Relationship between the use of virtual social networks, self-directed learning and critical thinking of students in developing countries: a comparative study between Iranian and Indian undergraduate students

Negin Barat Dastjerdi
University of Esfahan, Iran
Anjum Ahmed
Aligarh Muslim University, India

This study investigated the relationship between uses of virtual social networks, self-directed learning and critical thinking of students in developing countries, a comparative study between students at the University of Esfahan in Iran and students of Aligarh Muslim University in India, enrolled in the academic year 2017-2018. Research was conducted using a descriptive correlational method and found that the use of virtual networks among Iranian students had a positive and significant relationship with components of critical thinking (interpretation, analysis and explanation skills), while among the Indian students, there was a positive and significant relationship with all the components of critical thinking. Moreover, the use of virtual social networks among Iranian students had a positive and significant relationship with the components of self-directed learning (interests in learning and self-control), but it did not have a significant relationship with the component of self-management. Among Indian undergraduate students, the use of virtual social networks had a positive and significant relationship with all the self-directed learning components (self-management, interests in learning and self-control).

Introduction

The words "network and community" both refer to the pervasiveness and high influence of such technology in the world. Students use technology more than other people in the community. According to the results of some studies, almost all students have at least one profile in social media and most users are between 18 and 29 years of age (Sponcil & Gitimu, 2013).

Virtual social networks are one of the most pervasive technologies of the 21st century. These networks have web-based content and by which people and communities share the contents created by users and cooperate in their production, discussion and moderation (Kitzmann et al 2011). Virtual social networks are the phenomena in the cyberspace that affect all aspects of human life and cause socio-political, economic, and cultural areas to face with a wealth of opportunities and threats. These social networks are valuable for learning because they enable learners to create, publish, and share their works. Moreover, the networks can facilitate learners' engagement and collaboration (Saemi et al, 2014). Therefore, regarding the development of information and communication technology, universities and schools have to educate people who, on the one hand, are consistent with the goals, missions and mechanisms of the intelligence community and, on the other hand, they are pioneers and advancers of it (Harbison& Rex, 2010). In this regard, virtual social networks, as one of the new information and communication technologies, can play an important role in learning.

One of the key concepts in education of the present age is self-directed learning, which has become one of the main goals of education in the last few decades, and self-directed learning theory is increasingly being used in higher education (Cazan & Magdalena, 2015). Self-directed learning is a process in which learners are responsible for identifying their own educational needs - planning, implementing and evaluating their learning outcomes, they show initiative and work independently of others in order to achieve predetermined learning goals (Fisher & King, 2010). In fact, self-directedness is an approach to learning that encourages learners to identify their own learning needs or goals through shared cognition and participatory decision-making. This approach allows learners to use learning strategies to meet their needs (Veiskaramiet at 2012).

Self-directed learning is also an active process and processing structure with which the learner sets goals for learning activities, cognition, motivation and behaviours (Hassani, 2015). In fact, self-directed learning focuses on the important role of motivation and will in the beginning and sustaining learners' efforts to achieve goals. (Sadeghi & Mohtashami, 2011). Self-directed learning increases student's self-confidence and their ability to learn independently in challenging environments and educational situations, making them self-reliant and independent. Furthermore, given their high motivation, self-directed learners' learning is purposeful, meaningful, stable and consistent. Such individuals are responsible in their lives and benefit from self-discipline in their learning (Ghobadi et al, 2015). In the process of self-directed learning, students are encouraged to develop abilities in assessing their own knowledge deficits and then deal with them by looking through the related sources. They may use their own knowledge, available resources or conscious judgment to find solutions to a problem (Karimi et al 2010).

Therefore, developing self-directed learning through a variety of tools, including virtual social networks, enables students to get the skills they need in their future positions (Cazan & Magdalan, 2015).

Another goal of learning in the present century is to educate learners who are prepared to face a changing society and the complexity of the information age. Hence, having critical thinking skills helps learners to learn, explain, and apply concepts with a deeper and more durable understanding. The learners who benefit from critical thinking skills, better understand the relationship between various topics, information in the virtual environment and the content they are learning, and they can relate what they learn to their needs in everyday life (Heidari et al 2013). Facing the remarkable transformations of the 21st century, learners need to increasingly develop critical thinking skills in order to make appropriate decisions and solve complex problems in society. Therefore, the main purpose and the mission of education system is to educate people who can think on their own and not merely embrace what others are saying (Kadivar, 2002).

Although it is not easy to give a concise definition of critical thinking, the attempt to do so will help measure it. Cottrell considers critical thinking to be a cognitive process that is relevant to the use of the mind. From his point of view, learning to think in an analytical and evaluative way means using cognitive processes such as attention, classification, selection and judgment. (Cottrell, 2005). Richard Bell defines critical thinking as self-directed, self-regulated, self-observant and self-corrective thinking. By internalizing critical thinking skills in the formulation of questions and basic issues, collecting and measuring relevant information, expressing results, reasoning solutions and evaluating them, enlightening thinking, identifying assumptions and their indications and implications, as well as establishing effective communication with others, one becomes able to find solutions to complex issues (Paul & Elder, 2009).

It is expected that adoption and application of new technologies such as virtual social networks, in education system will facilitate the teaching and learning process and increase high level thinking skills such as the critical thinking and self-directed learning as well (Rumpagorn & Darmawan, 2007). Through the use of virtual social networking tools, students can converse, learn and think. As a result of working with these technological tools they will be encouraged to think reasonably, to be independent in learning, and then to acquire internal cognitive tools for future uses in other situations (Mirzabeigi & Colaee, 2011).

Review of Related Studies

Regarding the development of ICT-equipped education environments, the role of using such tools in developing critical thinking skills and self-directed learning has been investigated in several studies. In this regard, the effect of various variables, including teachers' attitude towards technologies namely the use of computer and ICT-based learning environments in developing critical thinking skills for learners have been measured (Rumpagorn & Darmwan, 2007).

So far, since the emergence of social networking, researchers such as Selwyn (2007), Yang (2009), Schwartz (2009), Hargittai & Pasek (2009), and Roblyer (2011) have studied the use of the networks in education. The researchers concluded that virtual social networks through internet

tools, reinforce critical thinking, research-based group learning, and group problem solving; and their power is not only due to the production and sharing of knowledge among their members, but because of the fact that they allow reflection and production of new knowledge. In these networks, ideas are generated, challenged, changed, and criticized by a large network of people (Pesek, More & Hargitta, 2009; Schwartz, Donovang & Guido-Dibrito, 2009; Yong, 2009; Sylwyen, 2007). Balakrishen (2017) conducted a research on social media and their use in learning. The findings of the research showed that the use of social media in education and learning develops experience, participation and communication between students. Eid & Al-Jabri (2016) conducted a study entitled social networks, knowledge sharing, and student learning. The results showed that there is a positive and significant relationship between online conversations - file exchange - the exchange of knowledge and entertainment and learning fun for learners.

One research claiming linking together self-regulated learning and social media is Vrieling & Matzat (2015) study which showed that using social media has a direct relationship with self-regulated learning. The results also showed that teachers use social media to share information with learners both in classrooms and out of classrooms, and the use of social media to facilitate self-regulated learning does not affect teacher-student relationships.

Miller (2009) carried out a study titled the development of skills of the 21st century through the use of personal learning networks. The results indicated an increase in learning interaction, the development of participatory learning and research skills, and an understanding of how to use social networking tools for general communication. Aliabadi et al., (2017) in a study on investigating the relationship between the extent of using virtual social networks and self-regulated learning strategies in students, concluded that there was a significant relationship between the extent of using virtual social networks and self-regulated learning strategies. Greenhow (2011) investigated on online social networking and learning and found that social networks sites directly support learning. Also, online social networking can stimulate social and civic benefits that are useful for education. Greenhow research entitled the effects of quality of educational objectives on self-regulation and academic performance of online and offline classrooms, Straehle (2009) concluded that education through new tools has a significant impact on self-regulated learning.

A study on developing the 21st century skills through using personal learning networks by students, Miller (2009) concluded that the use of social networking tools has led to an increase in students' awareness of the benefits of social networking tools as a learning tool. A research study was conducted on forecasting the tendency towards critical thinking in students by using information and communication technology tools, the investigators, Barat Dastjerdi and Yousefi Hamedani (2017) concluded that there is a significant relationship between the level of familiarity with ICT tools and the tendency toward critical thinking. Blaschke (2014) in a research entitled using virtual social networks to develop self-directed learning of online students, concluded that there is a significant relationship between their use of social networks and their cognitive and metacognitive skills. Knowles (1978, as cited in Moore & Kearsley, 2012) defined andragogy in the 1970's as specific to adult education and characterized by learner control and self-responsibility in learning, learner definition of learning objectives in relation to their relevance to the learner, a problem-solving approach to learning, self-directedness in how to learn, intrinsic learner motivation, and incorporation of the learner experience. Key attribute of andragogy is *self-directed learning*. The goals of self-directed learning include helping learners develop the capacity

for self-direction, supporting transformational learning, and promoting "emancipatory learning and social action" (Merriam, 2001).

Heutagogy (based on the Greek for "self") was defined by Hase and Kenyon in 2000 as the study of self-determined learning. Heutagogy applies a holistic approach to developing learner capabilities, with learning as an active and proactive process, and learners serving as "the major agent in their own learning, which occurs as a result of personal experiences"
(Hase & Kenyon, 2007).

The concept of heutagogy offers certain principles and practices that could be considered as a response to these developments within higher education. A heutagogical learning environment facilitates development of capable learners and emphasizes both the development of learner competencies as well as development of the learner's capability and capacity to learn (Ashton & Newman, 2006; Bhoryrub, Hurley, Neilson, Ramsay, & Smith, 2010; Hase & Kenyon, 2000). A renewed interest in heutagogy has also been generated by Web 2.0 as a result of the affordances of social media that complement and support this learning approach. Heutagogy has been called a "net-centric" theory that takes advantage of the key affordances of the Internet; it is also a pedagogical approach that could be applied to emerging technologies in distance education, as well as serve as a framework for digital age teaching and learning (Anderson, 2010, Wheeler, 2011). Heutagogy is of special interest to distance education, which shares with heutagogy certain key attributes, such as learner autonomy and self-directedness, and has pedagogical roots in adult teaching and learning.

In recent years, in third world countries, the use of information and communication technology tools such as virtual social networks in traditional classes and virtual training courses have been increasing; however, by increasing the number of distance education programs and the diversity of registered individuals, higher education institutions are concerned about measuring the efficiency of various data transfer methods (Derwein, 2009). Therefore, it seems that studying and investigating the effects of technologies in all aspects, especially on the quality of teaching and learning, is of great importance. On the other hand, capabilities like the ability to select, organize, process, and evaluate information used in virtual social networking tools are expected to improve learning opportunities such as critical thinking and self-directed learning skills. Thus, the present study investigates the relationship between the use of virtual social networks on improving self-directed learning and critical thinking skills among students in Iran and India. The selection of the two countries is due to the fact that both are third-world countries and the use of technologies, including virtual social networks, has grown significantly amongst the students of both countries. Hence, the researchers decided to perform a comparative study in the two countries. The results of this study can provide important implications for educational planners in the field of content selection, teaching-learning methods and, in general, the integration of technology tools in education system.

Therefore, the present research has been conducted to test the following hypotheses:

1. There is a significant difference between the level of using virtual social networks and self-directed learning among Iranian and Indian students.

2. There is a significant difference between the level of using virtual social networks and critical thinking among Iranian and Indian students.

3. There is a significant difference between the attitude toward using virtual social networks and self-directed learning and critical thinking among Iranian and Indian students.

4. There is a significant relationship between the level of using virtual social networks and self-directed learning among Iranian and Indian students.

5. There is a significant relationship between the level of using virtual social networks and critical thinking among Iranian and Indian students.

6. There is a significant relationship between the attitude toward using virtual social networks and self-directed learning and critical thinking among Iranian and Indian students.

Research Method

This is research was conducted with descriptive correlational method. In this research, the statistical population included all undergraduate students of University of Esfahan and students of Aligarh Muslim University in India who were enrolled in the academic year 2017-2018. The sample size was determined using Cochran formula, which was selected from the three faculties of humanities, engineering, and basic sciences by cluster random sampling method. The research tool was self-constructed. A virtual social networking questionnaire which was developed by the researchers by referring to valid documents and previous researches. The content validity of the tool was approved by the experts in the field of information and communication technology and educational technology. Their liability of the tool was established by using Cronbach's alpha as 0.89.

The standardized self-directedness questionnaire that was developed by Fisher, King &Tague in 2001 consisted of 42 questions grouped under three components of self-management, interest in learning and self-control. The respondents were judged on a 5-degree Likert scale of 1: completely agree to 5: completely disagree. Findings of Fisher et al (2001) in Australia showed that the total reliability of this scale was 0.83 using Cronbach's alpha method and for different components it was 0.87 for self-management subscale, 0.85 for interests in learning, and 0.80 for self-control. Moreover, the construct validity of this scale has been reported as acceptable using confirmatory factor analysis method. California Critical Thinking Skill Test (CCTST) standard questionnaire (form B) was used to measure critical thinking, which is measured in three cognitive skills including analysis, evaluation, and inference, and its reliability has been confirmed in various studies (Facion & Facion, 1993).

Data analysis

According to descriptive analysis of questionnaires estimated results, it was found that 59.6% of respondent were female and 40.4% of them were male from India and 88.6% of respondent were female and 11.4% of them were male from Iran. According to the results of processing the questions of the questionnaire, 56.5%of the respondents from India and 40.75% of the respondents from Iran are in the age range of 21-23 years and other respondents were of the age range of 24-26years.

Table 1
The rate of using various types of virtual social networks among Iranian and Indian students

Country	Facebook	Twitter	Linkedin	Telegram	Instagram	Whatsapp	Viber
Iran	14.4%	15.8%	5%	100%	57.6%	61.9%	28.8%
India	35%	12.3%	6.5%	2.7%	2.7%	38.8%	1.5%

The results of Table 1 revealed that the social network of telegrams is the most commonly used and the linkedin network is the least used network by the Iranian students; but Whatsapp and Facebook are the most commonly used and Viber is the least used virtual social network by Indian students.

Table 2
Objectives behind using virtual social networks among Iranian and Indian students

Country	Learning new things	Creating new information	Interaction with friends and family	Scientific communication	Sharing information	Entertainment
Iran	55.4%	15.1%	81.3%	12.2%	43.8%	64.7%
India	32.7%	20.8%	24.2%	9.5%	8.8%	3.5%

The results of Table 2 expounds that the most important goals of using virtual social networks among Iranian students were respectively interaction with friends and family (81.3%), entertainment (64.7%), and learning new things (55.5%); and among Indian students learning new things (32.7%), interaction with friends and family (24.2%) and creating new information (20.8%). Besides, the comparison between the goals of using virtual social networks among Iranian and Indian students shows that for Iranian students, using virtual social networks is more fun than Indian students.

Table 3
Summaries of the results of regression coefficients of students' critical thinking based on the amount of use of virtual networks

	Criterion variable	Predictor Variable	R	R^2	t	P.Value
Iranian students	Critical thinking	Usage of virtual social Network	0.210	0.044	2.513	0.013
	Interpretation	Usage of virtual social Network	0.205	0.042	2.446	0.016
	Analysis	Usage of virtual social Network	0.267	0.071	3.237	0.002
	Inference	Usage of virtual social Network	0.117	0.014	1.374	0.172
	Evaluation	Usage of virtual social Network	0.092	0.008	1.083	0.281
	Explanation	Usage of virtual social Network	0.224	0.050	2.692	0.008
	Self – regulatory	Usage of virtual social Network	0.091	0.008	1.069	0.287
Indian student	Critical thinking	Usage of virtual social Network	0.294	0.086	4.942	0.000
	Interpretation	Usage of virtual social Network	0.215	0.046	3.534	0.000
	Analysis	Usage of virtual social Network	0.201	0.040	3.295	0.001
	Inference	Usage of virtual social Network	0.252	0.064	4.189	0.000
	Evaluation	Usage of virtual social Network	0.242	0.059	4.005	0.000
	Explanation	Usage of virtual social Network	0.189	0.036	3.086	0.002
	Self- Regulatory	Usage of virtual social Network	0.276	0.076	4.620	0.000
Total	Critical thinking	Usage of virtual social Network	0.263	0.69	5.423	0.000
	Interpretation	Usage of virtual social Network	0.209	0.044	4.265	0.000
	Analysis	Usage of virtual social Network	0.222	0.049	4.529	0.000
	Inference	Usage of virtual social Network	0.199	0.040	4.051	0.000
	Evaluation	Usage of virtual social Network	0.188	0.035	3.815	0.000
	Explanation	Usage of virtual social Network	0.195	0.038	3.959	0.000
	Self – Regulatory	Usage of virtual social Network	0.180	0.032	3.646	0.000

According to the explicate results of Table 3, R observed at the level of P≤0.05, there is a positive and significant correlation between the amount of virtual social networks and critical thinking in general, as well as between Iranian and Indian students separately. So that the use of virtual social networks is about 4 and 9 percent of the variance of critical thinking among Iranian and Indian students, respectively. Also, the findings suggest that the use of virtual social networks among Iranian students has a positive and significant impact on the skill of interpreting, analysing and explaining students. But, the impacts of the use of virtual social networks on evaluation, inference and self-regulation among Iranian students have not been confirmed. Meanwhile, findings from Indian students in general indicate a positive and significant relationship between the use of virtual social networks and all critical thinking components among the students.

Table 4
Summary of the results of student's self-directed learning regression coefficients based on the amount of use of virtual networks

	Criterion variable	Predictor Variable	R	R^2	t	P.Value
Iranian students	Self-directed learning	Usage of virtual social Network	0.388	0.151	4.935	0.000
	Self-Management	Usage of virtual social Network	0.004	0.000	-0.050	0.960
	Desire to learn	Usage of virtual social Network	0.261	0.068	3.166	0.002
	Self-control	Usage of virtual social Network	0.580	0.336	8.334	0.000
Indian student	Self-directed learning	Usage of virtual social Network	0.405	0.164	7.118	0.000
	Self-Management	Usage of virtual social Network	0.256	0.066	4.260	0.000
	Desire to learn	Usage of virtual social Network	0.316	0.100	5.350	0.000
	Self-control	Usage of virtual social Network	0.469	0.220	8.529	0.000
Total	Self-directed learning	Usage of virtual social Network	0.374	0.140	8.034	0.000
	Self-Management	Usage of virtual social Network	0.154	0.024	3.108	0.002
	Desire to learn	Usage of virtual social Network	0.267	0.71	5.515	0.000
	Self-control	Usage of virtual social Network	0.492	0.243	11.274	0.000

The results of table 4 elucidate that for R observed at P≤0.05 level, there is a positive and significant correlation between the use of virtual social networks and self-directed learning in general, as well as among Iranian and Indian students separately. So that the amount of virtual social networks use is about 15% and 16% of self-directed learning variance among Iranian and Indian students, respectively. Also, the findings confirm that the use of virtual social networks

among Iranian students have a positive and significant effect on all components of self-directed learning, including self-management component. Meanwhile, findings from Indian students in general, disclose a positive and significant relationship between the use of virtual social networks and all critical thinking components among students.

Table 5
Summary of the Results of Regression Coefficients of students' Critical Thinking based on the Attitude to using Virtual Social Networks

	Criterion variable	attitude towards virtual social Network	R	R^2	t	P.Value
Iranian students	Critical thinking	Usage of virtual social Network	0.391	0.153	4.973	0.000
	Interpretation	Usage of virtual social Network	0.248	0.061	2.992	0.003
	Analysis	Usage of virtual social Network	0.312	0.097	3.845	0.000
	Inference	Usage of virtual social Network	0.314	0.098	3.869	0.000
	Evaluation	Usage of virtual social Network	0.302	0.091	3.714	0.000
	Explanation	Usage of virtual social Network	0.325	0.106	4.028	0.000
	Self – regulatory	Usage of virtual social Network	0.316	0.100	3.895	0.000
Indian student	Critical thinking	Usage of virtual social Network	0.213	0.045	3.469	0.001
	Interpretation	Usage of virtual social Network	0.230	0.053	3.800	0.068
	Analysis	Usage of virtual social Network	0.113	0.013	1.833	0.067
	Inference	Usage of virtual social Network	0.113	0.013	1.839	0.000
	Evaluation	Usage of virtual social Network	0.196	0.029	2.755	0.000
	Explanation	Usage of virtual social Network	0.196	0.038	3.206	0.000
	Self- regulatory	Usage of virtual social Network	0.183	0.033	2.984	0.000
Total	Critical thinking	Usage of virtual social Network	0.272	0.074	5.631	0.000
	Interpretation	Usage of virtual social Network	0.234	0.055	4.799	0.000
	Analysis	Usage of virtual social Network	0.171	0.029	3.466	0.001

	Inference	Usage of virtual social Network	0.184	0.034	3.726	0.000
	Evaluation	Usage of virtual social Network	0.207	0.043	4.206	0.000
	Explanation	Usage of virtual social Network	0.227	0.052	4.643	0.000
	Self – regulatory	Usage of virtual social Network	0.222	0.049	4.527	0.000

The results of table 5 illustrates that R observed at P≤0.05 level, there is a positive and significant correlation between the attitude toward the use of virtual networks and critical thinking in general, as well as among Iranian and Indian students separately. So, the attitude toward using virtual networks accounts for about 15 and 5 percent of the variance of critical thinking among Iranian and Indian students, respectively. Also, the findings reveal that the attitude toward the use of virtual networks in general and among Iranian students has a positive and significant impact on the components of critical thinking. However, findings from Indian students affirm that the impact of the attitude towards the use of virtual social networks on two components of critical thinking (analysis and evaluation) is not significant.

Table 6
Summary of the results of student self-directed learning regression coefficients based on the attitude toward the use of virtual networks

	Criterion variable	attitude towards virtual social network	R	R^2	t	P.Value
Iranian students	Self-directed learning	Usage of virtual social Network	0.478	0.229	6.376	0.000
	Self-Management	Usage of virtual social Network	0.770	0.593	14.137	0.000
	Desire to learn	Usage of virtual social Network	0.213	0.046	2.557	0.012
	Self-control	Usage of virtual social Network	0.167	0.028	1.983	0.049
Indian student	Self-directed learning	Usage of virtual social Network	0.302	0.091	5.097	0.000
	Self-Management	Usage of virtual social Network	0.537	0.288	10.221	0.000
	Desire to learn	Usage of virtual social Network	0.114	0.013	1.837	0.067
	Self-control	Usage of virtual social Network	0.186	0.035	3.043	0.003
Total	Self-directed learning	Usage of virtual social Network	0.327	0.107	6.900	0.000
	Self-Management	Usage of virtual social Network	0.604	0.365	15.096	0.000

	Desire to learn	Usage of virtual social Network	0.116	0.013	2.326	0.021
	Self-control	Usage of virtual social Network	0.165	0.027	3.342	0.001

The results of Table 6 reveals that for R observed at the P≤0.05 level, there is a positive and significant correlation between the attitude toward the use of virtual social networks and self-directed learning in general, as well as among Iranian and Indian students separately. So, the attitude toward using virtual networks accounts for about 23 and 9 percent of self-directed learning variance among Iranian and Indian students, respectively. Also, the finding suggests that the attitude toward the use of virtual networks in general and among Iranian students has a positive and significant effect on self-directed learning components. Meanwhile, findings from Indian students acknowledge that the impact of the attitude toward using virtual social networks on the component of the desire to learn is not significant.

Table 7
Comparison of the mean of critical thinking and its components among Iranian and Indian students

Variable and its Components	Students	M	SD	t	Sig
Critical thinking	Iranian	3.67	0.50	-1.076	2.83
	Indian	3.72	0.50		
Interpretation	Iranian	3.74	0.58	0.416	0.677
	Indian	3.71	0.62		
Analysis	Iranian	3.79	0.53	0.657	0.512
	Indian	3.76	0.59		
Inference	Iranian	3.58	0.70	-1.227	0.221
	Indian	3.67	0.64		
Evaluation	Iranian	3.73	0.60	0.303	0.762
	Indian	3.71	0.71		
Explanation	Iranian	3.86	0.57	2.558	0.011
	Indian	3.70	0.62		
Self-regulatory	Iranian	3.95	0.93	2.429	0.016
	Indian	3.74	0.62		

According to all the analysis tabulated in Table 7 , except for explanation and self-regulatory components, all the t-values are less than 1.96 (0.05 level of significance) therefore it can be concluded that there is no significant difference between the Iranian and Indian students in terms of critical thinking and its components i.e, interpretive, analysis, evaluation and deduction skills; However, there is a statistical significant difference between Iranian and Indian students in their critical thinking components, that is, explanation and self-regulatory. As the t-values are greater than 1.96 (0.05 level of significance) the results confirm that Iranian students are better in evaluating their explanation and self-control skills than Indian students.

Table 8
Comparison of self-directed learning and its components among Iranian and Indian students

Variable and its Components	Students	M	SD	t	Sig
Self-directed learning	Iranian	4.03	0.40	5.459	0.000
	Indian	3.78	0.48		
Self – Management	Iranian	3.78	0.52	1.724	0.085
	Indian	3.68	0.53		
Desire to learn	Iranian	4.21	0.45	7.501	0.000
	Indian	3.82	0.57		
Self-control	Iranian	4.08	0.56	4.174	0.000
	Indian	3.84	0.56		

All the analysis tabulated in Table 8, with the exception of the self-management component, all the t-values are greater than 2.58 (0.01 level of significance) therefore it can be concluded that there is statistical significant difference between the Iranian and Indian students in terms of self-directed learning and its components (willingness to learn and self-control. However, there was no significant difference in the self-management component as the t-value was less than 1.96 (0.05 level of significance). The results indicate that Iranian students have better self-directed learning, desire to learn and self-control than Indian students.

Table 9
Mean comparison of attitude toward using social networks among Iranian and Indian students

Variables	Students	M	SD	t	Sig
Usage of Virtual Social Network	Iranian	3.03	0.89	-0.605	0.545
	Indian	3.08	0.77		
Attitude towards Virtual Social Network	Iranian	3.65	0.91	-1.006	0.315
	Indian	3.76	1.00		

Table 9 highlights the analysis in which the t-values are less than1.96 (0.05 level of significance). Therefore, it can be concluded that there is no statistically significant difference between Iranian and Indian students, in terms of usage and attitude toward using virtual social network.

Conclusion

Virtual social networks increasingly play an important role in teaching and learning in general and in curriculums in particular, and one of their main features is to pay attention to the learner as the constructor of knowledge. Accordingly, paying attention to learning activities in the curriculums is essential, and various activities have to be considered so that the learners can develop their learning quality through them. By providing a wide range of tools, social networks enable learners to make their learning process interactive and they also allow effective learning strategies to be implemented better through the use of such tools.

These networks create several communication tools (public, private, synchronous and asynchronous) and facilitate group work and horizontal relationships between teachers and learners. Moreover, the exchange of information and feedback for social learning purposes optimizes social networks and allows the learners to create contents, and then determines the teacher's initial orientation (Njenga & Fourie, 2010).

The result of the data analysis showed that there is a positive and significant correlation between the amount of using virtual social networks and critical thinking among Iranian and Indian students, which is consistent with the results of Barat Dastjerdi and Hamedini (2017) research. The use of virtual networks among Iranian students had a positive and significant relationship with certain components of critical thinking (interpretation, analysis and explanation skills), while among the Indian students it had a relationship with all the components of critical thinking (interpretation, analysis, evaluation, inference, explanation and self-regulation). Also, the results show a positive and significant correlation between the use of virtual social networks and self-directed learning among Iranian and Indian students. Findings indicate that the use of virtual social networks among Iranian students has a relationship with the components such as interests in learning and self-control, but it does not have a meaningful relationship with the component of self-management; but among Indian students, the use of virtual social networks has a positive and significant relationship with all the self-directed learning components (self-management, interests in learning and self-control).

Another result of the research suggests that there has been a positive and significant correlation between the attitude towards the use of virtual social networks and critical thinking. Also, the results indicate that the attitude towards the use of virtual social networks among Iranian students had a significant relationship with all components of critical thinking (interpretation, analysis, evaluation, inference, explanation and self-regulation) while for Indian students it was not meaningful only for the two components of analysis and inference.

The results also show that there is a positive and significant relationship between the attitude towards the use of virtual social networks and self-directed learning among Iranian and Indian students. But the attitude towards using networks among Iranian students had a significant relationship with all the components of self-directed learning (self-management, interests in learning, and self-control) and among Indian students with self-management and self-control components but it had no meaningful relationship with the components of interests in learning among the Indian students; the results are consistent with the results of the research by Vrieling & Matzat (2015), Greenhow Christine (2011), Straehle Manfred Mario (2009), Blaschke (2014).

As noted, the research conducted on virtual social networks has shown that these networks provide facilities for professors and students, and the use of such networks makes the students create a positive relationship with other students, especially those of the same age and interests and thus stimulates and engages the learner (Kabilan, 2010). Apparently, viral social networks are to be more important in the future and increasingly become more popular among students around the world, especially for third world countries. Therefore, it is suggested that necessary platforms for using virtual social networks provided in countries such as Iran and India that were studied in this study, especially in Iran, to allow easy access for all students. Educational contents are also should be designed to be capable of sharing in social networks in order to enhance self-directed learning and critical thinking skills of users

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