The Exploration of Models Regarding E-learning Readiness: Reference Model Suggestions

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Abstract
Many studies have been conducted about readiness for e-learning, yet it is quite hard to decide which work of research from the literature to use in a specific context. Therefore, the aim of this study is to identify of which components models consist and for which stakeholders they were developed by investigating the most comprehensive and prevalent models in the related literature. Thus, the methods for both implementers and researchers were shown. A literature review was employed as the method of the present study. Thirty models or measurement tools were explored in the scope of the study. The findings of the study show that competency in technology usage, access to technology, content, culture, human resources, finance, management and leadership, self-directed learning, motivation, and time management components of models pertaining to readiness for e-learning became prominent. Further findings and implications are discussed in the main text of the study.

Keywords: E-learning, e-learning readiness, readiness, literature review

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Introduction

In 1932, Thorndike created the assumption that learning occurs in physical environments as he was developing the theory of readiness. Instructional programs and activities in physical classes were prepared based on this assumption. Nevertheless, today, physical classes with the rapid development of Information and Communication Technologies (ICT) have started to be transformed into virtual ones. Distance learning is one of the most important fruits of this transformation process. Beginning from the early 2000s, distance learning has gradually started to attract more attention and to be used due to the unique benefits it provides. Subsequently, the field of distance learning has expanded too much; thus, it has been classified into sub-components. Amongst these sub-components, e-learning is one of the most vital ones. The field of e-learning is more specific compared to distance learning, and it is widely accepted that e-learning entails the usage of electronic technologies in distance learning (Omoda-Onyait & Lubega, 2011).

Today, e-learning is intensely utilized by both private companies for in-service training and universities with the aim of instructing their students (Hung et all., 2010). Notwithstanding the intense efforts and investments of these organizations, plenty of e-learning initiatives end in failure or are not sufficiently successful. As it is well known, there have always been hindrances to transition processes from old to new. In the literature, several reasons are deemed relevant to this failure; however, readiness is one of the pioneering factors that has come into prominence (Piskurich, 2003).

In the field of e-learning, this special readiness status mentioned above is referred to as e-learning readiness. E-learning readiness is defined as an institution or individual's ability to benefit from the advantages of online learning (Lopes, 2007). Kaur and Abas (2004) define readiness for e-learning as the stakeholders' ability to utilize e-learning resources and multimedia technologies with a goal to promote the quality of learning. Finally, Choucri, Maugis, Madnick and Siegel (2003) define it as individuals' ability to make use of the opportunities facilitated by the advent of the Internet. In addition to the definition of the term, there is another issue that should be discussed. Some experts name the aforementioned construct as e-learning readiness, as it is so in two above mentioned studies; however, others refer to it as online learning readiness (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo and Marczynski, 2011; Hung et al., 2010). This distinction proceeds from the general distinction between e-learning and online learning, owing to the fact that the researchers of the present study are of the opinion that the previously mentioned distinction is theoretical rather than practical, and the terms were used interchangeably within the present study.

Institutions, e-learners, and e-teachers must be ready for e-learning before embarking on this journey (Akaslan & Law, 2011a; Moftakhari, 2013), inasmuch as Oliver (2001) indicated that e-learning readiness is one of the most significant factors to influence e-learning programs' successful outcomes. A substantial body of research was carried out, and a great many models were proposed pertaining to e-learning readiness in order to clarify the concept of being ready for e-learning (Eslaminejad, Masood & Ngah, 2010; Hung, Chou, Chen & Own, 2010; Mercado, 2008; Omoda-Onyait & Lubega, 2011).

With the gradually increasing importance of e-learning and the launch of several brand new e-learning programs, the question of whether or not teachers, students, and institutions that are the stakeholders of e-learning are ready for e-learning was brought up within the agenda. In order to answer this question, many models in Turkey and around the world have been developed especially during the last 15 years based on different point of views and components to comprehend the constructs of e-learning readiness and show a way for the implementers to engage in e-learning. Although there are some common points in these models, these points may not be understood by virtue of differences in both the naming and measurements of the constructs.

The current research aims to investigate the models pertaining to readiness for e-learning in terms of which stakeholders they were developed for and on which characteristics they mostly concentrated. By weighting the weaknesses and strengths of these models, the characteristics and the

components of a current and comprehensive model were indicated. Based on this investigation, the components and characteristics of a comprehensive and current e-learning readiness model were discussed; hence, three reference models that shed some light on subsequent e-learning readiness models and implementers of e-learning were suggested.

Models regarding e-learning readiness

In this part, models regarding students, teachers, and institutions' e-learning readiness are examined.

Models regarding students' e-learning readiness

In this part, models regarding students' e-learning readiness are examined.

Hung, Chou, Chen, and Own (2010)

This model was proposed by Hung et al. (2010) in order to measure university students' readiness for online learning (See Figure 1). Afterwards, the scale developed within the scope of this model was adapted to Turkish by Yurdugül and Alsancak-Sırakaya (2013).

As seen above, the model consists of five components: computer/Internet self-efficacy, motivation, online communication self-efficacy, learner control, and self-directed learning.
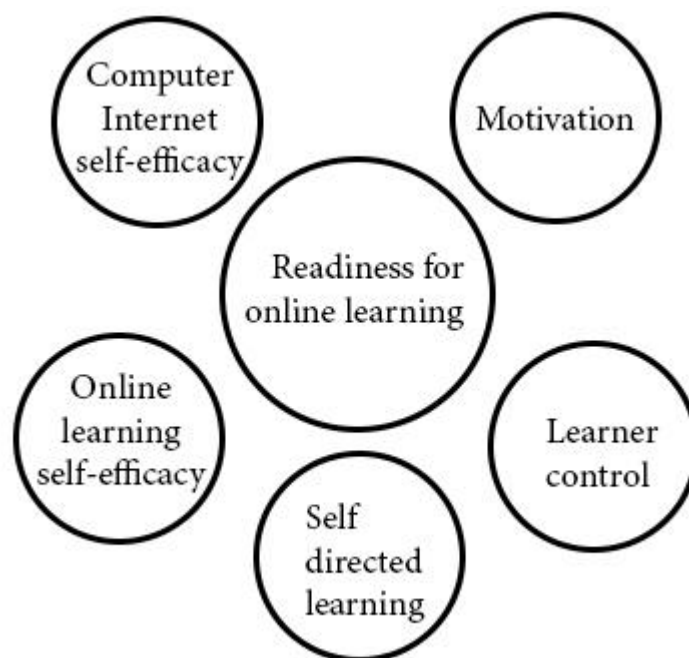
Figure 1: A model of students' online learning readiness (Hung et al., 2010)

Watkins, Leigh, and Triner (2004)

Watkins et al. (2004) developed a self-assessment tool and proved its validity for identifying students' readiness for e-learning. This scale consisted of six dimensions: access to technology, online skills and relationships, motivation, online audio/video, Internet discussion and importance to your success. New computers with an Internet connection and new and up-to-date software are included in access to technology. The dimension of online skills and relationships includes the ability to communicate in online learning environments, educational usage of online tools and basic Internet usage like sending an email and using search engines. Online audio/video comprises the acquisition of delivered information in case

of audio and video usage in education. Motivation refers to the ability to stick to a task notwithstanding the distracting elements in the environment. Online discussion measures debating easily in online learning environments. Finally, the importance of your success explains the relations of dimensions such as support, participation, and experience with success.

### Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, and Marczynski (2011)

This model was developed by Dray et al. (2011) and was based on the measurement tools of Bernard, Brauer, Abrami, and Surkes (2004) and McVay (2000) for identifying undergraduate and graduate students' readiness for online learning. In the model, readiness for online learning was determined to be learner characteristics and technology capabilities. The dimension of learner characteristics incorporates the sub-dimensions of belief in their ability to complete a college degree, beliefs about responsibility in problem solving, self-efficacy in writing and expression, orientation to time and time management, and behavior regulation for goal attainment. With regard to technology capabilities, it incorporates technology skills, material access to technology and the nature and frequency of technology use.

Smith (2005)

Smith, Murphy and Mahoney (2003) and Smith (2005) tested the scale developed by McVay (2000) in an attempt to assess university students' readiness for online learning. The original scale of McVay (2000) was comprised of two factors: comfort with e-learning and self-management or self-directed learning. Comfort with e-learning includes using electronic devices with ease. Self-directed learning includes determining one's own goals, self-evaluation, independent studying, and self-discipline. In the subsequent two studies, the item-factor structure of the scale was generally preserved.

Asaari, Hasmi, and Karia (2005)

Asari et al. (2005) proposed an e-learning readiness model concerning adult distance learning students (See Figure 2). As an underpinning framework, Davis's (1989) technology acceptance model (TAM) was adopted. According to this model, home computer and Internet connection have an impact on perceived ease of use and usefulness, which in turn have an impact on readiness for e-learning.
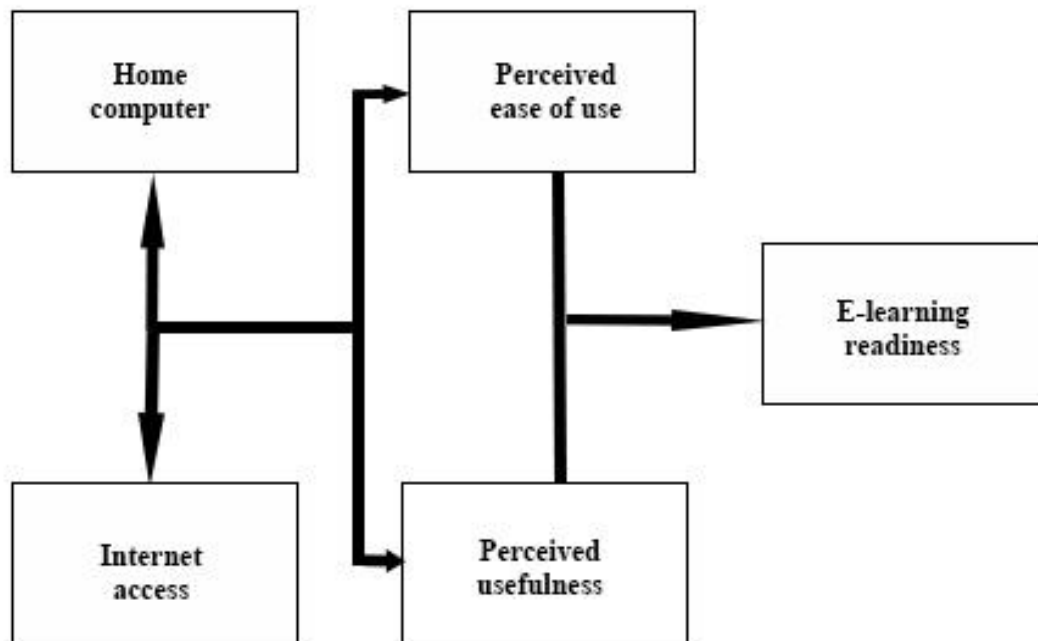
Figure 2: A model of students' e-learning readiness (Asari et al., 2005)

Tubaishat, and Lansari (2011)

Tubaishat and Lansari (2011) developed a scale to identify whether students in the gulf region are ready to adopt e-learning. This scale consisted of six dimensions: infrastructure, Internet use, students' computer skills, confidence development, preferred mode of communication, and students' perception of e-learning.

Valtonen, Kukkonen, Dillon, and Vaisanen (2009)

In Finland, Valtonen et al. (2009) studied secondary school students' readiness level to online learning from the point of belief about e-learning. They utilized the diffusion literature as they were developing this model. Valtonen et al. (2009) pointed out that readiness for online learning consists of two general dimensions: beliefs about learning online and ICT skills. The dimension of beliefs about learning online incorporates how students perceive e-learning, and it fits the way students are accustomed to study. The ICT skills dimension incorporates skills related to technology use. While the general dimension of beliefs about learning online consists of the sub-dimensions of self-efficacy online learning, online learning as an intentional activity, online learning as an isolated way to learn, online learning as a collaborative activity, and importance of online learning in itself, the general dimension of ICT skills consists of the sub-dimensions of basic and advanced tools.

Bernard, Brauer, Abrami, and Surkes (2004)

Bernard et al. (2004) developed a measurement tool, which also includes McVay's (2000) original items, to predict students' success in online learning. This measurement tool consists of four factors: general beliefs about DE, confidence in prerequisite skills, self-direction and initiative, and desire for interaction.

Oliver (2001)

Oliver (2001) asserted that it is essential for Higher Education Institutions (HEI) to identify their students' readiness status for online learning before embarking on e-learning. To do so, four dimensions must be reviewed. These dimensions are teaching skills, access to technology, technology literacy and self-regulated learning. The technology skills dimension incorporates basic computer skills and experience. Access to technology includes having the required technology and access to it. Technology literacy is a combination of social, cultural, and technical skills. Finally, yet importantly, self-regulated learning represents deep and student-centered learning.

Models regarding teachers' e-learning readiness

In this part, models regarding teachers' e-learning readiness are examined.

Guglielmino and Guglielmino (2003), and Eslaminejad, Masood and Ngah (2010)

Guglielmino and Guglielmino (2003) classified e-learning readiness into two dimensions: technical readiness and self-directed learning. Both components in themselves were further classified into knowledge, attitude, skill and habit. Eslaminejad et al. (2010) improved upon this model by also utilizing Sadık's (as cited in Eslaminejad et al., 2010) model and indicated that faculty members' e-learning readiness encompasses the pedagogical readiness dimension instead of the self-directed learning dimension.

Yun and Murad (2006b)

Yun and Murad (2006b) carried out a study that examines secondary school teachers' readiness for e-learning. Within the scope of this study, readiness for e-learning was classified into two components: psychological and technical skill readiness. Constructs such as attitude, confidence, and anxiety are included in the psychological constructs, while technical skill readiness includes competency in using a computer.

Al-Furaydi (2013)

Al-Furaydi (2013) developed a scale with the intention of determining middle school teachers' readiness for e-learning. This scale was established with the TAM. This measurement tool consists of two components: attitude towards e-learning and computer literacy. Attitude towards e-learning comprises the components of attitude toward using, intention to use, perceived ease of use and perceived usefulness of computers. Computer literacy comprises the components of office and computer-mediated communication and Internet and computer experiences.

Models regarding institutions' readiness for e-learning

In this part, models regarding institutions' readiness for e-learning are examined.

Omoda-Onyait, and Lubega (2011)

In this model, Omoda-Onyait and Lubega (2011) tried to determine the e-learning readiness of higher education institutions (HEIs). Omoda-Onyait and Lubega (2011) indicated that the models developed so far are for developed countries; hence, they proposed a model for emerging countries (See Figure 3).
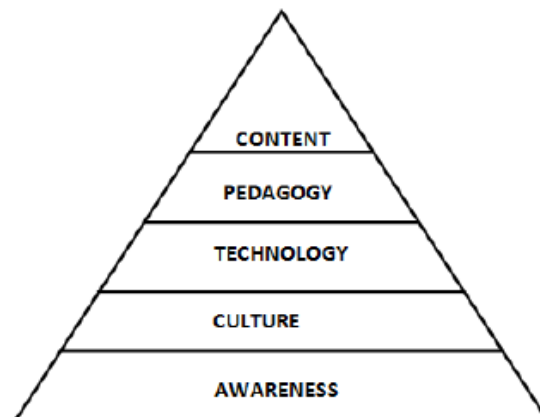
Figure 3: A model of institutions' e-learning readiness (Omoda-Onyait & Lubega, 2011)

The model above indicates that it is designed in the shape of a pyramid and consists of five components. The components of the pyramid are awareness, culture, technology, pedagogy, and content, from bottom to top. More important components are placed more toward the bottom of the pyramid.

Chapnick (2000)

Chapnick (2000) mentioned the significance of conducting a needs analysis in e-learning and, in this regard, proposed an e-learning readiness model. Chapnick (2000) pointed out three questions as listed below that should be answered in the proposed model. The prime purpose of this model is to facilitate the process of attaining the information required to answer these three questions:

1) Can we do this?

2) If we can do this, how are we going to do it?

3) What are the outcomes, and how do we measure them?

According to the model, readiness for e-learning consists of eight components: psychological, sociological, environmental, human resource, financial, technological skill, equipment skill, and content readiness. This model measures the readiness of non-educational institutions.

Aydın, and Taşçı (2005)

Aydın and Taşçı (2005) indicated that, until today, the measurement tools developed in an effort to measure readiness for e-learning were proposed in countries where there are mature developments of human resources. Thus, Aydın and Taşçı (2005) further indicated that a scale needs to be developed for countries where there are no mature developments of human resources, such as Turkey. Moreover, they developed a model to fill this gap (See Table 1). This scale aimed at measuring institutions' readiness for e-learning. At this point, institutions are also accepted as non-educational ones, which may possibly have goals to make a profit.

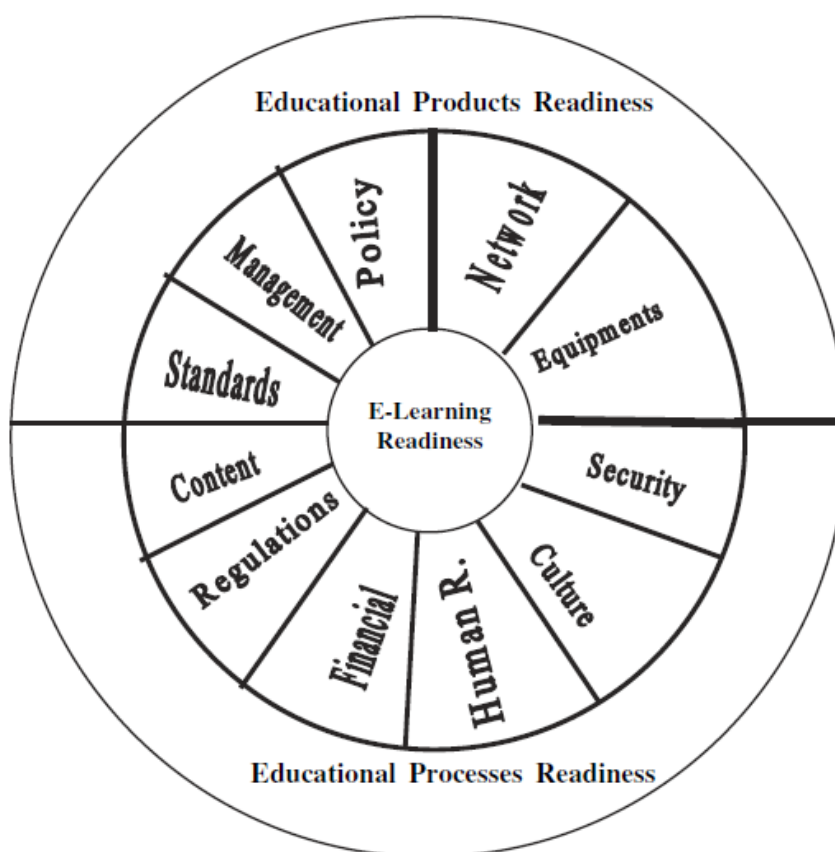**Table 1. A model of institutions' e-learning readiness (Aydın & Taşçı, 2005)**

Technology			Innovation			People			Self-development		
Res.	Skills	Attitudes	Res.	Skills	Attitudes	Res.	Skills	Attitudes	Res.	Skills	Attitudes

*Res.=Resources

A measurement tool was developed by taking Rogers' (2003) theory of diffusion of innovation into consideration, and it consists of technology, innovation, people, and self-development dimensions. Moreover, each dimension in itself consists of the sub-dimensions of resources, skills, and attitudes. In this regard, this measurement tool is akin to that of Guglielmino and Guglielmino (2003).

Darab, and Montazer (2011)

Darab and Montazer (2011) proposed a model within the context of Iranian universities in order to identify the e-learning readiness of HEIs (See Figure 4). The model is comprised of three core components: hard infrastructure, soft infrastructure, and coordination, supervision and support infrastructure. Hard infrastructure in itself includes equipment and networks. Soft infrastructure is composed of management, regulations, standards, financial, security, culture, content, human resources, and policy aspects. Finally, coordination, supervision, and support infrastructure comprises the dimensions of supervision, support, and assessment.
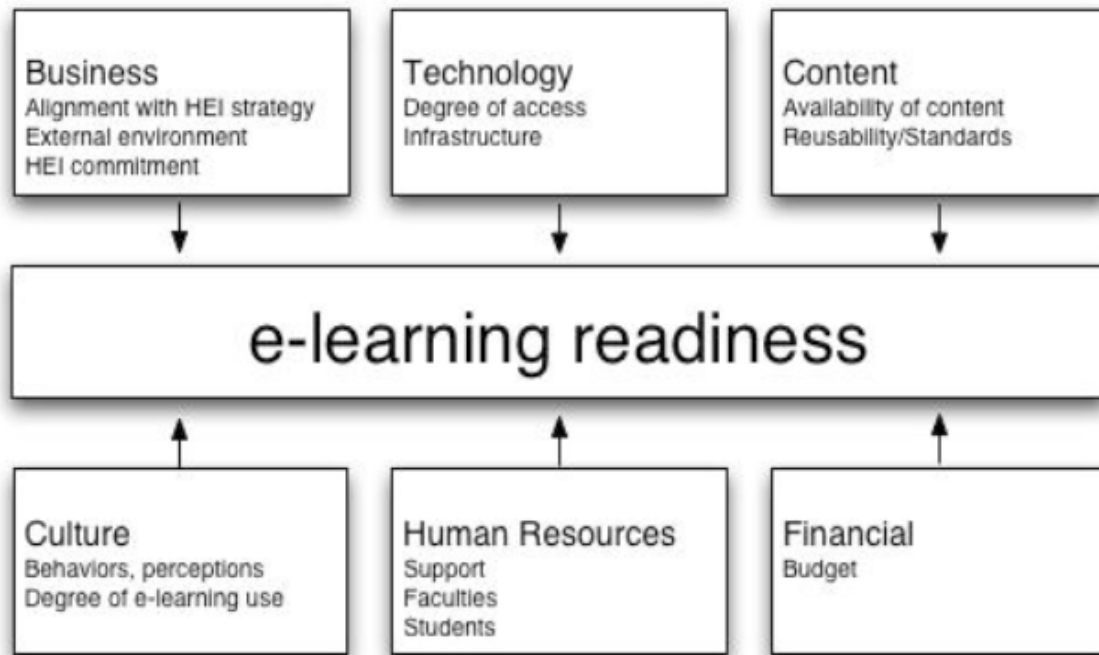

Figure 4: A model of institutions' e-learning readiness (Darab & Montazer, 2011)

Lopes (2007), and Borotis and Poulymenakou (2004)

Lopes (2007) indicated that the model of Borotis and Poulymenakou (2004) should be reviewed when it is applied in HEIs. Therefore, Lopes (2007) discarded the education process component from the model of Borotis and Poulymenakou (2004) and further indicated that the model consists of business, technology, content, culture, human resources, and financial components (See Figure 5).

Figure 5: A model of institutions' e-learning readiness (Lopes, 2007)

Azimi (2013)

Azimi (2013) carried out a descriptive study to identify university administrations' readiness for e-learning. In the aforementioned study, readiness for e-learning encompasses the dimensions of ICT infrastructure, human resources, budget and finance, psychology, and content.

Schreurs, Ehlers, and Sammour (2008)

Schreurs et al. (2008) developed a measurement tool in an attempt to identify Netherlands hospitals' readiness for e-learning. This measurement tool comprises four components: learner characteristics, organization and management of e-learning, availability of qualitative technological facilities for e-learning, and the e-learning process and solutions/courses dimensions. The dimension of learner characteristics includes characteristics such as motivation, Internet experience, and ICT skills. The dimension of organization and management of e-learning encompasses adjustment of work hours according to e-learning and investment in physical and e-learning infrastructure. The dimension of availability of qualitative technological facilities embraces Internet connection, ICT infrastructure, and the flexible learning management system. Lastly, the dimension of e-learning process and solutions/courses embraces the situations such as in-service training concerning the usage of e-learning systems and matching of courses with students' learning styles.

Psycharis (2005)

Psycharis (2005) explored the models concerning e-learning readiness and synthesized these models under three main components: resources, education, and environment. This model is related to education institutions' readiness for e-learning.

The resource component comprises three sub-components, which are technological readiness, economic readiness and readiness of human resources. The education component is constituted of educational readiness and readiness of content. Finally, environmental readiness comprises entrepreneurial readiness, readiness of culture and leadership.

So and Swatman (2006)

So and Swatman (2006) pointed out that the models pertaining to e-learning readiness proposed until now were primarily proposed for HEIs and with the intent to fill this gap in the literature. They proposed an e-learning readiness model pertaining to primary and secondary school institutions. According to the model, primary and secondary school institutions' readiness for e-learning encompasses six dimensions: students' preparedness, teachers' preparedness, IT infrastructure, management support, school culture, and preference to meet face to face.

Rosenberg (2000)

Rosenberg (2000) developed a measurement tool in order to identify institutions' readiness for e-learning. This measurement tool was developed for non-educational institutions that have intentions to make a profit. In this study, readiness to for e-learning was classified into seven components. These are your business readiness, the changing nature of learning and e-learning, value of instructional and informational design, change management, reinventing the training organization, the e-learning industry, and your personal commitment.

Multilayer models regarding e-learning readiness

In this part, models developed for e-learning readiness of more than one stakeholder are examined.

Mercado(2008)

Mercado (2008) developed measurement tools one by one for students, teachers, and institutions, who are the stakeholders of e-learning, after examining the related literature. According to Mercado (2008), the technology access component is essential for both students and teachers. It encompasses computers, Internet connection, and tool sub-components. Another component necessary in order to be ready for e-learning is technology skills. These skills include required competencies for both teachers and students. They include basic computer skills, basic Internet skills, and literacy in software application. As far as teachers are concerned, the sub-component of literacy on software application was altered as literacy regarding online tools and other productivity tools.

The other component in the model is students'/teachers' attitude and the characteristics of successful online teachers/students. Study habits, abilities, motivation, and time management constitute the above-mentioned component for students. With regard to teachers, the component of teaching styles and strategies substitutes for study habits.

The last stakeholder of the model developed by Mercado (2008) is the institution. Readiness of the institution consists of two components: administrative and resource support. The administrative support component comprises commitment, policies, and instruction sub-components. Lastly, financial, human, and technical sub-components constitute the resource support component.

Kaur, and Abas (2004)

Kaur and Abas (2004) carried out a work of research for identifying both teachers' and students' readiness for e-learning at Malaysia Open University. A measurement tool was developed in the context of this study. This measurement tool, which is designed for instructors, consists of eight components: learner, management, personnel, content, technical, environment, cultural, and financial. However, students are not required to fill the management and personnel dimensions of the scale.

Akaslan and Law (2011a), Akaslan and Law (2011b), and Moftakhari (2013)

Akaslan and Law (2011a) proposed a model and measurement tool for readiness for e-learning (See Figure 6). This model was firstly proposed to identify particularly teachers' readiness for e-learning, and it was used for this purpose by Soydal, Alır, and Ünal (2011).
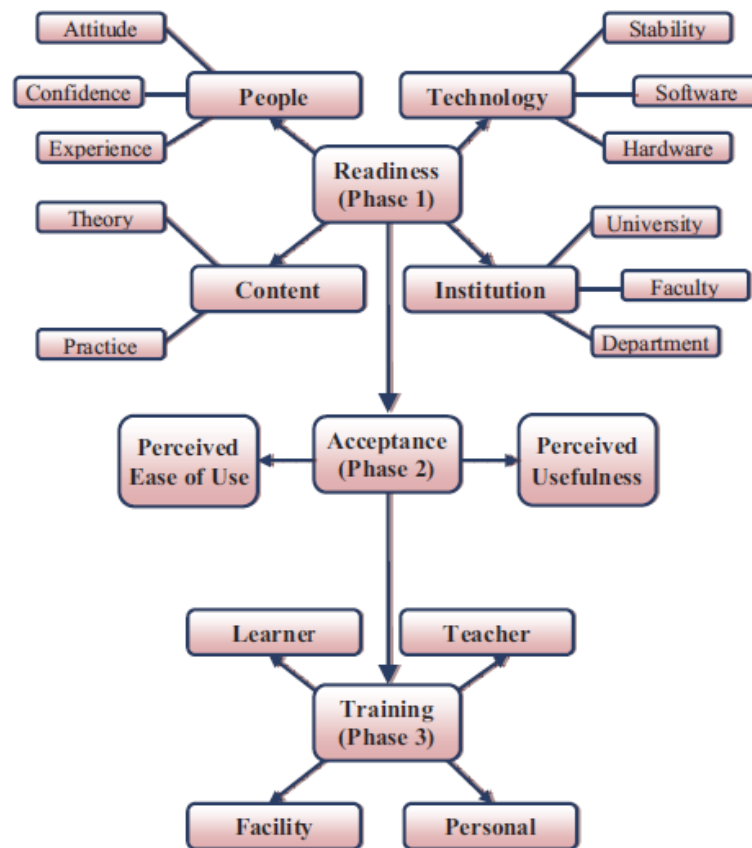
Figure 6: A multi-layer model of e-learning readiness (Akaslan & Law, 2011a)

Later, the model was reviewed to identify students' readiness for e-learning by Akaslan and Law (2011b). Even though it is said to be proposed for teachers by Akaslan and Law (2011a), it is actually proposed for university staff. The fact is that, when the research of Akaslan and Law (2011a) is investigated, it can be seen that the data were gathered from administrators, strategists, lecturers, and researchers instead of teachers. Subsequently, this model was once more reviewed by Moftakhari (2013).

The main components of the model are readiness, acceptance, and training. The readiness dimension comprises people, technology, content, and institution. The acceptance component was framed with Davis' (1989) TAM. The training component consisted of learner, teacher, facility, and personal sub-components. Within the model of Akaslan and Law (2011b), developed for students, there is one additional component, which is traditional skills, in the people component. Moreover, this component consists of three sub-components: self-motivation, self-responsibility, and lastly time management skills.

Method

The method of current study is literature review. Related literature was reviewed in terms of models pertaining to e-learning readiness.

Search criteria and results

Within the scope of the current study, the databases of Google Scholar and Science Direct were searched. The keywords "readiness for e-learning", "readiness for online learning", "e-learning readiness", "online learning readiness", "preparedness for e-learning", and "e-learning preparedness" were employed while carrying out the literature search. Moreover, Turkish counterparts of these search keywords were also employed. After exploring the publications, which were reached at the end of literature search, all models generating a measurement model, theoretical model, or classification concerning readiness for e-learning/online learning were included in the current study.

Thirty-three related publications were included in the current study as an outcome of the literature search. Some of these publications were handled under the same title due to their very slight difference from another model. Therefore, there are overall twenty-five unique models in the current study. As there are several multi-layer models, when Table 3, Table 5, and Table 7 are explored, it is seen that there are twenty-nine models. In addition, the models or measurement tools examined were developed between 1998 and 2013.

About the components of e-learning readiness

Some components of some models were merged because of their great similarity to one another in meaning, yet solely their names were different. To illustrate the point, self-directed learning and self-regulated learning were treated as synonymous. Furthermore, computer self-efficacy, Internet self-efficacy, competency of technology usage, technology literacy, technology skills, and technical readiness were merged under a suitable title for clarification purposes, despite the fact that there are some small differences among them. In this manner, tables became plainer and simpler; specifically, it became easier to grasp their meaning, too. Owing to their being technical details and also given the space limit, further instances of merging operations amongst components of the models were not mentioned here.

Another point to mention is components' being first- or second-level components. In the models in which there were second-level components, these components were used. When models regarding readiness for e-learning were investigated, it was seen that they are typically classified into three parts: students', teachers', and institutions' readiness for e-learning.

Some criteria were determined with the intention of deciding which components of examined models should be incorporated in the reference model. For a certain component to be incorporated in the relating reference model proposed for both students and teachers, that component needed to be utilized more than 29% of all examined models. In addition, this criterion was altered to 50% for institutions.

Findings

This section specifies which stakeholder models on the topic of readiness for e-learning were developed and what sort of distribution components these models had. Subsequently, the meaning of the results of the study was discussed.

Stakeholders of e-learning readiness

Under this title, stakeholders for whom e-learning readiness models were developed were adverted.

First, when models regarding readiness for e-learning were explored, it was seen that twelve modes were developed for students, seven models were developed for teachers, and ten models were developed for institutions (See Table 2).

Table 2. The distribution of models regarding readiness for e-learning

	Students	Teachers	Institutions
The number of models	12	7	10

When Table 2 is considered, it can be concluded that models and measurement tools regarding teachers' readiness for e-learning are relatively less compared to models related to students and institutions.

Among the models regarding students' readiness for e-learning, it is seen that seven models were proposed for university students, four models were proposed for students in general, while one model was proposed for primary and secondary school students. As a result, it can be concluded that several models were proposed for university students, while only one model was proposed for primary and secondary school students.

In terms of the models pertaining to teachers' readiness for e-learning, three, one, and three models, respectively, were developed for academic staff, teachers in general, and finally primary and secondary school teachers. Due to the lack of sufficient studies, it is not possible to say with certainty the distribution of models on the subject of teachers' readiness for e-learning.

With regard to the models pertaining to institutions' readiness for e-learning, it was calculated that there are four models for HEIs and private companies for each, and lastly two models for educational institutions. It can be concluded that the models and measurement tools pertaining to institutions' readiness for e-learning are mostly proposed for either HEIs or private companies. On the other hand, stakeholders for whom those models were developed, which were explored in this study, are put aside, and, instead, the underpinning frameworks on which they were established are investigated. This way, it may easily be seen that theories of diffusion literature, such as Rogers' (2003) theory of Diffusion of Innovation and Davis' TAM, were made use of five times.

Components of models regarding readiness for e-learning

In this part, models regarding readiness for e-learning were investigated.

Components of models regarding students' readiness for e-learning

Twelve models regarding students' readiness for e-learning were investigated, and Table 3 was created.

Table 3. The distribution of components of models regarding students' readiness for e-learning

	Akaslan and Law (2011b)	Kaur and Abas (2004)	Watkins, Leigh and Triner	Mercado (2008)	Oliver (2001)	Bernard et al. (2004)	Valtonen et al. (2009)	Tubaishat and Lansari (2011)	Asaari, Hasmi and Karia (2005)	Smith (2005)	Dray et al. (2011)	Hung et al. (2010)
Beliefs about e-learning						✔	✔					
Confidence in prerequisite skills and yourself	✔		✔			✔	✔	✔			✔	
Online communication self-efficacy			✔								✔	✔
Self-directed learning	✔			✔	✔	✔				✔	✔	✔
Access to technology	✔	✔	✔	✔	✔			✔		✔		
Competency of technology usage	✔	✔	✔	✔	✔		✔	✔		✔	✔	✔
Motivation	✔		✔	✔		✔						✔
Time management	✔	✔		✔							✔	
Content	✔	✔										
Acceptance	✔							✔	✔			
Culture		✔			✔			✔				
Commitment to e-learning		✔	✔									

*Components that are used just one time were either merged with one of other appropriate components or discarded from Table 3 for clarification purposes.

The most used components of the models developed for pinpointing students' readiness for e-learning were provided in Table 4.

Table 4. Frequencies and percentages of the most used components of models regarding students' readiness for e-learning

Component	Frequency	Percentage
Competency of technology usage	10	83
Self-directed learning	7	58
Access to technology	7	58
Confidence in prerequisite skills and yourself	6	50
Motivation	5	42
Time management	4	33

Table 4 shows that competency of technology usage, self-directed learning, access to technology, confidence in prerequisite skills and yourself, motivation, and time management components were included 9, 7, 7, 6, 5, and 4 times, respectively, in the above mentioned models. Hence, the previously mentioned components were ascertained to become prominent. On the other hand, with regard to Turkey, a study could be attained pertaining to students' readiness for e-learning, such as that of Akaslan and Law (2011b).

Components of models regarding teachers' readiness for e-learning:

Six models regarding teachers' readiness for e-learning were investigated, and Table 5 was created.

Table 5. The distribution of components of models regarding teachers' readiness for e-learning

	Eslaminejad, Masood and Ngah (2010)	Yun and Murad (2006b)	So and Swatman (2006)	Al-Furaydi (2013)	Mercado (2008)	Akaslan and Law (2011a)	Kaur and Abas (2004)
Competency of technology usage	✓	✓	✓	✓	✓	✓	✓
Pedagogical competency	✓				✓		
Affective (anxiety, attitude and so forth) readiness		✓					
Attitude towards using e-learning				✓			
Access to technology			✓		✓	✓	✓
Motivation	✓				✓		
Time management					✓		✓
Training						✓	
Acceptance			✓	✓		✓	
Content						✓	✓
Institution and policy			✓			✓	✓
Commitment to e-learning							✓

The most used components of the models developed for identifying teachers' readiness for e-learning were provided in the following Table 6.

Table 6. Frequencies and percentages of the most used components of models regarding teachers' readiness for e-learning

Component	Frequency	Percentage
Competency of technology usage	7	100
Access to technology	4	57
Acceptance	3	43
Institution and policy	3	43
Pedagogical competency	2	29
Motivation	2	29
Time management	2	29
Content	2	29

Table 6 illustrates that competency of the technology usage component is included in all models, whereas access to technology component is included in four of them. Institution and policy, and acceptance components are encompassed in three models. Hence, these four components are crucial for teachers' readiness for e-learning. In addition to the above mentioned components, content, motivation, time management, and pedagogical competency components are also crucial components, since they are twice each covered by models. On the other hand, in Turkey there appears to be only

one study regarding teachers' readiness for e-learning, which was conducted by Akaslan and Law (2011a).

Components of models regarding institutions' readiness for e-learning:

The distribution of the components of models regarding institutions' readiness for e-learning was presented in the following Table 7.

Table 7. The distribution of components of models regarding institutions' readiness for e-learning

	Omoda-Onyait and Lubega (2011)	Chapnick (2000)	Aydın and Taşçı (2005)	Darab and Montazer (2011)	Lopez (2007)	Azimi (2013)	Schreurs, Ehlers and Sammour (2008)	Psycharis (2005)	Mercado (2008)	Rosenberg (2000)
Content	✓	✓	✓	✓	✓	✓	✓	✓		
Pedagogy	✓						✓	✓	✓	
Culture	✓	✓		✓	✓		✓	✓		✓
Psychological		✓				✓				
Content management system			✓				✓		✓	
Human resources		✓	✓	✓	✓	✓		✓	✓	✓
Finance		✓	✓	✓	✓	✓	✓	✓	✓	✓
ICT infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Competency of technology usage	✓	✓	✓				✓	✓		
Innovation and entrepreneurship	✓	✓						✓		✓
Management and leadership				✓	✓		✓	✓		✓
Policy, Regulations and standards				✓				✓	✓	
Motivation	✓						✓			
In service training							✓			✓
Commitment to e-learning					✓	✓			✓	✓

* Components that are used just one time were either merged with one of other appropriate components or discarded from Table 7 for clarification purposes.

The most used components of the models developed for identifying institutions' readiness for e-learning were provided in the following Table 8.

Table 8. Frequencies and percentages of the most used components of models regarding institutions' readiness for e-learning.

Components	Frequency	Percentage
ICT infrastructure	10	100
Finance	9	90
Content	8	80
Human resources	8	80
Culture	7	70
Competency of technology usage	5	50
Management and leadership	5	50

When Table 8 is examined, it can be concluded that the ICT infrastructure component is incorporated in all models, while the finance component is incorporated in nine models. In addition, content and human resources components are incorporated eight times for each single one, whereas the culture component is incorporated seven times in the models. Finally, the competency of

technology usage and management and leadership components are included in five models. On the
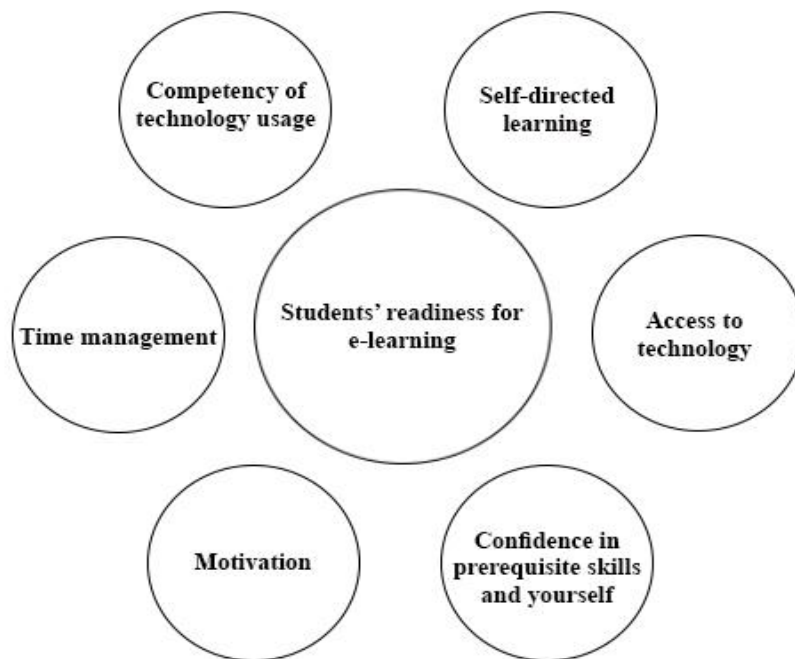
Figure 7. Reference e-learning readiness model proposed for students

other hand, in Turkey, there appears to be only one study pertaining to institutions' readiness for e-learning, which is Aydın and Taşçı (2005).

Reference model suggestions

In this part, reference model suggestions regarding each stakeholder were separately proposed in light of the findings of the study. That said, we need to accept that, even though we separated the models according to the previously mentioned three stakeholders, they are somewhat related, and this can be observed through common components in each model. In fact, some models even cover the other two stakeholders' readiness in order to measure one stakeholder's readiness. Nonetheless, in the current study, we proposed three distinct reference models, although we also accept that they are rather related to each other. In the following paragraphs, components of these reference models were explained one by one.

The reference model regarding students' readiness for e-learning includes six components: competency of technology usage, self-directed learning, access to technology, confidence in prerequisite skills and yourself, motivation, and finally time management. Competency of technology usage signifies students' self-efficacy on the subject of using a computer, the Internet, and other technological devices. Self-directed learning encompasses determining learning sources, reaching out to learning materials independently, determining which strategies one should employ, and assessing learning processes and outcomes. Access to technology refers to the need for students either to have the necessary technological devices or have access to them. It also includes capabilities like a stable Internet connection. Confidence in prerequisite skills and yourself is a combined component, which comprises one's own trust towards the skills required to be successful in e-learning and towards oneself. Motivation is the students' willingness and eagerness concerning attending classes via online or electronic methods. Lastly, the time management component measures the degree to which students can utilize their time effectively with the intention of achievement. The figure of the model was given in Figure 7.

In the reference model regarding teachers' readiness for e-learning, there are eight components: acceptance, access to technology, motivation, time management, institution and policy, content, pedagogical competency, and lastly competency of the technology usage component.

Competency of technology usage, access to technology, time management, and motivation components incorporated in the reference model above were already accounted for in the earlier reference model. The sole difference here is that these components are for teachers instead.

First, the acceptance component has something to do with the diffusion literature. The fact is that it includes perceived ease of use and usefulness. The institution and policy component measures the extent to which policies supported by higher managers and regulations in place consolidate the implementation of the e-learning initiative. Content includes delivered materials' being effective, efficient, of good quality, and applicability to teach to novices and low-achieving learners as well as experts and high-achieving ones. Finally, the pedagogical competency dimension obliges teachers to use suitable instructional strategies and pedagogical approaches in both the development and delivery phases of the e-learning content. The figure of the model was illustrated in Figure 8.
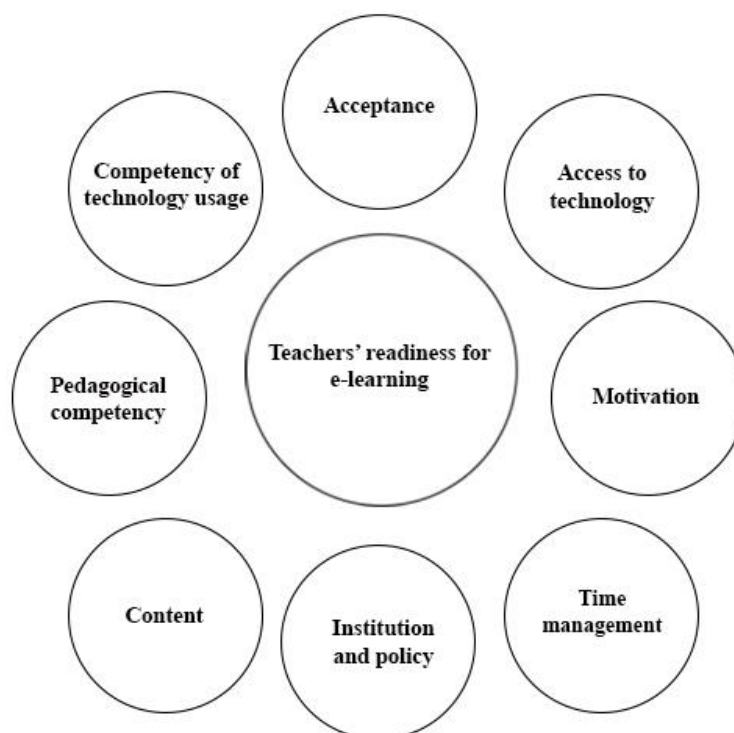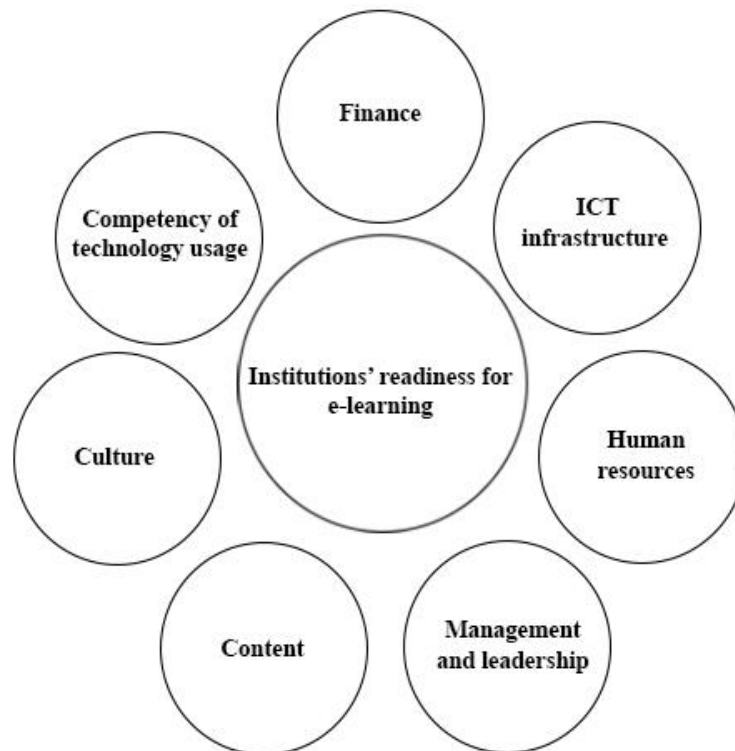

Figure 8. Reference e-learning readiness model proposed for teachers

In the reference model regarding institutions' readiness for e-learning, there are seven components: finance, ICT infrastructure, human resources, management and leadership, content, culture, and lastly competency of the technology usage component.

The components of competency of technology usage and content were already accounted for in the reference model above. We could also say that ICT infrastructure is accounted for, since it is nearly the same as access to the technology component, except for the fact that it encompasses other capabilities facilitating e-learning, such as learning management systems.

Finance relates to the financial situation of the institution where e-learning is aimed to be applied. It includes both an institution's capacity to allocate sufficient money and its willingness to do so. The human resources component measures the degree to which adequate and instant assistance can be provided to teachers or other staff in urgent need of assistance. It also includes staff's competency regarding the requirements of the e-learning initiative. Management and leadership is somewhat

similar to the aforementioned component of institution and policy. It explains the support of high managers and the way they deal with and overcome unforeseeable complications that occur and slow down or obscure the implementation of the e-learning initiative. Finally, culture signifies whether institutions can create environments in which e-learning is welcomed and consequently supported not only by all high-level managers but also by all employees. The figure of the mentioned model is presented in Figure 9.

Figure 9. Reference e-learning readiness model proposed for institutions

Overall Suggestions

These reference models presented above consist of components used mostly in the examined models. The aim here should not be to use these reference models directly; on the contrary, it should be to utilize them, and if required, perform necessary amendments to them according to the requirements of different contexts by not only researchers but also implementers. Yun and Murad (2006a) pointed out that every model developed for readiness for e-learning has some shortcomings; therefore, every model should be reviewed before applying it to a specific context. Hence, implementers of e-learning should determine readiness for e-learning of the target audience by selecting a suitable one amongst the above models and measurement tools before implementing it, and, based on this determination, if any, they should also remedy those deficiencies that they pinpointed.

More specific models should be proposed for each stakeholder rather than proposing multi-layer ones encompassing each of the three stakeholders (student, teacher, and institution), as proposing multi-layer models pertaining to three e-learning readiness models seems to fit none rather than fitting them all.

When each of three models pertaining to readiness for e-learning is investigated, it is emphasized that there are only a few papers published within the context of Turkey. Thus, there appears to be a need for both developing models and measurement tools pertaining to readiness for e-learning in Turkey and carrying out descriptive and correlational studies with these developed models

and measurement tools. Lastly, the criteria set to include a certain component in the reference models above might conceivably be modified with regard to the needs and points of view of the researchers.

References

Akaslan, D., & Law, E. L. C. (2011a). Measuring teachers' readiness for e-learning in higher education institutions associated with the subject of electricity in Turkey. *In Proceedings of 2011 IEEE Global Engineering Education Conference: Learning Environments and Ecosystems in Engineering Education* (pp. 481-490). Amman, Jordan.

Akaslan, D., & Law, E. L. C. (2011b). Measuring student e-learning readiness: A case about the subject of electricity in higher education institutions in Turkey. In *Proceedings of the 10th International Conference on Advances in Web Based Learning - ICWL* 2011 (pp. 209–218), LNCS, Vol. 7048, Springer, Berlin.

Al-Furaydi, A. A. (2013). Measuring e-learning readiness among EFL teachers in intermediate public schools in Saudi Arabia. *English Language Teaching, 6*(7), 110-121.

Asaari, A. H., Hasmi, M., & Karia, N. (2005, June). *Adult learners and e-learning readiness: A case study.* 2005 European College Teaching & Learning Conference, Athens, Greece.

Aydın, C. H., & Taşçı, D. (2005). Measuring readiness for e-learning: Reflections from an emerging country. *Educational Technology & Society, 8*(4), 244-257.

Azimi, H. M. (2013). Readiness for implementation of e-learning in colleges of education. *Journal of Novel Applied Sciences, 2*(12), 769-775.

Bernard, R. M., Brauer, A., Abrami, P. C., & Surkes, M. (2004). The development of a questionnaire for predicting online learning achievement, Distance Education, 25(1), 31-47.

Borotis, S. A., & Poulymenakou, A. (2004). *E-learning readiness components: Key issues to consider before adopting e-learning interventions.* Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, Washington, USA. An abstract retrieved from http://editlib.org/noaccess/11555

Chapnick, S. (2000). Are you ready for e-learning? Retrieved from http://blog.uny.ac.id/nurhadi/files/2010/08/are_you_ready_for_elearning.pdf

Choucri, N., Maugis, V., Madnick, S., & Siegel, M. (2003). Global e-readiness - for what? (MIT) Retrieved from http://ebusiness.mit.edu/research/papers/177_choucri_global_ereadiness.pdf

Darab, B., & Montazer, G. A. (2011). An eclectic model for assessing e-learning readiness in the Iranian universities. *Computers & Education, 56*(3), 900-910. doi:10.1016/j.compedu.2010.11.002

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Dray, B. J., Lowenthal, P. R., Miszkiewicz, M. J., Ruiz-Primo, M. A., & Marczynski, K. (2011). Developing an instrument to assess student readiness for online learning: A validation study. *Distance Education, 32*(1), 29-47.

Eslaminejad, T., Masood, M., & Ngah, N. A. (2010). Assessment of instructors' readiness for implementing e-learning in continuing medical education in Iran. *Medical Teacher, 32*, 407-412.

Guglielmino, L. M., & Guglielmino, P. J. (2003). Identifying learners who are ready for e-learning and supporting their success. In G. M. Piskurich (Ed). *Preparing learners for e-learning* (pp. 19-33). San Francisco: John Wiley & Sons.

Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: scale development and student perceptions. *Computers & Education, 55*(3), 1080–1090. doi:10.1016/j.compedu.2010.05.004

Kaur, K., & Abas, Z. W. (2004, November-December). *An assessment of e-learning readiness at the Open University Malaysia.* Paper Presented at the International Conference on Computers in Education (ICCE2004), Melbourne, Australia.

Lopes, C. T. (2007). *Evaluating e-learning readiness in a health sciences higher education institution.* Proceedings of IADIS International Conference of E-learning, Porto, Portugal.

McVay, M. (2000). *Developing a web-based distance student orientation to enhance student success in an online bachelor's degree completion program (Unpublished practicum report presented to the Ed.D).* Program, Nova Southeastern University, Florida.

Mercado, C. (2008). Readiness assessment tool for an e-learning environment implementation. *Special Issue of the International Journal of the Computer, The Internet and Management*, *16*, SP3. Retrieved from http://www.elearningap.com/eLAP2008/Proceedings/18_fullpaper_cecilia%20Mercado_Revised.pdf

Moftakhari, M. M. (2013). *Evaluating e-learning readiness of faculty of letters of Hacettepe (Unpublished Master's Dissertation).* Hacettepe University, Ankara, Turkey.

Oliver, R. G. (2001). *Assuring the quality of online learning in Australian higher education.* Proceedings of 2000 Moving Online Conference (pp. 222-231). Gold Coast, QLD. Norsearch Reprographics

Omoda-Onyait, G., & Lubega, J. T. (2011). E-learning readiness assessment model: A case study of higher institutions of learning in Uganda. In R. Kwan, J. Fong, L. F. Kwok, & J. Lam. (Eds.) *ICHL 2011*. LNCS, Vol. 6837 (pp. 200–211). Berlin, Germany: Springer, Heidelberg.

Psycharis, S. (2005). Presumptions and actions affecting an e-learning adoption by the educational system implementation using virtual private network. Retrieved from http://www.eurodl.org/materials/contrib/2005/Sarantos_Psycharis.htm

Rogers, E. M. (2003). *Diffusion of innovations* (5th Edition). New York, NY: Free Press.

Rosenberg, M. J. (2000). The e-learning readiness survey: 20 key strategic questions you and your organisation must answer about the sustainability of your e-learning efforts. Retrieved from http://www.books.mcgraw-hill.com/training/elearning/elearning_survey.pdf

Schreurs, J., Ehlers, U.-D., & Sammour, G. (2008). E-learning readiness analysis (ERA): An e-health case study of e-learning readiness. *Int. J. Knowledge and Learning, 4*(5), 496–508.

Soydal, I., Alır, G., & Ünal, Y. (2011). Are Turkish universities ready for e-learning: A case of Hacettepe University Faculty of Letters? *Information Services & Use*, *31*, 281-291.

Smith, P. J., Murphy, K. L., & Mahoney, S. E. (2003). Towards identifying factors underlying readiness for online learning: An exploratory study. *Distance Education, 24*(1), 57-67.

Smith, P. J. (2005). Learning preferences and readiness for online learning. *Educational Psychology: An International Journal of Experimental Educational Psychology, 25*(1), 3-12.

So, T., & Swatman, P. M. C. (2006, February). E-learning readiness of Hong Kong teachers. *Hong Kong IT in Education Conference 2006 (HKITEC 2006).* Capacity Building for Learning through IT.

Tubaishat, A., & Lansari, A. (2011). Are students ready to adopt e-learning? A preliminary e-readiness study of a university in the Gulf Region. *International Journal of Information and Communication Technology Research, 1*(5), 210-215.

Watkins, R., Leigh, D., & Triner, D. (2004). Assessing readiness for e-learning. *Performance Improvement Quarterly, 17*(4), 66-79.

Valtonen, T., Kukkonen, J., Dillon, P., & Vaisanen, P. (2009). Finnish high school students' readiness to adopt online learning: Questioning the assumptions. *Computers & Education 53*(3), 742–748. doi:10.1016/j.compedu.2009.04.014

Yun, G. P., & Murad, M. W. (2006a). E-learning readiness amongst secondary school teachers in Malaysia: A literature survey and theoretical framework. In D. Remenyi, & T. C. Dublin (Eds.) *Proceedings of the International Conference on e-Learning* (p.153-162), Montreal, Canada.

Yun, G., & Murad, M. (2006b). Factors influencing psychology and skills of the secondary school teachers' e-learning readiness: A case study in Malacca, Malaysia. *In Fourth International Conference on Multimedia and Information and Communication Technologies in Education (M-ICTE 2006)* (pp. 2135-2140).

Yurdugül, H., & Alsancak-Sırakaya, D. (2013). Çevrimiçi öğrenmeye hazır bulunuşluk ölçeği: Geçerlik ve güvenirlik çalışması. *Eğitim ve Bilim, 38*(169), 391-406.