

## A Review on Individual Differences Focusing on Learning and Learning Speed in Open and Distance Education

Emin Özen<sup>1</sup>

Anadolu University, Eskişehir  
Turkey

Civan Güran<sup>2</sup>

Nezihe Derya Baltalı Bilim ve Sanat  
Merkezi, Denizli, Türkiye

### Abstract


With the developments in information and communication technologies, it is seen that the interest in open and distance education continues to increase. Although the recent covid-19 pandemic and natural disasters have made the demand for this education model essential, the importance in this field has increased even more with the developments in technology. In addition, changes in the educational paradigm show signs of a transition from teaching-centered approaches to student-centered approaches. In this period, students' lifelong learning process and individual differences play a critical role in the creation of open and distance education environments. This study addresses the important focus of learning processes and individual differences in the field of open and distance education. In this context, learners' learning speed constitutes an important aspect of individual differences in open and distance education. By focusing on the importance of this issue, this study emphasizes that these individual differences of learners should be considered in the planning of learning processes in open and distance education. As a result, this review draws attention to the importance of learning speeds among individuals for the effective design of learning processes in open and distance education.


**Keywords:** Open and Distance Education, Individual Differences, Learning Speed, Differentiation, Learning Environments

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<sup>1</sup>  Corresponding Author: Dr., Anadolu University, Department of Distance Education, Eskişehir, Turkey. [eminozen@anadolu.edu.tr](mailto:eminozen@anadolu.edu.tr)

<sup>2</sup>  Nezihe Derya Baltalı Science and Art Center, Ministry of Education, Denizli, Turkey. [civanguran@live.com](mailto:civanguran@live.com)

The first quarter of the 21st century brings with it many disruptive innovations and new lifestyles. It can be stated that with the developments in information and communication technologies, innovations in many areas of our lives have gained momentum and new opportunities have emerged, especially regarding how we learn, how we teach and how we access information. It is observed that disruptive changes in education are transforming the way education is given and received by affecting learners, teachers, and administrators alike, and in the light of these developments, there is an increase in open and distance learning environments and many differently structured learning environments are offered to the users' choice. In this context, in the 2020s, especially with the Covid-19 pandemic period, the number of institutions providing open and distance education is increasing, and in parallel, there is a significant increase in the number of teachers and learners in the relevant environments (Dhawan, 2020).

Additionally, there is a paradigm shift in education from teacher-centered learning approach to learner-centered learning approach. Learners learn information not as it is presented to them, but by structuring it in the context of their individual differences (Perkins, 1999). Individual differences of learners are becoming one of the main factors that must be considered in the creation of open and distance learning environments, contents and learning processes. In addition, with the spread of open and distance education in recent years, it is seen that the speed of learning has become a critical factor in this process. In this context, learning speed, which is one of the individual differences of open and distance learners, becomes an important issue.

Learning speed is the time taken to process and use information and the speed of perception of all kinds of external stimuli and information (Beledioğlu, 2012). The different learning speeds of students should be considered in the design of educational materials and methods. The aim of this study is to emphasize the necessity of considering the individual differences of students to effectively plan learning processes in open and distance education. Taking these differences between individuals into account is a fundamental step to achieve more effective and inclusive results in education. This review aims to shed light on the future development of open and distance learning and offer new perspectives for research in this field.

In this study, open and distance learning, individual factors affecting learning, learning speed, open and distance learning environments, differentiation in open and distance learning are discussed. Additionally, learning in open and distance education is evaluated in the context of individual differences and learning speed, and some suggestions are offered.

### **Learning in Open and Distance Education**

The phenomenon of learning is defined in different ways by many theorists, researchers and educators. Although there is no agreement on a single definition, many definitions contain common elements. Accordingly, learning; It can be defined as a permanent change in behavior or the ability to behave in a certain way, based on a few internal or external processes.

According to behaviorists, learning can be described as reactions to stimuli. Behaviorists claim that definitions of learning do not need to include internal events such as thoughts, beliefs, and feelings, and that the causes of learning are observable environmental

events. In the behaviorist approach, less importance is given to the differences of learners than in the cognitivist approach. What is important for behaviorists is how much students have been reinforced in the past to perform the same or similar behavior and the developmental state of the learner (Schunk, 2009).

According to the cognitive approach, learning is internal mental concepts that can be inferred from what learners say and do (Schunk, 2009). Rather than behavioral reactions, what the student knows and how he acquired the knowledge is important. Learning occurs after a few mental processes in the individual because of the individual's effort to understand what is happening around him (Özer, 2003).

The cognitive approach recognizes the impact of environmental conditions on learning. On the other hand, it emphasizes that learners' thoughts, beliefs, attitudes, and values also affect their learning (Schunk, 2009). Memory is very important in this approach. For cognitivists, learning is equivalent to encoding or storing information in a meaningful form in memory. Information is retrieved from memory as a response to relevant cues that activate appropriate memory structures (Schunk, 2009).

According to the constructivist approach, which is based on cognitive theories, learning develops because of making connections between previous knowledge and newly acquired knowledge. The focus of learning is the process, not the product/result as in the behavioral approach (Şaşan, 2002). Learners learn information as they construct it, not as it is presented to them (Perkins, 1999).

There is no single truth underlying this approach. Learners produce meaningful and useful information for themselves by making connections between new information and previously acquired information. Since learners have an active role, learning environments should enable learners' active participation, questioning and research, and problem solving, rather than the transfer of knowledge (Demirel, 2009). During the teaching process, learners should be autonomous, question and take more responsibility. Therefore, constructivist learning environments should be organized in a way that allows individuals to interact more with their environment and have rich learning experiences (Brooks and Brooks, 1999).

In recent years, there has been a transition in higher education from an instructor-centered approach to a learner-centered approach based on constructivist understanding (Weimer 2002). The learner-centered approach is the most suitable approach for more autonomous and self-oriented learners, allowing them to learn what, when and how they will learn and to create their own learning experiences (Ahmed, 2013). In this context, it can be said that open and distance learning adopts a constructivist approach with a learner-centered application.

Open and distance learning is a learning process in which learners are distant from each other and learning resources in the context of time and/or space, and their interactions with each other and learning resources are carried out based on distance communication systems (Aydın, 2011). In the most general sense, it can be described as a system where the educator and the learner are in different places and learning and teaching activities take place at any time through information and communication technologies (Moore and Kearsley, 2011).



Eby (2013) defines open and distance learning environments as multicultural, democratic, interactive, flexible, open, and accessible and emphasizes that they contain very different approaches and policies from traditional face-to-face education activities in terms of design, theory, and practice. In open and distance learning, education; It is perceived as designing and carrying out learning activities in line with the individual's needs, expectations, and abilities. The responsibility for learning lies with the individual and the individual is at the center of learning (Eby, 2013).

### **Pedagogy, Andragogy and Heutagogy**

Pedagogy (child education) and andragogy (adult education) are approaches that address the learning processes of individuals according to childhood and adulthood (Figure 1). However, unlike heutagogy, pedagogy and andragogy, it is an approach that addresses the development of learning skills with a holistic approach, in other words, it emphasizes lifelong learning and the self-determination of the learner. At the core of this approach is a learner-centered understanding, in which the responsibility for the act of learning lies with the learner, rather than a teacher- or program-curriculum-centered approach. The basic thesis of heutagogy is that learners "know how to learn" (Bozkurt, 2015).

### **Figure 1**

*Progress From Pedagogy to Andragogy, from Andragogy to Heutagogy (Canning, 2010)*



### **Blended Learning**

In the international literature, "blended", "hybrid" or "mixed"; This learning environment, which is called "blended" or "mixed" learning in the Turkish literature; It can be defined as integrating face-to-face learning with electronic or distance learning, integrating different learning theories, methods and techniques, and supporting the learning process in the classroom with various online technologies (Brown, 2001; Mantyla, 2001; Driscoll, 2002; Singh, 2002; Young, 2002; Osguthorpe). and Graham, 2003).

In blended learning, the strengths of online education can be complemented by the strengths of face-to-face education. Therefore, the aim of blended learning approaches is to find the harmonious balance between online access to information and face-to-face interaction (Osguthorpe and Graham, 2003).

According to (Singh and Reed, 2001, p. 2), the main purpose of blended learning is; It is the achievement of the learning goals that need to be achieved by using the "right" personal learning approaches and the "right" learning technologies to transfer the "right" skills to the "right" person at the "right" time.

In this context, blended learning; It can be defined as the complementarity of distance and face-to-face learning environments. Thus, it is thought that the limitations in learning environments are reduced to a minimum.

### **Adaptive Learning**

Towards the 21st century, the concept of Information Society emerged with the developments in information and communication technologies and the increasing use of technology (Somyürek, 2009). As a result of the increase in information production and rapid change, it is seen that it causes many changes and transformations in the economic, social, political, cultural and educational fields (Aktan & Tunç, 1998).

In today's world where information changes rapidly, personalized information and systems that allow the transfer of this information are needed. According to Bloom (2000), personalization is defined as changing the functionality, interface, information content and distinctiveness of a system to increase its suitability for the individual's own structure (cited in Özarlan, 2014).

Customizable learning (Adaptive Learning); It is a learning experience prepared in accordance with the learner's interest, goal, readiness, experience, motivation, learning speed and learning style (Şahin & Kışla, 2013).

As an alternative to the "one size fits all" approach of traditional education, customizable learning environments offer an environment created in accordance with the learners' own pace and learning styles, at the place and time they want, considering their individual differences (Barbarosluoğlu, 2016).

Adaptive learning aims to offer learning experiences that take individual differences into account, avoiding the idea that a single model is suitable for everyone (Ercan & Orhan, 2016). In this context, both in-class and out-of-class activities can be used. Nowadays, with the convenience provided by information technologies, personalized learning environments can be provided more easily in open and distance learning systems.

### **Flipped Learning**

The flipped learning approach refers to a blended learning process that operates contrary to the traditional education approach that is instructor-centered and limited to four walls (Görü Doğan, 2015). Flipped Learning Network [FLN] (2014) defines flipped learning as the transformation into practice and internalization of learning in interactive learning environments where the teacher is the classroom guide, and the student is active.

Flipped learning consists of in-class learning activities and extracurricular learning activities. Interactive group and individual-based learning activities are carried out in the classroom. Learning outside the classroom takes place through computer-based individual learning activities (Bishop and Verleger, 2013). According to Stacy and David (2014), the key

to the effectiveness of flipped learning, that is, ensuring the permanence of learning, is that the student studies interactive subject learning activities outside the classroom in a qualified manner and with as many repetitions as possible (Torun & Dargut, 2015). In this context, to achieve success, it is necessary to plan and follow up not only in-class activities but also out-of-class activities accurately and effectively (Karadeniz, 2015).

The development of interactive learning environments makes the use of flipped classrooms easier and makes teachers and students prefer this approach. In other words, in the flipped learning approach, the teacher acts as a guide instead of being a direct educator in the classroom, using various technological tools, and provides students with the opportunity to learn individually or in groups, at more flexible times (Serçemeli, 2016). However, although this learning approach is widely used around the world, the opposite situation is experienced in Turkey.

### **Rapid E-Learning**

Rapid e-learning is essentially defined as the process of designing and developing online-based learning courses to make them more time and cost efficient (Virtual College, 2017). Until recently, rapid e-learning seems to have been used only to refer to the actual design of online courses. However, today it is also used to describe a learning method. For example, if a course can be completed in a shorter time than is typical for the subject in question, it can be considered a "rapid e-learning course". The term microlearning is sometimes used interchangeably with rapid e-learning.

Learners can benefit greatly from rapid e-learning, given that their learning is broken down into smaller units. This can enable them to get information quickly and even when they are on the move or at work, so they can still get the data they need to solve a problem or further their education.

Since learners need to learn in a short time with fast e-learning techniques, the key to a successful fast online training course is to engage the user. This is thought to increase the likelihood of acquiring knowledge and make the most of the experience.

### **Individualized Learning**

Individualized learning is prepared to meet the educational needs of individual students rather than a group or class. This program is implemented to prepare the necessary educational environment for the individual and to eliminate the problems that arise due to individual differences. Individualized learning can be applied to academic fields as well as social adaptation, vocational education, physical education and adaptive behavior skills (Fiscus and Mandell 1997, pp. 22-23).

Individualization of teaching is not enough just to take into account the differences between students. The aim of this method is to prepare a useful field of study for all classes in a school, to take students to the end of school life with continuous and adequate studies, in edifying ways, without tiring them, to help them reach the determined goals and to prepare them for life (Mory 1956, p. 2).



### **Individual Factors Affecting Open and Distance Learning**

It is known that achieving desired learning depends on various factors. It can be said that some of these factors are innate and unchangeable characteristics, while others are controllable and changeable environmental conditions. Therefore, factors affecting learning are discussed in three groups: learner, method and learning material (Bacanh, 2005).

In this context, individual factors affecting the pace of open and distance learning are focused on, and some of these factors are discussed in this section. These:

**Age:** In order for good learning to occur, the organism must have reached the required age to learn that behavior (Seven & Engin, 2008). In this context, individuals' learning speeds may vary depending on their age range.

**Interest:** Interest or curiosity is a motivational-emotional variable that affects people intending to new learning experiences and exhibiting exploratory behavior (Hidi, Renninger, & Krapp, 2004). Interest, as a positive emotion, directs individuals to explore and enables them to continue their efforts in this direction. Learners' interest in the subject or content they want to learn can affect their learning speed.

**Motivation:** It is defined as the force that activates the organism, and our needs constitute the source of motivation. (MEB, 2016). Learning speed may vary depending on the level of motivation of the learner.

**Attention:** It can be defined as the concentration of consciousness at a certain point (Seven and Engin, 2008). In order for learning to occur quickly, the learner must concentrate his attention on the content conveyed.

**Readiness:** The ability for a new behavioral change to occur in education depends on the student's readiness level. For this reason, the student must have the cognitive, affective and psychomotor behaviors that are the prerequisites for the new behavior he will acquire (Başar, 2001). In this context, it can be said that readiness covers all the characteristics that the individual already has in a new learning situation. In addition, the readiness level of the learner can affect the learning speed.

**Intelligence:** The concept of intelligence is generally discussed with the concept of mental maturity. Although there is no definition that everyone can agree on, intelligence can be defined as "the ability to adapt to new situations" (Seven and Engin, 2010). The ability to adapt to new situations can affect the speed of learning.

**Learning Speed:** Learning speed refers to the speed at which an individual learns new information or skills. That is, it indicates how much time a person spends in the process of grasping, understanding, and applying a particular topic. This speed is seen as an important factor affecting a person's progress and success in the learning process.

Learning speeds may vary between individuals. While some people can quickly grasp a particular subject, others can get to the same level with more repetition and practice. These differences are often based on factors such as cognitive abilities, experience level, learning styles and motivation.

## **Open and Distance Learning Environments**

In open and distance learning, communication and learning environments differ depending on the technologies used. Therefore, examining Open and distance learning in terms of the richness of communication environments becomes important in terms of being able to explain the journey of knowledge to potential distance learners and from learners to other learners and other learners through interactive communications (Yüzer, 2013).

In open and distance learning, more flexible opportunities can be offered in accordance with the philosophy of openness in order to meet the interests and needs of the learners according to their speed. There is free content that any learner can easily use. These are Open Educational Resources (OER) and Massive Open Online Courses (MOOC).

Open Educational Resources (OER); They are learning, teaching and research resources that are in the public domain or open to free use and reprocessing by others, published under any copyright agreement. Open Educational Resources: They include entire courses, course materials, modules, textbooks, videos, tests, software, and other tools, materials, or techniques used to access information (Atkins, Brown, & Hammond, 2007). For the first time in the world, the Massachusetts Institute of Technology (MIT) implemented the concept of Open Educational Resources (OER) by opening its courses to anyone who wanted them. A course offered by MIT with free and open educational resources designed to enable learners to learn on their own; includes lecture notes, problem sets, laboratory notes, course videos and applications (MIT-openCourseware).

Massive Open Online Courses (MOOCs) can also be described as an open educational resource. MOOCs are online courses that enable large-scale interactive participation through an approach that allows open access over the web. With this method, where the concept of openness is at the forefront, everyone who wishes can benefit from this opportunity and learning occurs in accordance with their own learning speed, which has attracted attention towards OER and MOOCs.

Media technology preferences used to access educational content among learners may also differ. Smartphone, laptop, or desktop computer etc. used to access educational content. Preferences for technologies may vary depending on learning speed.

## **Differentiation in Open and Distance Learning Environments**

### ***Differentiation***

Differentiation: It can be expressed as making differences in content, process and product according to students' readiness, interests and learning styles. In short, it can be said to provide a learning environment according to the ability levels and speed of the students .

The main reason behind the need for differentiation is that the number of learners participating in the open and distance learning process is increasing every year. The reason for this is that the number of learners who participate in these types of educational activities for reasons such as flexibility, convenience and cost is increasing day by day (Fuller, Kuhne and Frey, 2011).

Open and distance learning offer differences to learners in terms of time, space and communication tools used, in accordance with its purpose at the macro level. In this respect,



the information and communication technologies used in this learning system make differentiated instruction design easier. In this regard, content is presented to learners with different media tools (audio, image, picture, video, etc.) that will keep communication and interaction at a high level in line with the possibilities of developing and changing information and communication technologies. In addition, in the context of lifelong learning philosophy, it can be said that differentiation in teaching has become essential when the changing teaching needs, interests, ages, motivational reasons, social, cultural and academic situations and various disabilities of open and distance learners are taken into account (Ireh and Ibeneme, 2011; Uçar and Kumtepe, 2015; as cited in Uçar, 2017).

### ***Types of Differentiation in Open and Distance Learning***

Teaching in open and distance learning environments can be differentiated into five different types, considering the readiness, interests and learning profiles of the learners (Braidic, 2008; Scalise, 2007). These:

- Content differentiation: Learners can start and progress in the learning process at different levels and speeds.
- Process differentiation: Differentiation is made by taking into account the learners' learning style, intelligence type, demographic characteristics or cultural affiliations.
- Product differentiation: By giving different tasks to the learners at the beginning of the learning process, different outputs are obtained at the end.
- Attitude differentiation: Learners' attitude differences regarding learning before the course are considered. Different strategies are used for learners with different attitudes.
- Learning environment differentiation: Learners can be divided into a certain number of groups and teaching tools, technology used, learning environment or form (online/offline, synchronous/asynchronous) can be differentiated.

### ***Differentiation Strategies in Open and Distance Learning***

Five different differentiation strategies are recommended in open and distance learning environments. These strategies are stated as dispersed, self-directed, random, Boolean and model-based differentiation strategies (Scalise, 2007).

- Distributed differentiation: It is the use of the same content in different/multiple learning environments.
- Self-directed differentiation: Learners progress according to their own choices and desires. The learner is responsible for his own learning process.
- Random differentiation: Randomly assign different content, images, videos, etc. each time. Learning takes place through presentations.
- Boolean differentiation: Boolean logic is a rule-based approach that proceeds in a two-option (true/false) system. Learners reach conclusions through different processes.
- Model-based differentiation: Artificial neural networks are prepared with expert opinions based on data mining and big data knowledge.

### **Conclusion and Suggestions**

As in different contexts, open and distance learning have the capacity to provide different opportunities in terms of eliminating inequalities in the context of learning speed. With the open and distance learning system, educational content can be accessed by everyone, regardless of learning speed. In his related study, Ally (2008) stated that educational contents; Text, audio, video, etc., suitable for individual differences and supporting the achievement of expected learning outcomes. It concludes that it should be planned in a diverse structure that includes based materials. It is also mentioned in the relevant study that presenting different learning materials in learning environments allows learners to structure the learning environment according to their own pace. At this point, the issue that needs to be taken into consideration is the necessity of diversifying the training materials as much as possible. Because each learner's interest can focus on different types of materials (interactive lessons, summary contents, audio texts, lecture videos, etc.). It is thought that converting and presenting the same course content into different materials will eliminate the inequality arising from the learning speeds of the learners.

Learning speed, which is considered as an individual difference in open and distance learning, reveals that learners have different needs arising from their individual learning speeds. However, considering other individual differences of people, it is thought that the required design should be made completely personalized and adaptable. In addition, according to Özen (2021), when planning open and distance learning processes, considering the individual learning speeds of the learners.

- Educational environments that meet the expectations of the target audience and allow learners to participate effectively and take responsibility for learning.
- Learning platforms independent of time and place
- Diversified, differentiated contents
- It is recommended to design activities according to learning speeds.

As a result, this review shows that learning processes in open and distance education should be planned sensitively to inter-individual differences. This approach can guide the development of future educational practices, allowing for the creation of more effective and inclusive educational environments. Advances in this area have the potential to make learning processes more effective and efficient. In addition, considering the possibilities of technology in the current period, it is thought that open and distance learning is of vital importance in meeting the completely personalized needs of the learners.

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### **Authors Information**

**Emin Özen:** He completed his undergraduate education in 2008 at Osmangazi University, Faculty of Education, in the field of Mathematics Education (Primary Education), his master's degree in 2013 at Osmangazi University, Institute of Educational Sciences, in the field of Educational Management and Supervision, and his doctorate in 2022 at Anadolu University, Institute of Social Sciences, Distance Education. Özen, who has been working as a mathematics teacher, administrator and educator trainer in schools and institutions affiliated with the Ministry of National Education since 2008, currently continues to work as a Measurement and Evaluation Specialist in a unit affiliated with the Ministry of National Education. Dr. Özen has more than 40 studies of articles, full texts, summary papers, books and book chapters on topics such as mixed method research, scale development and adaptation, digital transformation in education, technological pedagogical content knowledge, attitudes and trends in distance education, quality in online distance education, learner support services. He is currently continuing his 2nd master's degree in mathematics education at Osmangazi University, Institute of Educational Sciences.

**Civan Güran:** She completed her undergraduate education at Çanakkale Onsekiz Mart University Faculty of Education/Department of Computer and Instructional Technologies in 2005, and since 2006, she has taught in the fields of Information Technologies, Robotics and Coding at three different Science and Art Education Centers affiliated with the Ministry of National Education. She has prepared students for the World Robot Olympics (WRO) and First Lego League (FLL) competitions. She received the "Master software developer award" in the First Lego League competition, in which he participated with the students she supervised. She took part as the manager of the "Integrative science and art education in Denizli" project carried out by Denizli Chamber of Commerce (DTO). He led the project called "If I Know Better", supported by the South Aegean Development Agency (GEKA). She currently works at Denizli Nezihe Derya Baltalı Science and Art Center.

### **Ethical Standards**

Since no studies were conducted with humans, no ethics committee permission was received.