




## Examination of the correlation between e-learning readiness and achievement goal orientation of college students

Nese Sevim-Cirak <sup>a</sup> , Osman Erol <sup>a</sup> \* , Vesile Gul Baser-Gulsoy <sup>a</sup> 

<sup>a</sup> Burdur Mehmet Akif Ersoy University, Türkiye.

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### Highlights

- College students e-learning readiness level was high
- College students develop mastery goals rather than performance goals
- There is significant relationship between e-learning readiness and achievement goal orientations

### Abstract

Students' readiness for e-learning is necessary in order to make the e-learning process more effective. Readiness for e-learning refers to the degree of having pre-knowledge and skills, and affective characteristics such as the necessary attitude and motivation to experience this process most effectively. Academic orientations of the students also contribute to their perception of the quality of the learning process in online learning environments. Furthermore, e-learning creates a learner-centered learning approach that might be contrived to personal goal orientations. Hence this study aims to identify the relationship between achievement goal orientations and the e-learning readiness level of the students. Data were collected from 457 university students enrolled in a public university in Turkey. The University Students' E-learning readiness Scale and 2X2 achievement goal orientation scale were used as the data collection tools. A canonical correlation analysis (CCA) was performed to analyze the data. This study revealed that there is a statistically significant relationship between e-learning readiness and achievement goal orientations of the students. Three of the four canonical correlations were statistically significant which indicates that variables' linear combinations were related.

**Article Info:** Research/Review Article

**Keywords:** *e-learning readiness, Achievement goal orientation, Canonical correlations*

## 1. Introduction

In recent years, many educational institutions have offered distance learning and e-learning (Şahin et al., 2018). According to Sun et al. (2008), e-learning is considered as a technological intervention in learning. The technological intervention mentioned here ranges from synchronous lessons to asynchronous lessons, hardware to online tools, content (image, text, video) to evaluation of the process (Clark & Mayer, 2016). With the advantage of the technology used in e-learning, educational activities can be carried out anywhere and anytime. Thus, the problems stemming from the physical environment are eliminated and the students are able to access the content whenever they want. But to benefit from the e-learning process more effectively, students should be ready for e-learning. In other words, the readiness levels of the learners are important for the success of the e-learning process (Yurdugül & Demir, 2017). If learners do not feel ready, they might be reluctant to the learning process, avoid attending the learning activities, might not be satisfied and fail in the courses (Hung et al. 2010; Yurdugül & Demir, 2017). Readiness for e-learning refers to the

\* Corresponding author. Burdur Mehmet Akif Ersoy University, Türkiye.  
e-mail addresses: [nsevim@mehmetakif.edu.tr](mailto:nsevim@mehmetakif.edu.tr), [oeol@mehmetakif.edu.tr](mailto:oeol@mehmetakif.edu.tr), [vbaser@mehmetakif.edu.tr](mailto:vbaser@mehmetakif.edu.tr)

degree of having pre-knowledge and skills, and affective characteristics such as the necessary attitude and motivation to experience this process most effectively (Lopes, 2007). In addition, readiness for e-learning is the ability to use and benefit from the technologies used in the e-learning process (Kaur & Abas, 2004). Learners who do not ready for e-learning will not only experience an unsuccessful e-learning process but also will develop a negative attitude towards e-learning and will be prejudiced for e-learning (Guglielmino & Guglielmino, 2003). In order to avoid this, the readiness of the students for e-learning should be addressed with all its dimensions, which might be technical, cognitive and affective domain.

Academic goal orientations focus on the beliefs of an individual and explain their purpose or reasons why they participate in a certain academic task (Eccles & Wigfield, 2002). These goals shed light on the efforts of the students and shape their motivations, behaviors, emotions, thoughts in their learning process (Midgley et al., 2001). They use a social-cognitive framework that contributes to the students' motivation, their perceptions of the learning environment, and possible effects of the learning environment on student learning (Meece et al., 2006). Previous studies showed that the relationship between students' academic achievements and their academic goal orientations is significant (Sins et al., 2008). Furthermore, the academic goal orientations of the students also make a positive contribution to their perception of the quality of the learning process in online learning environments (Kickul & Kickul, 2006).

E-learning creates a learner-centered learning approach that might be affected by personal goal orientations. E-learning students need to deal with the information delivery medium which is prone to operational difficulties. They have to learn the use of technology that the instruction is given from and overcome the difficulties like hardware or software failure, congestion, slow network speeds. Due to these characteristics, students with high learning goal orientations are more likely to be engaged in learning strategies that enhance learning performance and be successful in an online environment (Kickul & Kickul, 2006). For all of these, students' goal orientations should be considered before delivering e-learning.

The literature provides a variety of researchers that emphasize the importance of assessing the students' readiness level for successful implementation of the e-learning process (Dikbas, Torun, 2020; So & Swatman, 2006). However, limited studies investigate the relationship between the goal orientations and e-learning readiness level of the university students. Hence, this study aims to identify the relationship between achievement goal orientations and the e-learning readiness level of the students. In line with these purposes, the research questions of the study are:

- Are there a meaningful relationship between achievement goal orientations and the e-learning readiness level of the students?
- To what extent can achievement goal orientation set explain the variables in the E-learning readiness dataset?
- To what extent does a single variable in achievement goal orientation set contribute to predicting the composite of the variables in e-learning readiness dataset?

Investigating the readiness and awareness of the students about e-learning could make a positive contribution to the development studies in e-learning (Dikbas Torun, 2020). Moreover, it would guide the researchers and decision-makers on how to make students more ready for the e-learning process (Yurdugül & Demir, 2017). Finally, investigating the effects of goal orientations of students towards their e-learning might have an effective value to offer students a better e-learning environment and support (Yavuzalp & Bahcivan, 2021).

## 2. Literature

### 2.1. E-learning Readiness

Readiness is an important concept in the educational process and is considered as one of the most important inputs of educational settings (Bloom, 1995). Readiness is about the introductory level of the students to the subject or process, their attitude and, prior knowledge (Yenilmez & Kakmacı, 2008). Thorndike (1971) defines readiness as “mental preparation for learning” and he identified three important points for readiness. Initially if the individual is allowed to do an activity when he is ready, he will be happy. But, if he is forced to do an activity when he does not feel that he is ready or if he is prevented to do the activity even though he is ready, he will be angry.

Evaluation of students' level of readiness before the implementation of the e-learning process is extremely important for their success (Kruger-Ross & Waters, 2013; So & Swatman, 2006). Lopes (2007), defines readiness for e-learning as the individuals' or organizations' ability to benefit from the advantages of e-learning. Kaur and Abas (2004), claim that readiness for e-learning is the ability of individuals using multimedia technologies and e-learning resources to increase the learning quality. Similarly, Warner et al. (1998), explain readiness of learning as the possession of prerequisite skills, knowledge and, beliefs of the students which are necessary for the learning environment. An individual or organization should gain the necessary prior skills or knowledge and affective characteristics like motivation, attitude to experience the e-learning process in the most effective way (Yurdugül & Demir, 2017) since students' readiness for e-learning directly affect their success (Dikbas Torun, 2020). In other words, there is a strong relationship between students' readiness for e-learning and their academic achievement in an online environment (Dikbas Torun, 2020). The high level of readiness of the students enhances the quality of interaction during the e-learning process (Hukle, 2009). It could be claimed that in e-learning systems, the low level of students' e-learning readiness is an important reason for their failure (Piskurich, 2003). Hence, the readiness of the students should be evaluated before the process for successful e-learning applications (So & Swatman, 2006). This assessment helps to design suitable e-learning strategies and gain and successfully implement necessary information and communication technology skills (Kaur & Abas, 2004). Guglielmino & Guglielmino (2003) emphasize that if the students are not ready for e-learning, they can gain negative learning experiences and might be prejudiced towards e-learning.

It is possible to consider e-learning readiness in 6 dimensions: computer self-efficacy, internet self-efficacy, online communication self-efficacy, self-learning, learner control, motivation for e-learning (Hung et al., 2010). Computer and internet self-efficacy refers to the perception of the ability to use the computer and internet technologies (Yurdugül & Demir 2017). Students in e-learning environments need to gain certain orientations and skills to overcome the problems and issues related to e-learning mediums (Alem et al. 2016). Thus, the internet and technology readiness level of the students were the most important factors that affect their satisfaction with the e-learning systems (Parnell & Carraher, 2003). Eastin and LaRose (2000) also found that computer and internet self-efficacy caused performance increase in technical subjects such as document download and lead to better performance in problem-solving in online learning. Similarly, Tsai and Tsai (2003) demonstrate that in a web-based learning process students who developed higher levels of internet self-efficacy learned better than students with lower levels of internet self-efficacy. Online communication self-efficacy refers to understanding the communication structure specific to online environments (Yurdugül & Demir 2017). Self-learning involves learners' ability to set their study methods, set goals, and evaluate themselves. Learner control is the ability of learners to determine how long they will devote to learning material and in which order they will work. Motivation for e-learning refers to the willingness and interest of learners towards e-learning (Hung, et. al. 2010). Students who develop high levels of self-directed learning and motivation are consistent in online discussions whereas those with low levels are prone to avoid online discussions (Sahin et al. 2018).

The literature includes several researches on the e-learning readiness level of university students. For instance, Yurdugül and Demir (2017) investigated the e-learning readiness of 1802 undergraduate students and found that students were ready for e-learning. They found that internet self-efficacy had the highest mean whereas motivation for e-learning was the lowest mean score. They claimed that because students possessed mobile technologies that had internet access, their internet self-efficacy was higher but their low motivation towards e-learning could be explained by affective factors such as desire and interest towards the subject. Additionally, they found that there was a moderate positive relationship between all the sub-factors in the e-learning readiness scale. They showed that self-learning and e-learning readiness as well as online communication self-efficacy and internet self-efficacy were the factors that gave the highest correlation with each other. According to the researchers, the high correlation between online communication self-efficacy and internet self-efficacy might be derived from the fact that students had to know the use of some communication tools to communicate with each other in an online environment. Similarly, Yılmaz et al. (2019) conducted a study with 5021 university students and showed the readiness of students' e-learning level was high. Moreover, they indicated that students' motivation for e-learning and computer self-efficacy were moderate whereas internet self-efficacy, online communication self-efficacy, learner control, and self-directed learning were found high level. Also Cigdem and Ozkan (2022) found that readiness for online learning of participants was at good level and highest average was online communication self-efficacy sub-factor, and with the lowest average was computer/internet self-efficacy sub-factor.

## 2.2. Achievement Goals

Achievement goal orientation is defined as an “integrated pattern of beliefs, attributions, and affect that produces intentions of behavior” (Ames, 1992, p. 261) Achievement goals can be considered as proficiency-relevant goals in which an individual put an effort to be successful (Elliot et al., 2009). They use a social-cognitive framework (Akin & Akin, 2014) to explain competence-relevant behavior (Elliot & Church, 1997).

Achievement goal orientation explains the purpose of individuals to engage in achievement-related behavior (Pastor et al., 2007), the goals that lead people to achieve, their beliefs to reveal the goals, the reasons why they choose those ways, and why they want to learn (Kaplan & Maehr 2007). The theory of achievement goals aims to identify the difference in students' achievement levels although they have similar ability and intelligence capacity (Dweck & Elliot, 1983). It gives attention to students' motivation to the learning and aims to reveal the reasons behind their performance in academic tasks and school activities (Ames, 1992). This theory has taken the attention of the experts in the educational psychology area (Akin, 2006) and is described as an integrated design of characteristics, beliefs, and influences that shapes the purposes of a behavior (Ames, 1992). This theory claim that students are different from each other in terms of their achievement behaviors. The belief of the individual about themselves affects their performance on a task. If an individual believes that they can develop some characteristics like intelligence, they are motivated to improve it and this leads them to do better at school (Elliot & McGregor, 2001).

In earlier studies, it has two main constructs which are learning and performance goals (Dweck & Leggett, 1988). Learning is related to academic and psychological variables whereas performance is about maladaptive ones (Akin & Akin, 2014). Typically, Achievement goal orientations are divided into two basic categories; “mastery goals” and “performance goals” (Ames & Archer, 1988). Mastery goals are related with the effort, persistence (e.g. Greene & Miller, 1996), and the use of deep-processing learning strategies like organization or elaboration (Greene & Miller, 1996) that leads competence development, whereas performance goals define to outperforming and competence demonstration (Polso et al., 2020). Students who adopt learning goals are motivated to learn and want to develop their skills and competence. But, students with performance goals compare themselves with others and want to perform better, receive positive evaluations, or avoid negative judgments about their performance (Dweck & Leggett, 1988).

This dichotomous model of achievement goal orientations was widely accepted in the academic area but it was also criticized by several researchers that performance goal orientation might also be functional and lead students to be more achievement than learning goal orientations (Elliot & Church, 1997). Hence, the achievement goal orientation model was revised and two sub-dimensions are added to Performance goal orientations; “performance-approach” and “performance-avoidance” (Ames, 1992). This trichotomous model proposes that students who adopt performance-approach goal orientations are motivated to demonstrate their skills and perform better than others while students with performance-avoidance goals focus on avoiding the demonstration of their incompetence (Akin & Akin, 2014). Finally, Elliot and McGregor (2001) proposed a more complex theory about achievement goals by adding incorporate and avoidance level to each factor and named 2x2 achievement goal orientation.

According to the 2x2 goal orientation framework, achievement goals are competence and the outcome might be either positive outcomes like success (an approach focus) or negative outcomes like a failure (an avoidance focus) (Pastor et al., 2007). Hence, when a student develops an approach orientation, they are hoping for success but if he adopts avoidance orientation he expects failure. In Elliot and McGregor's (2001) 2x2 achievement goal framework, one dimension is the definition of competence (mastery or performance). Learners define their learning goals by comparing themselves with others or themselves. If they choose to compare themselves with themselves it is called mastery goal or if they compare themselves with their peers it is called performance goal.

The second dimension is the valence of competence (approach or avoidance) (Elliot & McGregor, 2001). Approach goals make students motivated to attain success whereas avoidance goals make them avoid failure (Metallidou & Stamovlasis, 2020). It evaluates the competence as positive or negative. Positive valence is about the motivation for success whereas negative valence is about the motivation to avoid failure (Yeh et al., 2019). Performance avoidance and mastery avoidance are considered as maladaptive performance (Baranik et al., 2010) and they are related with some negative effects like low self-determination, fear of failure (Elliot & McGregor, 2001), or low help-seeking (Baranik et al., 2010). The combination of two dimensions leads to four achievement goal orientations; mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance (Elliot & McGregor, 2001).

### 2.2.1. *Mastery Goals*

Mastery goals are related to adaptive learning strategies like intrinsic motivations, the use of deep level of cognitive strategies problem solving, positive attitudes towards learning, the belief that efforts brings success, persistence, allocation of time on tasks, and effort investment (Ames, 1992; Metallidou & Stamovlasis, 2020). A mastery goal approach defines the persistence of a student, his willingness to learn and to develop new skills as much as possible so it focuses on enhancing knowledge and developing new skills (Elliot & McGregor, 2001). In mastery goal orientation, the learning process is valued, and attaining mastery is considered dependent on effort (Ames & Archer, 1988).

The main goal in the mastery goal orientation is mastery of a task and learning (Tomić et al., 2020). Hence, students who adopt mastery goal orientation are intrinsically motivated. They focus on their improvement and effort as well as judge themselves based on their perceived task self-efficacy and past attainments (Tomić et al., 2020). According to Tomić et al. (2020), the mastery approach positively correlated with final grades and interest. Students are getting high grades and show more interest if they adopt mastery goal orientations. Ames and Archer (1988) showed that students that adopt mastery goals had a more positive attitude towards the class, preferred challenging tasks, use more effective learning strategies and develop a stronger belief that effort leads to success. Xie and Huang (2014) found that students with mastery goals participated in online discussions frequently and claimed that they had gained a great deal from activities in online learning environments.

Mastery goal orientations are also included two-approach/avoidance dimensions and named “mastery approach” and “mastery-avoidance” (Elliot, 1999; Pintrich, 2000). Students with mastery approach and

mastery avoidance goal orientations are both focused on the material comprehension and skills development but their motives behind this willingness are different. Mastery-approach goal orientation is the willingness to maximize the development of ability and learning (Arslan et al., 2017) so students with mastery approach goal orientation try to gain as much knowledge and skills as they can and develop higher self-competence (Elliot & McGregor, 2001; Yeh et al., 2019). Students who develop mastery approach goals are motivated to learn and do well on the assignments (Arslan et al., 2017)

On the other hand, learning avoidance is about the desire to avoid the misunderstood the learning material or not master the task. These students focus on the learning material because of not their comparison with others (a performance-avoidance goal) but rather because of their high standards (Pintrich et al., 2003). Students who develop mastery avoidance goal orientation fear not being able to master all the materials and lose skills (Arslan et al., 2017). They avoid failure in learning to decline competence (Elliot & McGregor, 2001). Hence, they focus on not to lose the knowledge or skills they possess or not to misunderstand the task or material (Pastor et al., 2007). Students with mastery avoidance goals try to avoid situations where they cannot master the task or understand the material (Yeh et al., 2019).

### 2.2.2. *Performance Goals*

Performance-approach goal orientation is about outperforming, the demonstration of competence and ability to others, and achieving success with little effort (Ames & Archer, 1988; Tomić et al., 2020). Performance-approach does not show a relationship between motivation and performance (Church et al., 2001). Performance goals are related to the belief that one cannot succeed, avoidance and escape challenging tasks, adopting superficial learning strategies (Ames, 1992; Ames & Archer, 1988). Performance approach goals are the desire to surpass others, to be best based on the normative standards of social comparison (Metallidou & Stamovlasis, 2020). Students who develop performance goals give their focus on their friends and concerns about how they are being judged based on their performance so they compare themselves with them to analyze their achievements and investigate their self-worth. (Ames, 1992). Students with performance goals emphasized the ability, estimate their ability, and keen to failure if they are lack ability (Ames & Archer, 1988). Tomić et al. (2020) claim that the performance approach negatively correlated with interest. Students generally develop less interest in the course if they adopt performance goal orientations. Moreover, the researchers claim that there is performance goal orientation has no relation with exam performance.

Similar to Mastery goal orientations, performance goal orientations are also included two-approach/avoidance dimensions and are named “performance-approach” and “performance-avoidance” (Elliot & McGregor, 2001). Performance-approach and performance-avoidance students both focus on their performance with the others but their motives are different. Students that adopt the Performance approach orientation attended to the activity in the classroom settings to show that their performance in assignments and tasks is better than the others (Yeh et al., 2019). Harackiewicz et al, (2000) claim that performance-approach affects the final grade of the students.

Contrary, performance-avoidance (PAV) goal orientation defines the desire of the students not to appear incompetent or not be able to achieve compared to others (Wolters, 2004). Students who adopt performance-avoidance goals participate in the learning activities avoid negative judgments about their performance (Pintrich, 2000). Performance avoidance goals are related to maladaptive learning patterns like low interest and performance, self-handicapping behavior, the use of rote memory strategies (Metallidou & Stamovlasis, 2020). Performance avoidance (PAV) is about the fear of failure, of showing a lack of competence (Metallidou & Stamovlasis, 2020). Students with PAV try to demonstrate their skills to avoid judgments about their skills and competence (Yeh et al., 2019). Performance avoidance students focus on not performing worse than others and not being judged as incompetent (Pastor et al., 2007). They are related to the shallow-processing strategies usage like memorization, unrelated persistence and effort, and negative relatedness with achievement (e.g., Greene & Miller, 1996). The performance-avoidance

approach correlated with negative outcomes (Senko et al., 2011). PAV affected negatively the non-posting behavior of the students and their perception of learning in an online environment (Xie & Huang, 2014).

### 3. Methodology

#### 3.1. Research Model

In this study a correlational research design was employed in order to see the degree of correlation between e-learning readiness set (factors) and goal orientation set (factors). In correlational research, the relationship between variables were investigated without manipulating or controlling any of them (Fraenkel & Wallen, 2006).

#### 3.2. Participants of the Study

The participants consisted of 475 college students, 51% (n=242) of whom were male, and 49% (n=233) were female enrolled in seven different faculties. Also, data were collected from 27.6% (n=131) freshmen, 27.6% (n=131) sophomores, 19.3% (n=92) juniors, and 25.5% (n=121) seniors. In this study, the convenience sampling method was applied. According to Fraenkel et al. (2012), convenience sampling limit the population's representativeness. Hence, the demographics of the sample should be provided in detail to increase the external validity of the study. The detailed information about the sample allows the readers to identify the extent to which the findings can be applied. Hence, the demographics of the sample are depicted in Table 1 in detail.

**Table1.**

Participants' Demographic Characteristics

Variables	N	%
Gender		
Male	242	51
Female	233	49
Faculty		
Faculty of Education	144	30.3
Faculty of Science and Literature	51	10.7
Faculty of Economics and Administrative Sciences	50	10.5
Faculty of Veterinary	47	9.9
Faculty of Divinity	54	11.4
School of Physical Education and Sports	76	16.0
Faculty of Health Sciences	53	11.2
Class Level		
Freshmen	131	27.6
Sophomores	131	27.6
Juniors	92	19.3
Senior	121	25.5
Total	475	100

#### 3.3. Data Collection Tools

In this study, two different data collection tools were employed.

##### 3.3.1. University Students' E-learning readiness Scale

It is a 7-point Likert type scale formed by Yurdagül and Demir (2017). It consists of 33 items under six factors; computer self-efficacy (5 items), internet self-efficacy (4 items), online communication self-efficacy (5 items), self-directed learning (8 items), learner control (4 items), and motivation towards e-learning (7 items). The first three factors assess the competence of the learners in e-learning while the others are related to learner autonomy. The maximum score that could be gained from the university students' e-learning scale was 231 and the minimum score was 33. For this study, the formula (highest value-lowest

value)/evaluation interval number were applied to calculate the score range for low, medium and high levels. The calculation result indicates the interval between 1-3 as low, 3-5 as medium and 5-7 as high level. The higher scores indicate a higher level of e-learning readiness. In fact; Yurdugül and Demir (2017) claim that a score higher than 3.5 gained in the e-learning readiness scales shows the readiness of the students for the e-learning process. The Cronbach's alpha level of the scale was .93. According to Field (2013), the Cronbach's alpha level above .8 indicates that the reliability of the scale is high so the original scale can be considered as reliable. In addition, the Cronbach's alpha level values of the factors were given as .84, .85, .84, .88, .91 and .95 respectively. In this study, the Cronbach's alpha level of the questionnaire was calculated as .96. The six dimensions of Cronbach's alpha level were .90, .90, .88, .92, .90 and .94 which indicates that the use of this instrument in this study allowed for reliable results.

### 3.3.2. 2X2 achievement goal orientation scale

It is a 5-point Likert type scale formed by Akın (2006). It includes 26 items under four factors; Learning-approach (8 items), learning-avoidance (5 items), performance-approach (7 items), and performance-avoidance (6 items). The Cronbach's alpha level of the scale was .95. In addition, the Cronbach's alpha level values of the factors were given as .92, .97, .97, and .95 respectively. In this study, the Cronbach's alpha level of the questionnaire was calculated as .86 and Cronbach's alpha level of the four dimensions were .94, .85, .82, and .88 which indicates that this instrument also allows the researchers to obtain reliable results.

### 3.4. Data Collection Process

The study was conducted during the fall semester of the academic year 2019-2020 and the data was gathered from a public university located in the Mediterranean Area of Turkey. As this study was carried out, the researchers got Ethical Review Board (ERB) permissions to ensure that there were no ethical problems regarding the study. Before delivering the questionnaire, the students were informed about the aim of the study and kindly asked whether they filled out the questionnaire voluntarily. The researchers reassured the students about their privacy. They informed them that there were no questions that revealed their identity and asked them to complete it as accurately as possible. The questionnaires were delivered to the students in printed form and the completion of it took ten or fifteen minutes.

### 3.5. Data Analysis

This study aims to identify to what extent the achievement goal orientation set (independent variable set) explains the E-learning readiness set (dependent variables set). Hence, a canonical correlation analysis (CCA) was performed to analyze the data by using SPSS 21 package program.

CCA is used to investigate and measure the relations between two sets of variables and it calculates the relationship between the variable sets in a maximum way. CCA analysis has three main goals; 1) to investigate the relationships between a set of multiple dependent and independent variables 2) to maximize the correlations between sets of multiple dependent and independent variables via canonical roots or functions 3) to estimate the relative importance of each variable to the canonical functions (Tabachnick & Fidell, 2013). Multivariate methods such as CCA are powerful tools because it allows researchers to understand reality more accurately by not forcing them to discard the variance of any variable in the dataset. According to Thompson (2005), researchers give importance to multiple outcomes since they are initiated by multiple factors and most causes have a variety of effects. Moreover, Multivariate methods control the inflation of Type 1 error (Thompson, 2005).

The number of canonical functions is determined by the number of variables in sets. The maximum number of canonical functions is created based on the set with the fewest variables. In this research, the e-learning readiness set includes six variables (learning readiness computer self-efficacy internet self-efficacy online communication self-efficacy self-directed learning learner control motivation towards e-learning) whereas the achievement goal orientation set contains four variables (Learning approach goal orientations, Learning



avoidance goal orientations, Performance approach goal orientations and Performance avoidance goal orientation). Hence, in this study, four canonical functions (roots) were created.

Before conducting CCA, the assumptions of CCA were tested to see whether they are met. CCA has several assumptions which are sample size, univariate normality, multivariate normality, linearity, multicollinearity, and homoscedasticity (Tabachnick & Fidell, 2013). The sample size should exceed at least 20 times the total number of variables (Stevens, 2009). In this study, there are six variables under the e-learning readiness set and four variables under the achievement goal orientation set. Hence the sample size should be at least 200. In this study there are 475 participants thus, it can be claimed that the sample size exceeds the minimum sample size to perform CCA. For the univariate normality, skewness and kurtosis values, histograms, and Q-Q plots were examined and it is seen that all variables in the data sets showed a distribution close to normal. Mahalanobis distance values and outliers were analyzed for the multivariate normal distribution, and it was established that the distance values were not higher than the critical value of 29.59 (Pearson & Hartley, 1958). CCA requires linear relations among the variables. To meet the linearity assumption, the scatterplots of each pair of variables are examined for outliers and curvilinear patterns and be ensured that there is a linear relationship between variables. For the multicollinearity, the Pearson correlation was examined and it is seen that the Pearson correlation was lower than .9 which indicates that there is no multicollinearity among the variables. Moreover, the values of VIF and tolerance are examined, and seen that the tolerance values are not smaller than 0.10 as well as the VIF values are smaller than 10 (O'Brien, 2007). To determine the strength of the relationship as a result of the correlation, the  $r$  values were evaluated. If the  $r$  value is between 0 and 0.30, it is expressed as a low-level relationship, between 0.30 and 0.70 as a medium level relationship, and between 0.70 and 1.00 as a high-level relationship (Büyüköztürk, 2012). Finally, homoscedasticity describes a situation in which the variance of residuals is the same for all independent variables. To check the homoscedasticity, a scatterplot was examined and saw that residuals were close to rectangular distribution.

#### 4. Findings

In Table 2, the descriptive statistics regarding the participants' achievement goals and e-learning readiness were given in detail. Also, female participants gained higher mean scores in mastery goals than performance goals. In other words, female participants in this study adopted learning-approach ( $M= 3.47$ ,  $SD= .69$ ) and learning-avoidance ( $M=3.16$ ,  $SD=.78$ ) goals more than performance-approach ( $M=2.77$ ,  $SD=.88$ ) and performance-avoidance ( $M=2.80$ ,  $SD=.82$ ) goals. Additionally, female participants in this study gained the highest mean scores in internet self-efficacy ( $M=5.07$ ,  $SD=1.71$ ) and online communication self-efficacy ( $M= 4.62$ ,  $SD=1.66$ ) and lowest mean scores in motivation towards e-learning ( $M=3.85$ ,  $SD=1.72$ ) and computer self-efficacy ( $M=4.11$ ,  $SD=1.67$ ). Likewise, male participants in this study also adopted mastery goals than performance goals. Male participants developed learning-approach ( $M= 3.34$ ,  $SD= .71$ ) and learning-avoidance ( $M=3.04$ ,  $SD=.75$ ) goals more than performance-approach ( $M=2.82$ ,  $SD=.86$ ) and performance-avoidance ( $M=2.78$ ,  $SD=.79$ ) goals. Similar to female participants, male participants in this study gained the highest mean scores in internet self-efficacy ( $M=5.09$ ,  $SD=1.53$ ) and online communication self-efficacy ( $M= 4.94$ ,  $SD=1.35$ ) and lowest mean scores in motivation towards e-learning ( $M=3.81$ ,  $SD=1.65$ ) and computer self-efficacy ( $M=4.35$ ,  $SD=1.50$ ).

**Table 2.**

Descriptive Statistics of the Variables

Variables	Female		Male		Total		Wilks's test of
	M	SD	M	SD	M	SD	
Learning-approach	3.47	.69	3.34	.71	3.40	.70	
Learning-avoidance	3.16	.78	3.04	.75	3.10	.77	
Performance-approach	2.77	.88	2.82	.86	2.80	.87	
Performance-avoidance	2.80	.82	2.78	.79	2.79	.80	
Computer self-efficacy	4.11	1.67	4.35	1.50	4.23	1.59	
Internet self-efficacy	5.07	1.71	5.09	1.53	5.08	1.62	
online communication self-efficacy	4.62	1.66	4.94	1.35	4.78	1.52	
self-directed learning	4.60	1.53	4.62	1.30	4.61	1.42	
learner control	4.72	1.64	4.66	1.47	4.69	1.55	
motivation towards e-learning	3.85	1.72	3.81	1.65	3.83	1.68	
N	233		242		475		

significance was analyzed to estimate the number of significant canonical correlations and the test revealed that the first three canonical correlations were significant ( $R_c = .464$ , Wilks's (24) = .660,  $p = .000$ ;  $R_c = .310$ , Wilks's (15) = .841,  $p = .000$ ;  $R_c = .244$ , Wilks's (8) = .933,  $p = .000$  respectively). Only the last canonical correlation was not found to be of statistical significance. The first variate pair explained 21.5 % of the variance, the second variate pair explained an additional 9.6 % of the variance and the third pair explained 6 % of the variance. The total pooled variance explained by the three statistically significant canonical correlation analyses was 37.1%. In Table3 the results of the canonical correlation analysis are given in detail.

**Table3.**

Canonical Correlations, Wilks's Test of Significance and Variance Explained by Canonical Variates of achievement goal orientation and E-learning readiness sets

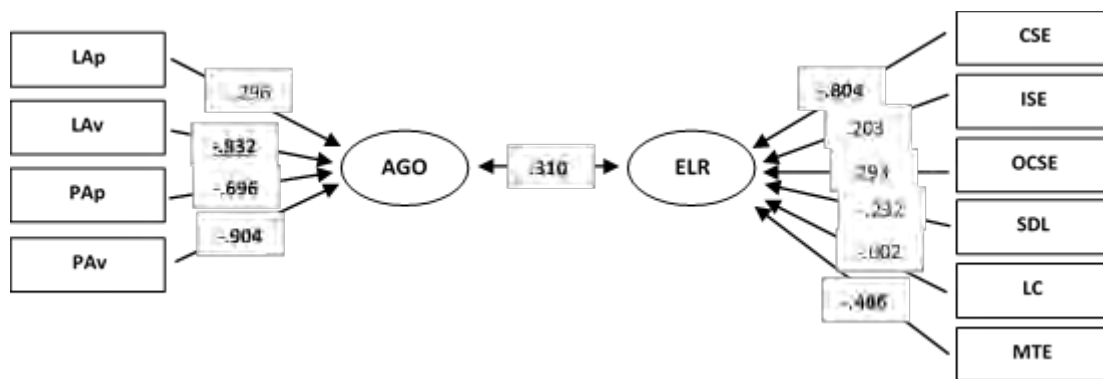
	Rc	Wilks's Test	Df	P	Rc <sup>2</sup>
1	.464	.660	24	.000	.215
2	.310	.841	15	.000	.096
3	.244	.930	8	.000	.060
4	.105	.989	3	.158	.011

Figure 1 shows the canonical correlations and variances explained by canonical variates of achievement goal orientation and e-learning readiness scale. Using a cutoff structure coefficient of 0.30, the first canonical function revealed that in the achievement goal orientations set, only Learning Approach Goal Orientations (-.935) were correlated with the achievement goal orientations variate. Moreover, Learning Approach Goal Orientations was 87.42% useful in explaining variance in the achievement goal orientations variate. Conversely, in the e-learning readiness set all the variables were correlated with the e-learning readiness variate in the first canonical function. The variables correlated to the first canonical variate in the e-learning readiness set were in order of magnitude; Self-Directed Learning (-.929). Learner Control (-.902). Internet Self-Efficacy (-.848). Online Communication Self-Efficacy (-.824). Computer Self-Efficacy (-.696) and Motivation towards E-Learning (-.353). The results also show that there is a positive relationship between all the variables in the e-learning readiness set. In other words, an increase in one variable in the set causes an increase in all other variables in the set. Moreover, Self-Directed Learning was 86.3% useful, Learner Control was 81.36% useful, Internet Self-Efficacy was 71.91% useful, Online Communication Self-Efficacy was 67.90% useful, Computer Self-Efficacy was 48.44% useful and finally Motivation Towards E-Learning was 12.46% useful in explaining variance in the e-learning readiness variate. Finally, the first canonical function shows that there is a positive relationship between all the variables in the e-learning readiness set and Learning Approach Goal Orientations variable in the achievement goal orientations set which implies that a student with higher learning approach goal orientations gains higher scores in all variables in the e-learning readiness scale.



**Fig.1.** First canonical function model

Using a cutoff structure coefficient of 0.30, the second canonical function indicates that Performance Avoidance Goal Orientations (-.904), Learning Avoidance Goal Orientations (-.832) and Performance Approach Goal Orientations (-.696) were correlated with the achievement goal orientations variate in the achievement goal orientations set. Moreover, Performance Avoidance Goal Orientations was 81.72% useful, Learning Avoidance Goal Orientations was 69.22% useful and Performance Approach Goal Orientations was 48.44% useful in explaining variance in the achievement goal orientations variate and they were positively correlated with each other. Regarding with e-learning readiness set, only Computer Self-Efficacy (-.804) and Motivation towards E-Learning (-.486) variables were correlated with the e-learning readiness variate. They were positively correlated with each other which indicates that an increase in Computer Self-Efficacy in the set leads to an increase in Motivation towards E-Learning. Moreover, Computer Self-Efficacy was 64% and Motivation towards E-Learning was 23.62% useful in explaining variance in the e-learning readiness variate. Similarly, there is a positive relationship between Computer Self-Efficacy and Motivation Towards E-Learning variables in e-learning readiness set and Learning Avoidance Goal Orientations. Performance Approach Goal Orientations and Performance Avoidance Goal Orientations in the achievement goal orientations set. Based on the second canonical function. It can be claimed that a student with higher Learning Avoidance Goal Orientations, Performance Approach Goal Orientations, and Performance Avoidance Goal Orientations gains higher scores in all variables in the e-learning readiness scale.



**Fig. 2.** Second canonical function model

In the third and final canonical function, using a cutoff structure coefficient of 0.30, Performance Approach Goal Orientations (-.603) and Learning Avoidance Goal Orientations (.408) were correlated with the achievement goal orientations variate in the achievement goal orientations set. Furthermore, the variables have a negative relationship between each other and Performance Approach Goal Orientations was 36.36% useful and Learning Avoidance Goal Orientations was 16.65% useful in explaining variance in the achievement goal orientations variate. In the e-learning readiness set, only Internet Self-Efficacy (.419) and

Learner Control (-.352) variables were correlated with the e-learning readiness variate. The results show that there is a negative relationship between the variables Internet Self-Efficacy and Learner Control in the e-learning readiness set. In other words, an increase in internet self-efficacy in the set leads to a decrease in learner control. Moreover, Internet Self-Efficacy was 17.56% and Learner Control was 12.39% useful in explaining variance in the e-learning readiness variate. Finally, the Internet Self-Efficacy variable was positively correlated with Learning Avoidance Goal Orientations and negatively with Performance Approach Goal Orientations. In contrast, Learner Control has a positive relationship with Performance Approach Goal Orientations and a negative relationship with Learning Avoidance Goal Orientations.



Fig. 3. Third canonical function model

Table4.

Canonical Loadings. Standardized Coefficients and Percentages of Variance. Between achievement goal orientation and e-learning readiness sets

Variable	First Canonical Variate			Second Canonical Variate			Third Canonical Variate		
	Coef	$r_s$	$r_s^2(\%)$	Coef	$r_s$	$r_s^2(\%)$	Coef	$r_s$	$r_s^2(\%)$
<b>Achievement Goal orientation Set (AGO)</b>									
Learning approach goal orientations (LAp)	-.969	<b>-.935</b>	87.42	.060	-.296	8.76	-.317	-.110	1.21
Learning avoidance goal orientations (LAv)	-.062	-.299	8.94	-.515	<b>-.832</b>	69.22	1.002	<b>.408</b>	16.65
Performance approach goal orientations (PAp)	-.071	-.038	0.14	-.075	<b>-.696</b>	48.44	-.841	<b>-.603</b>	36.36
Performance avoidance goal orientations (PAv)	.429	.170	2.89	-.594	<b>-.904</b>	81.72	-.171	-.289	8.35
<b>E-learning readiness Set (ELR)</b>									
Computer self-efficacy (CSE)	-.065	<b>-.696</b>	48.44	-.443	<b>-.804</b>	64.00	.072	.175	3.06
Internet self-efficacy (ISE)	-.303	<b>-.848</b>	71.91	.383	.203	4.12	1.386	<b>.419</b>	17.56
Online communication Self-efficacy (OCSE)	-.046	<b>-.824</b>	67.90	.857	.293	8.59	-.828	-.071	0.50
Self-directed learning (SDL)	-.371	<b>-.929</b>	86.30	-1.304	-.232	5.38	.380	-.047	0.22
Learner control (LC)	-.364	<b>-.902</b>	81.36	.811	-.002	0.000	-.952	<b>-.352</b>	12.39
Motivation towards e-learning (MTE)	.035	<b>-.353</b>	12.46	-.690	<b>-.486</b>	23.62	-.108	-.293	8.59

### 5. Discussions Conclusion & Suggestion

This study aims to identify the achievement goal orientations and e-learning readiness level of the students. Moreover, it reveals to what extent the achievement goal orientation set explains the E-learning readiness set.

In this study, the data showed that students develop mastery goals rather than performance goals. This finding is similar to the research conducted by Yeh et al. (2019). In their study, Yeh et al. (2019) found that participants developed mastery-approach goals performance-approach goals rather than mastery avoidance and performance-avoidance. Academic goal orientation focuses on the beliefs of an individual and explains their purpose or reasons why they participate in certain academic tasks (Eccles & Wigfield, 2002; Midgley et al., 2001; Pintrich, 2000). These goals shed light on the efforts of the students and shape their motivations, behaviors, emotions, thoughts in their learning process (Midgley et al., 2001). Students who adopt learning goals are motivated to learn and want to develop their skills and competence (Dweck & Leggett, 1988). But, students with performance goals compare themselves with others and want to perform better, receive positive evaluations, or avoid negative judgments about their performance (Dweck & Leggett, 1988). This study indicates that the students were motivated to learn and master their skills for their future careers rather than focusing on comparing their performance with others.

This study showed that the e-learning readiness level of the students was high which indicates that they are ready for e-learning. This finding is consistent with the previous studies conducted by Yılmaz et al., (2019) Yurdugül and Demir (2017) and Cigdem and Ozkan(2022). They also demonstrated that students e-learning readiness level was also high whereas Elçiçek and Erdemci (2021) found that the e-learning readiness of the students in higher education was medium.

Sahin et al. (2018) claim that the readiness of the online learners includes several sub-constructs such as learner control, communication, motivation, etc. The level of having these skills can differentiate the online learning behaviors of the students. The students who have low levels of these skills might not be successful in the e-learning process, and because they are more likely to avoid a learning task or do not want to attend online discussions (Sahin et al., 2018). For this reason, the determination of these sub-factors levels is important in advance. Unfortunately, the participants in this study gained a medium-level score from the majority of the dimensions. Only internet self-efficacy of the students was high whereas their computer self-efficacy, online communication self-efficacy, self-directed learning, learner control, and motivation towards e-learning was medium. It is seen that the motivation of students towards e-learning was the lowest mean value whereas internet self-efficacy was the highest. In their study, Elçiçek and Erdemci (2021) reported that the participants' self-learning, learner control and self-efficacy were high but their computer and communication self-efficacy and motivation for e-learning were medium. But Yılmaz et al. (2019) showed that students' motivation for e-learning and computer self-efficacy were moderate whereas internet self-efficacy, online communication self-efficacy, learner control and self-directed learning were found high level. On the other hand, Yurdugül and Demir (2017) found that internet self-efficacy had the highest mean whereas motivation for e-learning was the lowest mean like the findings in this study. According to Yurdugül and Demir (2017), students use mobile technologies and access the internet in their daily life which might increase their internet self-efficacy. But the authors also claim that their low motivation towards e-learning could be explained by affective factors such as desire and interest.

This study also showed that there is a statistically significant relationship between e-learning readiness and achievement goal orientations of the students. Three of the four canonical correlations were significant statistically at the  $p < .01$  level which indicates that variables' linear combinations were related. The three significant correlations explained totaled 37.1% of the pooled variance. The first variate pair explained 21.5% of the variance, the second variate pair explained an additional 9.6 % of the variance and the third pair explained only 6% of the variance. The findings indicate that the relationship between achievement goal orientations and e-learning readiness existed indeed but the relationship was medium in the first canonical correlation ( $r = .464$ ) and the second canonical correlation ( $r = .310$ ), small in the third canonical correlation ( $r = .244$ ) and it explained a small amount of variance (total pooled variance was 37.1%).

The first canonical variate showed that only the learning-approach goal was an important contributor in the achievement goal orientation set whereas in the e-learning readiness set all six inputs were contributors. The most important contributors were self-directed learning and learner control whereas the least important

were motivation towards e-learning. In their study, Yurdugül and Demir (2017) found that there was a moderate positive relationship between all the sub-factors in the e-learning readiness scale. This study also shows that all the variables were positively correlated to the first canonical variate in the e-learning readiness set. But, when students' achievement goal orientations and their e-learning readiness level were examined together, it is seen that self-directed learning and learner control become the most important contributors. Yurdagül and Demir (2017) describe self-learning as learners' ability to set their own study methods, set goals, and evaluate themselves while they express learner control as the ability of learners to determine how long they will devote to learning material and in which order they will work. The students in this study generally develop mastery goals rather than performance goals so it can be claimed that they are motivated to learn and want to develop their skills and competence (Dweck & Leggett, 1988). As stated by Yeh et al. (2019) there is a close connection with, learning strategies and behaviors of the students and their achievement goal orientations. Wang and Lehman (2021) claim that the achievement goal orientations of the students affected cognition, emotion, strategies adaptation, and motivation of the students might lead to differentiated support needs and learning outcomes. For this study, the focus of the students on the development of their skills and competence might affect their decision on their own goals and study methods as well as help them to determine the time they allocate to study the learning material.

In this quantitative study, the relationship between e-learning readiness and goal orientation was examined, and findings were obtained about the direction and size of the relationship. Qualitative studies should be conducted to examine the relationship in more detail. Furthermore, more studies should be conducted with large numbers of participants.

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