiou and Angeli (2008) examined the factors that affect teachers' efforts to teach with technology. They list the factors as "(a) teachers' knowledge of technology tools, (b) teachers' frequency of using technology for personal purposes, (c) teachers' frequency of using technology for instructional purposes in different content areas, (d) teachers' attitudes toward technology, (e) teachers' self-confidence in using technology in teaching and learning, and (f) school climate" (p. 70). Oncu, Delialioglu and Brown (2008) investigated how teachers decide what technologies to use and teachers' expectations from adopting technology. They determined five criteria that affect teachers' decision: (1) accessibility and availability, (2) applicability, (3) influence of colleagues, (4) teachers' skills/knowledge, and (5) students' skills/knowledge (p. 19).

Byrom (1998) clearly distinguishes the concepts as "access to technology is one thing: use is another" (p. 1). A teacher's competence about using computers is one of the most important factors for integration of technology into learning environments and processes (Becker, 2001; Becker, Ravitz & Wong, 1999). OTA (1995) reports that "most teachers have not had adequate training to prepare them to use technology effectively in teaching" (p. 2). In order instructional technology to play a major role in schools, pre-service teachers should be taught about new technologies and the processes of integration and in-service teachers should be provided continuous trainings (Harrell & Bynum, 2018). Göktaş (2006) presents statistical evidence that taking ICT related course significantly affected perceived ICT competencies.

Papanastasiou and Angeli (2008) explain the importance of intrinsic factors for integration of ICT into schools by stating "… dealing effectively with ICT relates not only to knowledge of the capability, limitations, applications, and implications of ICT, but also to individuals' attitudes and perceptions regarding ICT tools" (p. 69). Yıldırım (2000) and Mortz and Nash (1997, cited in Hung & Hsu, 2007) express that teachers' attitude towards computers determine their preference of using computer-based technologies in their classrooms. An interesting finding of Hung and Hsu (2007) is that they found r2= 0.21 for teachers' attitudes toward computers and their use of technology in classrooms. That 21% of the variance in use of computers could be explained by the attitudes of teachers. Mumtaz (2000) found that teachers' beliefs and the role of pedagogy are to be the major factors of ICT

integration. Furthermore, taking information technology course positively affects student teachers attitudes towards IT use (Wong & Hanafi, 2007).

The research literature focused mainly on barriers of successful integration of technology in schools. The list below summarizes the literature, mainly based on barriers lists of Ertmer (1999), Göktaş (2006), Gülbahar (2007), Harrell and Bynum (2018), Karasavvidis (2009), NCES (2000b), and Zamani (2010) among many others:

- Lack of insufficient training
- Lack of teaching experience
- Lack of technology availability and access to technology
- Lack of technical support
- Lack of administrators' support
- Lack of good instructional software
- Lack of time in schedule
- Lack of time for integrating ICT into classroom
- Lack of financial support

The barriers to ICT integration are generally categorized into two categories as intrinsic and extrinsic (Mubashrah, Shaziah, & Samina, 2016). Extrinsic barriers include access to technology (computers and the Internet) and software, technical support, and administrative and peer support. Intrinsic barriers are identified to be personal beliefs, previous success with technology, and self-efficacy.

The research studies in Turkey, in particular, focused on technology integration from different perspectives. The most comprehensive of these studies is the dissertation written by Göktaş (2006) focused on developing a deeper understanding of integration of technology into instruction in terms of usage, effectiveness, barriers and possible enablers. Göktaş (2006) investigated barriers faced in integrating information and communication technologies into from deans' perspectives, faculty members' perspective and prospective teachers' perspective. However, it is important to state that his study didn't gather data from in-service teachers. Lack of appropriate software and materials for instruction, lack of in-service training about ICT, lack of basic knowledge and skills about ICT and lack of hardware (computer, printer etc.) were listed as the main barriers. Possible enablers listed were more budget for hardware, in-service and prospective teacher training about ICT, redesigned course content for benefiting more from ICT and ICT materials. It is worth to note that these enablers are pre-integration factors. Another study focused on technology integration was conducted by Top (2007). Top focused on English teachers' technology integration processes. He revealed that the teachers participated the study can be classified as beginners of technology use. Instructional purposes that teachers use were listed as providing visual help, getting students' attention and enabling practice for listening. It is worth to note that the technologies English teachers focused were usually cassette player, CD player, projection, video, OHP, etc. A more recent study conducted by Arslan and Şendurur (2017) investigated the changes in factors affecting the technology integration in education. The authors concluded that teachers expect ready-to-use contents and necessary software.

In addition to the studies discussed in detail above, Kaya and Koçak Usluel (2011) stated hardware and network infrastructure (and access to these) status as external factors among the factors affecting technology integration in education. Internal factors generally includes teachers' perceptions and attitudes concerning technology integration including pedagogical beliefs. Teo, Ursavaş and Bahçekapılı (2011) and Çetin and Göngör. (2014) mentions about technology use in terms of self-efficacy beliefs and acceptance correspondingly. Zengin, Kağızmanlı, Tatar and İşleyen (2013) reported that most of the teachers uses smart boards during their instruction however either of the teachers used software related to their subject area. Yücel et al. (2010) concluded a model showing ICT integration stages. They figured gender, experience, attitudes, knowledge and inadequacy affects ICT integration stages. None of these studies focused on the effective teaching process. The studies have generally reached their results via perceptions by questionnaire or interview. On the other hand, this study focuses directly on the implemented technology integration processes of a teacher.

Young and Ku (2008) state that "core instructional practice is still examination-oriented, and the use of ICT in teaching practice in schools remains marginal" (p. 52). Seels and Richey (2004) underline that "the research base of implementation and institutionalization is not as well developed as other areas" (p. 45) and therefore literature addressing implementation process is insufficient? Furthermore, Bottino and Robotti (2007) emphasize that at primary school level there is need for research to explain phenomenon of integration of technology in the classroom. Finally, Ertmer, Gopalakrishnan, and Ross (2001, cited in Inan, Lowter, Ross, & Strahl, 2010) suggest that "researchers should focus on what teachers are doing in terms of beliefs and practices regarding computer use in the classrooms" (p. 541).

Based on the use of materials, utilization has its roots from the use of audiovisual materials (Januszewski & Molenda, 2008; Seels & Richey, 1994). The utilization domain, therefore, is mostly associated with the concept

of learning materials and processes for their use. Molenda (1993, cited in Seels & Richey, 1994) proposes three stages for utilization: usage, installation, and institutionalization. Usage is the simplest stage, using an instructional material one-time, usually spontaneously. Installation is the stage where an instructional material or technique embedded into curriculum, generally continuously. Last, institutionalization stands for consciously embedding the instructional change into the culture of an organization (Seels & Richey, 1994). The author of this paper addresses the definition provided by AECT (2008) and Robinson, Molenda and Rezabek (2008) who explain that "the learners encounter with the learning resources takes place within some environment following some procedures, often under the guidance of an instructor, the planning and conduct of which can fit under the label utilization" (p. 6).

To summarize, the literature focuses on the following: factors that affect teachers' adoption and integration of technology into their teaching especially in terms of availability and access to technology. Although low use of technology has been investigated from different perspectives the revealed factors were generally focus on teachers' knowledge of technology, teachers' attitudes toward technology and teachers' self-confidence in using technology in teaching and learning. On the other hand accessing to technology is one thing: using is another. Therefore, focusing on implementation processes may contribute understanding the utilization processes. As Seels and Richey (2004) underlined there is a need for researching base of implementation.

1.1. Purpose of the Study

The purpose of this study was to understand how a computer teacher utilizes an online learning environment (OLE) and to reveal strategies that are used during the utilization process and to reveal possible enablers of utilization process of online learning environment for classroom instruction. Focusing on implementation process of a computer teacher eliminates some barriers such as lack of technical knowledge about information and communication technologies (ICT), lack of knowledge about hardware accessibility to hardware, and technical support thereby strengthen the understanding about integration process.

2. METHOD

This is a case study where the case is the process of utilization of the online learning environment by a computer teacher. A case can be an individual, or a role, or a small group, or an organization, or a community, or a nation, or a decision, or a policy, or a process, or an incident, or event of some sort, and some other possibilities (Johnson & Christensen, 2004; Wallace & Poulson, 2003).The focus is on the process rather than outcomes and on the context rather than a variable (Merriam, 1998). The process of utilization affects and is affected by the teacher, the teacher's teaching/learning strategies, the students, the activities during an instruction phase, or types of activities.

2.1. Participants

The study employs purposeful sampling based on the definition provided by Meriam (1998) as "based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned" (p. 61).

The study conducted by Göktaş (2006) shows that K-12 teachers do not perceive themselves as competent in terms of general ICT competency. Moreover, prospective teachers and K-12 teachers has the lowest competency in "use of LMS" and "use of ICT in analysis process of a course" (p. 160). Furthermore, he presents the barriers for integrating ICT into K-12 schools and the major barriers are "lack of in-service training about ICT, lack of technical support, lack of hardware, and lack of basic knowledge-skills" (p. 167).

This study focused on computer teacher purposively to eliminate some of the major barriers so that the elements of the integration process could be examined. First, computer teachers, graduated from Computer Education and Instructional Technology (CEIT) department, have basic and advanced ICT skills. They do not need much technical support; even they provide technical support to teachers and to school administration. A subject area teacher might have difficulties in having information technology equipment or access to them, but a computer teacher has the power of computer laboratories. Finally, computer teachers gain much knowledge about instructional technology and experience of using ICT during their undergraduate education.

2.1. Research Context

Research context is comprised of an information technologies course, a computer teacher, an online learning environment, students and the computer laboratory. In the following paragraphs research context is detailed.

There were two hour lessons in a week for fourth and fifth grades and one hour for sixth, seventh, and eighth grades. The curriculum of the computer course (ESCCIP, 2006) was defined by Turkish Ministry of National Education (MoNE, 2009).

The computer teacher who used the online learning environment was graduated from CEIT Department and had six-years teaching experience prior to the study. The computer teacher has been teaching computer course from grade 4 to grade 8 at the elementary school. He teaches 20 hours a week at an average. He described himself to be a democratic and tolerant teacher rather than an authoritative traditional teacher.

The Online Learning Environment (OLE) was developed under the supervision of a professor at CEIT department of a public university. The OLE is consistent with the elementary education computer course instructional curriculum. It is worth to note that the author was also one of the four members of the academic advisory board of aforementioned instructional curriculum. The OLE was designed based on the Computer Education Curriculum identification of the five steps: 1) preparation and general information, 2) information share, 3) implementation/practice, 4) evaluation, and 5) resources for activities. These curricular activities were organized as "Learning-gains in five steps learning objects" (Özden, 2008). The OLE has two main use of purposes targeted. The first one targets the teacher's use. The teacher can use the OLE to prepare his lessons. Secondly, the teacher can direct his students to study the subject matter from the OLE individually or in groups. Afterwards, the teacher can have students discuss the topic, or present information to other students, produce a document or another kind of activity. Another strategy that could be used by the teacher is to have students do the activities presented in implementation step to have students completed the evaluations provided by the OLE.

The OLE was developed concerning the elementary education computer course instructional curriculum, i.e. it was consistent with the curriculum. It was developed under the supervision of professor who was also one of the four members of the academic advisory board of the instructional curriculum. OLE followed the identification made by Computer Education Curriculum which were preparation and general information, information share, implementation/practice, evaluation and resources for the activities. These steps were organized as "Learning-gains learning objects in five steps" (Özden, 2008). The general information step provided information about the learning gains. Information share step included animations, simulations, images, discussion examples, demonstrations or sometimes PowerPoint presentations or short movies. Supportive materials were provided in order to enrich learning environment. The implementation/practice step included an activity to be completed by the students. The activity can be a real life problem, presentation of a group project or a task to be completed on computer. An interactive quiz, homework or a discussion topic can be places under the evaluation page. Interactive quizzes enable self-assessment. OLE targeted two purposes. First, teachers can use it for preparing his lessons and second teachers can direct their students to study subject matter individually or in groups from OLE. Afterwards, as a teaching strategy, teachers can create a discussion environment for the topic of study. In addition students can do activities presented by OLE or students can do interactive evaluations provided by OLE.

2.3. Data Collection Instruments

The main drive of the study is qualitative; therefore qualitative data collection methods were employed. The data were collected through interview sessions. The conversations between the teacher and the researcher were carried out by following an interview guide. It was a semi-structured interview protocol with open-ended questions and pre-determined "probes" (Johnson & Christensen, 2004) were developed. There were five main categories of an interview session; (1) information about the class/grade/objectives, (2) how the lesson was carried out, (3) the effect of the online learning environment on the learning environment, (4) students' progress, (5) evaluation of the learning environment specific to the lesson and to the class/grade/objectives.

2.4. Procedures of the Study

Before beginning to the study, the teacher was suggested to take some notes and records on his utilization processes. The notes or recordings the teacher took were a helpful strategy for the teacher to remember the events occurred during the lecture sessions.

There were 25 interview sessions conducted over four weeks of implementation. Each interview session took approximately 30 to 50 minutes. The interviews were held every weekday evening and when possible some earlier time. Some interview sessions covered two different sections at the same grade, for example 4A and 4B sections were following the same curriculum and therefore same teaching and learning strategies were applied. The teacher indicated that it would be nearly the same interview process so there was no need to interview such cases separately. However, the different incidents/cases, if existed, were expressed by the teacher and the possible reasons of this situation were discussed with the researcher. If the curriculum was different for the same grade classes they are presented as separately like 6A and 6B. Interview results coded with grade name and interview number such as [4A, 4B–Int. 2] indicates the interview about 4A and 4B sections and the second interview (second lecture).

2.5. Data Analysis Procedures

The data analysis included four steps; "(1) coding, (2) developing themes, (3) organizing codes and themes, (4) defining and describing the findings and interpretation" (Yıldırım & Şimşek, 2005, p. 228). In detail, the data analysis of this study is as follows; the data were read, meaningful sections (words, sentences, etc.) underlined, and a concept was tried to be related to the meaningful data piece. The researcher re-read the data, and paired the codes together, and if necessary renamed some codes. The coding was formed according to some predetermined concepts and the concepts emerged from the data. Afterwards, the researcher made an effort to categorize the codes in order to create and develop themes. In other words, the codes and classification of codes was tried be placed under an upper theme. The researcher again re-examined the codes so that the data can be re-arranged according to the themes emerged so that the codes can be fully placed under themes, and the relationship of themes can be revealed. Finally, the themes, concepts and the relationships, if ever exists, between themes were interpreted by the researcher.

2.6. Validity and Reliability Issues

In order to increase the validity and reliability of the study, several strategies were applied. Transcripts of the interviews, results and interpretations are reviewed and confirmed by the computer teacher as a member checking strategy. The interview data and coding was examined by outside peers who had experience in qualitative data analysis as peer examination strategy. The data was provided by in-depth descriptions and without interpretations and direct quotations were used frequently as thick description strategy. The data collection procedures, instruments and analysis were done in a consistent way to ensure consistency.

3. FINDINGS

3.1. Main Strategies Used During the Utilization Process

The elements of the teacher's instruction were activities, demonstrations, discussions, evaluation and Content explanations. To explain the teachers' usage and utilization of the online learning environment the elements related to the teacher's instruction are explained below. The strategies used more frequently than others were activities, demonstrations and discussions. Strategies are given below in this corresponding order.

3.1.1. Activities (assigning a task)

The teacher frequently organized in-class activities for students. The students were assigned tasks to complete. Most of the time tasks required individual work, but especially 6th grade students worked in groups. Tasks required students to produce documents such as presentations, spreadsheet calculations or posters. For example, while introducing presentation software the teacher assigned an activity that students were going to prepare a presentation about themselves. The following quotes are examples to activities occurred during implementation:

> *Last week the students prepared a presentation about themselves and in today's lesson hours they were going to add pictures into their slides and they were going to change the visual appearance (slide design) of their slides. [4A, 4B–Int. 2]*
>
> *At the end of the lesson I reminded my students about the presentation they were going to prepare. I told to them that they should choose a presentation topic for the next lesson. [4A, 4B–Int. 2]*
>
> *The students were expected to prepare a PowerPoint presentation about a topic they chose. They are required to follow visual design rules (text-background contrast, choosing appropriate slide design, etc.) and enrich their presentations with pictures and clipart images. [4A, 4B–Int. 3]*
>
> *Today, you are going to prepare a presentation about a musician you like. You are going to work in groups similar to last week. As a group your task is to search information and some materials which can be pictures, music like an MP3 file, or a short video. Afterwards, you are going to prepare your presentations. [6A–Int. 2]*
>
> *I assigned another activity for them, so that they can practice the IF formula. [7B, 7C–Int. 2]*

In another section [6B–Int. 4] students' task was creating a brochure. The students were free to choose the content of brochure. The only requirement was that brochures must have the school's logo. The students used MS-Publisher software to prepare their brochures.

Overall, 4th and 6th grade students' created presentations most and they completed their tasks individually. 6th grade students' activities were usually required working in groups. Lastly, 7th grade students prepared various spreadsheet documents during the implementation. Their tasks included inserting data, using formulas to solve a problem [7A, 7B, 7C –Int. 2], using conditional formatting [7A, 7B, 7C –Int. 3] and creating charts [7A–Int. 1] for presenting their data.

3.1.2. Demonstrations

The teacher, many times, directed his students to watch demonstrations provided by the OLE. Over 25 lecture sessions the teacher used demonstrations 10 times. Teaching computer software such as Word, Powerpoint etc. usually requires teachers to show the steps of competing a task such as inserting an image or creating a table. The teachers generally use projection to show such steps to students. The main problem is that via projection there are usually students who are not able to follow at the expected pace. Therefore, teachers usually have to re-demonstrate the steps which is a time consuming process. On the other hand students can watch OLE demonstrations individually. The OLE demonstrations are short videos about how to complete an operation of software. The demonstrations are not interactive. Therefore, the students referred the demonstrations of the OLE for completing their tasks. The teacher stated that:

> *I directed my students to the OLE in order to have them watch the short video (2 minutes 30 seconds) demonstrating how to open the PowerPoint program, how to add new slide, how to prepare a title slide, how to add text (heading and body/content) to new slides and how to show presentation (slide show). [4A, 4B–Int. 1]*
>
> *You are going to add pictures to your presentation and change the design of your presentation. Whenever you need, you can watch the demonstrations provided by the OLE... I directed my students to the OLE which provides demonstrations of 'inserting a clipart picture and inserting a picture from file' (2 minutes) and 'changing the slide design' (50 seconds). [4A, 4B–Int. 2]*
>
> *I was around to observe their actions, help when they need. I also recommended that they can refer to the OLE when they forget how to do something. [4A, 4B–Int. 3]*
>
> *Most of the students were able to finish their presentations without any help. Some of the students referred to the OLE to remember the steps. Some others asked my help. [4A, 4B–Int. 3]*
>
> *Therefore, the students can watch a demonstration [from the OLE] about 'how to do something in PowerPoint'. [Brackets added] [6A–Int. 2]*
>
> *I informed my students about that the demonstration of how to add chart into a spreadsheet was provided in the OLE so that they can refer to the OLE when they needed. [7A–Int. 1]*

The nature of computer course, most of the time, requires demonstrating procedures/steps of software. The teacher, in this case, used the demonstrations provided by the OLE instead of demonstrating over the projector.

3.1.3. Discussions

The teacher frequently used short discussion sessions for introducing the lesson content and for supporting students' comprehension of content. Discussions are activities that go deeper than question and answer activities. Usually requires students to interpret a topic. The discussions were face-to-face moderated by the teacher in the classroom. For example, in one lesson [6A–Int. 4], the teacher indicated that he opened the discussion by asking which news is true, how we know which to trust, how we can evaluate the quality of news etc. The teacher indicated that they focused on criticizing presentation of visuals, and underlining the importance of providing different perspectives.

In another section [4A, 4B–Int. 2] the teacher and the students discussed about the importance of visuals, how they attract people's attention, how they help us to remember, the importance of readability and contrast. Another discussion session was about visual literacy and symbols. The discussions were detailed by the teacher as:

> *After guessing game, I directed my students to the OLE so that afterwards they can have a discussion about the importance of visual literacy and symbols. As a class our discussion's focus was mainly on the importance of international communication with symbols and understanding the necessity of visuals and symbols. [6B–Int. 2]*
>
> *…the discussion was about the importance of the visual hierarchy, balance (text and image), color (text and background contrast and importance of font color in terms of readability) and importance of spacing. [6b–Int. 1]*

The discussion sessions were usually a kind of warm up strategy to introduce the lesson content to the students. For example, before introducing the presentation software the teacher and the students have a very short discussion about the differences between word processing software and presentation software [4A, 4B–Int. 1]. As a class the students discussed the capabilities, usage areas, limitations of word processor software and presentation software. Afterwards the teacher introduced the presentation software to the students. The teacher indicated that he preferred a short discussion session instead of solely explaining (expository teaching) the aim of using presentation software.

3.1.4. Evaluation

The teacher evaluated his students' performance during the implementations. Most of the lessons included in-class activities which required students to produce documents. The evaluation sessions were not standing for official grading rather criticizing the produced documents, peer evaluations and short quizzes. The teacher used the evaluation forms available in the OLE frequently [4A, 4B–Int. 2; 4A, 4B–Int. 4]. Fourth grade and sixth students developed presentations during the implementations. Therefore, the teacher mainly used individual and peer evaluation forms suggested by the OLE. The teacher stated that:

> *I showed the related evaluation page of the OLE. Students' presentations were going to have four slides which are 'my information' (two slides), 'my hobbies' and 'where I live'. [4A, 4B–Int. 1]*
>
> *I informed my students about the evaluation form that they were going to evaluate their friend's presentation according to the criteria written in the evaluation form. [4A, 4B–Int. 2]*
>
> *At the end of the lesson I made a short quiz based on the evaluation questions provided in the OLE. [6B–Int. 1]*
>
> *At the end of the lesson I assigned homework to my students from the OLE. I told my students to complete and write the IF formula using the data set provided by the OLE. [7A–Int. 2]*

The teacher made a short quiz at the end of two lessons [6A–Int. 1, Int. 3]. The teacher explained that he developed a short quiz based on the evaluation questions provided in the OLE. Similarly for seventh grade [7A–Int. 1] the teacher stated that he requested his students to answer the short quiz (four items were present) provided by the OLE. The teacher detailed that after two minutes; he showed and answered the quiz questions via projector. Furthermore, the teacher also expressed his expectations from evaluation pages of the OLE. The teacher stated that it would be better to have online evaluation strategy rather than providing evaluation forms or assessment questions provided by the OLE. The teacher pointed out:

> *There can be a page for students to evaluate the presenters online. For example, listeners can give scores to the presenters and at the end of the lesson best presenters can be chosen. [6A–Int. 3]*

3.1.5. Content explanations

The teacher used the OLE for (a) preparing the content of his lessons and (b) directing his students to study content from the OLE. The teacher used the content explanation pages of the OLE mainly for introducing and explaining the content of the lesson to the students. Content explanations provided by OLE includes all of the learning gains of the curriculum. It is very similar to a textbook. For example, it included explanation of terms, concepts, and definitions. Content explanation pages explain the content to be taught via text, images, etc. Teachers can benefit from content explanations by either to prepare his/her lessons or direct his/her students to read from content explanation pages. The following statements are examples to use of the OLE for content explanation purposes:

> *I directed my students to the OLE, which also had two different kinds of documents and some questions. I requested my students to study individually and investigate the two documents and provide answers to the given questions. [4A, 4B–Int. 1]*
>
> *Students in the role of a teacher started to study from the OLE. I gave five minutes to study. [6A–Int. 1]*
>
> *I decided to direct my students to related learning gains page of the OLE in order to study the lesson topic and concepts. [6B–Int. 1]*
>
> *I started the lesson by introducing some symbols to the students and asking about these symbols' meanings. [6B–Int. 2]*
>
> *I directed my students to the OLE so that, afterwards, they can have a discussion about the importance of visual literacy and symbols afterwards. Another point that took my attention was that, there was more participation to class discussions. I guess that, students knew that they didn't have anything to miss. [6B–Int. 2]*
>
> *…in order to have my students learning about how to criticize formally I directed my students to the OLE, which had a video (3 min 23 seconds) criticizing two different posters, one was well-designed and the other was not. [6B–Int. 3]*
>
> *I told my students that they have 10 minutes to study the lesson topic from the OLE. [7A–Int. 3]*

6th grade curriculum includes topics such as effective presentation strategies [6A–Int. 3], importance of role of media [6A–Int. 4], visual literacy [6B–Int. 2] and visual design [6B–Int. 3]. Therefore, 6th grade students used the content explanations pages of the OLE more than the other grades. 4th and 7th grade curriculum focuses much on teaching use of software. Therefore, 4th and 7th grades utilized the demonstrations of the OLE and 6th grades utilized content explanations more.

3.2. Enablers of Using the Online Learning Environment

The OLE enabled teacher to spare more time for dealing with students individually, provide another information source for students and increase students' motivation and interest to the lesson. The word enablers is used as apposite of barriers. Barriers limit teachers to do something, on the other hand enablers are things that contribute to teachers' doing something else. For example by using the OLE the teacher saved time (via demonstrations). Saving time has created time for the teacher which enabled the teacher to deal with students.

3.2.1. Sparing much time for dealing with students individually

Using the online learning environment enabled the teacher to overcome some classroom management issues. Especially the demonstrations of the OLE assisted teacher during his instruction. With the presence of the demonstrations the teacher was able to spare more time to his students and individually guide the students. The teacher pointed out:

> *Previously, when I demonstrated how to complete an operation/procedure, for example saving a document, or creating a new slide, I was usually interrupted by the students who did not understand, or who had technical problems, or who were too slow to follow my demonstration. This caused, totally stopping my demonstration and starting over again, or speaking to these students that 'after the demonstration was completed I was going to help them'. However, when I directed my students to the OLE, which actually demonstrates instead of me, I had two kinds of student groups, ones who can watch the demonstration and perform the task without having a problem, and others having problems with performing the task given. Therefore, I had time for individually guiding these students. Therefore, I was able to help each student without making other students wait. [4A, 4B–Int. 1]*

> *Previously, when I gave a task to complete, some students, who had difficulties completing the steps of the task, called me and I showed/demonstrated the steps to them individually. On the other hand, with the OLE I observed that most students refer to the demonstration in the OLE while performing their tasks. Clearly, those students figured out that the demonstration presented in the OLE is always there and they can watch it again and again when they needed. Therefore, there was a decrease in the number of students who require my help or guidance to perform the task in hand. [4A, 4B–Int. 1]*

> *Most of the students were able to finish their presentations without any help. Some of the students referred to the OLE to remember the steps. Some other asked my help. [4A, 4B–Int. 3]*

3.2.2. Providing additional information source for students

The presence of the OLE provided additional information source both for students and the teacher. The students became aware that there was the OLE which also had demonstrations and content explanations. The teacher, many times, directed his students to the OLE for demonstrations thereby the students got used to refer to the OLE when they need. Not only demonstrations but also content explanation sections were used frequently. The teacher directed his students to the OLE mostly before short discussion sessions. The following statements indicate that the teacher utilized the OLE for providing additional information source for students:

> *Moreover, in our case there was the OLE which also shows the steps of a task. Therefore, a student knows that when s/he forgets some steps, there is an information source that s/he can get help. [4A, 4B–Int. 2]*

> *I guess that, students knew that they didn't have anything to miss. In other words, they know that they were always able to refer to the OLE when they need. [4A, 4B–Int. 2]*

> *…interestingly some of them provide answers from the OLE, even some directly read from it. [4A, 4B–Int. 2]*

> *I observed that my students were used to use the OLE. Moreover, I believe that their self-confidence was raised because they knew that without asking to the teacher they were able to learn, complete a task. [4A, 4B–Int. 2]*

I observed a student who was writing the steps, I told the students that while they are teaching to their friends they are free to switch to the OLE and check their knowledge. [6A–Int. 1]

The content in the OLE was good to provide enough information for the students. [6B–Int. 3]

3.2.3. Increasing students' motivation and interest to the lesson

The teacher stated that using the OLE somehow increased his students' motivation to lessons. During the interview sessions the teacher underlined that his students participated more to the classroom discussions and activities. The teacher explained that especially the content explanation pages of the OLE were interesting for the students. Therefore, they liked using the OLE and they were more positive to the lessons. The teacher pointed out that:

Another point that took my attention was that there was more participation to class discussions. [4A, 4B–Int. 2]

Most of the students were participated to the activity with high motivation. Many of the students adopted the roles given to them. [6A–Int. 1]

The advertisement movie in the OLE was attracted all of the students' attention than I expected…. the movie was very good in terms of taking attention of students and matches very well with the learning gains of the unit. [6A–Int. 2]

4. DISCUSSION and CONCLUSION

The teacher utilized the OLE for (i) preparing and supporting content explanations, (ii) preparing and providing alternative examples, (iii) supporting activities, (iv) supporting discussions, (v) presenting demonstrations, (vi) supporting projects and (vii) preparing evaluation. The main purpose of teacher's use of the online learning environment was to support his classroom instruction. The main purpose of the teacher's use is similar to Hayes' (2007) results that revealed teachers utilizing information and communication technologies for supporting and supplementing existing classroom practices. The study of Uluyol and Şahin (2016) discusses ICT use of elementary teachers and they categorize the purposes of uses as: presenting the lecture content (referred as content explanations in this study), practicing the lecture content (referred as activities in this study) assessing learning (referred as evaluations) in this study.

4.1. Main Strategies Used During the Utilization Process

To explain the teachers' usage and utilization of the OLE the teaching-learning strategies are explained. Figure 1 shows that the teacher used activities, demonstrations, discussions, evaluations and content explanations to form his classroom instruction.

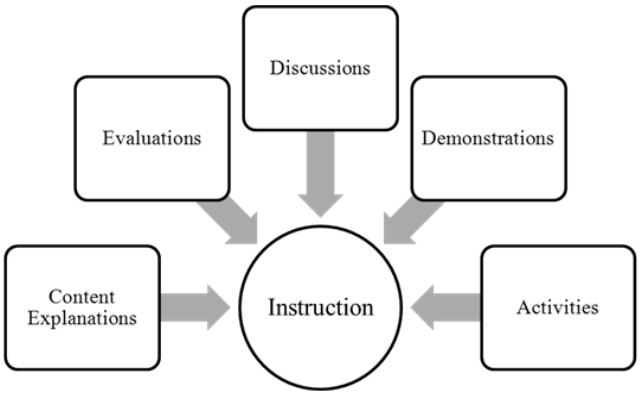

Figure 1. Main strategies used during the utilization process

Instructional strategies are "the activities used to engage learners in the learning process" (Akdemir & Koszalka, 2008, p. 1452). Instructional strategies are listed as direct instruction, coach or facilitator, use of higher-level questioning, cooperative or collaborative learning, and project based learning (Inan, Lowther, Ross & Strahl, 2010). Student activities are independent seatwork, experiential/hands on learning, systematic individual instruction, sustained writing/composition, sustained reading, independent inquiry/research, and student discussion as student activities (Inan, Lowther, Ross & Strahl, 2010, p. 543). Furthermore, Parker and Hess (2001) clearly accepted discussion as an instructional strategy.

4.1.1. Activities

The results indicated that the computer teacher assigned tasks for the students in many of his lessons. Teacher's assignment of task includes students' individual or group study aiming to complete the given task. The term 'activity' is used instead of 'task' as Ellis, Goodyear, Calvo and Prosser (2008) distinguished the two terms. They defined task as the work prescribed by the teacher and activity as what students really do. Therefore, from teacher's perspective a task is assigned, and from students' perspective students engaged in an activity. Furthermore, the curriculum of the computer course also used the term activity (MoNE, 2009; ESCCIP, 2006) and the curriculum was mainly adopts activities as an instructional strategy. The computer course requires students to perform operations of software, therefore, students completed some tasks during each lesson to learn such operations. Most of the time students individually performed the tasks. From an individual study perspective, completing a task was supported mainly by the demonstrations of the online learning environment. Figure 2 shows the relationship of individual/group study (performing an activity), the OLE, the teacher and students.

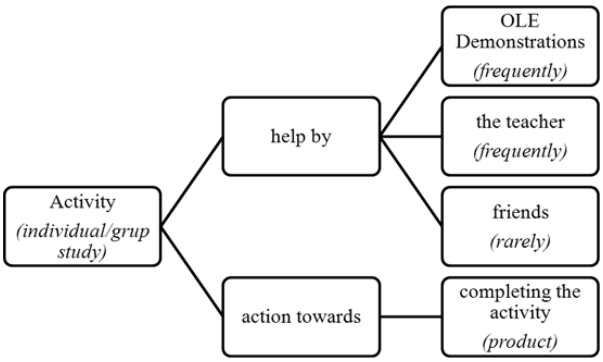

Figure 2. Activity and related actions during the utilization process

4.1.2. Demonstrations

According to the results of this study, the main purpose of the computer teacher in using the online learning environment was for showing demonstrations of software to students because of the nature of the computer course. The computer course requires students to learn how to do some operations of software and produce documents. Computer teachers widely use demonstration for showing steps of doing operations of software. First of all, the implementation of the OLE revealed that the computer teacher benefited from demonstrations most. The demonstrations increased the students' self-confidence which enabled the students to do better individually. Therefore, students perceived themselves as successful in doing operations of software. Sivin-Kachala and Bialo (2000) concluded that when students self-confidence and thereby success are increased they enjoy much and perform better. Figure 3 below summarizes the relationship between demonstration, the OLE, the teacher and students.

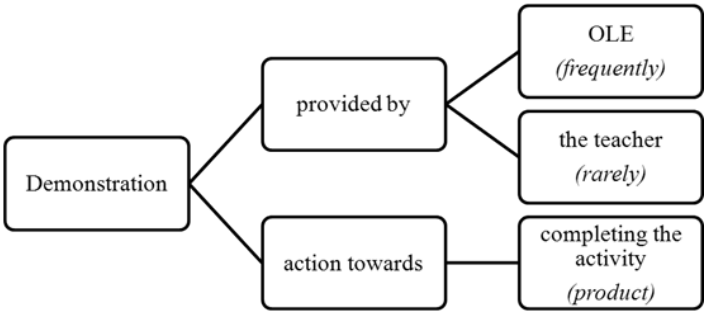

Figure 3. Demonstrations and related actions

4.1.3. Discussions

Larson (1999) defines two types of discussions as method of instruction and discussion competence. Method of discussion focuses student engagement in lesson and learning academic content, whereas discussion competence focuses learning about discussing. Similarly, Parker and Hess (2001) describe the two different types of discussion as teaching with discussion (as method of instruction) and teaching for discussion (as a curriculum objective). In this study the teacher's use of discussion is identified as a method of instruction (teaching with discussion) except for one lesson which aimed to teach students to 'interpret visuals from a critical point of view'.

For subject topics requiring students to process information to knowledge and gain perspective for a subject topic, or learn academic content (Larson, 1999), the teacher preferred discussions most of the time. Therefore, in order to create an efficient discussion environment, the teacher directed his students to content explanation (information share) section of the OLE or sometimes he explained introductory information so that his students have prerequisite or prior-information about content. After such an individual study session with the OLE or teachers' introductory session, the teacher opens a discussion session for the students to share their ideas and gain perspectives about subject topic and learn content. In other words, the teacher wanted to create an environment for his students to "construct an understanding about the topic" (Larson, 1999, p. 662) via their interactions with their friends by his guidance. Therefore, via discussions students can interpret, analyze, and manipulate information (Larson, 1999) or broadly gain an understanding (Ellis, Goodyear, Calvo & Prosser, 2008) as active participants. Furthermore, Larson (1999) found that "students have to have knowledge of a topic before they can talk about it" (p. 667). Similarly in this study the teacher used the online learning environment to provide the students with some prior information/knowledge about a topic. Figure 4 shows the interaction between discussion, the OLE, the teacher and students.

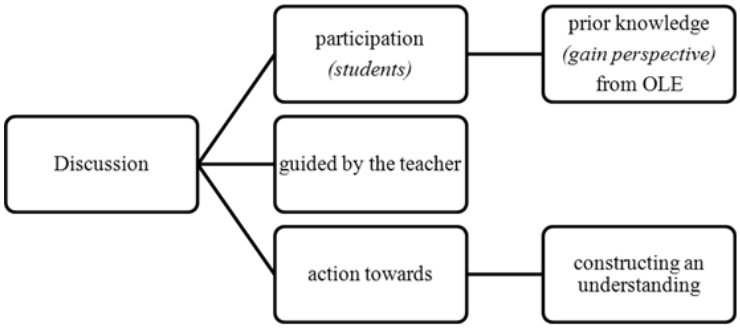

Figure 4. Discussions and related actions

4.1.4. Evaluations

Bebell (2003) found that teachers use technology most frequently for creating tests, quizzes, or assignments. Parallel to this argument, in the present study the computer teacher used the questions provided by the OLE and some evaluation forms to prepare evaluation of his lessons. The teacher especially used evaluation forms to prepare criteria for evaluating his students' products and progress.

It is a fact that the computer teacher didn't use the evaluation part of the OLE as much as demonstrations and content explanation parts. The computer teacher used the evaluation of the OLE for preparing evaluation forms for his students. Furthermore, the teacher directed his students to evaluation pages of the OLE for online assessment. The evaluation pages of the OLE were consisted of mostly multiple choice quizzes and open-ended questions. Therefore, it can be stated that the teacher might have expected more interactive and interesting evaluation activities rather than pure open-ended questions. In general, the teacher used the OLE for preparing peer evaluation forms, creating evaluation criteria for assessing students' performance and products, preparing paper-based quizzes, and directing the students for online self-assessment. Figure 5 presents the relation of evaluation, the OLE, the teacher and students.

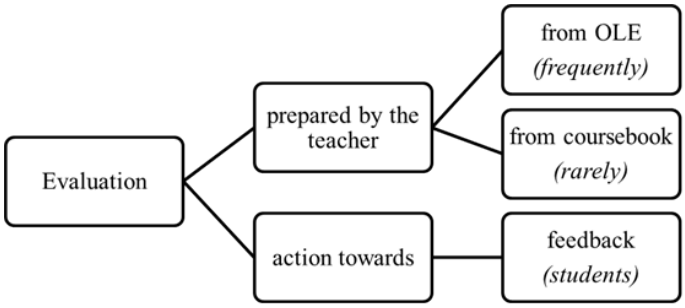

Figure 5. Evaluation and related actions

4.1.5. Content explanations

Many of the lessons were initiated with classroom discussions. For example, at the beginning of a lesson the teacher introduced the students with two kinds of documents aiming a discussion about the differences of these two documents. As a result, students can reveal that word processing software is not enough for presenting

information. The computer teacher believed that discussions were much beneficial for students to understand and comprehend a subject topic. The OLE served as information source for students to have basic information about the lesson content so that they can participate to the discussions with the necessary prerequisite/prior knowledge. In other words, with a discussion session the teacher wanted his students to share their ideas about a subject topic, but their ideas should be rationalized and related to the lesson topic. Becker (2001) terms the above situation as "information-gathering objective" (p. 8).

The OLE enabled the students to retrieve some prior knowledge (content explanation) and ideas about a subject topic and discuss further. Moreover, for sections 7B and 7C the teacher requested his students to study from the OLE before coming to the class. It was seen that for the first lesson hour there were more students who didn't study and practice their assignment before coming to the class. However, for the following lesson hours the number of students, who did study, was increased. The teacher wanted his students to have some basic information and practice about the lesson so that they can learn much better in the lesson hour. As seen from the Figure 6, the computer teacher used the OLE for preparing his students for lesson in order to have students with some prior knowledge about the lesson topic. The students, studying from the OLE participated in discussions and got involved in activities more than the ones who did not study from the OLE.

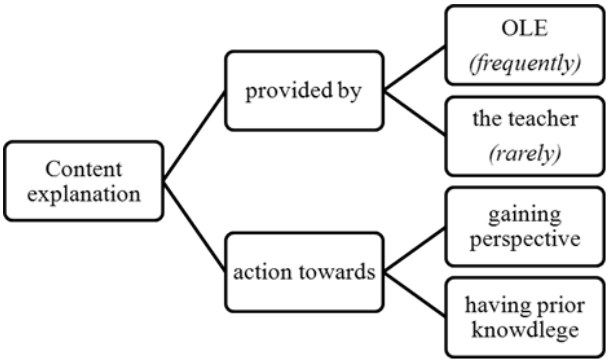

Figure 6. Content explanation and related actions

4.2. Enablers of Using the Online Learning Environment

4.2.1. Spare much time for dealing with students individually

Results show that the OLE demonstration enabled the teacher to spare more time for students who needed help. The results of the study conducted by OTA (1995) indicated that 70% of accomplished computer-using teachers stated that "I spend more time with individual students" (p. 153). A current study from Turkey revealed that 77.9% of the social studies teachers agreed that use of technology enables effective use of class time (Gulbahar & Guven, 2008). Computerized learning environments help teachers organize classroom activities and save time for other activities (Donnelly, McGarr & O'Reilly, 2011). The findings of this study are parallel to the existing literature that the presence of demonstrations enabled the teacher to save time and deal with students individually.

4.2.2. Provide additional information source for students

The findings showed that the presence of the OLE was perceived by the teacher and so the students as additional information source. The results indicate that it was not only the demonstrations but also the content explanations served as information source. Many times the teacher assigned study topics for his students to have basic information about subject topic. Therefore, the students can take active role in their learning from passive listeners to active learners. The teacher tried to place students at the center of their learning. Instead of explaining the subject topic, providing definitions of terms, or stating the differences between some concepts, the computer teacher preferred the students to comprehend the information at hand, discuss the differences between concepts and build their understanding. It is important to note that the students were not alone to process this learning phase. The teachers' presence and guiding through a lesson also supported students in their learning.

4.2.3. Increase students' motivation and interest to the lesson

The results showed that the movies presented in the content explanation pages of the OLE increased the students' motivation and interest in some lessons. It can be understood from the teacher's responses that videos, other than demonstrations, caught interest of students more. The results also presented that when the lesson starts with such activities students participate more than usual.

The examples and movies provided in the content explanation pages of the OLE were used by the computer teacher to take attention of students and increase their motivation towards the lesson. The movies, not the demonstrations, available in the OLE were characterized by the teacher as interesting, attractive or motivating for the students. The results also indicated that whenever such introductory learning materials were used, students' participation to discussions and classroom activities were increased. The findings of this study are parallel to the existing literature (Bodur, Özkan, Altun & Şimşek, 2009; Sivin-Kachala & Bialo, 2000). OTA (1995) research stated that "technology can be a key vehicle for stimulating learning, primarily because it creates environments and presents content in ways that are more engaging and involve students more directly than do textbooks and more traditional teaching tools [italics added]" (p. 165). Baek, Jung and Kim (2008) also found deriving students attention as the second key factor for teachers to use technology in classrooms.

4.2.4. Categorization of the Teachers' Utilization Process

In general the teacher can be said to be in 'installation' stage (Molenda, 1993, cited in Seels & Richey, 1994) based to his use of the technology in education. Just to note, the teacher can be said to be between integration and evolution stages according to Wilson and Wright's (2007) classification.

Januszewski and Molenda (2008) explain the theoretical base for use of media in teaching. From the cognitive approach perspective, learners' mental and emotional processes during instruction are focused. Application of cognitive approach involves presenting information to learners, or allowing learners to read material and show mental efforts to comprehend it. The presentation of information aims to match with learners existing mental structures. Teachers' role is identified to work to gain students' attention and interest. Furthermore, teacher provides analogies, examples, and outlines so that new information is more easily attached to learners' schemata and therefore easy to remember.

Application of the theory addresses use of authentic materials so that learners take responsibility of their learning, importance of social context, interactions with the environment, discovery learning, learning from mistakes, and problem or project based or ill structured environments. Constructivist approach focuses on learner-centered approaches, and change of teachers' role in the educational context, suggest learning with media instead of learning from media. Examples include learners producing document, multimedia productions especially with collaborative work, participation to social scenarios, tutorial programs allowing variable consequences and multiple brunches inclusion of virtual reality, dynamic interactions. Januszewski and Molenda (2008) states that digital technology also makes it possible for reading-type activities to become less passive, more active, and more learner-controlled. Examples:

- Web text with links allowing the reader to connect related ideas (hypertext), possibly incorporating sounds and motion images (hypermedia).
- Web-based practice exercises that allow learners to choose different answers in order to experience the consequences of their decisions.

Based on the above definitions and descriptions and the results related to the teacher's use of the technology, it can be asserted that the teacher benefited from applications of both approaches, mainly the cognitive strategies. The teacher's use of the OLE implies that the teacher used strategies of gaining the attention of learners, the importance of prior knowledge of the learners for presenting new knowledge and skills, and valuing practice activities. On the other hand the teacher showed efforts to student-centered environments, by valuing their ideas, trying to integrate learners in evaluation processes, trying to use different forms of technology to address different perspectives, by providing other information source (both for prior knowledge, which addresses cognitive implications, and for indicating that teacher is not the only information source, that students can learn from), preferring group activities, and trying to provide an activity based environment.

Based on the Teacher ICT Integration Model (Donnelly, McGarr & O'Reilly, 2011) the teacher would be considered as Inadvertent User (IU). The teacher would not be considered as Contented Traditionalist (CT) or Selective Adopter (SA) because the teacher's focus was not on assessment (considering both extrinsic and intrinsic factors). The teacher used the particular online environment because he volunteered to participate in research rather than seeking out the innovation. In other words, the innovation came to him. On the other hand, using the new learning environment moved the teacher towards a more learning focused and student-centered approach.

In this study the teacher benefitted from the OLE. Teachers should be provided such learning environment which should have appropriate learning materials for them. Teachers can benefit from content explanations, demonstrations and especially interactive evaluations. EBA (Information Network in Education) initiative can be developed in this sense. Teachers should be provided continuous in-service training about technology and how to integrate technology into instruction.

The integration process is focused in this study from teachers' perspective. Other studies focus on students' perspectives, how students perceive such learning environments. This study focused on computer science education and purposefully addressed computer science teacher. Other studies can focus on other subject area teachers' utilization of such online learning environments.

REFERENCES

AECT (2008). *Definition*. In A. Januszewski and M. Molenda (Eds.), Educational Technology: A definition with commentary. New York: Lawrence Erlbaum Associates.

Akdemir, O., & Koszalka, T. A. (2008). Investigating the relationships among instructional strategies and learning styles in online environments. *Computers & Education, 50*, 1451-1461. doi: 10.1016/j.compedu.2007.01.004

Amiel, T., & Reeves, T. C. (2008). Design-based research and educational technology: Rethinking technology and the research agenda. *Educational Technology & Society, 11*(4), 29-40.

Arslan, S., & Şendurur, P. (2017). Investigation of changes in factors affecting the technology integration in education. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 43*, 25-50.

Baek, Y., Jung, J., & Kim, B. (2008). What makes teachers use technology in the classroom? Exploring the factors affecting facilitation of technology with a Korean sample. *Computers & Education, 50*, 224-234. doi: 10.1016/j.compedu.2006.05.002

Barnett, H. (2000). Assessing the effects of technology in a standards-driven world. *Learning & Leading with Technology, 27*(7), 28-31.

Bebell, D. J. (2003). *Examining and understanding teachers' use of technology* (Unpublished doctoral dissertation). Boston College, Boston.

Becker, H. J. (2001). *How are teachers using computers in instruction?* Paper presented at the annual conference for the American Educational Research Association. Seattle, WA.

Becker, H. J., Ravitz, J. L., & Wong, Y. (1999). *Teacher and teacher-directed student use of computers and software*. Irvine, CA: Center for Research on Information Technology and Organizations, University of California, Irvine, and the University of Minnesota.

Bodur, E., Özkan, F., Altun, E., & Şimşek, E. (2009). The role of teacher in web enhanced learning activities in primary school information technologies lesson: A case study. *Procedia Social and Behavioral Sciences I, 2009*, 1043–1051.

Bottino, R. M., & Robotti, E. (2007). Transforming classroom teaching & learning through technology: Analysis of a case study. *Educational Technology & Society, 10*(4), 174-186.

Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development Using Information and Communication Technology, 8*(1), 136–155.

Byrom, E. (1998). *Review of the professional literature on the integration of technology into educational programs*. Retrieved from http://edhd.bgsu.edu/~sbanist/6320/pdfs/litreviewbyrom.pdf

Cubukcuoglu, B. (2013). Factors enabling the use of technology in subject teaching. *International Journal of Education and Development using Information and Communication Technology, 9*(3), 50-60.

Çetin, O., & Güngör, B. (2014). İlköğretim öğretmenlerinin bilgisayar öz-yeterlik inançları ve bilgisayar destekli öğretime yönelik tutumları. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 33*(1), 55-78.

Donnelly, D., MacGarr, O., & O'Reilly, J. (2011). A framework for teachers' integration of ICT into their classroom practice. *Computers & Education, 57*(2), 1469-1483. doi: 10.1016/j.compedu.2011.02.014

Ellis, R. A., Goodyear, P., Calvo, R. A., & Prosser, M. (2008). Engineering students' conceptions of and approaches to learning through discussions in face-to-face and online contexts. *Learning and Instruction, 18*, 267-282. doi: 10.1016/j.learninstruc.2007.06.001

Ely, D. (1991). Trends and issues in educational technology. In G.J. Anglin (Ed.), *Instructional technology: Past, present, and future* (pp. 34-58). Englewood, CO: Libraries Unlimited.

Ertmer, P. (1999). Addressing first- and second-order barriers to change: Strategies for technology implementation. *Educational Technology Research and Development, 47*(4), 47–61.

Ertmer, P.A., Addison, P., Lane, M., Ross, E., & Woods, D. (1999). Examining teacher beliefs about the role of technology in the elementary classroom. *Journal of Research on Computing in Education, 32*(1), 54-72.

European Commission. (2016). *Connectivity for a competitive digital single market - towards a European gigabit*. Retrieved from http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=17182

Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main barriers and possible enablers of ICT integration into preservice teacher education programs. *Educational Technology & Society, 12*(1), 193-204.

Göktaş, Y. (2006). *The current status of information and communication technologies integratıon into schools of teacher education and K-12 in Turkey (*Unpublished doctoral dissertation), METU, Ankara.

Gülbahar, Y. (2007). Technology planning: A roadmap to successful technology integration in schools. *Computers & Education, 49*, 943–956. doi: 10.1016/j.compedu.2005.12.002

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.

Harrell, S., Bynum, Y. (2018). Factors affecting technology integration in the classroom. *Alabama Journal of Educational Leadership, 5*, 12-18.

Hung, Y. W., & Hsu, Y.-S. (2007). Examining teachers' CBT use in the classroom: A study in secondary schools in Taiwan. *Educational Technology & Society*, *10*(3), 233-246.

Hsu, Y. S., Wu, H. K., & Hwang, F. K. (2007). Factors influencing junior high school teachers' computer-based instructional practices regarding their instructional evolution stages. *Educational Technology & Society, 10*(4), 118-130.

Inan, F. A., Lowther, D. L., Ross, S., & Strahl, J. D. (2010). Pattern of classroom activities during students' use of computers: Relations between instructional strategies and computer applications. *Teaching and Teacher Education, 26*(3), 540-546. doi: 10.1016/j.tate.2009.06.017

İBDÖP. (2006). *İlköğretim bilgisayar dersi (1–8. siniflar) öğretim programı*. Retrieved from https://docplayer.biz.tr/2069302-T-c-milli-egitim-bakanligi-talim-ve-terbiye-kurulu-baskanligi.html

Johnson, B., & Christensen, L. (2004). *Educational research: Quantitative, qualitative, and mixed approaches (2nd edition)*. Boston, MA: Pearson Education Inc.

Kafyulilo, A., Fisser, P., & Voogt, J. (2016). Factors affecting teachers' continuation of technology use in teaching. *Education and Information Technologies, 21*(6), 1535–1554. doi: 10.1007/s10639-015-9398-0

Karasavvidis, I. (2009). Activity theory as a conceptual framework for understanding teacher approaches to information and communication technologies. *Computers & Education, 53*, 436–444. doi: 10.1016/j.compedu.2009.03.003

Kaya, G., & Koçak Usluel, Y. (2011). Öğrenme-öğretme süreçlerinde BİT entegrasyonunu etkileyen faktörlere yönelik içerik analizi. *Buca Faculty of Education Journal, 31*, 48-67.

Larson, B. E. (1999). Classroom discussion: A method of instruction and a curriculum outcome. *Teaching and Teacher Education*, 16, 661-667.

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

Januszewski, A., & Molenda, M. (2008). *Educational technology: A definition with commentary*. New York: Routeledge.

MoNE. (2009). *Orta öğretim kurumları bilgi ve iletişim teknolojisi dersi öğretim programı*. Retrieved from http://talimterbiye.mebnet.net/OgretimProgramlari/ortaokul/2010-2011/Bilgive%C4%B0letisim-6-8(Yerel).pdf

Mubashrah, J., Shaziah, J., & Samina, B. (2016). Extrinsic and intrinsic barriers of integrating ICTs tools in teaching at undergraduate and elementary level: A comparative study. *Pakistan Journal of Social Sciences, 36*(2), 1073-1087.

Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: A review of the literature. *Journal of Information Technology for Teacher Education, 9*(3), 319-342.

NCES, National Center for Education Statistics (2000a). *Teacher use of computers and the Internet in public schools*, Department of Education. Retrieved from http://nces.ed.gov/pubs2000/2000090.pdf

NCES, National Center for Education Statistics (2000b). *Teachers' tools for the 21st century*, Department of Education. Retrieved from http://nces.ed.gov/pubs2000/2000102.pdf

NCES, National Center for Education Statistics (2009). *Educational technology in public school districts: Fall 2008*, Department of Education. Retrieved from http://nces.ed.gov/pubs2010/2010003.pdf

NCTAF, National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. New York: Author. Retrieved from http://www.nctaf.org/documents/WhatMattersMost.pdf

Oncu, S., Delialioglu, O., & Brown, C. A. (2008). Critical components for technology integration: How do instructors make decisions? *Journal of Computers in Mathematics and Science Teaching, 27*(1), 19-46.

OTA. (1995). *Teachers and technology: Making the connection*. Washington DC: U.S. Government Printing Office. Retrieved from http://www.coedu.usf.edu/itphdsem/eme7938/ota9541.pdf

Özden, M. Y. (2008). *Bilişim teknolojileri 1-8 kazanımları*. Retrieved from http://guide.ceit.metu.edu.tr/ceit419_2007_1/finalproject.

Parker, W. C., & Hess, D. (2001). Teaching with and for discussion. *Teaching and Teacher Education, 17*, 273-289.

Papanastasiou, E. C., & Angeli, C. (2008). Evaluating the use of ICT in education: Psychometric properties of the survey of factors affecting teachers teaching with technology (SFA-T3). *Educational Technology & Society*, *11*(1), 69-86.

Piciano, A. G. (1994). *Computers in the schools*. New York: Macmillian Publishing Co.

Robinson, R., Molenda, M., & Rezabek, L. (2008). Facilitating learning. In Januszewski, A., & Molenda, M. (Eds.), Educational Technology: A definition with commentary. New York: Lawrence Erlbaum Associates.

Seels, B. B, & Richey, R. C. (1994). *Instructional technology: The definitions and domains of the field*. Washington, DC: Association for Educational Communications and Technology.

Shi, M., & Bichelmeyer, B. (2007). Teachers' experiences with computers: A comparative study. *Educational Technology & Society, 10*(2), 180-190.

Sivin-Kachala, J. & Bialo, E. (2000). *2000 research report on the effectiveness of technology in schools*. (7th ed.). Washington, DC: Software and Information Industry Association.

Teo, T., Faruk Ursavas, Ö., & Bahçekapili, E. (2011). Efficiency of the technology acceptance model to explain pre-service teachers' intention to use technology: A Turkish study. *Campus-Wide Information Systems, 28*(2), 93-101.

Tickton, S. G., & Kohn, S. D. (1971). *The new instructional technologies: Are they worth it?* (AA00802). A report presented to the Presidents' Commission on School Finance. Washington, DC: Academy for Educational Development, Inc. (ED058498).

Top, E. (2007). *Secondary school English teachers' technology perceptions and issues related with their technology integration processes: A qualitatıve study.* (Unpublished Ph. D. Thesis). METU, Graduate School of Social Sciences, Ankara, Turkey.

Topp, N. W., Mortensen, R., & Grandgenett, N. (1995). Building a technology-using faculty to facilitate technology-using teachers. *Journal of Computing in Teacher Education, 11*(3), 11-14.

Uluyol, Ç., & Şahin, S. (2016). Elementary school teachers' ICT use in the classroom and their motivators for using ICT. *British Journal of Educational Technology, 47*(1), 65–75. doi: 10.1111/bjet.12220

Wallace, M., & Poulson, L. (2003) *Learning to read critically in educational leadership and management*. London: Sage.

Wilson, E. K., & Wright, V. H. (2007). *Teacher use of technology: From the teacher education program to the classroom*. Retrieved from https://facultyfp.salisbury.edu/ddsessoms/pdf/wilson_elizabeth_n07.pdf

Wong, S. L., & Hanafi, A. (2007). Gender differences in attitudes towards information technology among Malaysian student teachers: A case study at Universiti Putra Malaysia. *Educational Technology & Society, 10*(2), 158-169.

Yıldırım, S. (2000). Effects of an educational computing course on preservice and inservice teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing in Education, 32*(4), 479-495.

Yıldırım, A., & Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin.

Yucel, C., Acun, I., Tarman, B., & Mete, T. (2010). A model to explore Turkish teachers' ICT integration stages. *Turkish Online Journal of Educational Technology, 9*(4), 1-9.

Young, S. S.-C., & Ku, H.-H. (2008). A study of uses of ICT in primary education through four winning school cases in the Taiwan schools Cyberfair. *Educational Technology & Society, 11*(3), 52-66.

Zamani, B. E. (2010). Successful implementation factors for using computers in Iranian schools during one decade (1995–2005). *Computers & Education, 54*(1), 59-68. doi: 10.1016/j.compedu.2009.07.004

Zengin, Y., Kağızmanlı, T. B., Tatar, E., & İşleyen, T. (2013). Bilgisayar Destekli Matematik Öğretimi Dersinde Dinamik Matematik Yazılımının Kullanımı. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10*(23), 167-180.

GENİŞLETİLMİŞ ÖZET

1. Giriş

Okulları başta bilgisayarlar olmak üzere teknolojik araçlarla donatmak başarının ve modernliğin temsili olarak, bilgi ve iletişim teknolojilerinin eğitimle bütünleştirilmesi de eğitsel sorunlara çözüm olarak sunulmaktadır. Her ne kadar okulları teknolojik araçlarla donatıyor olmak bu araçların verimli kullanılacağını garanti altına almasa da tüm eğitim süreci göz önünde bulundurulduğunda teknolojinin eğitime bütünleştirilmesindeki başlangıç adımları olarak görülebilir. Teknolojinin eğitim ortamlarında düşük düzeyde kullanımı farklı bakış açılarıyla alan yazında incelenmiştir. Benzer şekilde alan yazın genellikle teknolojinin öğretim sürecine bütünleştirilmesinde yaşanılan sorunlara ve bariyerlere daha çok değinmiştir. Alan yazın araştırmaları teknolojinin bütünleştirilmesine yönelik sorunları: teknolojiyi kullanacaklara yeterli düzeyde eğitim verilmemesi, öğretmenlik deneyimindeki eksiklikler, gerekli teknolojilerin mevcut olmaması ya da teknolojiye erişimin sınırlı olması, teknik destek hizmetlerinin yetersiz olması, yeterli yönetim desteğinin olmaması, kaliteli öğretim yazılımlarının bulunmaması, öğretim programında zaman yaratılamaması, finansal destek olarak tartışmıştır.

Teknoloji entegrasyonuna yönelik olan bariyerler genellikle içsel ve dışsal faktörler olarak ana başlıklar altında tartışılmaktadır. Dışsal faktörler genellikle teknolojiye erişim, teknik destek ve yönetsel destek olarak açıklanmaktadır. İçsel faktörler ise kişisel inanç, teknoloji kullanma deneyimi ve öz-yeterlik olarak tartışılmaktadır. Young ve Ku'nun açıkça ifade ettiği üzere alan yazın genellikle faktörler üzerine yoğunlaşmakta ve esas nokta olan öğretim sürecine odaklanılmamaktadır ve bilgi ve iletişim teknolojilerinin öğretim amaçlı kullanımına yönelik daha fazla araştırmaya ihtiyaç bulunmaktadır. Kuramsal temelleriyle ele alındığında öğrenme materyallerinin ve bu materyallerin kullanımına odaklanan öğretim süreci daha fazla araştırma konusu olmalıdır. Bu çerçeveden değerlendirildiğinde, teknolojinin öğretim ortamıyla bütünleştirilmesi sürecine odaklanılması teknolojinin öğretim amaçlı kullanılmasına yönelik stratejileri ve ilgili faktörleri anlamaya yönelik farklı bir bakış açısı ve katkı sağlayabilir.

Bu kapsamda, bu çalışmanın amacı bir bilgisayar öğretmeninin çevrim-içi öğrenme ortamını nasıl kullandığını anlamaya çalışmak ve olası stratejiler ile kullanma sürecine katkı sağlayan olanakları ortaya çıkartmaktır. Özellikle, bilgisayar öğretmeninin bütünleştirme sürecine odaklanmak, bilgi ve iletişim teknolojileri açısından teknik bilgi eksikliğini, teknolojiye erişimi ve kullanımı kısıtlayan bariyerlerin ortadan kaldırılarak teknolojinin bütünleştirilmesine odaklanılmasına olanak sağlanması amaçlanmıştır. Diğer bir ifade ile içsel ve dışsal faktörleri maksimum düzeyde olumlu şartları sağlayarak öğretim sürecine odaklanılmaya çalışılmıştır.

2. Yöntem

Nitel araştırma paradigması benimsenen çalışmada amaçsal örnekleme yöntemi kullanılmıştır. Çalışmanın amacı doğrultusunda, teknoloji erişiminde sorun yaşamayacak, bilgi ve iletişim teknolojilerinin kullanımı konusunda bilgi sahibi, öğretim teknolojileri alanı odaklı eğitim aldığı için bilgisayar öğretmeni örneklem hedefi olarak belirlenmiştir.

Araştırma bağlamı bilgisayar dersi olarak belirlenmiştir. Bilgisayar dersi haftada iki saat olarak yürütülmektedir. Dersi yürüten bilgisayar öğretmeni Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünden mezun ve 6 yıllık öğretmenlik deneyimine sahiptir. Bilgisayar öğretmeni 4-8. sınıflara eğitim vermektedir ve haftada ortalama 20 saatlik ders yükü bulunmaktadır. Çevrimiçi öğrenme ortamı BÖTE bölümü öğretim üyesi danışmanlığında geliştirilmiş olup bilgisayar dersi müfredatına yönelik içerik barındırmaktadır. Çevrimiçi öğrenme ortamının iki ana amacı vardır. Birincisi bilgisayar öğretmeni ders içeriklerini hazırlamak için çevrimiçi öğrenme ortamını kullanabilir. İkincil olarak ise öğretmen öğrencilerini ders içeriğini bireysel ya da grup çalışması kapsamında öğrenmek üzere çevrimiçi öğrenme ortamına yönlendirebilir. Daha sonra öğretmen sınıf içerisinde farklı etkinliklerle öğrenme sürecini zenginleştirebilir.

Çalışma kapsamında nitel veri toplanmıştır. Dört haftalık uygulama süreci boyunca bilgisayar öğretmeni ile 25 farklı görüşme gerçekleştirilmiştir. Tekil görüşme öğretmenin uygulama gerçekleştirdiği 2 saatlik derse tekabül etmektedir. Her bir görüşme yaklaşık olarak 30-50 dakika arasında sürmüştür ve her ders gününün sonunda gerçekleştirilmiştir. Veriler içerik analizine tabi tutulmuştur. Analiz süreci; verilerin kodlanması, temaların oluşturulması, kodların ve temaların organize edilmesi ve bulguların tanımlanarak yorumlanması aşamalarını içermiştir. Son aşamada ise temalar, kavramlar ve ilişkiler oluşturularak sonuçlar ortaya çıkartılmıştır. Çalışmanın geçerliğini ve güvenilirliğini sağlamak amacıyla görüşme kayıtları bilgisayar öğretmeni ile paylaşılarak içeriğin doğru şekilde aktarıldığı ve yorumlandığı teyit edilmiştir. Verilerin kodlanması süreci bağımsız bir araştırmacı tarafından denetlenmiştir. Araştırma ortamı ve araştırma süreci detaylı olarak açıklanmış, bulguların sunumunda doğrudan alıntılara yer verilmiştir.

3. Bulgular, Tartışma ve Sonuç

Öğretmen sınıf içi aktiviteleri, gösterileri, tartışma oturumlarını, değerlendirme formlarını ve çevrimiçi öğrenme ortamı tarafından sağlanan içeriği kullanarak öğretim sürecini gerçekleştirmiştir. Çevrimiçi öğrenme ortamı bu öğretim stratejilerini farklı şekillerde desteklemiştir. Öğretmen öğrencilerine aktivite tasarlarken çevrimiçi öğrenme ortamı tarafından sağlanan gösterilerden faydalanmıştır. Aktiviteler öğrencilerin bireysel ya da grup çalışması yapmasını gerektiren ve çoğunlukla bir ürün ortaya çıkarmalarını sağlayan etkinliklerdir. Gösteriler genellikle sınıf için etkinliklerin tamamlanmasına ve bir ürün ortaya çıkartılmasına katkı sağlamıştır. Öğretmen, sınıf içi aktivitelerden önce öğrencilerini genellikle Çevrimiçi Öğrenme Ortamı tarafından sunulan gösterileri izlemeye yönlendirmiştir. Böylece öğrenciler gerçekleştirecekleri etkinliğe yönelik işlem adımlarını bireysel olarak takip edebilmişlerdir. Ayrıca aktivitenin gerçekleştirilmesi sürecinde öğrenciler istedikleri zaman, genellikle bir işlem adımında takıldıklarında, tekrar Çevrimiçi Öğrenme Ortamı üzerindeki gösteriyi izlemişlerdir. Çevrimiçi öğrenme ortamı sınıf içi tartışma oturumlarına öğrencilere ön-bilgi sağlayarak hizmet etmiştir. Öğrenciler çevrimiçi öğrenme ortamında sunulan içeriğe erişerek kendi bilgilerini oluşturmaya ve bir perspektif kazanmaya başlamışlardır. Takip eden sınıf içi tartışma ile de öğrencilerin anlam oluşturmaları sağlanmaya çalışılmıştır. Bu kapsamda çevrimiçi öğrenme ortamı aynı zamanda içerik açıklayıcı olarak görev almıştır. Öğretmen dışında ikinci bir bilgi kaynağı olarak hizmet etmiştir ve öğrenciler tarafından da bu şekilde algılanmıştır. Ayrıca öğretmen anlatacağı ders içeriğini hazırlamak için kendisi de Çevrimiçi Öğrenme Ortamını başvuru kaynağı olarak kullanmıştır. Değerlendirme aşamasında öğretmen sıklıkla çevrimiçi öğrenme ortamı tarafından önerilen değerlendirme formlarını rehber olarak kullanmıştır. Öğretmen, Çevrimiçi Öğrenme Ortamı tarafından sunulan ders sonu sorulardan yararlanarak kısa testler de oluşturmuştur.

Çevrimiçi öğrenme ortamını kullanmanın sağladığı katkılardan en önemlisi öğretmenin öğretim sürecinde öğrencileriyle bireysel olarak ilgilenmesine zaman yaratması olarak ortaya çıkmıştır. Özellikle çevrimiçi öğrenme ortamı tarafından sağlanan gösteriler öğretmenin öğretim sürecini desteklemiş ve öğrencilerine daha fazla vakit ayırabilmesine katkı sağlamıştır. Çevrimiçi öğrenme ortamının diğer bir katkısı ise ikincil bir bilgi kaynağı olarak hizmet sağlamasıdır. Öğrenciler için öğretmen dışında bir bilgi kaynağı olarak çevrimiçi öğrenme ortamı kullanılmıştır. Öğretmen için de ders hazırlama sürecinde başvuru kaynağı olarak hizmet sağlamıştır. Çevrimiçi öğrenme ortamı, öğretmenin ifadesine göre, öğrencilerin derse karşı motivasyonlarını ve ilgisini artırmıştır. Öğretmen, öğrencilerinin ders tartışmalarına ve ders etkinliklerine daha fazla katılım sağladıklarını ifade etmiştir.

Öğretmenin teknolojiyi öğretim ile bütünleştirme süreci Januszewski ve Molenda' nın tanımlaması baz alındığında kurulum (installation) olarak ifade edilebilir. Bilişsel bakış açısıyla bilginin öğrenenlere etkili bir şekilde sunulması, öğrencilerin ilgisinin çekilmesi, yeni kazanılan becerilerin pratiğinin yapılması öğrencinin edindiği bilgiyi var olan bilgisi ile birleştirerek yeni bilgisini organize etmesi beklenilmektedir. Bu kapsamda öğretim süreçleri görsel-işitsel materyallerle desteklenmekte, bireysel çalışmalara ek olarak grup çalışmaları / tartışmaları gerçekleştirilmekte ve problem çözme ve aktiviteler kullanılmaktadır. Bu bakış açısı temel alındığında öğretmenin teknolojiyi bütünleştirme sürecini daha çok bilişsel stratejiler için kullandığı söylenebilir. Diğer taraftan çevrimiçi öğrenme ortamı öğretmenin daha fazla öğrenme odaklı ve öğrenci merkezli yaklaşımları benimsemesine katkı sağlamıştır.