

## Examining and Explaining the Relationship and Effect of Virtual Education on Cultural Intelligence and Academic Achievement (A Case Study of High School Students)

Review Paper

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**Abstract:** Virtual education is currently viewed as one of the kinds of formal education due to the prevalence of Corona disease. Virtual education is a collection of educational activities that are performed utilizing electronic devices including audio, video, computer, and network. On the other hand, cultural intelligence indicates the ability to be useful between various cultures, and these abilities can be trained to individuals and have been identified in four dimensions: motivational, cognitive, metacognitive, and behavioral. Additionally, academic achievement symbolizes students' success in one or more subjects (such as comprehension, reading comprehension, or numerical calculation), such advancement is measured by determined academic subjects and has indices such as the desire to study, self-esteem, motivation for progress, and creativity. This study aims to examine and explain the effect of virtual education on cultural intelligence and academic achievement of high school students and the statistical sample of this study is male and female high school students in Tehran's fifth district that 357 students were selected randomly based on Cochran's formula and were examined in a survey form. This research is based on Earley and Ang's theories. According to them, cultural intelligence refers to the degree to which citizens identify the cultural indices of society, which it is possible to be in four dimensions: cognitive, metacognitive, behavioral, and motivational in any community. Findings show that there is a perfect correlation between cultural intelligence indices. Additionally, indices of academic achievement are extremely affected by indices of cultural intelligence. Lastly, the findings explain that there is a relationship between virtual education and cultural intelligence with Pearson and Chi-square correlation coefficient equal to 42.791, and virtual education and academic achievement with Pearson and Chi-square correlation coefficient equal to 21.3425 and cultural intelligence and academic achievement with correlation coefficient of Pearson and Chi-Square equal to 22.9075. In other words, there is a direct and significant relationship between the variables of virtual education and cultural intelligence, virtual education, and academic achievement, cultural intelligence, and academic achievement. So that increasing one variable increases another variable and also decreasing one variable decreases another variable. In general, virtual education as one of the most significant types of formal education that is presently very widespread in schools can increase and develop communication between students and cultural exchange, which if planned in the dimensions of virtual education and also cultural intelligence, will be possible to provide the conditions for academic achievement.

**Keywords:** Virtual Education, Intelligence, Culture, Cultural Intelligence, Academic Achievement, Creativity.

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### Introduction

The crisis of corona disease has transformed and changed society in general and the education division in particular. So that it's most important achievement is to change the approach of education from traditional to virtual. Accordingly, applying virtual-education has made widespread changes in the student's learning process, which is achieved by forming opportunities and strengths on the one hand and threats and problems and challenges on the other hand. Virtual education is commonly applying electronic systems, such as computers, the Internet, electronic memory, electronic publications, and

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virtual newsletters, etc. in order to reduce traffic and save time and money while learning better and easier.

In recent decades, improvements in information and communication technology have produced exciting changes in the world's educational systems and created the way for the development of universities, schools, and institutions with new teaching and learning systems. Sharing knowledge with the help of information and communication technology can produce comprehensive wealth to nations in the form of better education, sustainable health, social feeling, and enhancing the quality of life (Pandia and Gore, 2011: 51).

On the other hand, culture as the most significant part of any society is everything we achieve, learn, and can transfer in a given society. Cultural intelligence is one of the important issues in the field of culture and understanding cultural differences and refers to the individuals' intellectual and practical desires. Cultural intelligence is the understanding of the people's appearance and the interior intellectually and practically so that it provides us with a framework and language to understand differences and invest in them, not to tolerate or overlook them. Cultural intelligence indicates knowledge and information about norms, activities, and contracts in various cultures. This dimension involves the obvious awareness of social, legal, and economic systems in various cultures and subcultures. It also involves procedural knowledge that can be achieved through observation and imitation. Individuals with high knowledge of cultural intelligence understand cultural similarities and differences (Ang et al., 2007: 336).

Academic achievement is one of the most significant goals of educational systems, that all efforts in this system are considered as an attempt to realize this goal. The whole society in general and in particular the education system is interested and concerned about the children's fate, their successful growth and development, their position in society, and expects students develop and excel in different aspects, including cognitive dimensions and skills acquisition, abilities as well as in emotional and personality dimensions in a perfect manner (Pourshafei, 1991: 76).

Consequently, virtual education as distance learning plays an essential role in the communication of human beings in general and students in particular with various cultures and if planned, will lead to the formation and strengthening of cultural intelligence and can play an outstanding role in the academic achievement concerning students and academic executives (principal, assistant director, and teacher) in the systematic system that the relationship and influence of virtual education on cultural intelligence, the relationship and effect of virtual education on academic achievement, and ultimately the relationship and influence of cultural intelligence on academic achievement have been reviewed in terms of three dimensions in this paper.

The importance and necessity of this paper symbolize that virtual education is increasingly growing and can undoubtedly affect the learning process, change its strategies and methods (Crumpacker, 2003: 11). Strengthening and supporting the application of information and communication technology in the field of virtual education, including planning, developing the content and texts, education-learning methods, particularly in educational settings is one of the most significant requirements so that if learning does not evolve in the education system, not only information technology will not evolve, but it will guide to conservative traditions of education. Since cultural intelligence is one of the most significant elements for virtual education in schools for development, it is extremely necessary to consider the dimensions of cultural intelligence and its role in shaping academic motivation. Consequently, the most significant goal of this paper is to investigate and explain the effect of virtual education on cultural intelligence and academic achievement concerning high school students.

This article aims to examine and explain the influence of virtual education on cultural intelligence and academic achievement in high school students and other goals including recognizing the dimensions and kinds of virtual education employed in high schools, classifying and examining the dimensions and components of cultural intelligence in secondary schools, identifying factors affecting students' academic achievement and recognizing the relationship between cultural intelligence and academic achievement concerning high school students. Consequently, the most significant question of this research is what is the effect of virtual education on students' cultural intelligence and academic achievement.

### **Theoretical considerations:**

Krass first raised term virtual education, which is simply the use of information technology for learning (Ladosser & Hamm, 2001: 52). Virtual education is a set of educational activities that are performed applying electronic tools including audio, video, computer, and network. Mayer has defined the concept of virtual and e-learning and regards it as active intelligent learning that will play an essential and key role in the development and deepening of cultural information and communication technology while changing the education. Virtual education is all educational activities that are performed through electronic means. Sebastian Theron believes that e-learning has a direct relationship with traditional education processes by reproducing all methods. For example, in this course, unlike in the past, the main and significant aspect of teaching and education is not learning but is teaching logical thinking and the scientific method in solving problems, and the materials are applied as instruments required for this educational process in the virtual teaching process (Abedi Jafari, 2005: 229).

Virtual teaching is a kind of teaching that happens in virtual environments. The virtual teacher owns responsibilities such as facilitating content, participating in discussions, managing, evaluating, encouraging group learning, technical support, evaluation and feedback, and monitoring and guiding. These features are selected according to principles such as increasing interaction between teacher and student, facilitating participation between students, encouraging students to active learning, the capacity to provide immediate feedback to students, emphasizing individual differences between students, strengthening cognitive flexibility, the central issue, and facilitating the interaction between the learner and the different learning resources. Accordingly, virtual teaching needs more elements and skills than face-to-face education. These skills are a framework for a deep understanding of the complicated network of relationships between content, pedagogy, technology, and the context for their operation (Kohler et al., 2007: 740). Accordingly, virtual education is one of the main requirements of education and one of the most significant conditions for strengthening universities. Realizing this goal needs a set of structural, technical, cultural, and managerial infrastructures that are beneficial and effective in the application of web technology, network, and other electronic instruments in order to teach and organize learning experiences (Ghadampour et al., 2014: 11).

The most important features and indices of virtual education include participation (increasing the passion to participate among learners and teachers), communication (e-mail communicators and conversations with each other and with teachers), inclusiveness (determining the direction of virtual education by learners, and a sense of responsibility in most of them), infinity (not restricted to space and time), community (forming virtual communities by enhancing access and communication), exploration (problem-oriented learning and setting learners in problematic situations), shared knowledge (availability of information for all), multi-sensory experience (providing certain types of multi-sensory learning experiences), originality (virtual education has a high level of credibility through communication, community and knowledge sharing) (Amir Teymouri, 2007: 19-25).

One of the most important models of virtual education is Gili Salmon's (2004) "electronic intermediary" model, which is often applied to train virtual instructors and evaluate their skills (Salmon, 2004: 12). Salmon has presented a model for teaching in a virtual environment in which he first emphasizes five outstanding characteristics of teachers and then considers five steps for efficient virtual teaching. In this model, creating discussion, guiding and conducting the process, encouraging students to participate in the discussion, and eventually establishing interaction between learners and the teacher structure the basis of the virtual instructor's responsibilities. Henceforth, in this model, the virtual instructor is called the electronic mediator.

According to Salmon model, effective virtual instruction during steps such as 1) e-mediator confidence in how and to what degree students have access to technology 2) direction of cyberspace by e-mediator in order to provide a sense of security and convenience to students 3) encouraging students by e-mediator through sharing ideas 4) asking deep questions by e-mediator in order to force students to discuss and help them in summarizing and reviewing the discussion 5) helping the teacher to students to combine different forms of discussion and applying knowledge suitable to personal goals and social situation (Chang, 2017: 63).

Culture as the most significant part of any society plays an essential role in individual and social development. Hofstede described culture as "brain software." Culture is learned, internalized, and

transferred from generation to generation. Culture is beyond conscious cognition, which recognizes how we interact with others (Madi, 2007: 13). Research has revealed that groups included members with various cultures are less correlated compared to groups with homogenous cultures because people are more attracted to people who are comparable to them. People with similar values and attitudes are more expected to work with each other (Hindoy, 2013: 46; and Thomas and Inxen, 2014: 243).

Intelligence in the real world includes intelligence that concentrates on specific content dimensions such as social intelligence, emotional intelligence, and practical and applied intelligence. Emotional intelligence assumes that individuals are familiar with their culture, consequently, they apply their cultural methods to interact with others. Cultural intelligence presents itself where emotional intelligence is ineffective. Cultural intelligence confirms practical realities and focuses on intercultural contexts (Kavanagh and Gooderham, 2007: 17).

Cultural intelligence as the most significant type of intelligence points to cultural differences and commonalities. According to Earley and Ang, cultural intelligence is "the ability to learn new patterns in cultural interactions and provide the correct behavioral responses to these patterns" that it is complicated to find familiar cues to use in order to establish communication in the face of new cultural situations. (2003: 18) Cultural intelligence relates to personal capacities that enable human beings to interact efficiently with other human beings with different cultural backgrounds and settings. In other words, cultural intelligence indicates the ability to be effective between different cultures, and these skills can be trained to individuals (Brislin et al., 2006: 43). An individual with high cultural intelligence has the capacity to learn in a new cultural environment and enjoys confronting new cultures (Deng and Gibson, 2008: 184). According to Earley (2003), cultural intelligence is an individual's ability to adapt efficiently to new cultural situations and conditions. In another definition, Johnson (2006) regards cultural intelligence as the effectiveness of an individual in understanding knowledge and awareness, skills and personality traits to more beneficial work with people related to different nationalities and cultures, both inside the country and abroad.

Cultural intelligence possesses three components: practical (body) or behavioral, emotional or motivational (heart), and cognitive (intellect). The cultural intelligence model has been shaped based on a four-factor framework and consisted of four different qualitative abilities. However, each of these four components has been interrelated. The four components of cultural intelligence are drive, knowledge, strategy, and action (Livermore, 2010: 18), which are normally referred to in research as; Motivational cultural intelligence, cognitive cultural intelligence, metacognitive cultural intelligence, and behavioral cultural intelligence (Van Dyne et al., 2009: 65).

"Ang, van Dyne, & Koh" consider cultural intelligence made of four components:

- **Motivational component:** The motivational dimension of cultural intelligence is a kind of individual ability to pay direct attention and spend energy in the direction of cultural differences. Motivational cultural intelligence indicates the individual's ability to focus his/her attention and energy towards adaptation to new cultures (Ang, 2008: 121).
- **Cognitive component:** it is the recognition of each of the similarities and differences of cultures and reflects the general knowledge about cultures. For example, it presents information about religious and spiritual beliefs and values and beliefs about work, time, family relationships, customs, and language.
- **Metacognitive component:** Metacognitive cultural intelligence indicates the processes that individuals use to acquire and understand cultural knowledge, this knowledge includes awareness and control over the process of thinking about culture (Ang and et al, 2006) . This dimension of cultural intelligence includes formulating a strategy, before the intercultural confrontation, examining the assumptions during the confrontation, and adjusting the mental maps in the case of being different from the real experiences from the early expectations (Hosseini Nasab, 2011: 31).
- **Behavioral component:** Behavioral cultural intelligence is an individual capacity to present proper verbal and non-verbal actions when interacting with other personalities in different cultural settings. Behavioral cultural intelligence is based on having and applying a wide list or range of behaviors. Behavioral cultural intelligence points to the wide range of individuals' behavioral skills and can properly express their verbal and non-verbal behaviors in new cultural situations (Ang, 2008: 123).

One of the most significant goals of educational systems that has constantly been considered by researchers is to cultivate motivated, purposeful, progressive, and efficient learners. Academic achievement and issues related to it are one of the main anxieties of the education system of countries because officials, political, economic, cultural, and social decision-makers around the world consider the development and progress of sociologists in the development and progress of the education system and this development and achievement is accomplished through students' academic achievement in school and the classroom. In other words, the students' academic achievement is one of the significant indicators in the evaluation of education, and all efforts in this system are considered as an attempt to realize this goal. The whole society in general and in particular the education system is interested and concerned about the fate of children, their successful growth and development, their position in society, and expects students develop and excel in various aspects, including cognitive dimensions and skills and abilities acquisition as well as in emotional and personality dimensions in a best way (Pourshafei, 1991: 76).

Academic achievement is the success of students in one or more subjects (e.g., comprehension, reading comprehension, or numerical calculation), such progress is estimated by scaled academic tests. The term also refers to a person's progress in the classroom, as evaluated in school work (Maher, 1997, quoted by Dodangeh, 1997).

Academic achievement suggests realizing the expected level of education and making the education organization closer to its predetermined purposes. Academic achievement is one of the responsibilities of the active learning process that is arranged with the help of educational activities. (Gage and Berliner, 1995; quoted by Mahdian, 2006).

The academic achievement level is one of the criteria for the efficiency of the educational system. Accordingly, analyzing related factors, the most basic research topics in the education system, depends on various factors that can be considered in the general category of factors related to individual differences and factors related to the school and the education system. In other words, academic achievement is sometimes due to personality traits, mental, social, emotional, and moral characteristics concerning students, which can be affected by family-related factors, and sometimes due to school functions and education system, of course, they interact with each other to some degree (Pour Shafei, 2014: 31).

There are various factors that influence students' academic achievement, which can be classified into three categories:

- A) Physiological factors:** These factors include the learner's physical and dynamic variables, including malnutrition and physical health.
- B) Psychological factors:** These factors include psychological variables such as intelligence, talent, self-concept creativity, self-esteem, attitude toward educational issues, motivation for advancement, the position of control, and other personal attributes.
- C) Environmental factors:** These factors involve external variables including economic and social situation (income, education, place of residence), variables related to the family (number of household members, parents' parenting style, family cultural values), and variables related to the school environment (conditions of the school, the management of the school, the attitude of teachers' characteristics, the culture and organizational atmosphere of the school (Rogers, 1982; Eschek and Fagan, 1994, quoted by Sahib, 2010: 151).

Consequently, the demand for progress is one of the original human motivations. Individuals who require to progress more strongly are more expected to complete and improve their performance. They prefer to do tasks with a sense of duty that are challenging so that it is achievable to evaluate their progress compared to other people based on criteria. In other words, the achievement is task-based behavior, which enables an individual's performance to be assessed according to supposed internal or external criteria (Kori, 2006; Kamuraja et al., 2009).

In general, it is possible to conclude that the process of education and learning has experienced many changes due to the development of science and technology and increasing its role in human life. E-learning and education is a new issue that is increasingly opening its position among educational methods. E-education is actually education through computers, multimedia computer networks, and

the Internet, which has become available with the help of the developing growth of information technology.

Human has always been learning and acquiring knowledge throughout their lives, which the category of education has not been deprived of it and has been coordinated and strengthened with technologies step by step by developing the technology; hence, education is one of his essential and obvious needs to live in today's advanced society where information is continually changing and developing. Human unaware of these human changes is considered unstable and separated from society. On the other hand, society cannot respond to all individuals to education by increasing the population; hence, it is required to find a strategy that makes education available to all at the lowest cost. In this process, there are many components and indices that can influence cultural intelligence and, consequently, students' academic achievement that the learning environment can be one of the most significant indices.

Learning environment applies to the processes that have a close relationship with physical and technical infrastructure.

The most important infrastructures for setting up a virtual education system are technological, human, and pedagogical infrastructures (changing the teaching and learning paradigm, changing from controlled classroom teaching to a self-accelerated learning system regardless of temporal and spatial limitations, moving from teacher-centric to Learner-centric, changing from a focus on learning rather than a focus on teaching) and the cultural, social, value (dissemination culture of Theocracy), economic and management, and leadership and administrative infrastructures and support systems. The virtual education system can be applied if the conditions and capability of utilizing the virtual education system in the school environment are examined and the applied fields of the virtual education system, the factors that facilitate the probability of its application are recognized, as well as the factors that prevent using the virtual education system can be identified and eliminated.

E-learning is a subset of learning, hence, issues related to how to learn in this environment are related to the principles and characteristics of that environment. Productive learning environments have been created at the intersection of four axes that cause to provide efficient learning. These four axes include learner-centered, knowledge-centered, evaluation-centered, and community-centered.

A learning-centered environment is not an environment in which only the intelligence, ambitions, and special characteristics of each learner are satisfied, but learning-centered contexts should satisfy the requirements related to the teachers, institutions, and the more extensive community that provide support for students and school. According to Bransford et al., Learner-centered learning includes awareness of the unique cognitive structures and perceptions that each learner brings to the learning environment. Consequently, the teacher attempts to learn from the learner's earlier knowledge and also the learner's misunderstandings and misinterpretations at the start of the development of new knowledge (Bransford, Brown, & Cocking, 1999).

The e-learning environment is learner-centered. Computer network space has the nature and principles and regulations of human laws. At first, many students are unknown with this space, but continuously, they will learn and master norms and communication devices by achieving insights into formal and informal experiences in cyberspace. While some of these norms for the situations of e-learning systems are not suitable (Benedict, 2011: 18).

### **Experimental literature:**

In terms of research background, various thinkers in the field of virtual education and cultural intelligence have conducted research. Butler (2013) investigated the relationship between cultural intelligence and academic achievement and discovered a significant relationship between cultural intelligence, students' self-esteem, and their academic achievement, and individuals with higher academic achievement had higher cultural intelligence.

Ahmadi et al. (2012) conducted a study in order to identify the factors influencing the mobile learning system in Iranian schools. In this study, rational action theory was appointed to investigate the factors influencing mobile learning purpose, which involved three independent constructs of mobile learning trend, behavioral control, and mobile learning mindset.

In a study, Fanch et al. (2011) considered metacognition strategies and cultural intelligence as the most significant factor in students' academic achievement.

Rui Neves Madeiraa, J. Luis Sousaa, V. Fernão Piresa, Luís Estevesa and O. P. Dias (2009) in a study entitled "Web-based student learning system" discovered that students learn much better and more than their own age group through a system designed by them that gave students access to their own databases and their own questions. Carrie Crown has conducted a study in 2007 entitled "Relationships between Social Intelligence, Emotional Intelligence, and Cultural Intelligence and Academic Achievement," the researcher has examined three types of cultural intelligence, social intelligence, and emotional intelligence and has examined the relationship between cultural intelligence and emotional intelligence and analyzes how they are distinct and related structures and subsets of social intelligence.

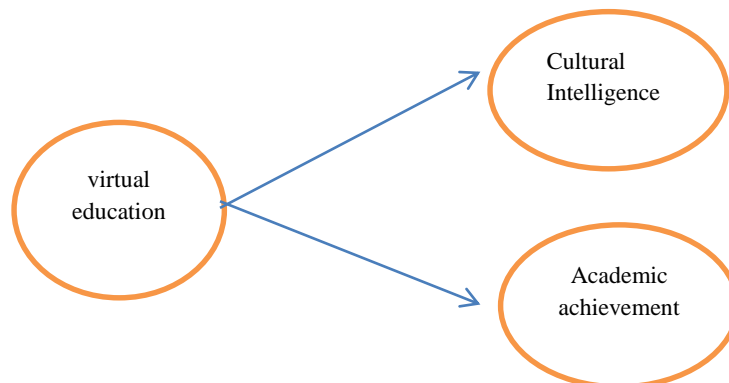
Straman et al. (2008) declared that those with higher cultural intelligence perform better in e-education and learning and are more psychologically adaptable, and are less feared of academic failure. Additionally, these students have higher academic performance (Yousefi, 2016: 19).

Van Dyne (2006), in a study concerning 338 business students, investigated the relationship between personality and four factors of cultural intelligence and concluded that there is a significant relationship between conscientiousness and the metacognitive dimension of cultural intelligence. Emotional vitality and stability with the behavioral aspect of cultural intelligence are related. There is a significant relationship between extraversion and the dimensions of knowledge, motivation, and behavior, and the most important result is that openness in gaining experience is one of the most significant personality traits that have a positive relationship with all four dimensions of cultural intelligence. In other words; it has a positive relationship with the ability of individuals to perform their duties effectively in various cultural complexes.

Zohrehvand (2014) conducted a study entitled Comparison of self-concept, academic self-efficacy, cultural and emotional intelligence, gender beliefs, and gender satisfaction of high school girls and boys and the role of each variable in predicting their academic achievement in third-grade high school students in the country. Findings indicate that girls in the sample group had lower self-concept, academic self-efficacy, and emotional intelligence and less gender satisfaction compared to boys. Additionally, girls in the sample group had fewer gender conventional believes than boys. The results of the study confirmed that, in the group of girls, only the concept of self and academic self-efficacy could predict their academic achievement. But, the variables of their concept, academic self-efficacy, gender beliefs, gender satisfaction, and emotional intelligence, respectively, predicted part of the variance of academic achievement in the group of boys.

Shah Mohammadi and Hassan Torabi (2011) conducted a study entitled "The role of the Web in promoting the educational system and related services" to examine the important capabilities of the Web in order to utilize it to improve the educational system for the considered population (Children to youth). The results of this study explain that the accurate use of web technology can reduce social costs, bring about comprehensive development of education in all parts of the country, development of justice in education, and ultimately the optimal use of time in addition to improving the quality of education in the young generation.

According to the presented theoretical foundations and theories of Ang and Earley and in this research, the following model has been presented as an experimental model.



The current research has been conducted with a method that is a kind of applied research and correlation class. The total statistical population of male and female high school students in Tehran's 5th district is 29,403 people that the sample size was calculated using Cochran's formula and 357 male and female students have been randomly studied to collect data and information. The data collection tool is a questionnaire that has been developed in three sections: virtual education, cultural intelligence, and academic achievement. SPSS software has been used after collecting the data to analyze them. In the description section, the data were analyzed through parameters such as mean, median, variance, and standard deviation, and Chi-square correlation coefficients and Spearman correlation were used in the inference section.

**Findings**

Descriptive findings reveal that 68.5% of the respondents are male students and 31.5% are female, 14.9% of students are in the tenth grade, 28.8% are in the eleventh grade and 44.8% are in the twelfth grade. More than half of the students, i.e. 58.9% have used laptops, 27.5% mobile phones, 6.4% tablets, and 2.4% fixed PCs. The majority of students, 47.9% have used Adobe Connect, 26.6% Shad network, 19.6% Sky Room and 5.9% TV school.

In the discussion of virtual education, 9 items have been suggested that explain the final evaluation of students from virtual education in such a way that 28.5% of students have evaluated virtual education as good and useful. 55.7% have no opinion on this issue and 15.8% have deemed it inappropriate and useless.

Cultural intelligence has been examined through 16 items. The level of cultural intelligence in four indices of motivation, cognitive, metacognitive, and behavioral at a high or great level is 59.7, 23, 66.1, and 94.1%, respectively. At the average level, this rate is 28.3, 59.1, 23.2, and 5.9 percent, respectively, and ultimately, at a low or low level, the rate of indicators among students is 5.3, 17.9, 10.6, and 0 percent, respectively. Accordingly, Half of the students, i.e. 38.1% of them have high cultural intelligence, 52.7% have moderate cultural intelligence and 9.2% have low cultural intelligence in terms of cultural intelligence.

Academic achievement has been evaluated through 9 items that according to the findings, 51.8% of students have high academic achievement motivation. 45.9 percent have the moderate motivation and 2.2 percent have motivation at a low level of academic achievement.

In the inferential section, the hypotheses were tested, the results of which are as follows:

*Table 1: Test the hypothesis of the relationship between virtual education and cultural intelligence*

Cultural Intelligence \ virtual education	High		Medium		Low		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Appropriate	8	11	54	28.7	11	15.1	73	20.4
Medium	25	11.4	113	60.1	82	37.3	220	61.6
Inappropriate	0	0	21	11.2	43	52.2	64	17.9
Total	33	9.2	188	52.7	136	38.1	375	100

chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.791 <sup>a</sup>	4	.000
Likelihood Ratio	49.053	4	.000
Linear-by-Linear Association	33.908	1	.000
N of Valid Cases	357		

The research findings of the above table present the relationship between the two variables of virtual education and cultural intelligence. Findings reveal that 11% of students who have rated virtual education as appropriate have high cultural intelligence, 28.7% of those who rated virtual education as appropriate and ideal have moderate cultural intelligence, and 15.1% of those who rated virtual education appropriate have low cultural intelligence.

Additionally, 11.4% of students who have rated e-education at the medium level have high cultural intelligence, 60.1% have moderate cultural intelligence and 37.3% have low cultural intelligence.



Ultimately, 11.2% had moderate cultural intelligence and 62.2% had low cultural intelligence among students who have rated e-education at an inappropriate level. Consequently, according to the acquired correlation coefficients and at the level of 95% confidence sig = 0.000 and with a degree of freedom of 4, the Pearson correlation coefficient and Chi-square equal to 42,791 indicates the relationship between the two variables. In other words, students' cultural intelligence will additionally be higher when virtual education is more appropriate.

**Table 2: Test the hypothesis of the relationship between virtual education and academic achievement**

Academic achievement / Virtual education	high		moderate		low		total	
	Frequency	percentage	Frequency	percentage	Frequency	percentage	Frequency	percentage
Appropriate	35	56.2	22	34.4	6	9.4	64	17.9
Medium	115	52.3	103	46.8	2	0.9	220	61.6
Inappropriate	34	46.6	39	53.4	0	0	73	20.4
<b>Total</b>	<b>185</b>	<b>51.8</b>	<b>164</b>	<b>45.9</b>	<b>8</b>	<b>2.2</b>	<b>357</b>	<b>100</b>

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.342 <sup>a</sup>	4	.000
Likelihood Ratio	17.136	4	.002
Linear-by-Linear Association	.005	1	.942
N of Valid Cases	357		

The research findings of the above table present the relationship between the two variables of virtual education and academic achievement. Findings explain that 56.2% of students who have rated e-education as appropriate have high academic achievement, 34.4% have moderate academic achievement and 9.4% have low academic achievement.

Among the students who have rated e-education at the medium level, 52.3% had high academic achievement, 46.8% had moderate academic achievement and 0.9% had low academic achievement.

Among students who have rated e-education as inappropriate, 46.6% had high academic achievement and 53.4% had moderate academic achievement. Consequently, according to the achieved correlation coefficients and at the level of 95% confidence and sig = 0.000 and with a degree of freedom of 4, Pearson and Chi-square correlation coefficient equal to 21.3425 symbolizes the relationship between the two variables. In other words, students' academic achievement will additionally be higher when virtual education is more appropriate.

**Table 3: Test the hypothesis of the relationship between cultural intelligence and academic achievement**

Academic achievement / Cultural Intelligence	high		moderate		low		total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Appropriate	62	45.6	71	52.2	3	2.2	136	38.1
Moderate	93	49.5	90	47.9	5	2.7	188	52.7
Inappropriate	30	90.9	3	10.1	0	0	33	9.2
<b>Total</b>	<b>185</b>	<b>51.8</b>	<b>164</b>	<b>45.9</b>	<b>8</b>	<b>2.2</b>	<b>357</b>	<b>100</b>

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.907 <sup>a</sup>	4	.000
Likelihood Ratio	26.675	4	.000
Linear-by-Linear Association	11.826	1	.001
N of Valid Cases	357		

The research findings of the above table show the relationship between the two variables of cultural intelligence and academic achievement. Findings reveal that among students with high cultural

intelligence, 45.6% have high academic achievement, 52.2% have moderate academic achievement and 2.2% have low academic achievement.

49.5% have high academic achievement, 47.9% have moderate academic achievement and 2.7% have low academic achievement among students with moderate level cultural intelligence.

90.9% have high academic achievement and 10.1% have moderate academic achievement among students with low levels of cultural intelligence. Consequently, according to the achieved correlation coefficients and at the level of 95% confidence and  $\text{sig} = 0.000$  and with a degree of freedom of 4, the correlation coefficient of Pearson and Chi-square equal to 22.9075 indicates the relationship between the two variables. In other words, students' academic achievement will additionally be higher when cultural intelligence is higher.

### **Discussion and conclusion:**

Virtual education as one of the most significant types of education has been currently considered by societies. The prevalence of corona and the connection of students through cyberspace and its range have caused people with different cultural backgrounds to be affected by each other. Consequently, cultural development (cultural capital, cultural dissemination, cultural intelligence, etc.) is influenced by virtual education. Students develop family relationships with each other by developing communication and becoming more familiar with different and various cultures. This is growing more obvious in cyberspace. Developing these connections and further monitoring it can be the foundation for scientific exchange among students and their cooperation and participation in the learning process and, consequently, academic achievement. These findings are compatible with the results achieved by the research conducted by Fanch et al. (2011), Butler (2013), and Zohrehvand (2014). Consequently, virtual education is a very good possibility that can be employed for cultural development in families and schools and as one of the most significant strategies for students' academic achievement.

### **Suggestions**

According to the high importance of education and academic achievement concerning students, the following cases are implied.

- Virtual education is a good possibility for active, self-controlled, and self-reading students to make the best advantage of all capacities and facilities (paying attention to the physical space of the school, increasing Internet bandwidth, using advanced intelligent software, etc.).
- Preparing brochures and cultural packages for students and families in order to become more familiar with the strengths, weaknesses, opportunities, and threats of e-education
- The supervisory role of parents in virtual and online education, particularly in elementary school, is a noticeable role that significant learning cannot be accomplished without parental supervision, control and support.
- Acknowledging that personality traits play an indisputable role in different aspects of life, particularly academic achievement, social inhibitions, and cultural intelligence, as well as other capabilities and other variables, it is recommended that educational systems and temporary education allocate time to measuring the psychological dimensions of learners' personalities so that they can help learners to succeed in different fields by providing appropriate programs.
- Schools should provide the required design and planning to teach cultural intelligence and other related and required capabilities. Consequently, it is suggested to school principals to hold conferences, seminars, workshops, and programs such as providing group activities to promote and increase cultural intelligence, with the help of educational planners.
- In another interpretation based on social learning theory, students are interested in gaining experiences and information from various cultural achievements due to their personality traits and characteristics and strengthen their social skills by observing different behavioral patterns. In fact, they strengthen their social skills through verbal and non-verbal skills. Consequently, proper and expert planning can help to strengthen the students' cultural intelligence and academic achievement.

- Evaluating the information literacy concerning students and their families can play an essential role in shaping academic motivation. Consequently, planning and holding counseling classes and scientific meetings for families can help in this important issue.
- One of the most prominent solutions to adapt to the new cultural situation is for students to be informed of cultural diversity and to be capable to strengthen interaction relevant to the new culture and tolerate more the new cultural circumstances and attitudes.
- It is recommended that if conceivable, a cultural basics course be developed for students in order to obtain a high level of academic achievement with a cultural approach.
- Conducting continuous research projects in the field of virtual education and cultural intelligence and academic achievement at different academic levels and various times

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