Communication Barriers in Online Teaching and Online Learning with Digital Media, in the Framework of Teaching and Learning Theory Approaches

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Abstract
Online education is a new trend at Universities in Turkey. To enable effective and productive communication, both between learners and between teachers and learners, it is of vital importance to identify all the difficulties and obstacles which may arise during the communication process. Considering this, the purpose of this study is to find out how teachers and learners perceive communicational barriers in online education, with regard to the implication of the three commonly known learning theory approaches - behaviorism, cognitivism and constructivism. To identify which communicational barriers exist in online education, a survey for online learners has been conducted at the University of Celal Bayar, one of the Universities in Turkey where the use of online education technologies for teaching and learning is relatively high. In order to find out teachers’ perceptions of online teaching and its communicational barriers, interviews were conducted with teachers from the same University.

Introduction
Nowadays, communication and technology play a significant role in everyday life, particularly in the way we educate our students. In Turkey the number of online courses and programs at institutions for higher education is rising rapidly. Interactive and multimedia systems offer online education a new culture of teaching and learning. Online education provides new opportunities and many advantages, especially in the organization of the learning process. Learners are able to learn almost entirely independently, as they can access all learning materials at any time and from anywhere in the world. They can also determine their rate of learning progress and the learning extent themselves. For this reason, online education is gaining in importance, in particular as a form of virtual classroom, supported by online learning methods, features and tools. Learners who want to acquire knowledge are easily reached and motivated through the provision of lecture accompanying learning materials. Regarding the continuing technological advancement within the private and academic environment, traditional teaching methods require an extension through online education to satisfy new expectations and requirements for teaching and learning. Whilst acknowledging this, we should consider that using technology in education may create some new communication barriers for teachers and learners.

Teaching And Learning With New Media
New media provides new learning opportunities that expand the learning environment and learning space to an extent that would have been difficult to imagine in former times. Learners are able to design their own learning processes; they can search online for all the
information that is relevant to them. Furthermore, they have the opportunity to talk online with their teachers, tutors and other learners, about their progress, questions and results (Zürcher, 2007, p. 76). Learning is no longer considered a collection of facts. It is a process, in which learners become aware of their personal knowledge - generated by a variety of inputs - and acquire new knowledge, which they exchange with other learners.

**Online Teaching and Learning**

The term ‘online teaching and learning’ has not yet been clearly defined. There is a common consensus that online teaching and learning, in principle, can be described as a form of teaching and learning, which is supported by information and communication technology (Bärwald, 2009, p. 105). In literature, online teaching and learning generally refer to: web-based training, e-Learning, Internet-based learning, web-based instruction, cyber learning, virtual learning, net-based learning etc. (Apostolopoulos, Hoffmann et al., 2009; Urdan & Weggen, 2000). Online teaching and learning is a subtype of distance education and contains huge opportunities with technology applications and learning processes including computer-based learning, web-based learning, virtual classrooms and online collaborations (Urdan & Weggen, 2000).

Online education can also be described as a 'new culture of learning and teaching' which supports the learning processes of the learner through the use of digital technologies. The characteristics of online teaching and learning are the interactive and multimedia design of learning contents, the implementation of the learning process over digital networks such as the Internet, and the network-based communication between the teachers and the learners. To make online education possible, several subsystems, including the learners, teachers, tutors, authoring tools, learning platforms and contents as well as the learning environments must interact effectively (Wache, 2003, pp. 1-3).

**New Forms of Teaching and Learning in Response to Changing Environmental Conditions**

The Internet acts as a channel that provides a wealth of information and knowledge to learners. The large quantity of data and information available, necessitates skills that teachers and learners must acquire, in order to deal sensibly and efficiently with it. Consequently, it is of great importance that learning is structured and organized differently, because without a restructuring of the learning processes, learners become overwhelmed; they don’t know how to deal with the extensive amount of information. The information will be useless if learners do not know what information they can use - which is significant and which can be discarded - for their learning processes. In this context, media literacy on the one hand, and the competence to judge, are essential skills. They are especially necessary for the learners, because the teachers are no longer mediators of knowledge but 'companions and moderators of learning processes', who do not lead the learner as they did in traditional methods of teaching. From a technical point of view, online learning is connected to devices, which learners and teachers have to deal with. These are primarily computer and multimedia devices (Ehlers, 2004, pp. 20-36).

There are various forms of online teaching and learning, but most are asynchronous; learners are able to access available learning materials on the Internet at any time and anywhere they want. Because of this, learners can plan their time frame by themselves and are not tied to specific times, as in traditional teaching and training programs. However, this means that
learners have to have a high degree of self-discipline and self-learning competence (Ehlers, 2004, p. 37). It can be noted that in technical terms online education enables ‘new forms of learning’, which can be considered as a response to the changing environmental conditions. These new environmental conditions are created by the Internet and the wealth of available information, data and knowledge and are accompanied by increasingly rapid technological developments.

**Teaching Approaches - Characteristics and Development of Knowledge**

For a long time traditional teaching approaches prevailed at Universities, in which knowledge was conveyed with only a little media integration. The classes consisted usually of the lecture by the teachers and the listening of the learners. With the use of media for classes this has now changed and there are different approaches to knowledge transfer. The method of knowledge transfer is referred to as the ‘teaching method’ and can be divided into three different approaches: the presenting, compiling and explorating (see table 1). In practice, teaching approaches are generally combined (Einsiedler, 1981; Gruehn, 2000; Steindorf, 2000).

<table>
<thead>
<tr>
<th>The teaching process is <strong>presenting.</strong></th>
<th>The teaching process is <strong>compiling.</strong></th>
<th>The teaching process is <strong>explorating.</strong></th>
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<tr>
<td>The role of teacher is …</td>
<td>leading and to pretending to do something.</td>
<td>evolving and instructing.</td>
</tr>
<tr>
<td>The role of the learner is …</td>
<td>receptive and retracing.</td>
<td>to work under the instructions of the teacher and is collaborative.</td>
</tr>
<tr>
<td>The learning contents are worked on by the …</td>
<td>teachers.</td>
<td>learners under the instructions of the teachers.</td>
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<td>The learning materials are …</td>
<td>provided for the learners to work on together.</td>
<td>provided.</td>
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Table 1: Characteristics of teaching processes (Einsiedler, 1981; Gruehn, 2000; Steindorf, 2000).

**Learning Approaches and Their Importance for Media use in Teaching**

Generally learning is the appropriation of knowledge and skills or the process of committing something to memory. Thus, learning can be defined as a complex progress of information processing, in which information is converted at the levels of ‘understanding’, ‘memorizing’ and ‘automating’ into meaningful and available knowledge and skills (Rumelhart & Norman, 1978). This also includes the process to gain -through experience, practice, study etc. - attitudes and behaviors that are determined by consciousness and awareness. Hence learning
is only possible through the active participation of the learners. Learning is influenced by various factors, which initiate the learning process and have an effect upon it. Learning processes themselves are not directly observable, but are inferred from the permanent change of the behavior of the learners. The attempt to systematize the knowledge of learning, which refers to learning conditions and learning outcomes as well as to their cohesion, is the main subject of learning theories (Gudjons, 2008, p. 213).

**Behaviorism Theory of Learning – Learning by Reinforcements**

The word ‘behaviorism’ derives from the American word 'behavior'. The theory determines an understanding of learning, in which the creation of a particular situation evokes specified predicted or desired behaviors by the learners. Behaviorism considers behavior and knowledge to be the result of reinforcing or punishing factors. The brain is regarded as an organ which reacts to stimuli with predetermined behaviors and patterns. The aim is an objective description of the measurable and observable reactions of the learners. Mental processes and consciousness are excluded. Ideas, emotions and inner experience are also not taken into account. The teachers are instructors who communicate the specified learning material, in an intentional and efficient way, and in an predefined time period, regardless of the previous knowledge of the learners. The transfer of factual knowledge is also in the foreground (Anderson & Bower, 1974, pp. 28-30; Zimbardo, 1992, pp. 229-230).

Watson (1913) and Skinner (1974), the two major representatives of behaviorism, analyzed how learning is affected and influenced by environmental changes. Generally, behaviorists are of the opinion that “only observable, measurable, outward behavior is worthy of scientific inquiry” (Bush, 2006, p. 14). They focus on learning as influenced by changes in behavior. Thus, behaviorism proposes an objective perspective of the observable reactions of the learners, and emphasizes the control of behavior caused by external stimuli and reinforcements. With the use of media for lectures, the defined learning objectives should be achieved. The use of computers is justified by the fact that certain information and cue stimuli are presented, which create and induce the desired learning behavior. If this behavior can be observed, it should be followed by feedback to reinforce it. But based on the learning theory of behaviorism, the use of digital media as a teaching tool is not justified through this theoretical position. Through the use of new media, in particular through the use of the Internet, defined learning objectives can be inadequately achieved because online research by a learner on the Internet will differ from the other learners and therefore will trigger different learning processes. Furthermore a digital learning environment makes it difficult for teachers to evolve a deep relationship with the learners as in traditional face-to-face classrooms. Having said this, there are new technologies that offer possibilities for synchronous communication, to give feedback and to reward the learners in real time. In online education, behaviorism is especially applicable when using educational software, such as drill and practice tutorials, to reward the learners “through an encouraging comment before moving on to the next learning objective” (Shield, 2000, p. 1).

**Cognitivist Theory of Learning - Learning by Insights**

In contrast to behaviorism, cognitivism is concerned with processes inside the learner. Generally speaking, cognitivism can be defined as follows: the processes by which an organism acquires knowledge of his environment, including perception, imagination, thinking, judgment or language. Knowledge is acquired through cognition (Edelmann, 2000, p. 114). An essential basis for the cognitivism theory is the assumption that learners are not
impartial individuals, when faced with the learning situation. The pre-existing knowledge of learners is important for information processing, because any new knowledge is combined with the existing knowledge of the learners. Therefore, learning is determined through the personal aims, individual attitudes and prior knowledge of the learners. New knowledge arises from the synthesis of perception and existing knowledge structures (Edelmann, 1986, pp. 213-215; Fatke, 1991, pp. 299-301).

Thus, in cognitivism the learner is no longer considered as a passive recipient. Learning is a more active process, in which the learners receive information to adapt into their existing knowledge structure. The learners are not influenced by external stimuli but treat external stimuli actively and independently (Tulodziecki, 1996, p. 43). So the learner is like an acting, interactive recipient of mediated learning opportunities. Furthermore, cognitivism presumes that learners select incoming information, organize it as coherent mental representations and integrate it into existing representations (Mayer, 2001, p. 44-45).

Therefore, multimedia presentations are particularly suitable for the transfer of knowledge. It can be taken for granted that the spoken word and appropriate visualizations are conducive to the learning process.

Constructivist Theory of Learning - Learning Through Personal Findings, Experiences and Interpretations

In constructivism it is assumed that reality is not an objective truth, but that learners construct their own subjective reality. The results of this learning process are a reality that can be considered as a subjective construct of learners (Merten & Schmidt, 1994, pp. 309-310, Coenen, 2001, p. 35; Schellmann et al., 2002, p. 32). In contrast to the transition from behaviorist to cognitivist approaches, the main focus of constructivism is not the subject matter, but rather the learners and their ways of actively dealing with information. So learning is considered as an active and constructive process that is always contextual and situational. As a result, sluggish and structured knowledge is prevented (Duffy & Jonassen, 1992, pp. 2-5).

Learning is no longer restricted to the pure reproduction of factual knowledge. It is expected of learners, that they are able to utilize what they have learnt in a flexible way. While doing this, learners determine for themselves what and how they learn, in the context of their own learning experiences. The knowledge is not easily transported, but rather individually constructed and considered as open, diverse and dependent on individual and social contexts (Gruber et al., 1995, p. 168). Constructivist teaching approaches aim to make possible active, self-directed and relevant self-motivated learning. In addition, the structure of various combinations and processes of understanding is supported. The learners as active learners develop, independently from the content and the presentation of the information, their own model of knowledge (Arzberger & Brehm, 1994, p. 33).

Hence, constructivism concentrates not on teaching, but on learning within specific learning environments. The everyday knowledge, the preferred learning strategies and the individual knowledge of learners are the main point of learning theory analysis. Educational constructivism strategies for traditional classrooms are, for example, projects where the learners work on their own to discover themselves, or group projects which allow collaboration with other learners through interaction. “Cooperative learning, hands-on activities, discovery learning, differentiated instruction, technology, distributed practice,
critical thinking, and manipulatives are elements that embrace the constructivist educational philosophy” (White-Clark et al., 2008, p. 41). Regarding this, the constructivist theory of learning in online education makes discovery learning and critical thinking exercises, through synchronous communication and collaboration, an immense learning experience for learners.

Barriers to Online Teaching and Learning
The literature is full of discussion regarding different types of barriers to online education, which can be categorized in various ways (Berge, 1998, Berge & Mrozowski, 1999, Pajo & Wallace, 2001, Barrett, 2002, Meyen & Yang, 2003, İşman & Dabaj, 2004). Communication obstacles can arise during the whole online education process, including in the design of the course, the development of course materials, organizing online collaborative working situations etc. For this study, the following types of barriers, which directly or indirectly affect communication, are seen as significant: technical, physical, cultural, emotional, gender and personal barriers. But firstly, to use new technologies for online teaching and learning, the necessary technical equipment must be provided. Adequate hardware and software as well as Internet connection are of great importance to prevent technical barriers. Furthermore, the lack of technical expertise among the teachers and the learners has to be addressed (Nkonge & Gueldenzoph, 2006).

Other issues with online education are a lack of access to teachers, and the time needed for learning online. Online courses provide a more comfortable teaching and learning environment but learners are more likely to be disturbed by noise and by others. Also, cultural barriers may be expressed in ethnicity, religion etc. This also refers to the variations in language for teaching or learning, accent, the use of different dialect, slang, jargon, colloquialism, acronyms and abbreviations. Furthermore, with a change from face-to-face communication to online communication, emotional barriers can be observed. This change in environmental conditions can result in an absence of emotional connection between teachers and learners, which can lead to feelings of isolation, fear and mistrust. Another significant challenge in online education can be defined as a gender barrier, which relates to a difference in the usage of technology between female and male teachers and learners. Additionally, personal feelings can be defined as barriers that influence the communication in online courses.

Research Methods and Results
In this study, one hundred students from the University of Celal Bayar, Manisa, Turkey were interviewed using (http://www.surveey.com/). The students are from the first and second grade of different departments. The students were chosen randomly and signed the consent form before answering the questions. The majority of the students (86%) were aged between 18 - 25. The gender ratio of the students was almost equal. The students involved in the survey are from different regions of Turkey. 70% of students do not work where as 23% of students work either full-time or part-time. Regarding the teachers, semi- structured interviews were conducted with five female and five male teachers.

How Often Students use Internet Applications and Media Tools
20% of the learners use e-mail ‘very often’, and the majority of students use e-mail ‘fairly often’. One in three learners uses e-mail ‘rarely’. A surprising find is that 7% of the students have never used e-mail in their entire lives. One in three students uses web search engines very often. All learners have used a search engine at some point in their lives. Almost all of
the learners (99%) use social networking services and video-sharing websites such as Facebook, Twitter and YouTube. Half of the learners state that they employ these media tools ‘very often’. One in three learners visits online discussion groups ‘fairly often’. One in ten learners never uses this kind of online media tool. There is an interesting point regarding this question; 23% of the learners say that they never use instant messaging sites such as ICQ, Skype, etc., and half of the students state they are not interested in these sites. The majority of learners (75%) often use websites with download contents, for instance, YouTube, Instagram, Academia, and Google Scholar. One in three students declared that he or she never uses online-games websites. Having said that, two in three students do use online games. Half of the students do not use online banking. Only 6% say that they use online banking ‘very often’. One in three learners never uses online shopping websites. Half of the learners use some kind of online shopping site. One in ten says that they do online shopping very often.

When asked if learners can overcome computer related technical problems on their own, half of the learners say ‘yes’ to this question, the other half says ‘no’. Since learners are chosen randomly, regardless of their educational departments, it is assumed that those who answered positively are likely to be from the computer programming department. This could be established with further research. The majority of learners are capable of dealing with technical issues such as software problems, computer formatting and hardware problems. The learners from the computer programming department, claim that they manage to solve almost all their computer related problems.

In Turkey, online teaching and learning methods are both synchronous and asynchronous; both methods are used whenever online education is part of the higher education system (Yeniad, 2006, p. 74). One in three of the students finds the online teaching materials provided by their teachers satisfactory. More than two-thirds (74%) of learners are following every online class until it finishes.

According to learners, a teacher should be the one; (i) who can make a difference and has the ability to teach the lesson in the first place; (ii) whose capability can attract learners to the classes and who can make useful suggestions to the students (chosen as a second option); (iii) who is a leader (chosen as a third option).

According to learners, in order of importance, a learner should be the one, firstly (i) who can work as a collaborator with teachers’ teaching methods; (ii) who has the ability to learn when taught and to make necessary research whenever needed; (iii) who is an independent person and thinks all the time about the subject s/he is learning.

Two-thirds of learners agree that teachers and learners should work together and have equal involvement in the context of lectures and, teachers should make teaching materials available for use in the teaching session.

When asked about the form lectures should take, learners’ answers are as follows; the majority of learners (89%) believe that lectures should be made as interactive as possible, and that teachers should provide the teaching material actively during the class session. More than two-thirds (73%) of learners want the teacher to give homework, which learners can work through with their friends during online class sessions. Almost all learners (98%) agree that
teachers should employ different teaching methods, using different teaching materials, during online class sessions.

Two-thirds (70%) of learners prefer a traditional in-class teaching environment, where the teacher and other fellow learners are present. More than half (52%) of the learners say that they would much rather do the classes face-to-face than online. Learners tend to listen more attentively to the teacher in a traditional class environment with their friends.

Difficulties and Barriers Encountered by Learners
The difficulties and barriers determined are mostly technical, cultural, background and communication related. Two-thirds (68%) of learners agree that technical barriers are the most common barriers among all the other possible barriers. The majority of the learners surveyed believe that they do not have sufficient computer skills (60%), Internet connection (about 66%), knowledge to deal with hardware problems, or the time required to get used to the online learning system (about 80%). They feel they may get panicked if something goes wrong during a lecture and they cannot get assistance to solve it (64%). Also, they are also influenced negatively by noise from others. Furthermore, they may not follow the lectures completely and could miss subjects, since there is no control over the pace of lecturing.

There are also cultural problems imposed by the society in which they live that influence how they use the Internet (cultural barriers: approximately 60%). Half of the learners believe that male learners are superior to females in the use of technology and that female learners encounter problems in communicating with male classmates. In addition, they feel concerned that their privacy is invaded somehow during on-line education (50%).

74% of learners would prefer conventional classes and would like to be able to make eye contact with the teacher and classmates (about 66%), being uncomfortable with the non-verbal communication. It is believed that online learning does not take individual requirements into account (50%). Either they do not understand the shorthand writing used by teachers or classmates from time to time (more than 50%), or they have difficulties in understanding either teachers or other learners, owing to local dialects or the way they speak (about 60%). Sometimes they do not have courage to ask questions (54%).

Difficulties and Barriers Encountered by Teachers
After having interviewed ten teachers on a face-to-face basis, problems similar to those experienced by the learners (technical, cultural, communicative) were determined. The problems experienced by the teachers during online learning could be summarized as follows.

Lack of Internet, computer, headphones and microphones as well as their compatibility with the whole system are the primary problems faced by the teachers. For example, one teacher shared this experience: “the apps worked smoothly in the previous lecture but failed to work in the next one due to updating problems”. Having special cameras and microphones are indispensable to prevent background noise from hindering communication. It is also apparent that there is a need for a quiet environment, isolated from outside noise. Not only outside noise but also noise in the room such as a ticking clock can be a problem.

Secondly, use of time seems to be another irritating problem. The time it takes to upload videos or slides, especially when it is done via the Internet is one problem. Answering each
learner’s e-mail also consumes considerable time. And occasionally, either learners or their friends interrupt an on-going lecture, even though there is a notice outside indicating the class is in progress. Teachers feel awkward as they cannot build a thorough communication with the learners and cannot adjust the pace of the lecture to the learners’ needs, due to the lack of feedback from learners. While the teacher is reading one message they may miss one from another learner.

The third main area of problems is that of learner related problems. Teachers often complain about learners neglecting to check their emails related to classes, which causes poor learning, lecturing and teaching. Most of the time there are only 7-10 learners present out of 40 students attending the class. Since there is no ‘outside and auto’ control system learners mostly engage with other things which they may find more entertaining. Being in front of a screen, learners feel like watching TV and easily get bored of the lecture. Although each learner has a camera and a microphone, most do not participate in the lecture. In most cases, learners try to express their problems by writing. However this is insufficient most of the time. They usually try to send short messages and shorten or mistype words, which causes misunderstandings. Some learners do not have an efficient Internet connection so they cannot benefit from the lecture as expected. While teaching online, teachers often miss the written messages because they are looking into the camera. Learners cannot express themselves properly. Another disadvantage of this type of teaching is that learners cannot adopt the teacher as their role-model since they see each other so rarely.

Additionally, it is difficult for teachers to determine whether a subject is understood by the learners or not, because their gestures cannot be observed as well as they can be in a conventional class environment. While in a conventional class environment, students are more active and their questions are more sincere, compared to online learning. Learners cannot function properly for some subjects requiring oral input. Learners may not participate actively during the majority of e-lecture sessions because they are busy with other things. In some lectures, such as 'introduction to communication', which requires intense participation by learners, this may not happen during online lecturing. Teachers and learners often have the chance to communicate informally outside scheduled classes during traditional learning. However, this cannot be the case for online learning. Teachers also have the opportunity to observe and praise learners in traditional classes. During a traditional learning session, teachers and learners can get together in different environments at the university, such as in a café, canteen, or garden. In this situation, learners can socialize with both their teachers and their friends, whereas online education cannot provide such an opportunity.

**Conclusion**

The tremendous growth of online education has changed the traditional learning environment to learning in cyberspace. This environmental reversal has provoked psychologists, educators and also computer scientists to analyze the learners’ learning progress with new media. The main aim of this research is to find out communication barriers in online teaching and online learning with new media, considering teaching and learning theory approaches. To summarize, it can be said that the implication of technology in online education has postponed the theoretical balance from the learning theory of behaviorism and cognitivism, to constructivism. This is due to the fact that the use of educational technologies is increasing very rapidly and the gap between face-to-face communication and online education can be bridged through the use of new technologies. Even so, the results of this study suggest that
due to the social nature of human beings and the traditional educational background of the learners, the traditional in-class teaching environment is preferred by learners. In this environment, teachers and other fellow learners are present and face-to-face interaction can take place. It was found that both teachers and learners appear to be in need of observing the other side’s gestures and behavior. In addition, technical and cultural barriers seem likely to remain problematic, for both teachers and learners. This situation is likely to change, as barriers are eliminated and both sides become more familiar with the system. Therefore further research will be needed to monitor and to improve the whole system in the future.

References


