Standardization of Professional Attitude Questionnaire on the Application of Social Networks in Iranian students

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Abstract

Introduction The growth of information and communication technology has faced students and medical professionals with challenges in terms of professionalism. The use of social networks in the field of education has also accelerated and has become a powerful source of learning for transformation and empowerment in different fields. This questionnaire addresses the standardization of the attitude to professionalism in using social networks in medical science students. **Methods** In this questionnaire, with the aim of standardizing the attitude toward social networks, we used a questionnaire with 10 questions in 5 fields by Ness et al, 2013, . The fields include Accountability, Hiring decisions, Profile edits, Professionalism and Privacy setting . In this study, the questionnaire was first checked by validity in content . In the next step, construct validity was performed by exploratory factor analysis .Also reliability checked by test – retest in one group of students . **Results** By examining the correlation matrix between the variables, correlation between the variables and total score of questionnaire were appropriate. The result of factor analysis by principal component method and Varimax rotation with 3 factors is approved The reliability of the test was obtained 0.940 through test-retest method, and internal consistency were good . **Conclusion** Perspectives on e-professionalism and social media questionnaire by Ness et al, 2013, perspectives on e-professionalism and social media is a reliable and valid instrument for assessing perspectives on e-professionalism and social media in Iranian medical students.

Background

The increasing growth of information and communication technology in the world is facing a new revolution. The information and communication technology revolution has had significant effects on economic, social, political and security sectors of the countries. One of the most important areas of application of information technology is the healthcare sector. Information technology can help this field in many ways. Creating opportunities to implement and follow-up therapies, online access to information resources, information sharing and counseling among medical professionals to improve clinical practice are the unique opportunities of this information system (1). Accordingly, one of the issues raised in the realm of professionalism is the use of new technologies in the clinical setting. Of course, professionalism is not a new concept. (2). Medical universities are responsible for training physicians who need to pay attention to the development and enhancement of values, attitudes, ethical norms, social skills, and other features that shape the behavior, or professional skills, of a doctor (3). In 2002, the American College of Physicians, along with the American Association of Internal Medicine and the European Federation of Internal Medicine, introduced a statement of the Charter of Medical Care, with three basic principles. The principles included "Prioritizing the patient's welfare and attention to patient values", "Respecting the independence of the patient and not depriving him of his liberty", and "advancing social justice, especially in health-care settings"(1,2) . Professionalism is inherently difficult to define, measure, or even use for training. Although there is widespread debate, most commentators believe that professionalism is primarily intended to "maintain public confidence in the medical profession"(3). Professionalism in virtual environments goes beyond the appropriate text for email or online communication rules. This includes an online character and online information in each template that shows signs of professional identity, attitudes, and behaviors (4,5). According to the definition of the Standard Technology Committee, the e-learning system is a type of learning technology that uses web search engines as a means of engaging learners, and these systems are used as a system for facilitating learning(6). Using electronic media to quickly share more information makes professional subjects more complex by creating interest in subtopics known as occupational professionalism. Occupational professionalism is defined as "attitudes and behaviors that reflect the traditional professionalism, and through

digital media." (7). Developing student appropriate behavior is a common goal in health science programs such as medicine, pharmacy and nursing. There are important discussions about occupational or online professionalism that usually addresses the student behavior in online areas such as email, media sharing sites, and social networking sites. There are a lot of instructions from different professions that offer examples of good and inappropriate behavior in online domains (8–10). Sharing digital photos, demographics, showing interest and holding online conversations are just some of the features that are used. While online social networking services offer students several benefits (e.g. maintaining relationships), they can also improve serious professional issues (11). Universities and medical organizations, particularly in the United States (such as the American Medical Association, AMA) and the United Kingdom, are beginning to develop guidelines and policies for healthcare professionals in the use of appropriate social media. In this regard, in order to strengthen awareness, social media management courses related to medical professions have been implemented in professional programs(12). An overview of medical articles and the multitude of articles and studies on professionalism in general and in online environments in particular indicates the attention of medical education practitioners in recent years to this issue and their efforts to overcome these threats. It also seems necessary to change the culture, educational environment, and t medical education curriculum to move towards professional development in the online environment(3). Therefore, it seems that professionalism, in addition to its role in identifying individuals susceptible to the occurrence of unprofessional behaviors in the future, plays an important role in vocational education. Therefore, measuring this capability in the curriculum based on the competency and medical education spectrum should be considered as an essential component (13).

In 2002, the American College of Physicians, along with the American Association of Internal Medicine and the European Federation of Internal Medicine, introduced a statement of the Charter of Medical Care, with three basic principles. The principles included "Prioritizing the patient's welfare and attention to patient values", "Respecting the independence of the patient and not depriving him of his liberty", and "advancing social justice, especially in health-care settings"(1,14) .

The growth of information and communication technology has faced students and medical professionals with challenges in terms of professionalism. These challenges include a variety of dimensions, such as unprofessional publication of online discussions on professional health and social networking blogs, or immoral distribution of patient information(15,16) .In many cases, the ethics of medicine in the traditional environment apply to all types of communications, including online communication, personal use of the Internet, and social networks in the clinical setting(17) .

Unfortunately, evidence suggests that professionalism is diminishing, and today's physicians are confronted with threatening issues and cases in values, especially in online environments (3)[.An overview of medical articles and the multitude of articles and studies on professionalism in general and in online environments in particular point out an indication of the attention of medical education practitioners in recent years to this issue and their efforts to overcome these threats. It also seems necessary to change the culture, educational environment, and t medical education curriculum to move towards professional development in the online environment.

There are few studies concerning the views of students about the lack of professionalism in virtual environments. Another examined the viewpoints of medical students about professionalism in the three faculties of medicine in the form of discussions in a small group. In the end, they selected 19 domains and concluded that the selected subjects in basic sciences and clinical sciences differed from one another(18). Considering the increasing use of

information and communication technology at the university, especially in the field of medical sciences, clarifying and professionalizing professionalism in online environments is vital(19).

The increasing use of information and communication technology in universities, especially in the field of medical sciences, and the professionalization of the field of professionalism in online environments are vital and serious. This is due to the fact that determining the boundaries of professional and non-professional behavior in the online environment is somewhat difficult, and also due to the ever-increasing use of information technology, especially among medical students(20).

It is also necessary to take the role of social networks in shaping public opinion into account. One of the things that can be considered as a criminal offense, which is one of its foundations, is violation of moral principles and rules. In this regard, the ethics of information technology is an interdisciplinary field in which the discussion about it requires familiarization and expertise in the field of ICT and information technology. With the rapid advancement of technology and dependence of individuals on the use of information and communication technologies, there are issues and problems in the field of IT ethics that created these maladaptive issues in the information space. The statistics of crimes such as hacking, unauthorized access, viruses, data manipulation, computer harassment, and the like are indicative of the importance of examining ethics in the field of information and communication technology.

The use of social networks in the field of education has also accelerated and has become a powerful source of learning for transformation and empowerment in different fields. Therefore, the standardization of relevant questionnaires and their application in education has been taken into consideration. This questionnaire addresses the standardization of the attitude to professionalism in using social networks in Iranian medical science students.

Methods

Aim

In this study, the aim of which was to standardize the attitude towards virtual professionalism in using social networks in Iranian medical sciences .

Design and setting

The following items were taken into account: (see Design and Setting in Supplementary Files)

Initial implementation of test

In this questionnaire, with the aim of standardizing the attitude toward social networks in pharmacology students, we used a questionnaire with 10 questions in 5 fields. The fields include Accountability, Hiring decisions, Profile edits, Professionalism and Privacy settings. Each of the fields had two questions, which were examined with "yes" and "no".

This questionnaire was conducted in different groups of pharmacologic students from 150 to 170 people across different universities(21).

Construct validity & Final Reliability

In this study, the questionnaire was first translated and then re-translated by two experts in the English language. After this stage, the questionnaires were distributed among 20 medical students in different fields, the items were reviewed, and final editing was done. Moreover, after confirmation by the researchers and their agreement on the final clauses, they entered the next phase. In the next step, construct validity was performed by exploratory factor analysis(EFA).Also reliability checked by test – retest in one group of students (Figure 1) .

Results

The main purpose of the factor analysis, if possible, is to explain the correlation relations between a number of variables in terms of several unobservable random quantities that are called factors. Suppose variables can be categorized by their correlations. That is, all the variables of a particular category have a high correlation among themselves, while having relatively low correlation with the variables of other categories. In this case, it can be assumed that each group of variables represents an examined compound or agent, which explains the observed correlations .

To perform factor analysis, there should be a reasonable correlation between variables (questionnaire questions). Not many correlations between variables should be less than 0.3, because then observations would not be suitable for performing factor analysis due to low correlation. Likewise, not many correlations should exceed 0.8 as this would create a multiple linear relationship between the variables . By examining the correlation matrix between the variables, correlation between the variables was appropriate; therefore, observations were made to perform a relevant factor analysis (Table 1).

Table 1:

Correlation coefficient of the questions

Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Q1	1.000									
Q2	.262	1.000								
Q3	-.019	.209	1.000							
Q4	.163	.361	.530	1.000						
Q5	.108	.282	.171	.088	1.000					
Q6	-.169	.084	.127	.032	.268	1.000				
Q7	.952	.195	-.013	.139	.108	-.157	1.000			
Q8	.184	.857	.277	.379	.350	.100	.225	1.000		
Q9	.040	.301	.810	.683	.228	.069	.023	.324	1.000	
Q10	.140	.334	.508	.844	.161	.043	.137	.373	.548	1.000

To determine if the data are suitable for Factor Analysis, the KMO Index is used to examine the Bartlett Spread Sampling and Testing Capability. The minimum acceptable value for the KMO index is 0.5 and the closer it is to one, the better. Bartlett's test is also used to determine whether the matrix of correlation between the opposite variables of the matrix is the same or not (Hamani is a matrix whose members are equal to 1 for the main diameter and zero to the other members). The zero assumption of this test shows the equality of the matrix of correlation between variables with the Hamani matrix. If the zero assumption is rejected, it is concluded that there is a reasonable correlation between the variables; therefore, it is permissible to perform factor analysis on the data in question. According to the results of these tests, as presented in Table 2, it is seen that according to the above indicators, the available observations for performing factor analysis are sufficient and the factor analysis is justifiable.

Table 2:
Bartlett Test and KMO Indicator

KMO Indicator		.516
Bartlett Test	χ^2	1182.802
	Df	45
	P	<0.001

Selecting the analysis method and the number of factors

In this research, factor analysis by main component method and by Varimax rotation were used to evaluate the governing structure of 10 questions of the research questionnaire. In addition to choosing the method of factor analysis and type of rotation, it is also important to decide on the number of factors.

One way to determine the number of factors is to plot the special values chart against the number of factors that is called the pebble or rocks graph (Fig. 1). The manner of specifying the number of factors with this graph is that the point at which the chart begins to flatten is considered as the number of factors. The disadvantage of this diagram is that in this method, the selection of the number of factors is performed intuitively, depending on the individual judgment of the analyst.

A more precise method to determine the number of factors is to check the special value of the extracted factors. Each agent has a special value that measures the variance explained by that agent. Therefore, higher special values indicate higher importance of this factor. Using the Kaiser criterion, if the special value of an agent is greater than 1, then the agent is extracted; otherwise, it is eliminated. In this study, it was found that 3 factors had a specific value greater than 1. Therefore, taking this criterion into account, there are up to 3 factors which can be extracted potentially (Figure 1).

Another important factor to be considered in a factor analysis is to examine the percentage of the variance explained by each factor and the cumulative percentage of variance explained by the extracted factors. Table 3

illustrates this issue. According to this Table, the three extracted factors together account for approximately 71.84% of the total variance, which is a perfectly good value.

Table 3:

Specific values and variance explained by factors (after rotation)

Factors	Eigenvalue	% of variances	Cumulative of variances
1	3.029	30.289	30.289
2	2.113	21.126	51.415
3	2.042	20.422	71.836

One of the criteria of examining the questions in the questionnaire in exploration factor analysis is the amount of their common extraction. This value represents the percentage of the variance of each question that is justified by the extracted factors. Table 4 shows the amount of the common extraction of the questions in the questionnaire. As you can see, the questions are in a good position and there is no need to remove one.

Table 4:

Extracted Commonalities of the Questions in the Questionnaire

Questions	Communalities Extraction
Q1	.916
Q2	.732
Q3	.696
Q4	.810
Q5	.460
Q6	.493
Q7	.903
Q8	.774
Q9	.784
Q10	.716

The matrix of the rotated factor loads is shown for each of the questions on the extraction agents. Factor loads are, in fact, correlation coefficients between the questions and factors. In addition, the power of the relationship between the factors and questions is shown by factor load.

The result of factor analysis by principal component method and Varimax rotation with 3 factors is presented in Table 5. To demonstrate which factor each question of the questionnaire belongs to, we highlighted the most significant factor load of that question in another color in the Table. It should be noted that the cutting threshold of 0.4 is considered to be the minimum acceptable factor load. It can be seen that the factor loads of each question on its own factor, in addition to being greater than the cutting threshold of 0.4, is due to other factor loads of that question on other factors.

Table 5:

Matrix of the rotated factor loads with main component method and Varimax rotation with three factors

Questions	Factor 1	Factor 2	Factor 3
Q4	.880	.148	.120
Q9	.871	-.049	.155
Q10	.821	.136	.152
Q3	.817	-.123	.113
Q1	.030	.949	.115
Q7	.019	.943	.112
Q8	.293	.200	.805
Q2	.254	.238	.782
Q5	.052	-.025	.676
Q6	-.022	-.407	.475
Eigenvalue	3.029	2.113	2.042
% of variances	30.289	21.126	20.422
Cumulative of variances	30.289	51.415	71.836

Table 5 can also be presented in a different way, so that we do not report values lower than 0.4 to better understand the structure of the obtained factors (Table 6).

Table 6:

Matrix of factor loads greater than 0.4 by the principal component and Varimax rotation

Questions	Factor 1	Factor 2	Factor 3
Q4	.880		
Q9	.871		
Q10	.821		
Q3	.817		
Q1		.949	
Q7		.943	
Q8			.805
Q2			.782
Q5			.676
Q6			.475
Eigenvalue	3.029	2.113	2.042
% of variances	30.289	21.126	20.422
Cumulative of variances	30.289	51.415	71.836

According to the results, three categories of questions can be considered as the explanations for 3 factors, as presented in Table 7. It is noticeable that the three extracted factors together account for approximately 71.84% of the total variance. (Table 7)

Table 7:

Extracted factors and related questions with principal component method and Varimax rotation

Factors	Questions
1	10-9-4-3
2	7-1
3	8-6-5-2

Reliability by using Cronbach's alpha (for internal consistency assessment):

Given the extraction factors and related questions, reliability is obtained using the Cronbach's alpha method, as follows. It is observed that the alpha value for the extracted factors is well suited. (Table 8)

Table 8.

Internal consistency with Cronbach's alpha

Factors	Questions	Cronbach's alpha
1	10-9-4-3	0.882
2	7-1	0.975
3	8-6-5-2	0.637

Investigating the relationship between each item and the entire questionnaire:

The correlation coefficient of each question with the total score of the questionnaire is presented in Table 9.

Table 9:

Correlation coefficient of each question with the total score of the questionnaire

Questions	Correlation coefficient	P.value
q1	.501**	<0.001
q2	.649**	<0.001
q3	.603**	<0.001
q4	.726**	<0.001
q5	.504**	<0.001
q6	.529**	<0.001
q7	.492**	<0.001
q8	.680**	<0.001
q9	.680**	<0.001
q10	.707**	<0.001

Investigating the relationship between the score of each factor and that of the total questionnaire:

The correlation coefficient of each extracted factor with the total score of the questionnaire is presented in Table 10.

Table 10:

Correlation coefficient of each extracted factor with the total score of the questionnaire

factor	Correlation coefficient	P.value
f1	.791**	<0.001
f2	.503**	<0.001
f3	.723**	<0.001

Reliability by test-retest method:

The reliability of the test was obtained 0.940 through test-retest method, which is a good value.

Discussion

The purpose of this study was to examine the standardization of professionalism in virtual networks questionnaire. By assessing the validity and reliability of the questionnaire in the standardized sample and by analyzing the exploratory factor analytical results, it was found that among the five factors of "Accountability, Hiring decisions, Profile edits Professionalism, Privacy settings", this questionnaire was divided into three items including "editing Profile, Professionalism, and Privacy settings". And, it can be changed and used as a questionnaire of attitudes toward professionalism in social networks in medical sciences.

Validity and reliability also indicate that it is appropriate to use this questionnaire with three factors in the field of attitude-measurement in Iranian society. The concepts addressed in this indigenous questionnaire have been considered, including some of its evidence that has been reviewed by numerous studies. Also, in some studies, the dimensions of professionalism in virtual environments and its indicators have been addressed. Of them, among other things, the importance of professional indicators in medical sciences can be highlighted from the professional points of view.

In these articles, the use of these networks and their capabilities to promote commitment and accountability in healthcare issues are mentioned. Some evidence suggests that the use of these media can be useful for medical and dental professionals to refer the patients to high-quality sources of medical information online(22,23).

The fields of business venture and business commitment focus on those activities in the field of medical science that somehow sells and supplies products or services in cyberspace. Here, traditional ethics and professionalism are considered in the business of medicine (24,25).

In many studies, the importance of professionalism in cyberspace and its application in social networks have been pointed out, including professionalism in virtual environments beyond the email-appropriate text or online communications rules. This includes an online personality and online information in each template that shows signs of professional identity, attitudes and behaviors(26).

In the other definition, virtual professionalism is how you come up with a self-image online in relation to your profession, as well as attitudes, actions, and adherence to codes of the relevant profession (27). In another part, people's misconducts are mentioned in the virtual environment, which include the need to pay attention to the

students' awareness of the risks of non-professional behaviors and the importance of professionalism among students (5).

Some consider responsibility and accountability as the guarantor of professional behavior in cyberspace. Considering the disclosure of private information and privacy violations as a non-professional behavior, they consider the need for positive influence as one of the factors of non-professional behavior in this environment. Some have also referred to non-professional behavior in creating false identity (28,29).

Other cases included sending unwanted messages, sending patient information and disclosing it, sending alcohol-based evidence, racist thoughts, and changing personal profiles after graduation. Also, cases like plagiarism, taking a text without reference to the name of the author, and the non-compliance with copyright rules in the use of texts can be considered as manifestations of ill-treatment in cyberspace(30) .

All of the above points highlight the importance of professionalism in virtual environments and attention to its indicators in the use of cyberspace, and represent an important indicator of professionalism and attitude towards it in this environment.

The role of virtual environment in explaining medical professionalism is one of the issues outlined in the articles. Many of the policies and laws governing the virtual environment are closely related to the principles of professionalism in the medical profession, and explain issues such as complying with the principles of communication in dealing with the patient and his information, the ways of communication between the teacher and the student, and communication with his counterparts, in parallel with other professionals principles, like accountability (31–34).

Conclusion

By examining the above-mentioned articles and their relationship with the three components of professionalism, it can be stated that the questionnaire, as an attitude survey in the field of virtual professionalism, can be used in medical sciences. It also emphasizes the important role of professionalism in medical science and in the application of social networks. According to the questionnaire and standards, it can be stated that this questionnaire has been used to measure the students' attitude towards virtual networks in Iran.

List Of Abbreviations

ICC :Intra-class Correlation Coefficient

EFA: Exploratory factor analyses

Declarations

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Availability of data and materials

This datasets are available from the corresponding author on reasonable request.

Authors' contributions

LM :Design , Data collection,, Analysis , Writing the first draft of the article ; SA : Critical revision of the article, R R: Critical revision of the article. All auteurs read and approved all parts of articles

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

First, the approval for the study was obtained from the ethics committee of Jahrom University of Medical Sciences cod number (IR.jums.REC.1398.040) .Then, to collect the data, one of the authors distributed the questionnaires among the participants and instructed the objectives of the study and advised them on how to fill out the questionnaire. And Written consent obtained from participants.

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Figures

Figure 1

Scree plot to determine the number of factors

Supplementary Files

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- [DesignandSetting.jpg](#)