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Evaluation of the Students Access to the 21st Century General Skills at Tabriz University of Medical Sciences, Iran

Firoz Mahmoodi [1*], Zahra Samadi shahrak [1], Zeinab Fizollahzade [1]

[1]Faculty of Education& Psychology, University of Tabriz, Tabriz, Iran.

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Abstract

Background & Objective: Attention to the necessary skills in time and place are among the most important issues in the evaluation of the quality of academic education. The present study aimed to evaluate the access of students to the 21st century general skills at Tabriz University of Medical Sciences, Iran.

Materials and Methods: This cross-sectional, descriptive study was conducted on 300 medical students, who were selected via simple random sampling. Data were collected using the questionnaire developed by Mahmoodi and Mola, which its validity has been confirmed based on expert opinions, and the reliability has been established at the Cronbach's alpha of 0.90.

Results: The general skills of the 21st century in the medical students were at an average level in the cognitive and affective domains considering a theoretical average of 3 ($P<0.0001$). However, the skill level was observed to be above average and favorable in the sociocultural domain ($P<0.0001$).

Conclusion: According to the results, the access of the students at Tabriz University of Medical Sciences to the high-level cognitive and affective skills of the 21st century was average, which should be taken into account for the optimization of the teaching-learning process and improvement of the curricula.

[*]***Corresponding author:*** Mahmoodi F, ***Email:*** firoozmahmoodi@tabrizu.ac.ir

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Introduction

Today, globalization has become a strategic issue among the international research and experimental issues (1), influencing the culture, politics, and economy of countries as a chain of transformations (2). Education is one of the most important areas affected by globalization, and researchers have proposed a wide array of theories with regards to the recognition and elucidation of the associated aspects of globalization (1).

In the 21st century, the assumptions toward the world are rapidly changing (3). Simultaneous with the transformations in communities, the skills required for citizens should also change in accordance with the complexities and problems of life (4). One of the significant challenges in every community is the abilities and skills required for living in the current era; therefore, preparation of university students and graduates through developing fundamental global skills is of paramount importance (5). With the changes in the assumptions of the 21st century about the world and communities, in addition to the specialized and disciplinary knowledge, access to the basic and general skills and information regardless of the fields of academic study has been further accentuated (6-8).

As the most fundamental unit for the endorsement of human resources, universities play a key role in this regard (5). In recent years, instructors, employers, and policymakers have stressed the importance of evaluation systems in order to trace the abilities of graduates in high-level thinking and problem-solving and assess their knowledge and skills in line with the global workplaces based on the technologies of the 21st century (9).

Organizations such as the Guide for the 21st Century Skills, National Science Foundation, Education test service center, Metiri Group (10), as well as authors such as Frey & Fisher, Elkins, Carroll, Burmack, Riddle, and Trilling & Fidel have emphasized on the essentiality of the learning skills of the 21st century for the purpose of alignment with the transformations in this era (11). Some of the main learning skills of the 21st century, as defined by experts, are critical thinking, information technology, effective interactions, creativity and risk-taking, interpersonal skills, personal, social and civil responsibilities, high efficacy, prioritization, management and planning, flexibility, adaptability, and self-confidence (12).

Investigating the necessary abilities and skills in the medical field in the 21st century, Rees

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concluded that medical students must acquire general skills, including problem-solving, critical thinking, social communication, and technological knowledge and literacy (13). Furthermore, the findings of Garrison, Bernard and Rasmussen have indicated that technology literacy and computer skills, which are among the key skills in the 21st century, are absolutely essential for medical students, while they also play a pivotal role in increasing patient satisfaction (14).

In a study by Abdolvahabi, Roomiani and Zarif, the basic skills required for the age of globalization were assessed in the master's degree students of Shahid Chamran University in Ahvaz (Iran). According to the findings, mean skills of the students was at an average level, with the lowest mean reported in the component of computer literacy, and the highest mean belonging to teamwork (15). In another research, Valipoor, Khajeh Ghiasi, Vahid Shahi and Salehi Emran evaluated the life skills of the medical students in Mazandaran (Iran), including cognitive, affective and social domains. The results showed these skills to be at an average level among the students (16).

In a study by Mahmoodi, Feyzollah Zadeh, and Samadi, interpersonal skills (e.g., development and maintenance of communication, communicative skills, solving conflicts, empathy) were assessed among medical students and other students in Tabriz University (Iran). The researchers concluded that the students of Tabriz University were superior to the medical students in terms of interpersonal skills (17). Moreover, the results obtained by Bazrafkan et al. at Shiraz University of Medical Sciences (Iran) indicated that six components have had the most significant effect on education in the 21st century; these components were reported to be the use of computers in education, development of virtual learning, using cell phone in communications, feeling of joy in E-learning environments, emphasis of learning on creating new perspectives, and the facilitating role of professors (18).

Evaluation of students in terms of the general skills of the 21st century is an inherent element of the current agenda in universities, as well as the education assessment of higher education, to determine the abilities of educational institutions (15). Considering that information technology has been widely applied in healthcare centers in recent years, and given the importance of changes in the educational curricula in medicine, this issue become more momentous in medical students (19).

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The present study aimed to evaluate the general skills of the 21st century in medical students. Various categories have been proposed in the study based on the background described by Nazari et al. (7), Mahmoodi and Mola, and Kong in the studies focusing on the 21st century (20), emphasizing on the scheduled skills (8), curricula (21, 22), and access of medical students to the general skills of the 21st century in the cognitive, affective, and sociocultural domains.

Materials and Methods

This was a cross-sectional, descriptive study, the design of which was selected in accordance with the research objectives. Sample population consisted of all the students of Tabriz University of Medical Sciences (TUMS) during the academic year 2016-2017. In total, 300 students were enrolled in the study via simple random sampling from the students of various medical fields (senior year).

Data were collected using the 73-item questionnaire of the 21st century skills developed by Mahmoodi and Mola. The items were scored based on a five-point Likerts scale with the theoretical mean estimated at 3. Based on the items of each component in the questionnaire, their theoretical mean was divided by the average of 3. To assess the internal consistency (reliability) of the questionnaire, the Cronbach's alpha was used. To do so, the questionnaire was completed by 30 respondents, and the reliability coefficient of the questionnaire was calculated at 0.90. In the study by Mahmoodi and Mola (8), the reliability coefficient of the questionnaire has been estimated at 0.92.

Data analysis was performed in SPSS version 24 using one-sample t-test.

Results

Among 300 students, 148 were male, and 152 were female, including 92 medical students, 39 midwifery students, 59 dentistry students, 103 pharmacy students, and seven cases with unmentioned field of study.

To assess the realization of the cognitive domain of the general skills of the 21st century among the students of TUMS, one-sample t-test was used. The results are presented in Table 1.

The cognitive skills included eight components of data collection and organization, quality assessment of the data, applying knowledge, problem-solving, research abilities, technology literacy, knowledge sharing, and electronic communication. According to the information

of Table 1, all the components of the cognitive skills in the questionnaire were significant with a higher experienced mean value of the theoretical average (3), except for the knowledge sharing (2.90).

Obtained mean of the knowledge sharing domain waslower than the theoretical average, and the mean value of cognitive skills (3.32) indicated that the enrolled medical students were at an average level in this regard.

Table 1: The result of the one sample t-single of the medical students' curriculum in the cognitive domain

	N	Mean	Std. Deviation	Test value=3			
				t	df	Mean Difference	Sig. (2-tailed)
data collection and organization	300	3.48	0.59	14.25	299	0.48	0.0001
quality assessment of the data	300	3.63	0.59	18.30	299	0.63	0.0001
applying knowledge	300	3.23	0.72	5.42	299	0.23	0.0001
problem-solving	300	3.28	0.66	7.27	299	0.28	0.0001
research abilities	300	3.44	0.59	12.98	299	0.44	0.0001
technology literacy	300	3.25	0.78	5.62	299	0.25	0.0001
knowledge sharing	300	2.90	-0.71	-2.39	299	-0.10	0.018
electronic communication	300	3.31	0.79	6.85	299	0.31	0.0001
Cognitive Domain	300	3.32	0.40	13.65	299	0.32	0.0001

To assess the affective domain of the general skills of the 21st century among the medical students, one-sample t-test was used. The results are shown in Table 2. The affective domain consisted of four components, including self-directedness, self-value, self-responsibility, and self-identification. In addition, as can be seen in Table 2, all these components were significant, with the experienced mean value observed to be higher than the theoretical average (3), which was statistically significant. Therefore, it could be concluded that medical students acquired these skills, while they still need to endeavor to improve their affective skills.

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Table 2: The result of the one sample t-single of the medical students' curriculum in the affective domain

	N	Mean	Std. Deviation	Test value=3			
				t	df	Mean Difference	Sig. (2-tailed)
self-directedness	300	3.59	0.50	20.30	299	0.59	0.0001
self-value	300	3.95	0.69	23.84	299	0.95	0.0001
self-responsibility	300	3.53	0.58	15.85	299	0.53	0.0001
self-identification	300	3.42	0.45	16.19	299	0.42	0.0001
affective Domain	300	3.62	0.39	27.82	299	0.62	0.0001

To evaluate the sociocultural domain of the general skills of the 21st century among the medical students, one-sample t-test was use. The results are shown in Table 3. The sociocultural domain consisted of five components, including social membership, social fulfillment, social receptivity, socialization, andpunctuality. According to the information in Table 3, all the components of the sociocultural domain were significant. The experienced mean of the components of social fulfillment, social receptivity, socialization and punctuality were higher than the theoretical average, whereas the experienced mean value of social membership (2.87) was lowerthanthe theoretical mean value. Therefore, it could be concluded that the medical students had poor performance in this regard and showed less interest in becoming a member of various social groups. Considering that the obtained mean value in the sociocultural domain (4.33) was higher than the theoretical mean value andaboveaverage,itcouldbestated that medical students had a favorable status in this regard.

Table 3: The result of the one sample t-single of the medical students' curriculum in the sociocultural domain

	N	Mean	Std. Deviation	Test value=3			
				t	df	Mean Difference	Sig. (2-tailed)
social membership	300	2.87	0.69	-3.312	299	-0.13	0.0001
social fulfillment	300	3.40	0.73	9.55	299	0.40	0.0001
social receptivity	300	3.61	0.72	14.66	299	0.61	0.0001
socialization	300	3.78	0.72	18.73	299	0.78	0.0001
punctuality	300	3.66	0.59	19.18	299	0.66	0.0001
Sociocultural Domain	300	4.33	0.57	40.36	299	1.33	0.0001

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Discussion

Given the importance of general skills of the 21st century for living in the current era, especially for academics, the present study aimed to evaluate these skills in medical students. To this end, we used the questionnaire developed by Mahmoodi and Mola (8). The general skills of the 21st century include the normal or general abilities and skills, which are expected of university graduates by the society. Based on their review, these skills could be classified into three categories of cognitive, affective and sociocultural skills.

Access to the Cognitive Skills Domain:

The difference between the obtained mean value and theoretical mean value in the medical students, the eight components of the collection and organization of data, evaluation of data quality, applying knowledge, problem-solving, research capabilities, technology literacy, knowledge sharing, and electronic communication was observed to be significant. In the components of data quality control, applying knowledge, problem-solving, research capabilities, technology literacy, and electronic communication, the experienced mean values were higher than the theoretical mean value.

Today, everyone is aware of the importance of cognitive skills, particularly skills such as problem-solving and decision-making regarding the issues of patients for the provision of optimal care by medical students (23). The experienced mean value of the component of knowledge sharing was lower than the theoretical mean value, which indicated that there was a difference between the experienced mean and theoretical mean values in the cognitive skills domain. Although the obtained mean value in this domain was higher than the theoretical mean value, it was observed to be at an average level (3.32). In other words, the cognitive skills were at an average level and far less than the optimal level in the evaluated students. This is consistent with the findings of Bardestani, Siamian, Hosseini and Ghorbani, Mahmoodi and Mola, Abdolvahabi, Roomiani, Zarif and Feizi Konjini, Fadakar Sogheh, Chehrzad, and Kazemnejad Leyli (8, 15, 23-25), while it is in contrast with the findings of Tayebnia, Miri and Cheshmeh Sohrabi (26, 27).

One of the findings of the current research was the lower ability of knowledge sharing in the curricula. Siemens states that nowadays, sharing of knowledge and learning via the internet and web-based networks are emphasized by the most recent learning

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theories (28). Considering the mentioned finding, the curricula of TUMS was not successful in this regard due to emphasizing on competitive qualities in students instead of focusing on participation in learning. Therefore, it is important to develop and implement curricula in accordance with the new learning approaches, such as constructivism and communicative methods.

Access to the Affective Domain:

The difference between the obtained mean value and theoretical mean value showed that the four components of self-directedness, self-value, self-responsibility, and self-identification were significant in the medical students, and the experienced mean values in all these components were higher than the theoretical mean value. Furthermore, the experienced mean value in the affective domain was higher than the theoretical mean value, while it was at the average level of 3.62. Therefore, it could be concluded that the medical students did not have a favorable status in terms of achieving affective skills, and various factors must be taken into account in achieving the optimal state in this regard. One of these factors is the curricula of medicine. The researchers of the present study believe that the educational curricula in TUMS are probably not in line with learning-oriented agenda, failing to enhance self-directedness, independence and responsibility in students. As a result, skills such as problem-solving, conducting research and data assessment are yet to be improved. These findings are inconsistent with the results obtained by Mahmoodi and Mola (8), who reported the affective domain to be higher than the theoretical mean value and at a favorable level.

Access to the Social Domain:

The difference between the obtained mean value and theoretical mean value was significant in the five components of social membership, social fulfillment, social receptivity, socialization, and punctuality in the medical students. In addition, the experienced mean values of the components of social fulfillment, social receptivity, socialization, and punctuality were higher than the theoretical mean value and above average. This is in congruence with the findings of Jabbarifar, Hosseinpoor, and Khalifeh Soltani et al., and it seems that acquiring these competencies was associated with the higher experience of the students in the provision of care for patients (29). However, the experience mean value of social membership was lower than the theoretical mean value.

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Several factors are involved in the formation and persistence of psychological wellbeing; one of the most important factors in this regard is social membership and the related support. Individuals who are socially isolated often have poor psychological health, while strong socials bonds guarantee community health. Another significant factor in this regard is the educational agenda of universities. However, the findings of the current research indicated that the curricula of the field of medicine at TUMS is not primarily concerned with these social skills (i.e., social membership) in the students, which is undoubtedly among the most crucial skills required for the current era (30, 31). Efficient management and high-quality care provided by healthcare team members, as well as being effective in clinical settings, require physicians to seek the membership of various groups and teams, so that they could work with different individuals and teams and become the leader of the team in most situations (33). The successful performance of the healthcare system depends on acquiring new skills and abilities by medical sciences graduates, such as professionalism, leadership, and teamwork skills (33, 34).

Considering that the obtained mean value of the sociocultural domain was higher than the theoretical mean value and statistically significant (4.32), it could be inferred that the medical students had a favorable status in terms of the required skills in this regard. This is inconsistent with the findings of Fong et al., Mahmoodi and Mola, and Miri, Cheshmeh Sohrabi and Mahram (8, 14, 27, 32).

Conclusion

According to the results, the status of the medical students at TUMS was favorable in terms of the access to sociocultural skills, while it was not optimal with respect to the instillation of cognitive and affective skills. Several factors are involved in the acquiring of the general skills of the 21st century by students, one of which is the lack of attention to the teaching-learning process, especially the development of educational curricula based on the most recent needs and interests. Applying learner-oriented curricula that are based on constructivism and situational learning (e.g., problem-based and assignment-based curricula) could enhance the development of the fundamental skills of the current era (36). Therefore, it is recommended that educational curricula be revised regularly in order to determine the needs and interests of students, as well as the latest changes of the era and communities. Moreover, given the

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importance of promoting these skills during academic education and after graduation, proper agenda must be devised and implemented in academic institutions.

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