Designing an emotional presence in virtual education

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Research Article

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Abstract

Emotional presence includes emotional response and perception of presence in the virtual learning environment. This study aimed to investigate the components of students' emotional perception and teacher's scheme for emotional response and determine a meaningful relationship between these variables. The quasi-experimental research method was utilized. The statistical population of the study included Tehran University of Medical Sciences students. Questionnaires were used to collect data. The PEYDE questionnaire was used to determine emotional response and perception. The validity and reliability of the questionnaire were estimated. The students were randomly divided into two experimental and two control groups based on the name list. The findings revealed a strong link between teachers' emotional responses and students' perceptions as two dimensions of emotional presence in virtual learning. There is a good fit of the measurement model and compatibility between teachers' and students' perceptions of the virtual learning environment. Therefore, the measurement model in the experimental group has a good fit. The value obtained from the model showed that the value of T is more than 1.96, so the researcher's hypothesis is confirmed in the experimental group at a confidence level of 0.95. Furthermore, because the value obtained Q2 is more than zero and positive, it can be concluded that the model has predictive power. Therefore, focusing on emotional presence is essential for a web-based exploratory community. Teachers' designed emotional response is significantly correlated with students' emotional perception and management in the virtual learning environment.

Background

Trends in the application of technology in education have been evolving over the past decades. One factor that has been examined independently by considering the aspects of technology and education is identifying the main channels of technology development in education and examining the mutual role of teacher and learner in technology-based education. This trend of technology advancement in education, which includes learning management systems, social media, virtual reality, augmented reality, the Internet of Things, artificial intelligence, MOOCs, simulators, and gamification, is expected to continue. However, the most important consideration is the quality of presence in online learning and teaching platforms (Xieling, Di, Gary & Haoran, 2020). Despite all the development, there are still significant issues, particularly in not paying attention to people's emotional aspects in an online learning environment. The findings show that the use of emotional components in the online classroom is essential for successful learning involvement. Recognizing learners' needs and emotions and paying attention to them as autonomous individuals with human identities, is commonly disregarded in studies on online course design (Novakowski, 2020). People with human identities and feelings are not introduced to an online learning system; instead, they are presented as a name or a number, which is a major challenge in virtual education. The foundations of the community of inquiry that Garrison (2001) introduced helped achieve success in e-learning, whose validity was confirmed by different studies. (Rourke, Kanuka, 2009, Akyol & Garrison, 2011; Garrison, 2017; Yildirim, Seferoğlu, 2021). Community of Inquiry includes cognitive presence, social presence, and teaching presence. Cognitive presence means "Are the thoughts and ideas

of individuals in the community influential? Does the exchange of ideas of individuals in the community make meaning?" In other words, critical exploration is one of the main features of cognitive presence (Garrison, 2017; Rourke et al., 2009). Social presence is defined as the ability of individuals to present their characteristics in society and the ability to belong to a group, so presenting themselves as "real people" to other users. Studies by Grldine, Sawsen (2020) and Giesbers et al. (2013), and Caspi et al. (2006) have shown that people need to create a social learning environment to participate in critical discourse in integrated online environments. The third component of the community of inquiry framework is the presence of teaching. Garrison (2017) outlined three main teacher roles that affect teaching presence in integrated and online environments, including designing learning and organizing environments, facilitating discourse and learning guidance. According to Reinties et al.,)2012(and Rourke and Canoca,)2009), Before beginning an online course, a teacher can design, organize, and plan a rich learning environment by determining learning goals, processes, and interactive activities, as well as determining manners and criteria of behavior in an online and integrated environment, learning outcomes, assessment, and evaluation strategies. Learners can learn and interact with their peers with a wide range of materials in this rich environment. For this reason, a teacher can facilitate discourse or design guidelines to encourage critical exploration. In 2011, a study called metacognition assessment in the online community of inquiry was conducted by Garrison. Aspects of the community of inquiry theory were considered as influential components on metacognitive levels in an online relationship. Metacognitive dimensions included self-regulation, organization, and self-efficacy.

According to Garrison (2017), "Facilitating discourse throughout the course is crucial to maintaining students' interest, motivation, and involvement for active learning. Cleveland-Innes and Campbell (2012) studied emotional presence, learning, and the online learning environment. They proposed a fourth dimension to the community of inquiry. Emotional presence was introduced as one of the dimensions of presence in the virtual learning environment (Stenbom et al., 2016). However, recent research showed that a fourth category, emotional presence, is needed to complete the community of inquiry framework. Every user in online education has experienced unpleasant feelings such as insecurity, fear of disconnection, a sense of anonymity. (You et al. 2014; Giesbers et al. 2013). Online contexts may make it difficult for peers and teachers to identify users' emotions (Cotterall,2013). Cleveland-Innes and Campbell (2012) defined emotional presence as: "The outward expression of emotions and its effects by individuals and among individuals in the community of inquiry, as learners interact with learning technology, course content, peers and teachers." According to Stenbom et al. (2016) 's research, Garrison's community of inquiry model was modified by adding the component "emotional presence." the community of inquiry with four presence components, cognitive, social, educational, and emotional components. Figure 1 shows the theoretical dimensions of the community of inquiry. As shown, the emotional presence dimension includes emotional perception and emotional response.

In 2021, the results of a study entitled Exploring learners' emotions and emotional profiles in simulation-based medical education showed that in a virtual environment, education with emotional load could be designed. Simulation-based learning in a virtual environment mainly reinforces positive emotions and reduces negative ones) Tuulikki,2021(. Therefore, designing a learning environment provides a platform

for students to share their emotions. Expressing, identifying, and reinforcing emotions helps teachers understand students' concerns and unpleasant situations. Teachers who know their students' motivations and their sensitive emotions can use this information to enhance the learning process. In addition, teachers' behavior, teaching methods, and assessment can activate certain chains of emotion in the learner and affect the quality of learning) Giesbers et al., 2013; Daniels et al. 2012; Tuulikki, 2021(. Teacher behavior has a significant impact on student learning results. The teacher should examine the aspects that affect students' performance during the teaching and learning process, such as communicating, providing a learning atmosphere, teaching style, and teaching methods. (Haskar-Hernandez et al., 2020). Inference, engagement, exploration, explanation, expansion, evaluation, and generalization are the seven learning cycles developed (Sarac, 2018). Perception of emotions as mental experiences depends on the context they arise. These identities are experienced in different situations and have many functions in the learning environment. Suppose we assume that learning contains seven stages of reasoning, engaging, exploring, explaining, expanding, evaluating, and generalizing. In that case, the seven learning cycles are reasoning, engaging, exploring, explaining, expanding, evaluating, and generalizing (Sarac, 2018).). People's emotions play a role in these seven dimensions of learning. In other words, emotions can be used to improve reasoning, engaging, exploring, explaining, expanding, evaluating, and generalizing in the field of learning so that relationships between concepts or ideas can be more easily established. Decision-making and problem-solving efficiency can be improved. Meanwhile, emotional learning involves discovering skills to identify and manage emotions, creating attention and interest in others, making responsible decisions, building positive relationships and effectively managing challenging situations (Fidekis, 2016). In recent years, research in the field of emotional awareness in learning has focused on investigating the effects of academic emotions (environment, anxiety, pride, anger, hope, hope, hope, failure, comfort, fatigue, hopelessness) on thinking and processing information. Self-regulated learning is recognized as a critical factor for successful online learning. Emotions and cognition are interrelated; students' perceived emotions are important antecedents of self-regulated learning. In the relationship between perceived academic control and self-regulated learning in online learning, perceived emotions, enjoyment, worry, and boredom are important. Control and self-regulation are linked to perceived emotions. Perceived emotions such as enjoyment, anxiety, and boredom are associated with control and self-regulation (You et al., 2014).

West et al., (2020) showed that designing an aesthetic learning environment significantly affects an individual's emotional response. Positive emotions, such as the learner's interest, attention, participation, and motivation, lead to curiosity, active learning, self-regulation, and deep information processing. Therefore, it is very important to pay attention to the learners' emotional state. In addition to having a profound effect on emotions, aesthetics profoundly impacts the cognitive aspects of learning. Visual elements in aesthetics are more effective than beautification in conveying messages, improving communication, better understanding, and supporting pervasive cognitive processing.

The term "emotional response" refers to the process of observing a teacher's reaction to a student's behaviors and feelings after determining their emotional state. The main purpose of emotional feedback is to motivate the respondent, facilitate their learning process, and improve their mood. In particular, the

teacher should encourage active learning and participatory knowledge structure, provide appropriate models and expression styles between individuals, and monitor, especially in discussing negative emotions often difficult to convey correctly.

More dopamine is released when the brain receives a reward, leading to a stronger connection between those newly activated nerve cells. These connections create a repository of successful procedures that will be called in the future. At the same time, dopamine secretion stimulates positive feelings (such as happiness), and motivation rises. The learner must receive immediate feedback within a few seconds of completing the action for the reward system to be engaged. On the other hand, environmental influences such as blaming, mocking other students, looking down on sensitive people, or even trying too hard to calm down after a failed activity can lead to bad consequences (Arndt, 2012). The instructor risks being a lifeless entity with little functionality to rejuvenate and improve the learning experience in an online setting. Learners have high expectations for communicating with their coaches and classmates, and they do not want to be passive when using various media. They want active participation and emotional engagement to manipulate the environment and experience a degree of emotion and interaction with learning objects in the online environment. Forming small groups provides an opportunity for students to commit to their colleagues and allow learners to solve the problem collectively. Teamwork promotes positive interdependence, social skills, verbal interaction, individual responsibility, and group processing. In fact, part of the educational design and presentation work includes providing opportunities to strengthen cognitive capacities along with social and emotional capacities that can be enhanced through the use of art and aesthetic presence. This study investigates the environment based on emotional presence in virtual education. In other words, it attempts to strengthen the emotional presence in the virtual classroom with proper planning and determine the relationship between the teacher's emotional feedback and the learner's emotional understanding.

Research Methodology

This research used a quasi-experimental method. The participants in the study were a sample of 60 medical students in Tehran attending sessions on "Computer Basics." Subjects were randomly divided into four groups of fifteen, two experimental groups, and two control groups based on the list of names. The teacher provided and managed similar learning activities and tasks for each group. The experiment was conducted in eight sessions and lasted four weeks. The students participated in the research project voluntarily. It should be noted that the researcher was the class teacher. The method utilized in class was developed with students who were willing to help with assistance and participation. A PEYDE questionnaire (Gallego & Gallego, 2004) measured emotional perception and emotional response for data collection instruments. All participants (teachers and students) answered the questionnaire. The 5-point Likert scale from 1 (rarely) to 5 (almost always) was used for closed questions. As a result, indicators of emotional perception include cheerfulness, worry, stress, tension, enthusiasm, sense of community, frustration, boredom, accompanying, learning engagement, and nagging, were addressed. The indicators related to the teacher's emotional response include encouraging students to participate in discussions and feel good, using gamification rules to activate students, encouragement to share feelings and

emotions, encouragement to make suggestions in the face of unpleasant feelings, paying attention to emoji and labels were also presented. Table 1 shows the indicators, labels, and emojis. In addition, Cronbach's alpha coefficients for both questionnaires were estimated as .78 and .75, respectively

Table 1 - *Questionnaire indicators and labels used*

<i>label</i>	<i>indicators</i>
<i>Emotional perception</i>
<i>CH</i>	<i>Cheerfulness</i>
<i>WO</i>	<i>Worry</i>
<i>ST</i>	<i>Stress</i>
<i>TE</i>	<i>Tension</i>
<i>EN</i>	<i>Enthusiasm</i>
<i>SOC</i>	<i>Sense of community</i>
<i>FR</i>	<i>Frustration</i>
<i>BO</i>	<i>Boredom</i>
<i>AC</i>	<i>Accompanying</i>
<i>PL</i>	<i>Participate in learning</i>
<i>NA</i>	<i>nagging</i>
<i>emotional response</i>	
<i>T.E</i>	<i>Encourage students to participate in discussions and feel good</i>
<i>T.G</i>	<i>Use gamification rules to activate students</i>
<i>T.SH</i>	<i>Encouragement to share feelings and emotions</i>
<i>T.S</i>	<i>Encouragement to make suggestions in the face of unpleasant feelings</i>
<i>T.A</i>	<i>Pay attention to emoji and tags</i>

Procedures: The scenario was designed based on the approach of the active learner and the guiding and scaffolding teacher. In this method, the teacher's emotional feedback was defined for responding to each student's emotions. The teacher and students used labels and emojis to express their feelings in the learning. Therefore, people had more control over their learning and feeling processes in the virtual classroom. The teacher used stealth and embedded assessment in the gamification method to control the learning path. The teacher used the formative assessment learning cycle to better understand students' feelings and provided appropriate feedback (Brookhart,2017). The teacher and student's interactions with labels and emojis to represent certain feelings, topics, resources, and features of electronic web environments and peer learning assessment were all part of the designed scenario. The method of using emojis and labels in conversation during teaching was used to express emotions in the experimental group. The stages of the formative assessment learning cycle began with a question from the learner

Where will I go (what am I learning and my success metrics)?

Where am I now (How am I trying to learn)?

What is the next step in my learning?

Teacher feedback: clear, exact, descriptive, and prompt using strategies, think and share, receive text answers with labels and emojis, peer feedback with labels and emojis

Principles of teaching method in the experimental group:

- Encouraging students to participate in discussions and feel good
- Using gamification rules to activate students

Encouragement to share

- feelings and emotions
- Encouragement to make suggestions in the face of unpleasant feelings
- Pay attention to emoji and tags

Students in the control group, on the other hand, did not have this opportunity and carried out their activities in a traditional and usual way. Finally, PLS software was used for statistical analysis.

Results

The results are as follows:

Research hypothesis:

Teacher's emotional feedback in the virtual learning environment is related to the student's emotional perception

In statistical science, before performing any inferential calculation, the statistical distribution of data should be checked. If the data has a normal distribution, parametric statistical methods will be used, otherwise non-parametric statistical methods will be used. Kolmogorov-Smirnov and Shapiro-Wilk tests are used to check the normality of the data. Hypothesis zero in these tests states that the data have a normal distribution. If the probability value of sig test is greater than 0.05, this hypothesis is accepted and otherwise it will be rejected.

Table 2
Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Emean	.096	30	.200*	.979	30	.801
Tmean	.119	30	.200*	.961	30	.337
*. This is a lower bound of the true significance.						

In Table 2, according to the value obtained from the significance level, shows that the data in this study follow the normal distribution.

Table 3
Correlations

		Emean	Tmean
Emean	Pearson Correlation	1	.368*
	Sig. (2-tailed)		.046
	N	30	30
Tmean	Pearson Correlation	.368*	1
	Sig. (2-tailed)	.046	
	N	30	30
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 3 shows the intersection of the first row with the second column and the second row with the first column. The first number is the correlation coefficient, which is a number between 1 and -1. The second number indicates the significance or P-Value, which if it is less than 0.05, indicates the significance of the relationship between the two variables.

Table 4
shows the model values in confirmatory factor analysis mode

variable type	the variable name	scale	Factor load	t-factor statistic	The result
Independent	teacher	TA	0/654	8/651	Accepted
		TE	0/721	11/132	Accepted
		TG	0/904	14/698	Accepted
		TS	0/946	39/094	Accepted
		TSH	0/958	46/854	Accepted
Dependent	student	EP1	0/954	64/705	Accepted
		EP2	0/621	7/301	Accepted
		EP3	0/886	20/312	Accepted
		EP4	0/793	12/049	Accepted
		EP5	0/938	40/045	Accepted
		EP6	0/898	22/321	Accepted
		EP7	0/660	7/981	Accepted
		EP8	0/950	63/621	Accepted
		EP9	0/930	63/033	Accepted
		EP10	0/920	62/728	Accepted
		EP11	0/710	11/999	Accepted

Table 4, shows the model values in confirmatory factor analysis mode, along with factor loads and t-statistics. 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 0.4, a weak relationship is considered and ignored. A factor load of between 0.3 and 0.6 is acceptable, and if it is greater than 0.6, it is highly desirable. (Klein, 1994). As can be seen, the values of the factor loads and the value of t of each scale are higher than the critical values specified for their

rejection, and this indicates the optimal fit of the measurement model and their internal consistency. The value of t-statistic for acceptance is 1.96 and at the level of 0.95 confidence

Table 5
RSquare

	R Square	R Square Adjusted
student	0.818	0.812

Table 5, shows R² or R Square is actually a statistical measurement between the closest data in a problem to the regression line. In the definitions given to R², the coefficient of determination is also called. The coefficient of determination indicates the fact that the percentage change of dependent variables in a problem is explained by the independent variable of the problem; In other words, the coefficient of determination or (R²) indicates the extent to which the changes in the dependent variable of the problem are affected by the independent variable of the problem and to what extent the rest of the changes in the dependent variable of the problem are related to other factors in the problem. The coefficient of determination will always be between 0 and 1. The number 0 indicates that the model shows no relationship between the dependent and independent variables around its mean, and the number 1 indicates that the model explains all the variability of the response data around its mean. The coefficient of determination is one of the most important indicators of the fit of the structural model in pls. The value of the coefficient of determination obtained in the experimental group is 0.818

Table 6: F Square

	student	teacher	
student			
teacher	4.503		

Table 6, shows F Square is the magnitude of the effect of f² as a proportion of the variation of the coefficient of determination R² on the part of the variance of the endogenous latent variable that remains unexplained in the model. To calculate this coefficient, first, run the model completely and write down the values of R². Next, delete the independent variable of the path for which you want to calculate f² and run the model again. According to Cohen (1988), the value of this index is interpreted as 0.02 (weak), 0.15 (medium), and 0.35 (strong), respectively. According to the obtained value, the fitting index has a desirable value.

Table 7: Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
student	0.701	0.974	0.739	0.600
teacher	0.720	0.957	0.756	0.548

Table 7, shows the table Construct Reliability and Validity are the fit indices of the measurement model in the partial least squares method. As can be seen in the experimental group, the values obtained from the critical values of these indicators are higher for accepting the measurement model and are green. Cronbach's alpha value should be higher than 0.7, Composite Reliability should be higher than 0.7, rho_A should be higher than 0.6 and Average Variance Extracted (AVE) or convergent validity should be higher than 0.5. Therefore, it can be concluded that the measurement model in the experimental group has a good fit

Table 8: Outer VIF Values	
	VIF
EP.10	1.339
EP.11	1.445
EP.2	2.115
EP.3	1.212
EP.4	2.222
EP.5	2.113
EP.6	1.885
EP.7	2.095
EP.8	1.302
EP.9	1.354
TA	1.065
TE	1.131
TG	3.251
TS	4.815
TSH	1.645
EP.1	2.777

Table 8, shows in statistics, the variance inflation factor (VIF) evaluates the intensity of Multiple linear in the regression analysis of ordinary least squares. In fact, this index indicates how much of the change in the estimated coefficients for alignment has increased. Multiple alignment intensities can be analyzed by examining the magnitude of the VIF value. If the VIF test statistic is close to one, it indicates the absence of alignment. As an experimental rule, if the value of VIF is greater than 5, it is a multiple of multiple lines (note that in some cases, the number 10 is also introduced as a threshold. To calculate this coefficient, note that only independent (explanatory) variables are used. As can be seen, no alignment is observed for the experimental group, none of the variables are higher than the critical value of 5.

Table 9: Path Coefficients					
Mean, STDEV, T-Values, P-Values					
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
teacher -> student	0.905	0.911	0.024	37.069	0.000

Table 9, According to the value obtained from the model, because the value of t is more than 1.96 and shows the number 37.069, the researcher's hypothesis is confirmed in the experimental group at a confidence level of 0.95. The obtained path coefficient is 0.905.

Table 10: Total			
	SSO	SSE	Q ² (=1-SSE/SSO)
student	330.000	193.151	0.415
teacher	150.000	150.000	

Table 10, Another structural model fit index is the Q2 index. This criterion, introduced by Stone and Geiser (1975), determines the predictive power of the model in endogenous structures. They believe that models with acceptable structural fit should be able to predict the endogenous variables of the model. This means that if in a model, the relationships between structures are properly defined, the structures have a sufficient impact on each other and thus the hypotheses are correctly confirmed. If the value of the Q2 index is positive, it indicates that the fit of the model is desirable and the model has good predictive power. Given that the value obtained, which is more than zero and positive, it can be concluded that the model has predictive power.

Discussion

The purpose of this study was to create an emotional presence in the virtual learning environment that encompassed both the teacher's emotional response and the student's emotional perception. Indicators of good or negative emotions in emotional situations and behaviors that students encounter in virtual classrooms are included in emotional perception. Teachers' emotional responses include indicators

relating to how teachers' attitudes are influenced, interventions on students' behavior and emotional status, and the progression of their learning process. A scenario was created, and its phases were carried out to achieve this, with the results presented in Tables 2 to 10. According to Tables 2 and 3, the data has a normal distribution. There is a significant relationship between teachers' emotional feedback and students' emotional perception, which is the dimension of emotional presence in virtual education. According to Table 4, because the factor load is greater than 0.6, there is a good fit of the measurement model and compatibility between teacher's emotional feedback and student's emotional perception in the virtual learning environment. According to the results derived from R2 and F2, the communication model of the variables explains all of the variability of the response data around its mean, as shown in Tables 5 and 6. The Cronbach's alpha value should be higher than 0.7, according to Table 7. Therefore, the measurement model in the experimental group has a good fit. According to Table 8, as shown in the variance inflation factor (VIF), no line is observed for the experimental group. None of the variables are higher than the critical value of 5.

Table 9 shows that the researcher's hypothesis is confirmed in the experimental group with a confidence level of 0.95, based on the value generated from the model, because T is greater than 1.96. in Table 10. Given the Q2 value, which is greater than zero and positive, the model has predictive power.

The results of this research are in line with the results of Robinson, Rourke, Kanuka (2009), Akyol, Garrison (2011), Garrison (2017), Yildirim, Seferoğlu (2021), Tuulikki (2021), (You et al. 2014). Cleveland-Ines and Campbell, 2012; Stanbum et al., 2014 Cleveland-Ines and Campbell, 2012; Stanbum et al., 2014; Sajnani, Mayor, Tillberg 2020, Arndt, 2012

Conclusion

The focus of this study was on emotional presence in the virtual learning environment, which includes emotional response and emotional perception. The teacher designed the virtual learning environment in such a way that students consciously deal with their feelings in the classroom and manage their emotions. As a result, students' emotional perceptions of presence in the virtual learning environment include feelings of joy, anxiety, stress, tension, enthusiasm, sense of community, frustration, boredom, accompanying, learning involvement, and nagging.

Students are aware of the dimensions of emotional presence in the virtual learning environment and face it consciously. Being in this environment with a positive feeling and eliminating the negative feelings encourages students to learn and increases their enthusiasm in virtual education. The teacher's emotional response impacts the student's emotional behavior in virtual education.

Because the teacher was working with limited interaction conditions on the platform, she tried to come up with a creative solution that included:

- Encouraging students to participate in discussions and feel good
- Using gamification rules to activate students

- Encouraging to share feelings and emotions
- Encouraging to make suggestions in the face of unpleasant feelings
- Paying attention to emojis and tags

Provide adequate emotional engagement with students in a virtual environment with limited resources so that they can experience the joy of learning in a virtual learning environment. Students with a proper understanding of their emotional sense in the classroom face it consciously and control and manage it with the help of the teacher and their peers in the virtual classroom.

Researchers in the future can explore other aspects of presence in e-learning and continue to look at components of emotional perception and different teaching approaches.

The limitation of this study was the use of the Big Blue Button.

Abbreviations

EP	Emotional Perception
CH	Cheerfulness
WO	Worry
ST	Stress
TE	Tension
EN	Enthusiasm
SOC	Sense of community
FR	Frustration
BO	Boredom
AC	Accompanying
PL	Participate in learning
NA	Nagging
ER	

Emotional Response

T.E

Encourage students to participate in discussions and feel good

T.G

Use gamification rules to activate students

T.SH

Encouragement to share feelings and emotions

T.S

Encouragement to make suggestions in the face of unpleasant feelings

T.A

Pay attention to emoji and tags

Declarations

Competing interests: In this research, the researcher is the author and executor of the project. Has no competitive interests. 'Not applicable

Authors contributions: In this research, the researcher is the author and executor of the project. Has no partner. 'Not applicable.

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Figures

Figure 1

The community of inquiry framework for e-learning