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Analyzing the relationship between student engagement in Online Learning and Achievement with mediator variables of Readiness and Learning climate during the COVID-19

Background: Creating conditions that guarantee the engagement of students in e-learning (online) courses and their academic achievement, has been very important and especially, after the outbreak of Covid-19 pandemic, it became even more necessary. The purpose of this study is to determine the effect of online students' engagement on the achievement of learning, based on the mediating variables of online learning readiness and climate, by answering research questions.

Method: The present study was fundamental and the statistical population were all students studying in the second half of the academic year 2020-2021, the undergraduate and graduate courses who had enrolled in virtual higher education courses and at least passed one semester final exam in the virtual course, (LMS course). The sample size was influenced by the assumptions of exploratory factor analysis and the number of constituents of five questionnaires. Using the facilities of the Internet and registration in Google, the questionnaires were provided to students by the researcher for 37 days, and according to self-declaration, 407 answers that were fully identified in every way, were selected and used in the final calculations. This study was derived from the distance education planning doctorate that was conducted in the year 2020-2021 at the graduate education center of Payam Noor University, Tehran.

Results: The engagement of online students had a direct effect on two intermediate variables (readiness for learning and online learning climate). It also had a direct impact on the achievement in online learning.

Conclusion: There were strong relationships between the online students' readiness and engagement and the quality of online learning climate with academic achievement.

Keywords: Online Student Engagement, Online Learning Achievement, Online Learning Readiness, Online Learning climate, Path Analysis

اثر التزام و تعهد به یادگیری بر خطا بر موفقیت در یادگیری با متغیرهای واسطه ای آمادگی و جو یادگیری در دوران همه گیری کووید-۱۹

زمینه و هدف: ایجاد شرایطی که التزام و تعهد) دانشجویان در دوره های آموزش الکترونیکی (برخط) و موفقیت تحصیلی آنها را تضمین نماید، اهمیت زیادی داشته است و به طور خاص، پس از شیوع بیماری همه گیر کووید-۱۹، ضرورت بیشتری یافت. هدف از پژوهش حاضر، تعیین اثر التزام و تعهد دانشجویان برخط بر موفقیت در یادگیری، بر پایه متغیرهای واسطه ای آمادگی و جو یادگیری برخط، از طریق پاسخ به پرسش های پژوهش انجام می شود.

روش: مطالعه حاضر بنیادی است و جامعه آماری تمام دانشجویان شاغل به تحصیل در نیم سال دوم سال تحصیلی ۱۳۹۹-۱۴۰۰ دوره های کارشناسی و کارشناسی ارشد که در دوره های مجازی، ثبت نام کرده و دست کم یک آزمون پایان ترم تحصیلی را در دوره مجازی (LMS) گذرانده باشند، می باشند. پرسشنامه چهارگانه، توسط پژوهشگر در اختیار دانشجویان قرار گرفته و بنا به خوداظهاری، تعداد ۴۰۷ پاسخنامه، انتخاب و در محاسبات نهایی مورد استفاده قرار گرفت. این مطالعه برگرفته از دکترای برنامه ریزی آموزش از راه دور می باشد که در سال ۱۳۹۹-۱۴۰۱ در مرکز تحصیلات تکمیلی دانشگاه پیام نور تهران، انجام شد.

یافته ها: التزام و تعهد دانشجویان برخط، تاثیر مستقیمی بر دو متغیر واسطه ای (آمادگی یادگیری و جو یادگیری برخط) دارد. همچنین به صورت مستقیم بر موفقیت در یادگیری برخط، تاثیر دارد.

نتیجه گیری: ارتباطی قوی، میان آمادگی و التزام دانشجویان برخط و کیفیت جو یادگیری، با موفقیت وجود دارد.

واژه های کلیدی: التزام و تعهد دانشجویان برخط، موفقیت و دستاورد در یادگیری برخط، آمادگی یادگیری برخط، جو یادگیری برخط، تحلیل مسیر

تحلیل العلاقة بين مشاركة الطلاب في التعلم عبر الإنترنت والإنجاز باستخدام المتغيرات الوسيطة لمناخ الجاهزية والتعلم أثناء وباء COVID-19

الخلفية: كان خلق الظروف التي تضمن مشاركة الطلاب في دورات التعلم الإلكتروني (عبر الإنترنت) وإنجازهم الأكاديمي أمراً مهماً للغاية، وخاصة بعد تفشي وباء Covid-19، أصبح الأمر أكثر أهمية. الغرض من هذه الدراسة هو تحديد تأثير مشاركة الطلاب عبر الإنترنت على تحقيق التعلم، بناءً على المتغيرات الوسيطة للاستعداد للتعلم عبر الإنترنت والمناخ، من خلال الإجابة على أسئلة البحث.

الطريقة: كانت الدراسة الحالية أساسية وكان المجتمع الإحصائي جميعاً الطلاب الذين يدرسون في النصف الثاني من العام الدراسي ٢٠٢٠-٢٠٢١، ودورات البكالوريوس والدراسات العليا الذين التحقوا بدورات التعليم العالي الافتراضية واجتازوا على الأقل امتحاناً نهائياً لفصل دراسي واحد في دورة افتراضية) دورة (LMS) تأثر حجم العينة بافتراضات تحليل العامل الاستكشافي وعدد مكونات خمسة استبيانات. باستخدام تسهيلات الإنترنت والتسجيل في جوجل، تم توفير الاستبيانات للطلاب من قبل الباحث لمدة ٣٧ يوماً، وفقاً للإقرار الذاتي، تم اختيار ٤٠٧ إجابات تم تحديدها بالكامل بكل الطرق واستخدامها في الحسابات النهائية. هذه الدراسة مستمدة من الدكتوراه في تخطيط التعليم عن بعد التي أجريت في عام ٢٠٢٠-٢٠٢١ في مركز التعليم العالي بجامعة بايام نور، طهران.

النتائج: كان لمشاركة الطلاب عبر الإنترنت تأثير مباشر على متغيرين متوسطين (الاستعداد للتعلم ومناخ التعلم عبر الإنترنت). كما كان له تأثير مباشر على التحصيل في التعلم عبر الإنترنت.

الخلاصة: كانت هناك علاقات قوية بين استعداد الطلاب عبر الإنترنت ومشاركتهم وجودة مناخ التعلم عبر الإنترنت مع التحصيل الدراسي.

الكلمات المفتاحية: مشاركة الطلاب عبر الإنترنت، التحصيل التعليمي عبر الإنترنت، الاستعداد للتعلم عبر الإنترنت، مناخ التعلم عبر الإنترنت، تحليل المسار

COVID-19 کی وبا کے دوران تیاری اور سیکھنے کے ماحول کے ثالثی متغیرات کے ساتھ آن لائن لرننگ اور اچھیمنت میں طلباء کی مصروفیت کے درمیان تعلق کا تجزیہ

پس منظر: ایسے حالات پیدا کرنا جو ای لرننگ (آن لائن) کورسز میں طلباء کی شمولیت اور ان کی تعلیمی کامیابی کی ضمانت دیتے ہیں، بہت اہم رہا ہے اور خاص طور پر، کووڈ-۱۹ کی وبا کے پھیلنے کے بعد، یہ اور بھی ضروری ہو گیا ہے۔ اس مطالعہ کا مقصد تحقیقی سوالات کے جوابات دے کر آن لائن سیکھنے کی تیاری اور آب و ہوا کے ثالثی متغیرات کی بنیاد پر سیکھنے کے حصول پر آن لائن طلباء کی مصروفیت کے اثر کا تعین کرنا ہے۔

طریقہ: موجودہ مطالعہ بنیادی تھا اور شماریاتی آبادی تعلیمی سال ۲۰۲۰-۲۰۲۱ کے دوسرے نصف حصے میں زیر تعلیم تمام طلباء تھے، انڈرگریجویٹ اور گریجویٹ کورسز جنہوں نے ورجوئل بائر ایجوکیشن کورسز میں داخلہ لیا تھا اور کم از کم ایک سمسٹر فائنل امتحان پاس کیا تھا۔ ورجوئل کورس، (LMS کورس)۔ نمونہ کا سائز ریسرچ فیکٹر تجزیہ کے مفروضوں اور پانچ سوالناموں کے اجراء کی تعداد سے متاثر ہوا تھا۔ گوگل میں انٹرنیٹ اور رجسٹریشن کی سہولتوں کو استعمال کرتے ہوئے، محقق کی جانب سے طلباء کو ۳۷ دنوں کے لیے سوالنامے فراہم کیے گئے، اور خود اعلانیہ کے مطابق، ۴۰۷ جوابات جن کی ہر طرح سے مکمل شناخت کی گئی تھی، کو منتخب کر کے حتمی حساب کتاب میں استعمال کیا گیا۔ یہ مطالعہ فاصلاتی تعلیم کی منصوبہ بندی کی ڈاکٹریٹ سے اخذ کیا گیا ہے جو پیام نور یونیورسٹی، تہران کے گریجویٹ تعلیمی مرکز میں سال ۲۰۲۰-۲۰۲۱ میں منعقد کیا گیا تھا۔

نتائج: آن لائن طلباء کی مصروفیت کا براہ راست اثر دو درمیانی متغیرات (سیکھنے کی تیاری اور آن لائن سیکھنے کے ماحول) پر پڑا۔ اس کا براہ راست اثر آن لائن سیکھنے کی کامیابی پر بھی پڑا۔

نتیجہ: آن لائن طلباء کی تیاری اور مصروفیت اور تعلیمی کامیابی کے ساتھ آن لائن سیکھنے کے ماحول کے معیار کے درمیان مضبوط تعلقات تھے۔

مطلوبہ الفاظ: آن لائن طالب علم کی مصروفیت، آن لائن سیکھنے کی کامیابی، آن لائن سیکھنے کی تیاری، آن لائن سیکھنے کا ماحول، راستے کا تجزیہ

INTRODUCTION

Since 2020, due to the sudden emergence of the Covid-19 pandemic, many changes have been made in daily life, especially in the world's education system. Universities, more than before, felt the need to change traditional teaching and learning methods in closed and crowded classrooms. An alternative approach was to use distance learning to train students. Distance or online (electronic) education is one of the phenomena of today's world that has emerged in the information age and in the knowledge-based society. Electronic learning is the product of the cycle of rapid changes entering the field of technology in the real sense, which has revolutionized the field of education. The covid-19 pandemic has created a unique opportunity to adapt and improve medical education with online teaching methods and virtual education. In the past, medical universities mostly used the lecture method in education and teaching methods in various courses, and as a result of the Covid-19 pandemic, a rapid transition to virtual learning took place (1). It is obvious that the achievement of students in online courses has different definitions and criteria, and trying to understand this issue and designing opportunities that can guarantee the achievement of students is considered essential. In addition, determining what factors can significantly affect the achievement and progress of students (especially the factors that are under the control of the students themselves), will increase the results and profits in this field. The achievement of online students is determined and measured in different ways. Two of the most common criteria for measuring students' achievement are class rank and grade and retention rate. Picano (2002), pointed out that the performance or achievement of students can be identified by various methods, including grades and memorization and learning, but of course evaluation should not be limited to these two methods. It seems that the achievement of students in online courses is determined at least by examining the number of times they enter the course, especially if it is accompanied by the index of participation and interaction (2). According to Dixon (2015), students' engagement is one of the factors that determine the quality and achievement of online learning. The most common and accepted definition of student engagement is "a multifaceted structure that includes effort, flexibility, and stability when facing obstacles and problems (strength), passion, inspiration, and pride in academic learning (dedication) and being involved in activities and learning tasks (absorption). These three items are considered as the main aspects of this structure (3). According to Kap et al. (2020), the reduction in the level of engagement of students during the Covid-19 pandemic is due to reasons such as the lack of focus and interest in virtual classes and the absence of a positive and collaborative learning environment in their surroundings (4). Some professors express concern about the lack of interaction and engagement of students in online learning environments. Interaction and engagement between students, professors and course content are considered as key structures to improve classroom environment and atmosphere. For this reason, Allen (2015) warned educators to be aware of the consequences of distancing students from the experiences of

being in the university environment (5). Students' engagement to online learning creates an opportunity to be accountable and responsible for their own learning. Students' engagement is: "Their feeling of satisfaction with their progress, enjoying their favorite activities and remaining in a sense of self-worth in interactions with peers", Student engagement, like an intermediary and a chain, connects important fields such as student living environments, university, hall and educational space for the academic achievement of a student (6). In general, for achievement and progress in online learning, students must acquire mental, technical, social and communication readiness before starting online courses. Bernard et al. (2004), in their studies, have classified online learning readiness in four forms: 1-Readiness to acquire online skills 2-Readiness to self-direct the online learning process 3-Readiness to believe and trust online learning 4-Delight to interact and communicate with professors and students in online courses (7). Recent research has shown that readiness for online education has a positive effect on students' achievement in this type of learning, satisfaction with learning experiences, self-confidence, and lifelong learning (8). In reviewing and analyzing the background and literature of studies related to virtual education, the advantages of electronic (online) teaching for medical students were identified. For example, the development of online interactive clinical education has been associated with characteristics such as the advancement of students' scientific base, students' engagement to the classroom and professors, and the improvement of the classroom climate (9). Research shows that students' readiness increases interaction and engagement in digital learning environments, and based on Allen (2015), these readiness and engagement, between students and the instructor and course content are considered as key structures to create a positive learning climate in the electronic courses. University climate can be described as the psychological or social impact of the climate inside the university, which includes: norms, goals, values, relationships, organizational structure and teaching-learning methods. According to the mentioned definitions, the academic climate consists of different physical, social and emotional parts. University's physical climate, which creates an intimate and positive learning. The social climate encourages positive communication and interactions among people, and the emotional climate that develops a sense of belonging and connectedness, especially among students and the academic environment (10). The concepts and issues related to the climate and learning environment are: morale, satisfaction with performance, sense of belonging to the educational environment, motivation, positive presence and participation in educational programs. According to the concepts and definitions related to the environment, the positive climate of learning can be considered as (the heart and soul of education), which is the main and important factor of students' performance and positive results (11). According to Bauden et al. (2017), academic achievement shows statistically significant positive relationships with engagement to learning. Research has shown that students' engagement will lead to academic achievement, more attention and concentration and involvement in solving

academic problems, and on the contrary, lack of engagement will weaken the intrinsic and internal motivation of students, that's why, positive engagement has a great effect on academic achievement and progress (12). The purpose of this research is to answer these questions: Does the variable of engagement of online students have an effect on the variable of achievement through the variables of readiness and learning climate? Does the readiness in online learning have an effect on the variable of achievement? Does the climate of online learning have an effect on the variable of achievement?

METHODS

The present study was of basic type. The statistical population in the current study were all medical and higher education students, studying in the second half of the 2020-2021 academic year, undergraduate, master's and professional doctorate courses, who have registered in virtual education courses and at least passed one semester final exam. This study was derived from the distance education planning doctorate that was conducted in the year 2020-2021 at the graduate education center of Payam Noor University, Tehran.

Most of the participants in the survey (equivalent to 91.65%) were women. Most of the respondents (34.64%) were in the age group of 21 to 25 years. Most of the respondents (47.67%) stated that they have about one year of experience in online learning environments. Most of the respondents (41.03%) stated that the number of online courses they participated in is 5 or less.

In the current research, the researcher used 4 questionnaires that are prepared from authentic sources in the original language. In this research, there were four main variables,

which were necessarily measured by questionnaires which their methods of selection are as follows. The first questionnaire was the Online Student Engagement (OSE) scale and had 19 items called engagement questionnaire (B) for short. The second questionnaire, students' online learning readiness (SOLR), was introduced with 20 items and C symbol. The third questionnaire, Online Learning Climate of Students (OLCS) was introduced in 15 items with D format. And finally, the last one was the Online Learning Achievement questionnaire (OLA). The highest number of items in the questionnaire with symbol E was 25 items. The items of all the questionnaires were in the original language with different and odd options, the questionnaires were written in clear Persian language and distinguished by the tutors and advisors to avoid the tendency towards the middle, the number of options of all 79 items of even and four options, completely disagree, somewhat disagree, somewhat agree, and completely agree were selected in the order corresponding to the numbers 1, 2, 3, and 4. SPSS version 24 software was used to answer research questions, and Smart PLS software was used to perform confirmatory factor analysis, model fitting, and path analysis. The two characteristics of validity and reliability, especially the construct validity of the measurement tool, were investigated, calculated, and presented independently for the 4 questionnaires. By using the internet facilities and Google registration, the questionnaires were distributed to the students by the researcher for 37 days and according to their self-declaration, the number of 407 completed answer sheets were selected and used in the final calculations.

Structural model fit:

Figures 1 and 2 shows the structural equation model and the path diagram of the research model.

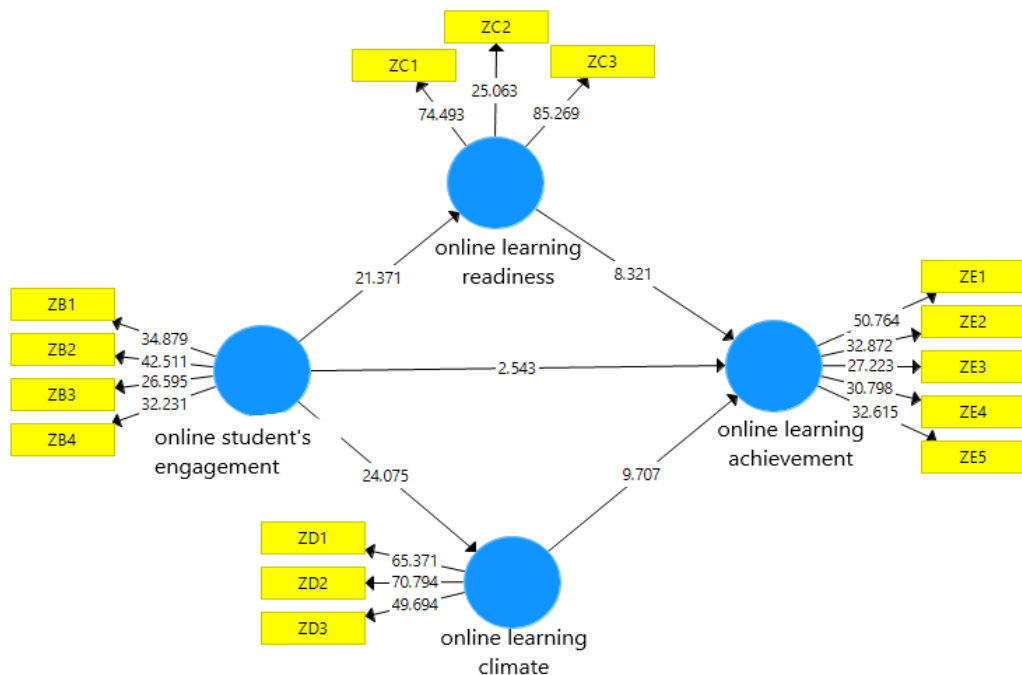


Figure 1. Structural equation model with t-statistics

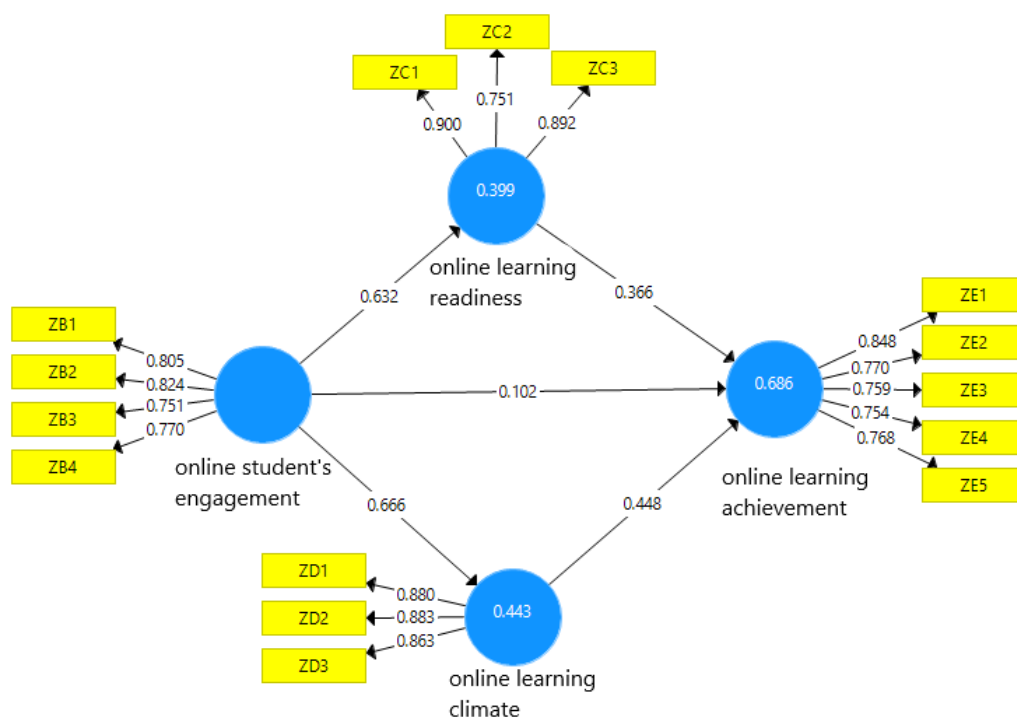


Figure 2. Structural equation model with standardized coefficients

In order to evaluate the structural (internal) model, the basic criteria, Coefficient of Determination and evaluating the path coefficients were used, which are reported separately in the steps examined by these criteria.

Coefficient of Determination

Coefficient expresses the percentage changes of the dependent variable by the independent variables. According to Figure 1, the coefficient of determination of learning readiness is 0.399, which indicates that 39.9% of changes in learning readiness variable are influenced by engagement to learning, and the rest are factors that are not considered in the model.

The coefficient of determination of learning climate is 0.443, which indicates that 44.3% of the changes in the learning climate variable are influenced by engagement to learning, and the rest are factors that are not considered in the model. The coefficient of determination of learning achievement is 0.686, which indicates that 68.6% of the changes in the variable of learning achievement are influenced by the learning readiness and learning climate and students' engagement, and the rest are factors that are not considered in the model.

Validity and reliability check

In convergent validity, each of the factor loadings (regression coefficients) must be significant and greater than or equal to 0.4. Otherwise, the optimal and acceptable limits of composite reliability (CR) and average variance extracted (AVE) should be examined, and two criteria are used in discriminant validity. The following table shows the results

of confirmatory factor analysis.

Therefore, according to the table 1 which shows the results of factor analysis, since the factor loading of all components is more than .4 and the value of T statistic is more than 1.96, also the values of AVE (more than 0.5), CR (more than 0.7) and Cronbach's alpha (more than 0.7) are in the target range, so convergent validity and reliability are established.

RESULTS

SPSS version 24 software was used to answer research questions, and Smart PLS software was used to perform confirmatory factor analysis, model fitting, and path analysis. The results of the calculations are evident in tables 1. In response to the first question of the research: "Does the variable of engagement of online students have an effect on the variable of achievement due to the variables of online learning readiness and climate. It can be concluded that by increasing the engagement of online students, the achievement in online learning also increases and by decreasing the engagement of online students, the achievement in online learning also decreases, that is, the variable of engagement of online students directly has a significant effect on the achievement of online learning. It also has an effect on achievement due to the variables of readiness and learning climate. Therefore, the answer to the first question is yes with 95% confidence.

In response to the second research question: "Does the online learning readiness variable have an effect on the online learning achievement variable?" it can be said that based on the results of Table 4, it can be concluded that with the increase of readiness for online learning, the

Table 1. Confirmatory factor analysis of latent variables

Variables	Components	Factor loading	The Standard Deviation	Statistics t	AVE	CR	Cronbach's alpha
The engagement of students	ZB1	0.805	0.023	34.879	0.621	0.868	0.797
	ZB2	0.824	0.019	42.511			
	ZB3	0.751	0.028	26.595			
	ZB4	0.770	0.024	32.231			
Online learning readiness	ZC1	0.900	0.012	74.493	0.723	0.886	0.806
	ZC2	0.751	0.030	25.063			
	ZC3	0.892	0.010	85.269			
Online learning climate	ZD1	0.880	0.013	65.371	0.766	0.907	0.847
	ZD2	0.883	0.012	70.794			
	ZD3	0.863	0.017	49.694			
Achievement in online learning	ZE1	0.848	0.017	50.764	0.609	0.886	0.839
	ZE2	0.770	0.023	32.872			
	ZE3	0.759	0.028	27.223			
	ZE4	0.754	0.024	30.798			
	ZE5	0.768	0.024	32.615			

Table 2. The results of the structural model of the research

Path	Direct effect path coefficient	Indirect effect path coefficient	Total effect	Significance level value
Readiness to achievement in online learning	0.366	----		0.000<0.05
Students' engagement to online learning readiness	0.632	----		0.000<0.05
Students' engagement to online learning climate	0.666	----	0.631	0.000<0.05
Students' engagement to achievement in online learning	0.102	----	0.174	0.000<0.05
Online learning climate to online learning achievement	0.448	----	0.554	0.000<0.05
Students' engagement to achievement in online learning through readiness	0.102	0.231	0.333	0.000<0.05
Engagement and commitment of students to achievement in online learning through learning climate	0.102	0.298	0.400	0.000<0.05

achievement in online learning also increases and with the decrease of readiness for online learning, the achievement in online learning also decreases that is, the online learning readiness variable has directly a significant effect on achievement in online learning. Therefore, the answer to the second question is yes with 95% confidence.

In response to the third research question: "Does the variable of online learning climate have an effect on the variable of achievement in online learning on the results of Table 2, it can be concluded that with the increase of the online learning climate, the achievement in online learning also increases and with the decrease of the online learning climate, the achievement in online learning also decreases, that is, the variable of the online learning climate has directly a significant effect on online learning achievement. Therefore, the answer to the third question is yes with 95% confidence.

The results of the present research showed that: with the increase of engagement of online students, the achievement

in online learning also increases, and with the decrease of online students, the achievement in online learning also decreases. That is, the variable of engagement of online students directly has a significant effect on achievement in online learning. Monkani (2019) in his doctoral dissertation, by examining various motivational factors and interactions in the online learning environment, came to the conclusion that the engagement of online students is considered an important factor in determining the quality and achievement of online courses (13).

By increasing the readiness of online learning, the achievement in online learning also increases, and when the readiness of online learning decreases, the achievement in online learning also decreases. As a result, the online learning readiness variable directly has a significant effect on the achievement of online learning. In Toron's (2020) research, online learning readiness was considered as an effective predictor of achievement in online learning,

especially, with the spread of the Covid-19 pandemic, online learning readiness was considered a necessity and a new educational paradigm (14). In Gıgdem Vazturk's research (2016), the relationship between the specific factors of online learning readiness and the final achievement in online learning was investigated, and the positive internal motivations of learners increased online learning readiness and its results in their final grades are clear. Also, the results showed that: with the improvement of the online learning climate, the achievement in online learning also increases, and in the absence of a positive online learning climate, the achievement in online learning also decreases, that is, the online learning climate variable directly affects achievement in online learning (15).

DISCUSSION

According to what was said earlier, the present research was conducted in order to determine the modeling of structural equations of achievement in online student learning based on engagement and intermediate variables of readiness and climate of online learning. The results of the implementation of the path analysis model indicated that: engagement has a direct effect on the two mediating variables of learning readiness and online learning climate, and it also directly affects achievement in online learning. The variable of engagement has an indirect effect on the variable of achievement in online learning through two variables, learning readiness and online learning climate. The factors that predict the achievement and engagement of students in online courses are still difficult to measure. According to Hoffman et al. (2020), the use of virtual education gives medical students the opportunity to observe and interact with Covid-19 patients without the risk of infection (16). Chandra et al. (2020) reported that the use of virtual calls by medical students recently in the emergency department brought a very positive feedback in students and patients, and the students expressed that this form of education has enhanced their clinical reasoning and communication skills (17). The knowledge and skills of clinical reasoning through social learning increases the level of engagement and readiness of students in online courses and causes more achievement, and the transfer of this type of learning to real life and its professional application in dealing with patients (18). The main form of virtual education for medical students is through virtual web-based platforms. These platforms include: webinars, case discussions and pre-recorded scenarios (19). At the same time, efforts to understand and design online courses that increase students' chances of achievement, especially for the continuous growth and development of online education, seem necessary and vital. Using the online learning environment is a challenge to

resolve individual differences, motivate students and create social interactions among peers. When students have high self-confidence and motivation in using online resources and technologies, a high level of participation and interaction is created among classmates and as a result, a better understanding of the contents of the class is obtained (20). In the present study, a number of related factors to the achievement of online courses have been investigated, and considering the wide range of online course designs and the different experiences of people participating in online courses, there was a possibility of unknown related factors, which was not studied in the current research. Another limitation is related to the main tool of this research (questionnaire). Due to the wide operational scope of this research and the wide statistical community of students, there was a possibility of errors and mistakes, which reduces the degree of credibility and trust of this method. The 79-item questionnaire caused fatigue and lack of attention and concentration, especially in answering the final questions, and as a result, to some extent, affected the results of the research. This study was conducted at a time when the Covid-19 pandemic created many limitations in the research process. The possibility of not having a correct understanding of the concepts and content of the questionnaire materials and the emergence of ambiguity to respond was another limitation of this research. The suggestions of the research for future researchers are: in the field of readiness for online learning, various courses should be designed for professors and students who use the electronic learning environment. Research in the field of electronic education and online learning requires a wide field of new research and each of the variables of this study can be compared and investigated with new variables. It is suggested that accreditation centers for electronic learning be established in universities and certificates for the readiness and quality of electronic learning be granted to students.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors.

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