THE EFFECT OF GAME CREATION MECHANISMS ON E-LEARNING DURING THE CORONA PANDEMICWITH THE MEDIATING ROLE OF STUDENTS' MENTAL INVOLVEMENT

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Abstract: The aim of this study was to evaluate the effect of game creation mechanisms on e-learning during the corona epidemic with the mediating role of students' mental involvement and with a practical approach in the Faculty of Management, University of Tehran. The research literature and studies indicate that play-making mechanisms affect e-learning during the corona epidemic through students' mental engagement. A questionnaire consisting of 17 questions with a five-point Likert scale was used to collect data. To evaluate the validity of the questionnaire, four methods of content validity, structural validity, convergent validity and divergent validity have been used. First, the questionnaire was approved from the perspective of experts in terms of content validity. Then the validity of the structure was performed using the external model. The value of AVE of all variables was above 0.5 and convergent validity was confirmed. Cronbach's alpha and composite reliability were calculated for reliability. Cronbach's alpha coefficient of the questionnaire was calculated to be 0.912 and the CR value of all variables was obtained above 0.7. Therefore, the reliability of the questionnaire has been evaluated as desirable. The statistical population of this research includes all students of the Faculty of Management, University of Tehran and the questionnaire was randomly given to 400 students. To test the research hypotheses, the technique of partial least squares and Smart Pls software have been used. Game creation mechanisms (competition and cooperation) are significantly associated with students' mental involvement and with e-learning during the corona epidemic. Students' mental engagement is significantly associated with e-learning during the corona epidemic. Students' mental engagement mediates the mechanisms of game creation (competition and collaboration) and e-learning during the corona epidemic.
Keywords: Game creation, competition, collaboration, mental engagement, e-learning, corona.

Introduction

In all knowledge-based societies, the development of knowledge and continuous learning is a fundamental and vital necessity. With the pervasiveness of information and communication technology and the spread of telecommunications on the one hand and the development of societies and at the same time increasing the need of people for education and learning on the other hand, educational tools and methods have also changed. که That every person at any time and any place can learn with specific facilities (Kim et al., 2006). E-learning is the idea of distance learning, which is designed by using electronic technology-based media to benefit from educational content and promote learning. It is worth noting that these media are integrated into e-learning, simple tools, and traditional books based on guidelines that use a centralized platform for organizing communication processes during educational activities (Sukendro et al., 2020). They digitize and add interaction. Students not only read what they have to learn, but also interact with it and receive feedback on their work. Interaction makes learning more engaging and interesting. Students feel that they are in control of the process. In the basic levels of e-learning does not require high expertise and skills and the available tools and facilities can be used for virtual education and it can be said that at this level (provided you have the usual and basic facilities of virtual education such as mobile, computer, Internet And convenient infrastructure) is relatively inexpensive and affordable. At higher levels, more sophisticated tools are used to produce and manage content. Learning management systems provide students with access to educational resources including textual resources, videos, podcasts, multimedia, etc. and store a lot of data from student transactions with these educational resources. In this way, by analyzing this data, the patterns in the data can be identified, teaching and learning methods can be improved, and students can be helped to learn the curriculum. But if e-learning is not designed with the latest technologies and principles of e-learning, it will become boring after a while, just like a good old book. At a better level, we can also refer to educational videos, which are then followed by activities to review what has been learned. However, it is difficult to design engaging exercises and teachers are not trained for it, so e-learning is ultimately done using the same repetitive and predictable activities. The student does not have a dynamic, active, interactive activity in the learning environment. One of the effective ways to increase the dynamism in the e-learning environment is playmaking, which includes the use of game features and ideas in areas that are not the nature of the game. (Dixon et al., 2011) by influencing users by creating a purposeful game in a predictable and designed process. Indeed; Game-creation is the addition of game mechanisms to non-play experiences, which encourage important behavior and motivate learners, and mean that game-motivating elements such as achievements and positions encourage people to engage in behavior. The main features of games are basically what e-learning models lack. Game mechanism is a metaphorical term that refers to the functional aspect of a game and is the structure of the rules of that game or the ways they are designed to interact with the conditions of that game, and thus shape and determine how the game is played. In total, there are about fifty known mechanisms in the game world. In most games there are usually 1 or 2 main mechanisms and at the same time there may be several other mechanisms as a sub-mechanism. Two important mechanisms in games are cooperation and competition. In games with a collaborative mechanism, it puts players on a team against the game itself. As the game goes on, the rules of the game challenge the players and try to cause the players to lose. In this category of games, working together is the only principle of victory. In the competition

mechanism, one of the players is placed in front of the other players with the aim of eliminating them, and in order to stay in the game, he has to compete with other players(BGG, 2019).

Playmaking has been used since 2003 as an effective way to influence people's behavior in the real and virtual world. Since then, the term has been used in a wide range of meanings. According to Dale (2014), playmaking was formed based on behavioral sciences and psychology and is based on three main factors: motivation, ability level and stimuli, and the existence of these three factors is necessary for behavior change. If these three factors work properly, playfulness will cause a person to become mentally and psychologically involved with his work and increase his learning. In this context; The view that views playmaking as the use of video game motivational resources is well known and endorsed. (Mitchell et al., 2020).

The concept of mental conflict originates from social psychology and is a perception of conscience conflict that refers to the degree of mental conflict of a person to a goal or a subject. This concept is the basis for recognizing "mental conflict" in behavior (Michaelidou, and Dobb, 2006) There are many definitions of mental conflict, but what they all have in common is the concept of personal attachment, and there is general agreement that the level of mental conflict A person is determined by a goal based on how important it is to the person. Mental engagement is defined as a person's perceived dependence on a goal based on basic needs, values, and interests (Zaichkosky, 2005). In some studies, mental engagement is considered as an internal state of arousal. Which has three main characteristics: intensity, direction and stability; Intensity refers to the degree of mental conflict or motivation that involves a continuum from the highest to the lowest mental conflict. Direction; It is defined as a goal or topic that motivates people, such as a product, advertising, etc., and stability refers to the duration of mental engagement. The concept of involvement is a psychological state of mind that indicates the degree of importance, personal connection to a subject, an advertisement or a product. Thus, the concept of conflict expresses our beliefs or feelings about a subject or message related to it. At least four factors can be the main source and cause of mental conflict, which are: person, the importance of the subject, message and media design (Fournier, 2010)

Thus, playmaking increases the efficiency of the e-learning process by increasing the interaction and attractiveness (entertainment) of the e-learning process, and on the other hand; With the increase of mental engagement and attachment in students, it leads to more encouragement towards e-learning. The increasing development of technology has made e-learning not a choice but a necessity for communities, and this requirement became even more vital when the Chinese government officially announced on December 31, 2019 that there is a case of pneumonia in Wuhan, Hubei Province. It is not clear. (Kang، 2020) and existing vaccines and treatments are not effective (Fox, 2020) Laboratory research has shown that the new virus is a member of the coronavirus family, a large family of viruses and subsets of coronaviruses that range from the common cold virus to more severe diseases such as SARS. Mors etc. Coronaviruses were discovered and studied in the 1960s

But the effects of the Covid 19 epidemic on human life have been catastrophic. One of the management measures taken to prevent disease and control the spread of the virus, which was implemented in more than 100 countries around the world, was the closure of schools and colleges. The shutdown has led to widespread use of online technology for distance learning. The need to use online technologies for educational purposes in education during the epidemic is undeniable (Mailizar,et al., 2020 Kerres,;, 2020; Wang et al., 2020). Because without the need

for physical presence and special health facilities during the high-cost epidemic, it allows all people to benefit from the educational content and thus; Prevents wasting time for learning, especially for students.

Under normal circumstances, e-learning aims to support face-to-face learning to be more flexible, efficient and effective. It can be said that e-learning has generally been developed for two reasons, cost-effectiveness and support facilities to enhance the effects of learning (Liu, L And Ma, (2004),). But many studies have emphasized the need for e-learning as the safest and most appropriate learning tool / method during the Covid epidemic. (Abbasi et al., 2020; Almanthari, et al., 2020; Favale, et al., 2020; Radha, et al., 2020).

However, studies on e-learning are still limited in developing countries and on specific topics. Lack of proper technology infrastructure, both in terms of access to the Internet at the appropriate speed or in terms of access to appropriate tools for network connection, lack of appropriate educational content in all areas, lack of sufficient expertise of training staff to provide educational content , Boring existing educational content, etc. are among the things that overshadow e-learning in many countries. Identifying the factors that affect e-learning can be an effective step towards removing the barriers in this area and ultimately the benefit of all members of society, especially students and students from the required training and lack of Jurisprudence should be in the way of their learning. (Sukendro, et al., 2020)

Also, the study of research literature in the field of learning and e-learning shows that e-learning leads to significant progress of students in performing their learning activities (Omar et al., 2011; Smith et al., 2008). Adherence to health protocols during the Covid 19 epidemic and the closure of schools and educational institutions has made the need to use e-learning more and more apparent. Also, by studying the development process of e-learning, it is determined that this type of education and learning based on it will be given more attention in the post-coronary period, so identifying the impact of factors that make e-learning more attractive and useful, such as games. Its construction and mechanisms as well as the study of the role of these mechanisms on students' mental involvement in the e-learning process can be considered as a research necessity in the field of education in the country. In addition; The traditional method of education has lost some of its effectiveness, and universities need to move from their current format to virtual education instead of teaching and promoting critical thinking (which is necessary for the world to come). The Corona crisis has shown that investing in higher education is a smart investment to move towards a secure future. Thus, the present study seeks to answer the fundamental question, "What effect do game-making mechanisms have on e-learning during the corona epidemic, and what is the role of students' mental engagement in this?"

Research literature

Recreating

The term gamification was first coined in 2002 by a British programmer named Nick Pling, but was not widely used until 2010. Of course, it should be noted that the use of elements of computer games has a longer history than the term gamification. The use of this concept intensified in 2010 with a focus on the social and reward aspects (Seaborn andFels, 2015). Game Creation Knowledge The use of game design-based thinking and the use of game mechanisms, techniques and elements in other platforms (other than games) to create joy and increase user enthusiasm in those platforms, solve problems, improve processes and motivate and attract the

audience. In simpler terms, playmaking is actually the ability to use game elements and playmaking thinking in contexts other than play (Zichermann, et al., 2013). Playing pays attention to the game because, unlike everyday life, the game is attractive and makes people happy and enjoy. Now, if this feeling can be incorporated into hard and dull work of life, the goal of playmaking has been achieved (Yavari and Jafarian, 2014).

Game creation is done with goals such as education, mastery, competition, altruism and socialization. One of the oldest techniques for playing games is to use a reward system. Rewards can include points, rankings, tokens of success, and virtual financial units. Ranking tables and feedback are used to empower users to compete. However, care must be taken to avoid immoral behaviors (Scheiner, et al., 2017). Game creation is a knowledge in which using game design attitude and using structures, stimuli and game elements, with the aim of increasing user participation, improving processes and audience behavioral changes to solve non-game issues (Kumar et al., 2018). Some large companies around the world today use gambling to hire talented people in various positions. Find talent from this number

The applicant is a very difficult job. That's why the company used game creation. He designed a game in which each person had to do exactly what an employee's job. After the winners of this game, employees were hired and the result was very positive (Bonyadi and Amini, 2017).

Playmaking promises to make hard work fun. Describes the world of playmaking, which, in addition to all its serious issues, incorporates the element of entertainment, and with the implementation of play-by-play platforms, it is no longer tedious to work. Your customers will become more loyal to you with interest. Takes positive steps to align user behavior toward your goals. According to Zichermann, (2013), play brings entertainment to our daily lives and is a very powerful tool in this regard. A work game can identify and implement game-like factors using different methods, and as a result make it a hobby, and the result is a better performance of that thing (school, website, organization, etc.). Game creation, using the techniques and elements of games, is used for purposes other than the game, such as motivating users or encouraging users to participate more or changing user behavior (meaning forcing the user to behave in line with our goals). In some cases, it has been mentioned as one of the effective online marketing techniques to engage users with a service or product, and sometimes, its compliance with the goals of customer loyalty programs has led to its use as an effective tool in this area. Playmaking is attractive because it makes hard work in life attractive and joyful (Seaborn and Fels, 2015).

Mental conflict

Brainstorming is recognized as a concept in research on consumer behavior. In general, two types of intellectual conflict have been identified: situational intellectual conflict that occurs over a short period of time and sustained intellectual conflict that implies a longer commitment related to the commodity class. Differences in the type of decision-making process in situations of high and low intellectual conflict are important discussions of the two groups of decisions. Brainstorming is used not only in understanding information processing but also in many topics related to marketing and consumer behavior such as relationship marketing, social media marketing, brainstorming in branding and brainstorming in the export of products and services. (Mosteller, et al., 2014).

Consumer intellectual engagement is defined as perceived personal importance, or interest associated with the acquisition of consumption and the abandonment of goods, services, and

ideas. As the level of intellectual engagement increases, consumers become more motivated to pay attention, understand, and retrain the information that is important in purchasing a product. Various factors affect the amount of consumer intellectual involvement. These factors include the following: 1- The type of goods in question 2- The nature of the communication received by the consumer 3- The nature of the situation in which the consumer operates 4- The personality of the consumer, for example, to any amount of goods or services The more expensive, the more socially visible, and the more risky the buyer, the more likely it is that the consumer's intellectual involvement in the purchase will increase. Relationships such as fear attractions can also increase consumers' mental engagement by stimulating emotions. Situation can also influence intellectual conflict by providing a definition of the context in which the purchase is made. Therefore, if the consumer's goal of buying a gift is important to a person, the consumer's intellectual conflict is likely to increase (Rezaei et al., 2017).

Different consumers may react with different levels of intellectual engagement to different products, situations and communications. Types of Consumer Mental Conflict Researchers have identified two different types of mental conflict. Situational conflict, which occurs over a short period of time, is related to the individual situation, such as the need to replace a defective good. In contrast to a persistent intellectual conflict that implies a longer commitment related to the commodity class. Sustained mental conflict arises when the consumer spends every day thinking about a product. As a result of the combination of situational and sustained mental conflicts, mental conflict reactions result (Van Doorn, et al., 2010).

Brainstorming reactions depend on the complexity of information processing and the subject matter of decisions by consumers. Brainstorming is recognized as a concept in research on consumer behavior. In terms of how consumers respond to advertising, there may be a chain of advertising reactions that ultimately involves two completely different ways of experiencing and being influenced by the mass media. What happens when a person has a persistent mental conflict over a product and suddenly needs to buy that product? Research shows that in such situations, the effects of situational and sustained mental conflict come together. As a result, a number of reactions to mental conflict occur, because the total amount of mental conflict is equal to the amount of sustained mental conflict plus situational conflict (Brodie et al., 2011).

Effects of intellectual engagement and information processing As the level of intellectual engagement of consumers increases, they process information more deeply. In addition to increasing information processing, we also find an overall increase in the level of arousal. Consumers pay more attention to information related to a particular decision. As a result, thinking about decisions increases. In addition, higher levels of intellectual engagement are likely to lead consumers to a broader decision-making process, and they go through a more complete process through each stage of the decision-making process. Economic research often assumes that people make wise decisions. The theory of expected utility, which is the dominant economic theory for decision making under uncertain conditions, formulates this method. Differences in the type of decision-making process in situations of high and low intellectual conflict are important discussions in the group of decisions. That is, limited decision-making in the state of low intellectual conflict and broad decision-making in the state of high intellectual thought. Overall, brainstorming plays a vital role not only in understanding information processing but also in many consumer issues. For example, the level of consumer intellectual engagement has important consequences for understanding the processes of memory, decision

making, formation and change of vision and verbal communication (AlaviNejad andMardani, 2015).

The Relationship between Intellectual Conflict and Marketing The intense competition, increased marketing costs, and shortened technology life span have shifted the focus of marketing from immediate exchange to building, maintaining, and maintaining long-term relationships with customers. Studies related to managerial and social psychology show that people are more willing to work in a group because it is stronger in relationships. Therefore, it can be suggested that when a customer has a close relationship with another customer, he wants to maintain interaction with him at a normal level. Therefore, the existence of these social connections has a direct effect on conscious trust in the service provider. Even if there is no complete customer satisfaction with the institution, this event will be possible. The concept of intellectual conflict is a superficial motivation given to economic stimuli, position or decision task. The level of intellectual engagement that consumers endure in their decisions for a product category is an important part of information management because it shows that with brand loyalty, brand discrimination, the amount of comparison between products, the number of products in A set, the amount and role of information search, whether the concept itself is important or not, how ads are processed and the elements that are considered in advertising, are related (Rezaei et al., 2017).

Decision support systems are a set of related programs and data designed to assist in analysis and decision-making processes (Hussain et al., 2016). While game creation has many functions as a decision support system, conceptual developments in decision support systems focus more on ways to improve decision-making by facilitating information and its availability. Such as improving the analysis of data used as the basis of the decision-making process (Hussain et al., 2016).

Playmaking, on the other hand, helps the decision support system with emotional means rather than a cognitive process. In addition, in many cases, game creation is used to encourage people to make good decisions, which leads to the phenomenon of "architectural choice" in economic behavior. This concept, which requires an optimistic view of behavioral deviations, is a form of soft behavior that seeks to influence choices in a way that helps decision-makers make their own judgments. This perspective causes the decision-making situation to be designed in such a way that beneficial deviations are reinforced and harmful deviations are avoided (Awa, et al., 2015).

Electronic learning

E-learning is the idea of distance learning, which is designed by using electronic technology-based media to benefit from educational content and promote learning (Sukendro, et al., 2020), although distance learning is initially , To facilitate access to higher education for people living in remote and rural areas, but with its evolution, it gave way to e-learning. In other words, the evolution of communication technologies, especially the Internet, has led the traditional concept of distance education to e-learning (Liu et al., 2009) Improving the quality of educational programs, improving access to learning opportunities and reducing costs. Education has been one of the three main reasons for the development of e-learning systems. E-learning system has been interpreted in various ways, including computer-based system, Internet-based educational system (Wang et al., 2007). An educational method that is able to provide opportunities for people in need in the right place, at the right time and with the right content. (Lee et al., 2008) Team

participation and formation, information management, knowledge production, customization of the system according to each knowledge researcher, no time and space constraints, selection of learning tools tailored to the individual's interests and use of based tools On the Web (Mailizar, et al., 2020) is another advantage and difference of e-learning system compared to traditional system. The e-learning system can also be used as an alternative to face-to-face classes or as a complement to them. On the other hand, Liu believes that the development of e-learning definitions is the basis for the development of e-learning system and will be in the future (Liu et al., 2009) in the literature on e-learning, different definitions of e-learning have been proposed; Learning and using knowledge distributed through electronic devices is one of the definitions according to which this form of learning depends on networks, computers and developed and compatible technologies such as wireless systems, mobile phones, computers. Manual, satellite and based on various channels (Henseler. and Sarstedt, 2013) in Another definition of e-learning is defined as the use of Internet technologies to provide systematic and comprehensive solutions that enhance knowledge and performance, which therefore includes three conditions;

1. It is network based.

2. Delivers content to the end user through Internet-based technologies.

3. Focuses on the transition from the traditional paradigm of education (Kumar Basak, S et al 2018)

Although some of the definitions of e-learning are intended to limit e-learning, in which they limit learning to content that can be delivered over the Internet, in more comprehensive definitions, the use of the Internet, intranet, extranet, audio-visual media. , Satellites and cable TVs are mentioned for both content presentation and interaction between people. Thus, in recent years, this definition has been extended to learning applications using wireless and mobile technologies (Martinez et al., 2007; Wagner et al., 2008) so e-learning can include a variety of text media. , Audio, form and diagram, video and animation and by connecting learners with web resources, facilitates the strengthening of their educational resources (Lu et al., 2007). Brings with it (Lee et al., 2008).

Coronavirus

In the latest pandemic to hit the world so far (Favale, et al 2020), on December 31, 2019, the Chinese government officially announced that it has a case of pneumonia in Wuhan, Hubei Province, the cause of which is unknown. (Li and Zhang ,2003). and existing vaccines and treatments were ineffective. Among the first people to be infected with the virus, two-thirds were found to be associated with the Hwanan seafood wholesale market, where live animals are also sold (Fox, 2020).

Laboratory research has shown that a new virus from the family of coronaviruses is called SARS-CoV-2, which is a large family of viruses and a subset of coronaviruses that range from the common cold virus to the cause of more serious diseases such as SARS, Mers, etc. Coronaviruses They were discovered in the 1960s and continued to be studied until the mid-1980s. The virus spreads naturally in mammals and birds. Of the 40 different species of the coronavirus family, seven have been identified in humans. Sometimes some coronaviruses attack the respiratory system and sometimes they show their symptoms in the intestines and stomach of people. Symptoms of coronavirus in the lungs usually appear in common colds and a type of

secretory cold called pneumonia, which is usually associated with a mild cold in most people. (Corman et al., 2018)

The most common symptoms of Covid-19 are fever, body aches, and a dry cough. But some patients may experience runny or stuffy nose, sore throat or even diarrhea. These symptoms are usually mild and start gradually. In addition, some people may become infected but do not show any symptoms or feel sick. Fortunately, about 80% of people recover without the need for special medical treatment. Out of every 6 people who become infected with the Covid-19 virus, only one gets worse They are having respiratory problems. These include the elderly, patients with high blood pressure, heart problems and diabetes.

As of February 19, 2020, the new coronavirus had killed more than 2,709 people and infected more than 73,332 people in 80 countries, including Thailand, South Korea, Japan, Taiwan, Australia, Singapore, and Nepal. Vietnam, Indonesia, Germany, Russia, Fiji, France, Iran and the United States became infected as the number of victims of the coronavirus crossed the 1,000 mark. "Covid 19" which refers to "Corona", "virus", "disease" and the year 2019. Preliminary estimates indicate that the mortality rate of the virus is between 2 and 3% of those infected. (Australian Health Organization, 2020)

A few months after the outbreak of the new virus, the World Health Organization announced that Covid 19 had entered the pandemic stage, but at the same time stressed that the use of the word pandemic would not change its general recommendations. It also urges countries to take action to diagnose, test, treat and quarantine their people.

According to the issues raised in the theoretical framework and summary of the status of independent and dependent variables, the general model of the research is drawn as Figure 1.
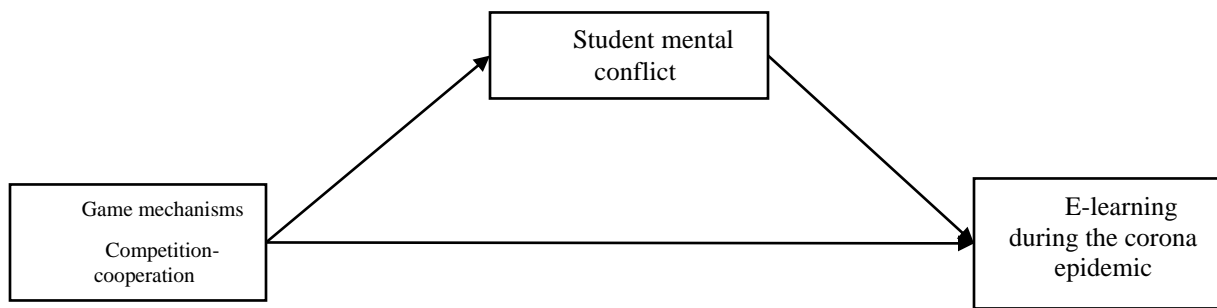
Figure 1- Conceptual model of research

Table 1- Research variables and distribution of their measurement items

Dimensions	Items	Source
Game creation mechanisms	**(Questions 1 to 9)**	Thomas Leclarcark and WafaHamamid and Wenger Ponsin, 2018

Student mental conflict	(Questions 10 to 15)	Thomas Leclarcark and WafaHamamid and Wenger Ponsin, 2018
E-learning during the corona epidemic	(Questions 16 to 17)	Sakandro et al., 2020

Research Method

The present study is applied in terms of purpose and descriptive and survey in terms of data collection method. The statistical population of this study includes all students of the Faculty of Management, University of Tehran. The Cochran's formula was used for sampling. The nature of the Cochran's formula is such that for a high volume of N it gives a value between 380 and finally 384 people. For example, if the size of the population changes from 30,000 to 3 million, the required sample size will change from 380 to 384.

$$\lim_{N \to \infty} (n) = 384$$

Because there is no exact information about the size of the community (unlimited community), the following formula has been used:

$$d = 0.05$$
$$t = 1.96$$
$$p = 0.5$$
$$q = 0.5$$
$$n = \frac{t^2 pq}{d^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = \frac{0.9604}{0.0025} = 384$$

In general, when the size of the community is very large and also for unlimited communities up to 400 people is recommended as an example (Habibi and Adnour, 2018). Sampling was done by simple random sampling among students of the Faculty of Management, University of Tehran.

Data collection methods in this research are divided into two categories: library and field. Regarding the collection of information related to the literature on the subject and research background, library methods have been used and to collect information to confirm or reject the research hypotheses, the field method has been used. A questionnaire was used to collect the initial data. The research questionnaire is based on the localized questionnaire of the research of Thomas Leclarcark and WafaHamamid and Wenger Ponsin (2018) and Sukendro, et al. (2020), which has been modified with the expert opinions of related professors and experts. To evaluate the validity of the questionnaire, content validity method (expert opinion polls), structural validity (external model), convergent validity and divergent validity were used. Cronbach's alpha coefficient and composite reliability were also calculated to calculate reliability. Cronbach's alpha coefficient of the questionnaire was calculated to be 0.89. Therefore, the reliability of the questionnaire has been evaluated as favorable.

Case Study

This study was conducted to investigate the effect of game creation mechanisms on e-learning during the corona epidemic with the mediating role of students' mental involvement. The strength of the relationship between the factor (hidden variable) and the visible variable is indicated by the factor load. The factor load is a value between zero and one. If the factor load is less than 0.3, a weak relationship is considered and ignored. (Edwards،2007) The factor load between 0.3 to 0.6 is acceptable and if it is greater than 0.6 it is very desirable. (Kline, 1998) The minimum acceptable factor load is also mentioned in some sources and references as 0.2, but the main criterion for judging the statistic is t. If the test statistic, t, is greater than the critical value of t0.05, ie 1.96, then the observed factor load is significant. (Azar and Momeni, Volume II) The results of the external model are presented in the table below.

Table 2 - Summary of the results of the external research model

Hidden variables		Items	Standard operating load	Statistics t	AVE	CR
Game mechanisms Competition-cooperation	Competition	Q01	0.861	47.654	0.766	0.952
		Q02	0.913	84.241		
		Q03	0.876	59.211		
		Q04	0.878	74.310		
		Q05	0.884	79.179		
		Q06	0.839	54.024		
	cooperation	Q07	0.885	54.576	0.822	0.933
		Q08	0.908	84.622		
		Q09	0.926	102.667		
Student mental conflict		Q10	0.885	50.589	0.826	0.966
		Q11	0.888	66.849		
		Q12	0.928	82.388		

	Q13	0.932	88.0 91		
	Q14	0.915	70.5 43		
	Q15	0.906	93.8 95		
E-learning during the corona epidemic	Q16	0.914	73.4 20	0.841	0. 914
	Q17	0.920	78.5 73		

The results of the external model presented in Table 1 show that the items for measuring each of the dimensions of the research have been selected correctly. In all cases, the standard factor load greater than 0.3 is obtained, indicating that the observed correlation is desirable. To measure the significance of the standard factor loads observed, the t-statistic was calculated. In all cases, the value of t-statistic is greater than 1.96, which indicates that the correlations observed at the 95% confidence level are acceptable.

Divergent validity is another measure of the fit of measurement models in the PLS method. The divergent validity matrix is presented in Table 3.

Table 3- Divergent validity assessment matrix

Research structures	Student mental conflict	Competition	Cooperation	E-learning
Student mental conflict	0.909			
Competition	0.892	0.875		
Cooperation	0.832	0.890	0.906	
E-learning	0.773	0.730	0.730	0.917

As you can see in Table 3, the square root of the AVE reported for each structure (principal diameter) is greater than its correlation with other model structures, indicating acceptable divergent validity for the measurement models. After ensuring the measurement models through reliability test, convergent validity and divergent validity, the results of the external model can be presented.

Testing research hypotheses using the partial least squares technique

To measure the effect of game creation mechanisms on e-learning during the corona epidemic with the mediating role of students' mental involvement, the partial least squares technique has been used. The results are summarized in the output of Smart PLS software. These results are shown in the table.

Table 4 - Summary of the results of the partial least squares technique

Hypothesis	Independent variable	The dependent variable	Factor load	Amara t	Result
Hypothesis No. 1	Game creation mechanisms (competition and cooperation)	Mental conflict	0.894	78.538	Confirmation
Hypothesis No. 2	Game creation mechanisms (competition and cooperation)	E-learning	0.410	4.723	Confirmation

Hypothesis No.3	Mental conflict	E-learning	0.407	4.903	Confirmation

The standard factor of the effect of game creation mechanisms (competition and cooperation) on the mental engagement of students is 0.894. Also, the value of t-statistic is 78.538, which is greater than the critical value of 1.96. Therefore, it can be claimed with 95% confidence: Hypothesis 1 is confirmed.

The standard factor of the effect of game creation mechanisms (competition and cooperation) on e-learning during the corona epidemic is 0.410. Also, the value of t-statistic is 4.723, which is greater than the critical value of 1.96. Therefore, it can be claimed with 95% confidence: Hypothesis 2 is confirmed.

The standard factor for the effect of students' mental engagement on e-learning during the corona epidemic was 0.407. Also, the value of t-statistic is 4.903, which is greater than the critical value of 1.96. Therefore, it can be claimed with 95% confidence: Hypothesis No. 3 is confirmed.

One of the basic topics in structural equation modeling is expressing the mediating role of an element. Basically, if the mediating variables are computable and the researcher tries to remove their effects from the model, it is called the control variable, but if the effect of this variable is examined in relation to the other two variables, then the mediating variable will be a moderator variable. Independent secondary also say. To calculate the mediating effect, the effect of game-making mechanisms (competition and collaboration) on e-learning during the corona epidemic must be calculated through the students' mental engagement, which is called the indirect effect. (Edward, 2007)
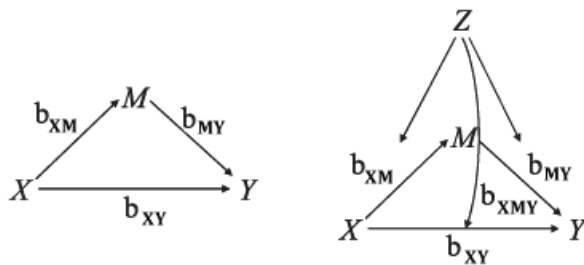

Figure 2 - Total effect (direct and indirect effect) of the mediating role of a variable (Edward, 2007: 4)

Total impact = direct impact + indirect impact

Indirect effect = independent effect on mediator × mediator effect on dependent

In the structural model of this research, game creation mechanisms (competition and cooperation) are an exogenous independent variable that we have shown with X. E-learning during the corona epidemic is a dependent variable represented by Y. Employment rate is an endogenous independent variable that has acted as a mediating variable in the X and Y relationship. We have shown the mediating variable of students' mental engagement with M.

Therefore, the indirect effect of students' mental engagement on the relationship between game creation mechanisms (competition and cooperation) and e-learning during the corona epidemic is calculated as follows:

$\beta_{xmy} = \beta_{xm} \times \beta_{my} = 0.894 \times 0.407 = 0.363$

$\text{Total effect}_{x \rightarrow y} = \beta_{xmy} + \beta_{xy} = 0.363 + 0.410 = 0.148$

Sobel statistic is used to test the significance of indirect effects caused by a mediating variable.

$$Z = \frac{a \times b}{\sqrt{b^2 s_a^2 + a^2 s_b^2}}$$

: Path coefficient between independent and mediator variables

b: The path coefficient between the mediator and dependent variables

Sa: Standard error of independent and mediator variable path

Sb: Standard error of mediator and dependent variable path

$$Z = \frac{0.894 \times 0.407}{\sqrt{0.894^2 0.011^2 + 0.407^2 0.083^2}} = 4.894$$

The value of test statistics was obtained using the Soubel test of 4.494, which is greater than the value of 1.96. Therefore, it can be said that the hypothesis of the mediating role of the variable of students' mental involvement is accepted.
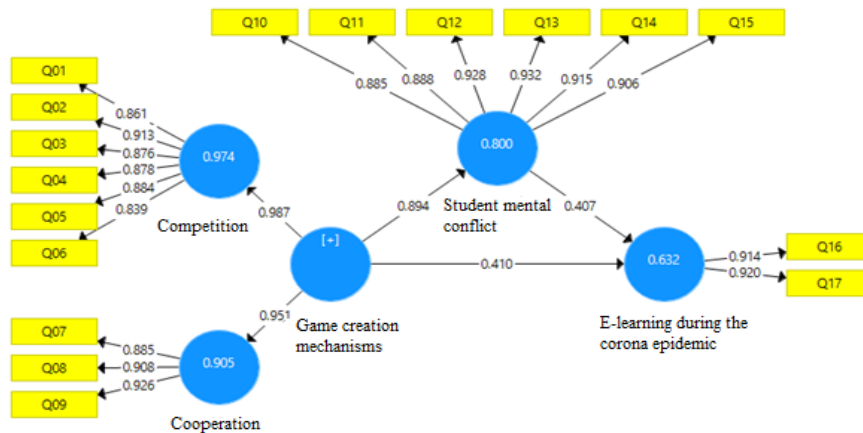

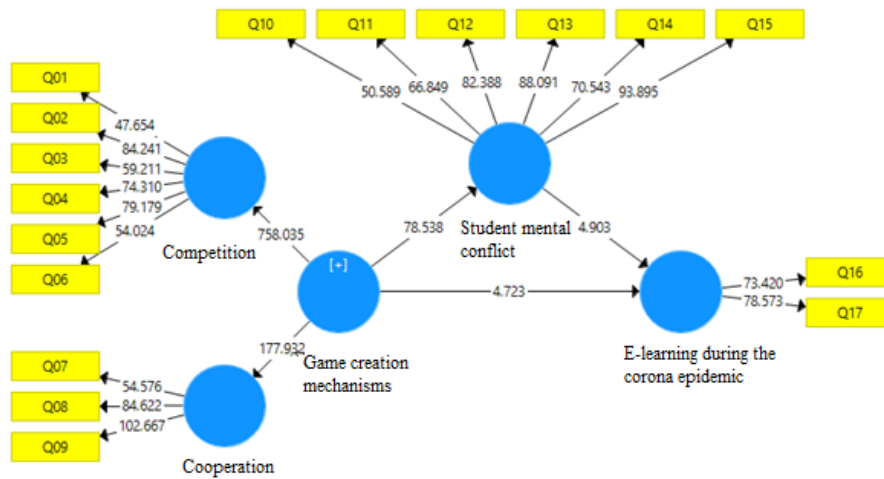**Figure 4.** Standard coefficient model

Figure 5. Statistics t

Good model fit

Finally, the fit of the model is examined. The structural part of the model, unlike measurement models, does not deal with the obvious questions and variables of the model and only pays attention to the hidden variables and the relationships between them. In this study, structural model fitting using coefficient of determination (R2), redundancy and GOF statistics has been used.

The coefficient of determination (R2) is a measure that indicates the amount of change in each of the dependent variables of the model, which is explained by independent variables. The value of R2 is given only for the endogenous variables of the model and in the case of exogenous structures its value is zero. The higher the value of R2 for the endogenous structures of the model, the better the fit of the model. China (1998) defined the three values of 0.19, 0.33 and 0.67 as the criterion values for the weak, medium and strong fit values of the structural part of the model by the coefficient of determination. The coefficient of determination R2 for the e-learning structure during the corona epidemic is reported to be 0.632, which is an acceptable value.

The most important index of model fit in the technique of least squares is the GOF index. This index evaluates the overall model fit, which evaluates both the measurement and structural model sections. This index is calculated using the square root of "average index R ^ 2" and "mean redundancy indices":

$$\text{GoF} = \sqrt[2]{\left(\overline{R^2}\right) \times \left(\overline{\text{Communality}}\right)}$$

The GOF index was developed by Tenenhaus et al. (2004) and is calculated according to Equation 1. Wetzels et al. (2009) introduced three values of 0.01, 0.25 and 0.36 as weak,

medium and strong values for Gof. The goodness of fit in this study is equal. Therefore, the goodness of fit in this study is equal to:

$$GOF = \sqrt[2]{0.827 \times 0.664} = 0.741$$

The GOF index is 0.741, so the model has a good fit.

Table 5 - Values of model fit indices

Main structures	Redundancy	The coefficient of determination	GOF
Competition	0.742	0.974	
Cooperation	0.736	0.905	
Student mental conflict	0.655	0.800	0.741
E-learning during the corona epidemic	0.524	0.632	

The Stone-Geisser criterion, or Q^2 index, determines the predictive power of the model. Regarding the intensity of predictive power of the model for endogenous structures, Henseler et al. Determined the three values of 0.02, 0.15 and 0.35 as weak, medium and strong predictive power, respectively. If the value of Q^2 in the case of an endogenous structure is zero or less than zero, it indicates that the relationship between the other structures of the model and that endogenous structure is not well explained. The blindfolding technique was used to calculate the value of Q^2 in PLS software. Positive numbers indicate the proper quality of the model. In this study, blindfolding values for all research structures are positive and greater than 0.35.

Conclusion

Success in e-learning depends on many factors. It seems that students' views on e-learning and its effective dimensions are influenced by playmaking. The ever-increasing development of information and communication technology and the growing number of e-businesses in the last two decades has given rise to a new phenomenon called game-making. Accordingly, the present

study seeks to investigate the role of play-making mechanisms in students 'mental engagement and also to investigate the effect of students' mental engagement on e-learning during the corona epidemic.

In general, the results of this study show that "playmaking" is a new and attractive feature of education and has a great impact on attracting students. Attracting students' attention and satisfaction is achieved through the active participation of students in the online learning process during the corona epidemic. Trust is created while students are acquiring trust-related knowledge by experiencing e-learning during the corona epidemic. Therefore, the more experience a student has in e-learning, the higher his level of confidence in e-learning. Also, by establishing a friendly relationship with the e-learning environment, students can be loyal to e-learning during the Corona epidemic. For this purpose, e-learning must have high flexibility and interaction. By observing the possibilities of e-learning, the user should feel adventurous and his sense of curiosity and search should be encouraged. E-learning should be fun. The training service process and the database support system should be such that the user is encouraged to re-learn continuously, and the experience that forms in the user's mind after each e-learning is not something that can be gained through training.

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