FACTORS AFFECTING STUDENTS' PREFERENCES FOR ONLINE AND BLENDED LEARNING: MOTIVATIONAL VS. COGNITIVE

Sinan Keskin [sinan.keskin@hacettepe.edu.tr], Halil Yurdugül [yurdugul@hacettepe.edu.tr], Hacettepe University, Faculty of Education, Department of Computer Education and Instructional Technology [http://hacettepe.edu.tr], 06800, Beytepe/Ankara, Turkey

Abstract

Today's educational institutions are expected to create learning opportunities independent of time and place, to offer easily accessible learning environments and interpersonal communication opportunities. Accordingly, higher education institutions develop strategies to meet these expectations through teaching strategies, such as e-learning, blended learning, mobile learning, etc., by using teaching technologies. These new technology-based teaching strategies are mainly shaped by decision-makers in education. This study seeks to analyse the individual factors that affect learners' mode of teaching and learning delivery preferences. In this study, blended and online learning is considered as preferences of learners' mode of teaching and learning delivery. The individual factors discussed in this research are cognitive learning strategies, e-learning readiness, and motivation. The data were obtained from the pre-service teachers at the end of the academic semester when they experienced online and blended learning. Data were analysed using optimal scaling analysis. The analysis method provides a two-dimensional centroid graph which shows the correlations between the variable categories. According to study findings, there is a correlation between the preferences of the learning environment, and the constructs of self-efficacy, e-learning motivation, and task value. It can be said that the motivational variables are more effective in the learning environment preference. The students with high task value, e-learning motivation, and self-efficacy preferred studying in blended learning environments. Cognitive strategies, self-directed learning, learner control, and test anxiety factors are independent of the learners' learning delivery preferences.

Abstract in Turkish

Günümüz eğitim kurumlarından; zamandan ve mekândan bağımsız öğrenme olanakları, kolay erişilebilir öğrenme ortamları ve bireyler arası iletişim imkânları yaratmaları beklenmektedir. Yükseköğretim kurumları bu doğrultuda öğretim teknolojilerinden faydalanarak e-öğrenme, mobil öğrenme, uzaktan eğitim vb.'den faydalanarak bu beklentileri karşılamaya yönelik çeşitli stratejiler geliştirmektedir. Bu yeni teknoloji destekli öğretim stratejilerini çoğunlukla eğitimde karar vericiler şekillendirmektedir. Bu araştırmada ise sürecin önemli paydaşlarından olan öğrenenlerin öğrenme ortamı tercihleri üzerinde etkili olan bireysel faktörlerin incelenmesi amaçlanmıştır. Bu bağlamda öğrenme ortam tercihi olarak harmanlanmış ve çevrimiçi öğrenme; öğrenen özellikleri olarak ise bilişsel öğrenme stratejileri, e-öğrenme hazırbulunuşluğu ve güdülenme yapıları ele alınmıştır. Araştırma verileri öğretmen adaylarından hem harmanlanmış hem de çevrimiçi öğrenme deneyimi geçirdikleri bir dönemin sonunda toplanmıştır. Doğrusal olmayan kanonik korelasyon analizi kullanılarak yapılar arası ilişkiler ortaya konulmuştur. Optimal ölçekleme olarak da adlandırılan bu analiz yöntemi sonucunda yorumlanması görece kolay olan grafiksel çözümlemelere ulaşılmıştır. Araştırma sonucunda öğrenme ortam tercihi ile öz yeterlik, e-öğrenme motivasyonu ve görev değeri yapılarının ilişkili olduğu belirlenmiştir. Görev değeri, e-öğrenme motivasyonu ve öz-yeterlik algısına yüksek düzeyde sahip öğrenenler, harmanlanmış öğrenme ortamlarında öğrenim görmeyi tercih etmektedirler. Bilişsel öğrenme stratejileri, kendi

kendine öğrenme, öğrenen kontrolü ve sınav kaygısı değişkenleri ise kendi içinde ilişkili yapılar olmasına karşın e-öğrenme ortam tercihinden bağımsız olduğu belirlenmiştir. Buna göre e-öğrenme ortam tercihinde motivasyon değişkenlerinin daha etkili olduğu söylenebilir. Araştırma sonucunda ortaya konulan bir diğer önemli bulgu ise yüksek düzeyde sınav kaygısına sahip öğrenenlerin düşük düzeyde bilişsel öğrenme stratejilerine sahip olduğudur.

Keywords: online learning, blended learning, mode of teaching and learning delivery, e-learning readiness, cognitive strategies, learner motivation, optimal scaling

Introduction

Today's educational institutions are expected to create learning opportunities independent of time and place, to offer easily accessible learning environments and interpersonal communication opportunities (NMC Horizon Report, 2017). Accordingly, higher education institutions develop strategies to meet these expectations through teaching strategies, such as e-learning, mobile learning, distance learning, etc., by using teaching technologies. The mass education programs, also called MOOC in distance education, allow for access to a wide mass of users. Besides, the concept of blended learning, which combines good learning practices, including both online and face-to-face practices, is more and more commonly employed in higher education institutions. These new technology-based teaching methods are mainly shaped by decision-makers in education. However, one of the important stakeholders of this process is the learners. In e-learning, which are relatively new learning environments, it is known that learners' learning strategies (Adam et al., 2017; Broadbent, 2017; Littlejohn, Hood, Milligan, & Mustain, 2016; Şahin, Keskin, Özgür, & Yurdugül, 2017), online readiness (Park, Lee, & Bae, 2010; Ramli, Muljono, & Afendi, 2018; Yurdugül & Demir, 2017) and motivation (Cull, Reed, & Kirk, 2010; Najafi, Rolheiser, Harrison, & Heikoop, 2018) levels have a significant effect on both the learning process and learning outcomes. A limited number of studies are available on student preference, which is one of the most vital actors in learning and teaching process, as well as on individual factors affecting these preferences (e.g. Butler & Pinto-Zipp, 2005; Tsai, 2005; Yang, & Tsai, 2008). This study seeks to analyse the individual factors that affect learners' mode of teaching and learning delivery preferences.

Not only Horizon report but also studies in the literature indicate that online learning is becoming increasingly widespread (Christensen, Horn, Caldera, & Soares, 2011). The factors of benefit (effective teaching, easy access to learning environment, using technology support), cost (use of less resource for more learners, reduced need for classroom materials, campus access and accommodation), and inter-agency competition factors are significantly effective in the decisions of educational institutions to move on to these new teaching strategies (NMC Horizon Report, 2017; Raffo, Gerbing, & Mehta, 2014). High-cost investments are made by the institutions with a high benefit expectation; yet, it is obvious that not all learners equally benefit from these investments. Muilenburg and Berge (2005) found that learner skills and motivation for learning were effective in student barriers to online learning. Research on online-learning reveals that learner characteristics also have a decisive role in the drop-out rate (Hart, 2012; Kizilcec & Halawa, 2015). Thus, we can say that learner-related factors have an important place in online learning processes. For example, Barnard-Brak, Lan, and Paton (2010) found that students differ significantly in their academic achievement according to their profiles of self-regulated learning. Najafi, Rolheiser, Harrison, and Heikoop (2018) found that learner motivation was effective on both achievement and course attendance in massive open online courses. Şahin et al., (2017) found that online learners' interaction profiles differ according to students' learning motivation and strategies. Consequently, learner characteristics affect the benefit to be gained from the learning environment and usage behaviours; these characteristics are expected to affect their preferences for mode of teaching and learning delivery. In this regard, this study analyses the

correlation between learner characteristics and students' preferences for mode of e-learning delivery.

Blended and Online Learning

Blended learning is a teaching method that incorporates enhanced interaction using face-to-face teaching methods as well as various instructional technologies to improve teaching (Lim & Morris, 2009). What is noteworthy here is that blended learning allows one to benefit from the conveniences offered by online learning during face-to-face contact (Rovai & Jordan, 2004). Educators believe that teaching using multiple communication channels can significantly increase learning outcomes and enhance student satisfaction (Lim & Morris, 2009). Several studies (Oblender, 2002; Wojciechowski & Palmer, 2005) suggested that in technology-based online learning practices, students cannot sufficiently benefit from these practices due to reasons such as the sense of loss, isolation, and lack of online communication skills, etc. Therefore, blended learning has an important advantage over online learning. Blended learning is considered as a short-term trend in the 2017 NMC Horizon Report for Higher Education. Due to this and many other reasons, blended learning practices, which presents a combination of both face-to-face education and online learning opportunities, have become more and more popular today. Bielawski and Metcalf (2003) reported that blended learning practices offer an effective teaching method for learners with different learning styles and self-regulation skills. Hence, the literature revealed the positive effect of online and blended learning practices on learning for different teaching situations. Research studies involving student's learning in blended learning environments have focused on the correlations of demographic variables with learning performance and participation (Kintu, Zhu, & Kagambe, 2017; López-Pérez, Pérez-López, & Rodríguez-Ariza, 2011; Padilla-MeléNdez, Del Aguila-Obra, & Garrido-Moreno, 2013). On the other hand, it is seen that a lack of enough studies on the individual characteristics that affect learners' preferences for the learning environment.

Online learning comes with various advantages, including synchronous and asynchronous participation with adjustable learning speed, the potential for access to a wide range of participants at once (enrolment size), discussion opportunities, different types of feedbacks (instructor, peer to peer, adaptive system feedback), use for different teaching practices (formal, informal, certification, just for fun), and cost (Vanides, 2018). On the other hand, there are some critical challenges to the use of online learning by learners and teachers. Challenges include the need for technology literacy, e-learning readiness, experience, communication skills, isolation in the classroom environment (Wojciechowski & Palmer, 2005). For that reason, the drop-out rate in the courses offered in online learning environments is higher relative to the drop-out rate in the courses in face-to-face education (Atchley, Wingenbach, & Akers, 2013; Oblender, 2002). In this process, e-learning readiness is accepted as a prerequisite for the usability and optimal utilization of online learning by any educational institution (Kaur & Zoraini Wati, 2004). Moreover, the relevant studies highlighted that the concept of online learning presents a biased learning environment in favour of the students with high self-regulation skills (Dembo, Junge, & Lynch, 2006; Lee, Hong, &Ling, 2001). Furthermore, students' sources of motivation are considered as one of the significative structures of e-learning and blended learning (Rosenberg & Ranellucci, 2017; Selim, 2007).

This study addresses the learning strategies proved to be effective in the e-learning process, and the notions of e-learning readiness and motivation, and discusses the correlation between these and preferences for the e-learning environment. These concepts and relevant sub-factors are below explained in detail.

Self-regulated Learning (SRL) Strategies

Learners with self-regulation skills are individuals who are actively involved in the learning process, make a cognitive effort and have the motivation to learn (Broadbent, 2017; Zimmerman, 1986). Capable of managing their own learning processes, these learners employ various strategies during the learning process. These strategies significantly affect learning outcomes (Richardson, Abraham, & Bond, 2012). Broadbent (2017) articulated that the self-regulation strategies used in blended and online learning environments varied according to the environment. Further, learners with different SRL strategies display different learning behaviours in online learning environments (Littlejohn, Hood, Milligan, & Mustain, 2016). Thus, it seems essential to understand what SLR strategies are and to determine the correlation between these strategies and the preferences for a learning environment.

The strategies employed by an individual in the learning process are grouped under three main categories as cognitive, metacognitive strategies and resource management (Pintrich, Smith, Garcia, & McKeachie, 1991). These strategies facilitate self-learning and information processing and allow for permanent learning. The cognitive strategies used by self-regulated learners in their learning process can be classified as rehearsal, elaboration, organization and critical thinking. Rehearsal is a strategy which involves learning through repeating and reciting material to recall it when necessary. Elaboration is a cognitive strategy which involves relating the new information to prior knowledge while performing tasks such as summarizing and interpreting. Organization involves the selection of suitable information and the establishment of connections among the pieces of information. Critical thinking refers to applying previously-learned material to a new situation, problem-solving, and critical evaluations. As stated in the definition of the learners with self-regulation skills, the learners are expected to employ these cognitive strategies as well as have the motivation to learn and improvable skills. Hence, the concepts of motivation and then e-learning readiness are discussed below in the next section.

Motivation

In the field of psychology, motivation refers to the force that leads one to act. The motivation to learn can be defined as the value, meaningfulness, and benefits of academic tasks to the learner (Lumsden, 1994). Motivation plays an important role in learning process. The study by Selim (2007) concluded that learner motivation has a critical part to play in the adoption of online learning environments among students. Moreover, several studies established a strong cause and effect relationship between motivation and learner success, engagement in online learning environments (Baturay & Yükseltürk, 2015; Cull, Reed, & Kirk, 2010). Further, highly-motivated learners spend more time in an online learning environment (Rosenberg & Ranellucci, 2017). Online learners' interaction profiles differ according to students learning motivation (Şahin et al., 2017). In other words, different levels of motivation affect the patterns of interaction in the e-learning environment. According to Pintrich et al. (1991), motivation consists of three main components called value, expectation and affective components, which include various sub-factors. This study features task value, test anxiety and self-efficacy as the sub-components of motivation. Task value is how interesting and important learners perceive the tasks (homework, projects, etc.) in a course and the course material. Test anxiety refers to negative cognitive and emotional processes experienced by a learner while in an evaluative situation. Self-efficacy pertains to an individual's feeling of competence to accomplish a given task. When the literature was examined, it was seen that motivation variables had an effect on both course outcomes and learner-system interactions. For example, Wang, Shannon, and Ross (2013) found that the self-efficacy variable had a positive effect on grade and satisfaction of the online learning course. Similarly, Joo, Lim, and Kim (2013) found that self-efficacy and task value were significant predictors of learner satisfaction and learning outcomes. Artino and Jones (2012) have stated that students' test anxiety feelings can influence their future self-efficacy beliefs. Accordingly, it is

understood that these structures are determining structures that should be considered in the online learning process.

E-learning Readiness

If e-learning environments are considered as a system, learner characteristics, which are the inputs of this system, considerably affect the outcomes from the system. E-learning readiness is one of the integral inputs in this system. Therefore, the readiness features of the learners to use e-learning environments emerge as an important construct in many studies (Kaur & Zoraini Wati, 2004; Muilenburg & Berge, 2005; Yurdugül & Demir, 2017). E-learning readiness is defined as knowledge, skill, social, psychological, affective characteristics and physical opportunities, which are necessary for learners to make the most of e-learning environments (Borotis & Poulymenakou, 2004; Yurdugül & Demir, 2017). E-learning readiness not only important for e-learning but also blended learning. Because learners use similar technologies in the blended learning process. E-learning readiness consists of six main components: computer self-efficacy, internet self-efficacy, online communication self-efficacy, self-directed learning, learner control and motivation towards e-learning (Hung, Chou, Chen, & Own, 2010). The first three factors are related to learners' competence in technologies and communication tools for e-learning. The constructs of self-directed learning and learner control refer to learners' pedagogical knowledge and skills for e-learning. These skills include students' learning methods, self-assessment, access to resources, resource management, time planning, etc. Self-directed learners can determine their learning needs, goals and learning strategies without the help of others, and also evaluate their learning result. Learner control can be considered as an individual's ability to manage the learning process (Yilmaz, 2017). The construct of the motivation towards e-learning addresses the willingness and interest of students in affective terms. These e-learning readiness components have a significant impact on learners' satisfaction and motivation in blended learning (Yilmaz, 2017). In order to provide positive e-learning experiences, learners must be ready for e-learning (Guglielmino & Guglielmino, 2003). E-learning readiness structures are an important indicator that learners are ready for this process. Today, since the learners are accepted as digital native, researchers start off with the assumption that the learners are sufficient to use e-learning technologies (Valtonen, Kukkonen, Dillon, & Vaisanen, 2009). However, the usage of these technologies at different levels and the problems observed in e-learning processes have led to the need to evaluate the learners' e-learning readiness.

Based on the studies in the literature, it is obvious that the end-of-term success, class attendance rate, participation in e-learning and number of the students studying in e-learning and blended learning environments vary according to their individual characteristics. Wang, Shannon, and Ross (2013) stated that students' self-regulated learning skills, motivation and readiness levels have a decisive role in the utilization and satisfaction level of online learning. Consequently, not all learners equally benefit from the learning environments and their needs differ according to their individual characteristics. A significant number of studies that compared the learning environments based on individual characteristics involve a comparison of F2F (face to face) learning to online learning; yet, there is a limited number of studies (Broadbent, 2017; Lim, Morris, & Kupritz, 2007) discussing blended learning and online learning environments together. This study explores the preferences for online and blended learning environment as well as the notions of cognitive learning strategies, e-learning readiness and motivation, which are among learner characteristics. It further seeks to explain the pattern between preferences for the learning environment and these learner characteristics. This study was conducted with a relatively small study group with the online and blended learning experience. The small size of the study group may be considered as a limitation. However, the fact that the research was conducted only with participants with knowledge and experience on this subject can be considered as a strength of the research.

Method

This study aims to explore the correlation between learner's characteristics and preference for the e-learning environment. This study was designed as a case study for the purpose of in-depth investigations of learners' mode of teaching and learning delivery preferences. To that end, based on the data obtained from the students with both e-learning and blended learning experience. The study revealed the relations between the constructs using non-linear canonical correlation analysis. This section explains the study group, the data collection tools and the method of analysis in detail.

Study Group

The study group consists of a total of 64 pre-service teachers in the Department of Computer Education and Instructional Technology, Faculty of Education at a state university in Turkey. All pre-service teachers in the third year participated in the study. Since the aim of this study was to examine the e-learning environment preferences of the learners, the study group was limited to the students who have knowledge and experience in these environments. In addition, pre-service teachers were provided with an online and blended learning experience within a compulsory course. In this respect, it can be said that the purposive sampling method is used in the research. They used an e-learning environment, which features weekly-designed hypertexts, videos, SCORMs (content packages), discussion and e-evaluations, for an academic semester. The pre-service teachers were provided with the opportunity to gain learning experiences with different kinds of e-learning materials. The data were obtained from the pre-service teachers at the end of the academic semester, when they experienced online and blended learning. Following this learning experience, 29 of the students preferred to continue their education in the blended learning environment while 35 preferred only online learning environment. Only face-to-face learning was not preferred by pre-service teachers.

Data Collection Tools

The study employed three different data collection tools. One of them is the personal information form prepared by the researchers. This form was used to obtain some demographic information about the participants and to determine their preferences of the learning environment. The second tool was "Scale of University Students' E-learning Readiness" formed by Yurdugül and Demir (2017); the third tool was "Motivation and Learning Strategies Scale" adapted into Turkish by Büyüköztürk, Akgün, Kahveci, and Demirel (2004). The data gathered through the scales were discretized as low or high based on the average scores. Further information on the scales used in the study to obtain data is presented below.

Pre-Service Teachers' E-learning Readiness Scale

The Scale of Pre-Service Teachers' E-learning Readiness was developed by Yurdugül and Demir (2017); the scale is a 7-point Likert type scale. The original scale consists of 6 factors as computer self-efficacy, internet self-efficacy, online communication self-efficacy, self-directed learning, learner control, and motivation towards e-learning. The first three factors are related to learners' competence in e-learning. These factors were excluded from the study given the department and grade level of the participants of the study. The study addressed the factors of self-directed learning, learner control and motivation towards e-learning. The reliability and validity of the scale were initially tested, and the scale was deemed acceptable based on the findings. The reliability coefficient was re-calculated in the study and the Cronbach alpha value was found to be greater than 0.70. Therefore, it can be stated that the use of this scale in this study allowed for reliable results.

Motivated Strategies for Learning Questionnaire (MSLQ)

"Motivated Strategies for Learning Questionnaire (MSLQ)" developed by Pintrich, Smith, Garcia, and McKeachie (1991) was adapted into Turkish by Büyüköztürk, Akgün, Kahveci, and Demirel (2004). The MSLQ items are scored on a 7-point Likert type scale. Designed as a modular-type scale, this tool can be administered with a focus on specific sub-dimensions to meet different purposes by researchers (Pintrich & Smith, 1993). The MSLQ consists of two main dimensions named as motivation and learning strategies. The motivation dimension is composed of three fundamental components as expectancy, value, and affect. To gather the relevant data in this study, the factors of task value, self-efficacy and test anxiety were each used as a sub-factor corresponding for these components. The sub-factors of rehearsal, elaboration and organization, which are under the main component of cognitive strategies, were included in the learning strategies dimension. The necessary validity and reliability tests were conducted by the researchers on both the original version and adapted version of the MSLQ. The Cronbach alpha coefficients were re-calculated for this study. The calculated values are within the acceptable range. For example, reliability coefficients were calculated as .78 for test anxiety, .87 for task value, and .69 for organization. Besides, re-calculated reliability coefficients were found to be greater than the values obtained in the Turkish-adapted version.

Data Analysis

The non-linear correlation between the variables in this study was analysed through OVERALS analysis tool in SPSS 21 software. The tool allowed for the canonical correlation analysis between the categorical variables. This analysis method, also called optimal scaling, results in graphical analyses, which are relatively easier to interpret. The method further enables the researcher to analyse the correlations between the resulting two-dimensional centroid graph and variable categories. As the level of the correlation between the categories increases, the points representing the categories are placed close to each other on the graph; as the level decreases, they are placed distant from each other. It is essential to classify similar variables and analyse them in this way (Meulman & Heiser, 2001). For that reason, prior to the optimal scaling analysis, 4 sub-data sets were formed to include the sub-dimensions of each scale used in the study. Table 1 presents the data sets and the factors included in these sets.

Findings

A total of 4 data sets were used for the non-linear canonical correlation analysis. Table 1 shows the research variables in these data sets and the categories for the variables.

Table 1: Research Variables and Variable Categories

Data Sets	Variables	Categories
Set 1	Learning Environment Preferences	Online Blended
Set 2: E-learning Readiness	Self-directed learning Learner control Motivation towards e-learning	Low High
Set 3: Cognitive Strategies	Rehearsal Organization Elaboration	Low High
Set 4: Motivation	Test anxiety Task value Self-efficacy	Low High

All variables in the study were the variables with two categories. The categories were identified as online/blended for the variable of environment preference and as low/high for other variables.

The low/high categories were formed based on the average score of the data obtained from the scales. A two-dimensional analysis was performed with the variables presented in Table 1. In the data analysis, the loss function was the smallest at 50 iterations and Table 2 shows the results of the analysis.

Table 2: Summary of Analysis Results

		Dimensions		Total
		1	2	
Loss	Set 1	.931	1.019	1.950
	Set 2	.353	.427	.780
	Set 3	.304	.618	.922
	Set 4	.358	.458	.815
	Mean	.486	.630	1.117
Eigenvalue		.514	.370	
Fit				.883

The eigenvalue presented in Table 2 indicates the correlation levels for each dimension. The fit is achieved by the sum of the eigenvalues obtained for both dimensions. The resulting value allows for the calculation of the variance. The two-dimensional analysis in the study calculated variance of $0.88/2 = 44\%$. The sum of the average loss value and fit value is the number of the dimensions in the analysis. Thus, the reduced loss value may be interpreted that there is a higher level of multiple correlations between the variables. The highest fit value is 2, which indicates that there is a perfect correlation between the variables. Only such correlation results from the insignificant dimensions in the data and is rarely observed (Meulman & Heiser, 2001). The calculated fit value for this research shows that there are moderate multiple relationships between structures. The mean loss value was calculated for the highest Set 2 (e-learning readiness) variables. Accordingly, it can be said that e-learning readiness variables are relatively more independent structures than others.
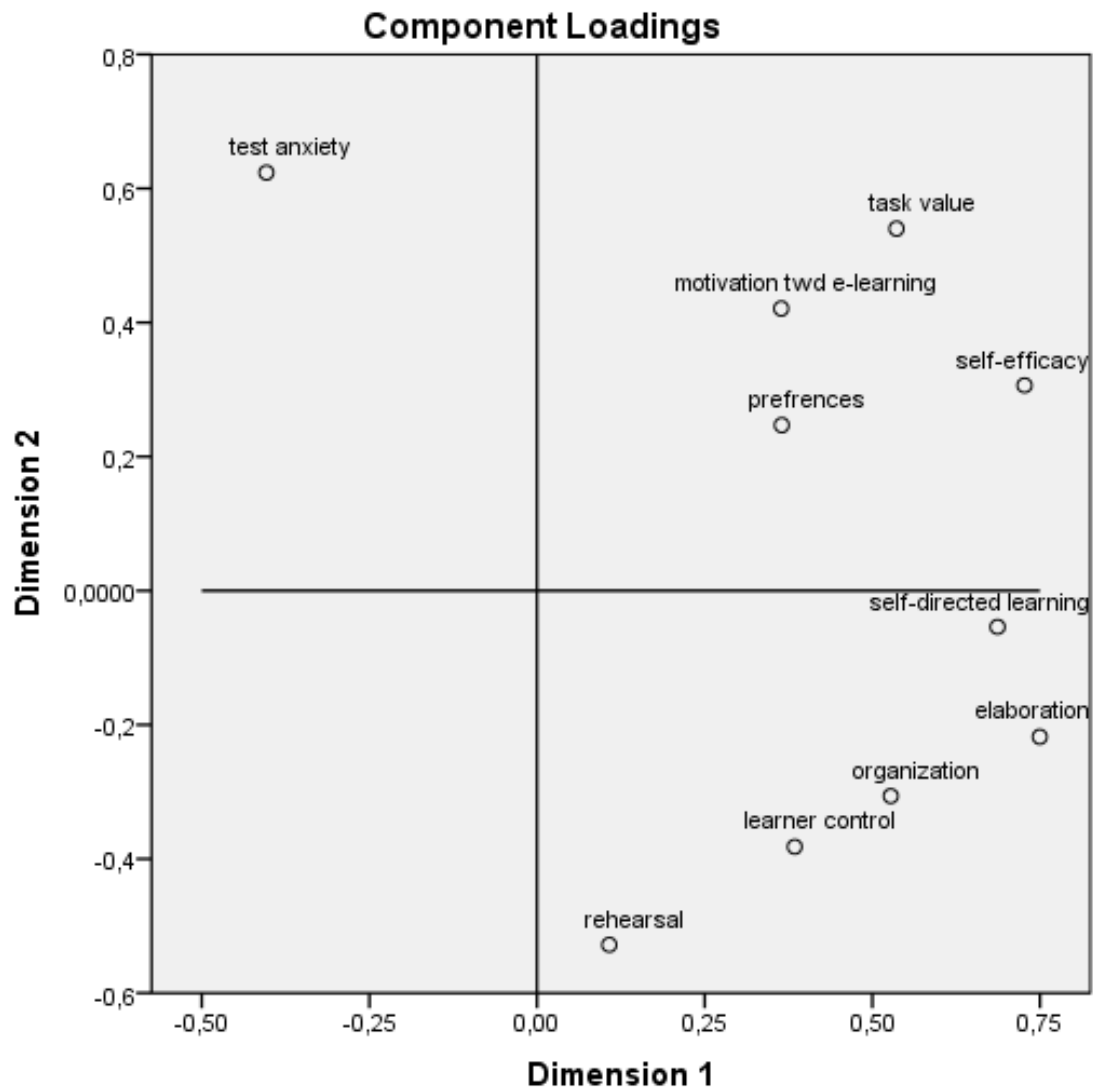
Figure 1. Component Loadings Graph

Figure 1 demonstrates the distribution of the component loadings for the variables in the study. The distance of the variables from the centre indicates their importance. Hence, it can be stated that the most remote variables are the most important ones in the analysis. Thus, the variables of test anxiety, task value and elaboration are the most important variables in the analysis. Component loadings graphs provide information about the correlation between variables. The fact that the structures are located in the cross regions on the coordinate plane shows that there is a negative relationship between the structures concerned. It is thus notable that test anxiety is negatively related to cognitive strategies (rehearsal, organization and elaboration), self-directed learning and learner control. The structures located in the same quadrant in the coordinate plane have a positive relationship within itself. For example, learning environment preference is positively correlated with the affective characteristics (motivation, self-efficacy and task value) of the learners.
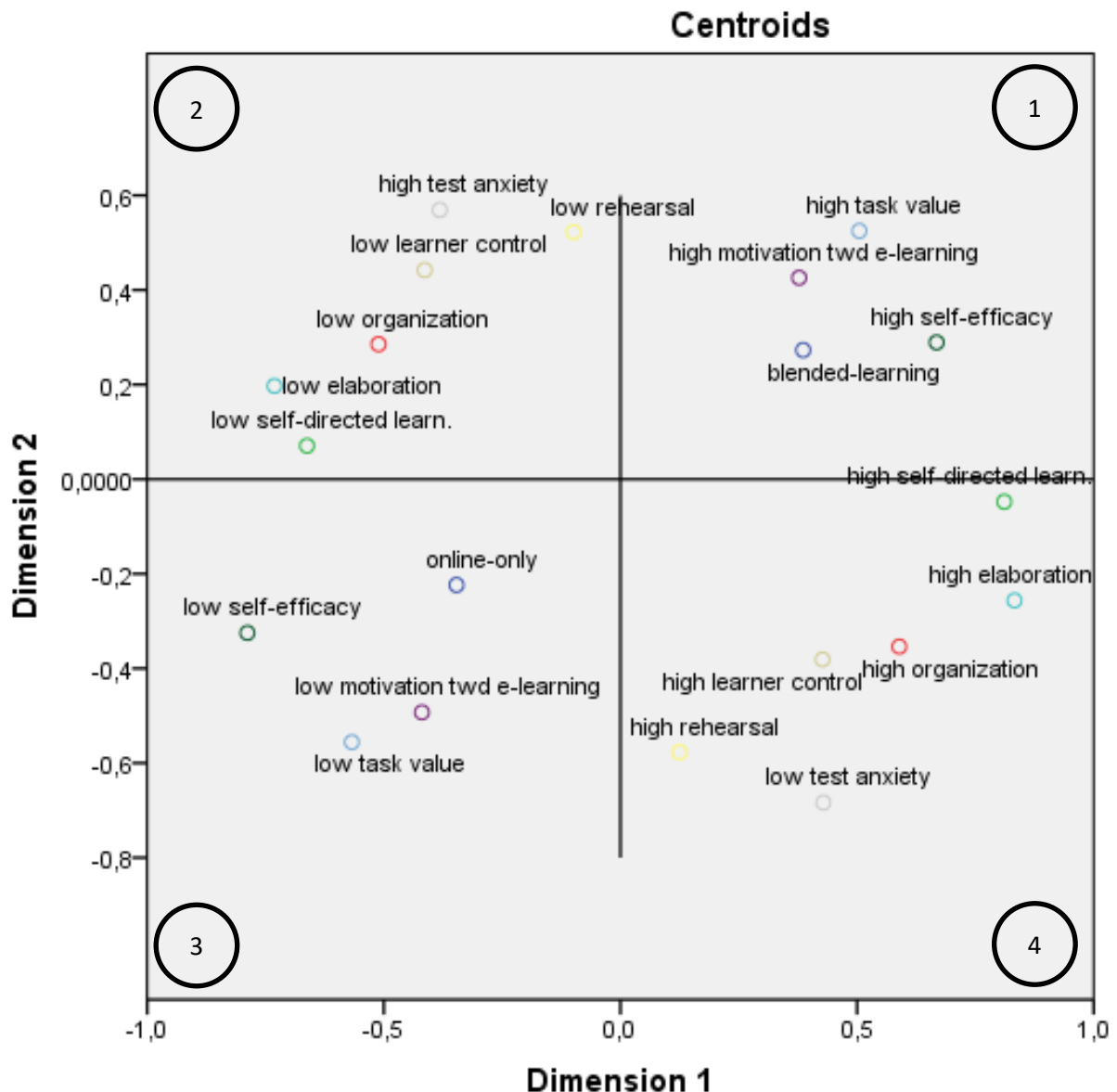
Figure 2. Centroid Graph Representing Correlations between Research Variables

The centroid graph in Figure 2 was formed based on the optimal scaling analysis, which was conducted to analyse the non-linear canonical correlation between the variables. The levels/categories for the variables are shown on the graph. For example, the variable of test anxiety is represented with two points on the graph as low anxiety and high anxiety. The proximity of these points indicating the levels of the variables represents the correlation between the levels. Therefore, the points close to each other on the graph can be considered as an associated cluster for a better understanding of the correlations between the variables.

The quadrants in the centroid graph are numbered. The point that represents the preference for a blended learning environment is in the 1st quadrant while the point that represents the preference for an online learning environment is in the 3rd quadrant on the graph. It is notable that blended learning, high e-learning motivation, high task value and high self-efficacy are close to each other. Low e-learning motivation, low task value and low self-efficacy are clustered with online learning preference. Thus, motivational variables are more effective on the environment preference. Cognitive strategies, self-directed learning, learner control and test anxiety are in the 2nd and 4th quadrants on the graph. These constructs in the 2nd and 4th quadrants on the graph are associated

with each other too. However, this means that the constructs are independent of the environment preference. As seen in the component loadings graph, there is a negative correlation between test anxiety and cognitive strategies, self-directed learning and learner control located in these areas. Remarkably, test anxiety is high in the 2nd quadrant where other constructs are low. Accordingly, it can be said that students with high test anxiety can use cognitive strategies at low level.

Conclusion and Discussion

This study discussed the preferences of the higher education students for blended and online learning environments based on their individual characteristics. In the literature, there are various studies on the effect of different learning environments on learning outcomes. To our knowledge, this present study is the first to examine the preferences for online and blended learning environments in terms of learners' characteristics. In the study, cognitive strategies, motivation and e-learning readiness were used as the learners' characteristics. The correlations between the constructs were revealed through optimal scaling analysis.

Different learning environments provide learners with diverse learning tools in which they can make learning interactions. For example, video materials come to the fore in online courses, while printed lecture notes come to the fore in face-to-face learning environments. There may also be multiple learning tools (video, text, formative assessments, etc.) with different characteristics in a learning environment. Learners need different cognitive strategies while using different learning tools. Often, learners have a notable learning strategy that they practice for different materials, independently of the course. For instance, a student who prefers to take notes in a lecture may apply different learning strategies such as highlighting a text while studying with a course book (Brown & Liedholm, 2004). The strategies employed by self-regulated learners are known to significantly affect learning outcomes (Broadbent, 2017; Richhardson et al., 2012). Moreover, Brown and Liedholm (2004) suggested that cognitive strategies have an impact on the preference for learning tools. However, this study found out that the preference for learning environments is independent of learning strategies. One possible reason for this finding may lie in the availability of multiple teaching materials, such as hypertext, video and formative assessment, in the e-learning environment offered to the learners. Since the learners had the access to the teaching materials through which they can apply their own learning strategies in both the e-learning environments presented. For that reason, their cognitive strategy structures did not affect the decisions regarding their preference for the learning environment.

The study revealed that there is a correlation between the preference for mode of teaching-learning delivery, and the constructs of self-efficacy, e-learning motivation and task value. The students with high task value, e-learning motivation and self-efficacy preferred studying in blended learning environments. In this respect, Pechenkina and Aeschliman (2017) reported that such factors as flexibility, accessibility and the opportunities to have face-to-face encounters in combination with streamlined feedback provision are among main reasons why students prefer blended learning to fully face-to-face or online education. Lim, Morris, and Kupritz, (2007) stated that learners can access support more easily in blended learning than online learning. Such opportunities brought by blended learning thought to have a significant impact on the preference of the students in the group with high task value, e-learning motivation and self-efficacy. Moreover, several studies reported that learners feel a sense of isolation and loneliness in online learning environments (Sit, Chung, Chow, & Wong, 2005; Zembylas, Theodorou, & Pavlakis, 2008). The study by Lim, Morris, and Kupritz (2007), which compares blended and online learning methods in terms of learning outcomes, found out that there was no significant difference between the groups, but online learning environments were considered more

challenging given the workload and difficulty level. All this explains why the affective constructs in this study played a more decisive role on the preference of learning mode.

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