**Developing a questionnaire for assessing medical professionalism in virtual environment: a multistage exploratory study**

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**Abstract**

In today’s world, information communication and technology has brought both opportunities and challenges for medical education. One of these issues is professionalism in virtual environment. The aim of this research was to determine and validate medical professionalism assessment questionnaire in virtual environment. The study method was exploratory which was conducted in three stages. In the first stage, the initial draft of this questionnaire was prepared. In the second stage, by holding focused meetings with experts, the designed questionnaire was validated. Eventually, in the third stage, the final version of the questionnaire was presented based on consensus of the executives. The results of the research suggested that information and computer literacy (Code 10), adhering to interpersonal and group professionalism (10 codes) in the virtual environment, obeying virtual rules and regulations (6 codes), professional commitment in virtual business (4 codes), caring for personal professionalism (7 codes) and healthcare professionalism (4 codes) constituted the six main areas of the medical professionalism assessment questionnaire in the virtual environment.

Keywords: medical professionalism; virtual environment; questionnaire; exploratory study

**Introduction**

The information communications and technology revolution has been greatly influential across all areas including economic, social, political, and security sectors of countries. One of the most important areas of using information technology is healthcare. Information technology helps this area in diverse ways. In clinical settings, the technology has developed opportunities for implementing and following up therapeutic measures, online access to information sources, sharing information, and consultations between medical specialists in order to improve clinical performance (1, 2). Studies have shown that the development of information and communication technology has confronted medical students and specialists with challenges in the area of professionalism, where today’s physicians should deal with issues and problems that threaten values especially in online environment (3). These challenges involve different dimensions including unprofessional publication of online issues in professional health weblogs and social media or unethical sharing of the patient information (4, 5). In many cases, the principles of medical ethics in traditional environment are applied to clinical settings for all types of communications including online communication, personal usage of Internet, and social media (6) Since the use of information and communications technology is progressively growing at universities especially in the area of medical sciences, the specialization of professionalism in online environment is crucial (7). Since the research in this area in Iran is very recent and new, this study has been conducted with the aim of interpreting and validating a questionnaire for assessing medical professionalism in virtual environment.

**Method**

The method of the study was of exploratory research type conducted in the three following stages:

Stage I: Initial preparation of the questionnaire for assessing medical professionalism in virtual environment by a hybrid study.

First, the references were chosen through internet and library search based on relevant keywords and then analyzed through content analysis method. For this purpose, having studied the texts of interest, the cases related to medical professionalism in virtual environment were identified, then the references were individually categorized and then coded. After achieving information saturation stage, investigation of texts was stopped, and categorization of concepts based on the subject was initiated by grouping similar ethical concepts in one category, whereby the categories were named. Then, using an analytical approach, the concepts of comparative codes were converted, the list of codes was completed, and the initial draft of the questionnaire for assessing medical professionalism in the virtual environment was designed. The research samples at this stage included all published papers and books available and related to the concept of medical professionalism in virtual environment in the databanks of Taylor and Francis, Eric, magiran, SID, IEEE, Scopus, prequest, scirus, Google scholar, and science direct from 2000 to 2018. The keywords searched were as follows: (medical education) AND (Professionalism OR ethics) AND (Virtual OR electronic OR Online) AND (environment OR learning OR instruction OR education).

Stage II: Validating the questionnaire of assessing medical professionalism in the virtual environment.

At this stage, first the opinions of experts about the initial draft of the questionnaire were collected. For this purpose, focus group meetings were held in the presence of five scholars who all had interdisciplinary experiences or education in three areas of ethics, education, and medicine. They included two physicians who were faculty members of university with academic degrees and experience in the area of medical education; two individuals with academic degrees and experience in the area of medical ethics, and one nurse who was a university faculty member with extensive research on virtual professionalism codes. In these meetings, based on the set of points obtained, the participants dealt with selecting special codes and eventually the questionnaire of assessing medical professionalism in virtual environment emphasizing medical sciences education.

Then, the obtained questionnaire was validated and finalized. The research samples at this stage included scholars at a national level (20 professors who were expert in virtual environment and the professors participating in the workshop of ethics in mutual education related to the national Congress of medical education in 2018). For this purpose, the scholars related to the subject were requested to express their views about the product of the second stage in terms of clarity of the content of each code and the implementability of the questionnaire. In case more codes were required in their opinion with an emphasis of professionalism in mutual education in medical sciences, they were requested to express that. To facilitate the responding procedure, in the form sent to the scholars, the question “is the concept of code clear?” had been written against each code, whose response was yes/no. Also, another question was “is this code suitable?”, with yes/no/to some extent responses. Furthermore, a column of comments was devised and the participants were requested to add their codes of interest if necessary. Then, the completed questionnaires were investigated and concluded. Based on the received suggestions, the required modifications were made in the format or composition of some codes. In this way, the final set of the questionnaire for assessing medical professionalism in mutual environment was developed as the third edition and prepared for presentation.

Stage III: Presenting the questionnaire of assessing medical professionalism in virtual environment.

At this stage, through a meeting by the executives, the design questionnaire was re-investigated and the final changes regarding modifying, adding, or removing codes and items were made. Finally, the questionnaire for assessing professionalism in virtual education of medical sciences was developed in the research group based on consensus.

**Results**:

The general aim of this research was to interpret and validate a questionnaire for assessing medical professionalism in virtual environment. Out of the 45 codes extracted, 11 were required to be modified, 5 were eliminated or displaced and 4 others were added. Eventually, 41 final codes were extracted across six themes. In the analysis performed, six major themes were extracted which include information and computer literacy, adhering to professionalism in interpersonal and group communication in the web atmosphere, obeying virtual rules and regulations, professional commitment in virtual business, caring for personal professionalism, and health-care professionalism. The set of extracted codes is listed in Table 1.

**Discussion**

The findings of this research suggest that information and computer literacy, following interpersonal and group professionalism in virtual space, obeying virtual rules and regulations, professional commitment in virtual business, caring for personal professionalism and healthcare professionalism are the six main themes of the questionnaire of assessing medical professionalism in virtual environment. The first theme is enjoying information and computer literacy. Various definitions have been provided in different papers and references about information literacy, most of which have described information literacy as having basic skills of computer and Internet for retrieving information and the ability of developing communication (8). Correspondence of the information literacy skills with the codes determined in this theme is shown below (Table 2).

One of the most important codes of this section is distinguishing the credibility of references. Studies have shown that many contents are published by non-specialist individuals. Evidence has shown that attractive internet references and advertisements influence the extent visitors welcome them and referral to search engines (9). Therefore, taking into account the needs and interests of audience in designing online environment helps medical groups to design quality information sources for patient (10,11).

The second theme is following professionalism in interpersonal and group communication in the web space. The codes of this theme are related to respecting privacy of individuals in the virtual environment, not overdoing bulk sending of content in beneficiary groups, having suitable language in sharing virtual works and contents, not sharing immoral content in the virtual space, and commitment to the rules of the virtual space. This policy tries to raise awareness whereby a mature, responsible, and professional view is taken into account during online communications (12,13).

In the area of obeying virtual rules and regulations, codes such as recognizing and becoming aware of rules and regulations for using virtual spaces, respecting intellectual property (copyright) in using virtual content, and receiving permission from owners of sources before their usage have been mentioned. In the subsequent codes, these points have been developed for accuracy in measurement. The concept equality is fulfilled when the stipulated rules and regulations are implemented properly. Therefore, obeying rules in professionalism and the protocols of activity in virtual space account for an important part of professionalism since it develops fair behavior (14).

Durability, searchability, reliability, and invisible audience are the unique features of social networks such as Facebook (15). With the simple search and storage of digital information, it leaves a permanent digital fingerprint and online credit. Removal of online information is very difficult and it can spread very rapidly and go out of control. Even a single moment of hurry can be followed by untoward and irrecoverable consequences such as being suspended from medical faculties, loss of occupation as a physician, and losing the public trust to the medical profession. All these eventually affect the academic and occupational prospect of students of the healthcare team (16).

The theme of professional commitment of business in virtual space is related to those groups of activities in the area of medical sciences which deal with selling and supplying products or services in the virtual space (17, 18). The proposed codes that organize this sector of healthcare services will be based on web.

The theme of caring for personal professionalism has suggested some codes which are of interest when investigating the characteristics of professional individuals. Greysen et al. state that considering absence of scientific evidence about the effect of positive and negative online behaviors on the public thoughts towards professional values, the principle of “not hurting” should be applied when physicians want to use social media. However, this is just a starting point. This means that it should move from reducing damage towards health promotion, and beyond restricting unprofessional behavior in the Internet, we should seek benefiting from the positive potential of social media. Physicians and healthcare organizations can and should use the power of social media to facilitate interaction with patients and the public, resulting in the building of trust in medical profession (19).

In the healthcare professionalism theme, the proposed codes are related to respecting the patient’s rights. Professional activity of physicians and therapists in the virtual space should completely match the professionalism indices in the healthcare area. The most important indices are respecting the rights of patients and clients, confidentiality in sharing the patient information even in the area of education and research, presenting valid documentation in virtual consultations, responsibility, and liability. The committee of American Medical Association regarding ethical and judicial issues has reported that physicians should be aware of the standards of privacy and confidentiality of the patient, and across all areas including online space, they should respect them. Further, they should avoid sending identifiable patient information in online environment ( 20, 21). Overall, considering the progressive advancement of information and publications technology in the area of medical education, development and upgrading the rules and questionnaires of processing medical professionalism in virtual environment are crucial and can be a guide to medical groups for provision of services education and research.

**Limitation**

The limitation of this study was that the study was done based on interviews and we could not observe the students.

**Declarations**

#### Ethics approval and consent to participate

In this study, the following ethical issues were considered: After obtaining permission from the college officials, the training program began at the, Faculty of Medicine, Jahrom University of Medical Sciences. At the beginning of the training program after the researchers had introduced themselves, they explained the objectives of the study and the need to implement them to the students and the written consent was obtained from students participating in the study. The students were also assured that all information collected will remain confidential.

This study was approved by the Ethics Committee of Jahrom University of Medical Sciences.

Consent for publication

Not applicable

#### Availability of data and materials

The data that support the findings of this study are available from the corresponding author on request.

# Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

**Leili mosalanejad** devised the study concept, designed the study, data collection and analysis, participated in the coordination of the study, and critically revised the manuscript.

**Nahid ZarifSanaiey** collected data, ran the study intervention, participated in the study concept, performed the analyses and revised the manuscript

**Mansoor Tafvisi** contributed to the design and analysis of the study data, and drafted the manuscript.

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