Original Article

E-professionalism in medical sciences: A Hybrid Concept Analysis

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Abstract:

BACKGROUND: Professionalism is one of the most important and vital concepts in the medical sciences. With the rapid growth of e-learning in the medical sciences in the past few years, the concept of virtual professionalism has emerged. This study was conducted as a hybrid concept analysis on describing e-professionalism in medical sciences.

MATERIALS AND METHODS: This is a qualitative study with a hybrid concept analysis approach, consisting of theoretical stage, field research, and analysis. In the theoretical stage, the concepts of e-professionalism in medical sciences were identified through a review of the literature. During the fieldwork stage, in-depth interviews were conducted with five medical students who were intentionally selected. Finally, after analyzing the literature and the qualitative interviews, a theoretical description of e-professionalism concept in the field of medical sciences was extracted.

RESULTS: the themes (3 numbers) and the subthemes (4 numbers) were extracted from 62 codes. These themes include information and communion technology and educational strategies professionalism in medical education.

CONCLUSIONS: For describing professionalism, it is necessary to consider education and culture, role models, by emphasizing on the acceptance of professional responsibility, developing and improving social media policies, determining the scope of communication and interaction between individuals, and identifying the boundary between local laws and customs.

Keywords:

Medicine, professionalism, qualitative research, virtual system

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Introduction

Professionalism in medical sciences is not a new concept.[1,2] The important responsibility of medical schools is to train physicians with moral values, social skills, and ethical norms.[3,4]

The American College of Physicians along with the American Society of Internal Medicine and the European Federation of Internal Medicine formulated a statement of the professional medical practice charter with the three basic principles of priority of patient's good, attention to patient values, respect for patient autonomy and loss of independence, and the promotion of social justice, especially in health-care settings.[5]

With the development of new technologies and new learning environments, a new concept called virtual "e-professionalism" was shaped.[6,7] E-professionalism points to professional attitudes and behaviors in technology-based environments.[8] With the growth of new technologies, challenges have arisen for physicians in this environment, including activity in social medias,[9,10] online teachings,[11] the patient-physician interaction,[12] and privacy.[13]

An overview of the medical articles and numerous studies on professionalism in the online environments point to the issue by those involved in the medical practice and their efforts to overcome these threats.[14-16] Considering the increasing use of technologies and practice in medical schools,

it is essential that the concept of e-professionalism in medical sciences becomes clear and specialized. Thus, the purpose of this study was to describe e-professionalism in the medical sciences. This definition will be derived through a hybrid concept analysis.

Materials and Methods

Study design
This is a qualitative study with hybrid content analysis model introduced by SchwartzBarcott and Kim in (1986). This model can create, develop, and expand concepts.[17] This is a conceptualization method that investigates the concept in a context. This model consists of three stages: theoretical stage, field work, and final analysis. In the theoretical phase, after concept selection, the available literature in this domain is reviewed[18] [Figure 1].

In the fieldwork stage, the concept is confirmed and clarified. This phase is based on qualitative research and involves selecting the environment and research samples in the study, collecting and analyzing the data, and in the final stage, the results of the previous stages are summarized, and suggestions are offered for redefining the concept.[13] In this study, the three phases of the hybrid approach were applied for a conceptual analysis of e-professionalism in medical sciences.

Theoretical stage
At this stage, first the concept of "professionalism" was selected. The concept was then integrated with its electronic word, and the term e-profession was examined. Second, we searched multiple databases (ProQuest, Scopus, SID, Bio-Medical, PubMed, [EBSCO and Ovid], and Eric) and reviewed articles from 2005 to 2018. The keywords used for the search were (electronic OR virtual OR Online OR technology-based) AND (professional OR profession), AND (medical, health) in English and Persian. The exclusion criteria were lack of access to

the full text of the articles, lack of a clear methodology and the review and exploration of other areas of professionalism.

The result of the search led to 56 articles, out of which 32 were excluded based on the inclusion criteria and relevance. In total, the 18 articles that were related to the subject and not repetitive were selected for the first phase [Table 1].

Field work stage
As the second step, the researchers selected a fieldwork and conducted purposeful interviews. The fieldwork phase aimed to attain practical definitions that were to be compared with the findings of the theoretical phase to refine the working definition. With regard to the involvement of the researchers with the environment, Jahrom University of Medical Sciences, Fars, Iran, was selected. In order to maximize the credibility and reliability of the data, researchers attempted to use different groups and disciplines selected by the purposive sampling method with the formulation of focused groups and interviews.

The researchers interviewed 10 medical students, 2 staffs, and 1 medical professor in the first phase. However, in order to complete the information, interviews with more groups were required to identify other unknown concepts. Overall, 22 medical students, 4 staffs, and 3 medical professors were interviewed to determine their understanding and perceptions of findings of the previous stage. The participants had sufficient experience in using virtual environments and the social media. All the important information, regarding the goals and methodology of the research, was adequately provided and explained to the participants before the study. In addition, they were assured that their personal information will be kept confidential.
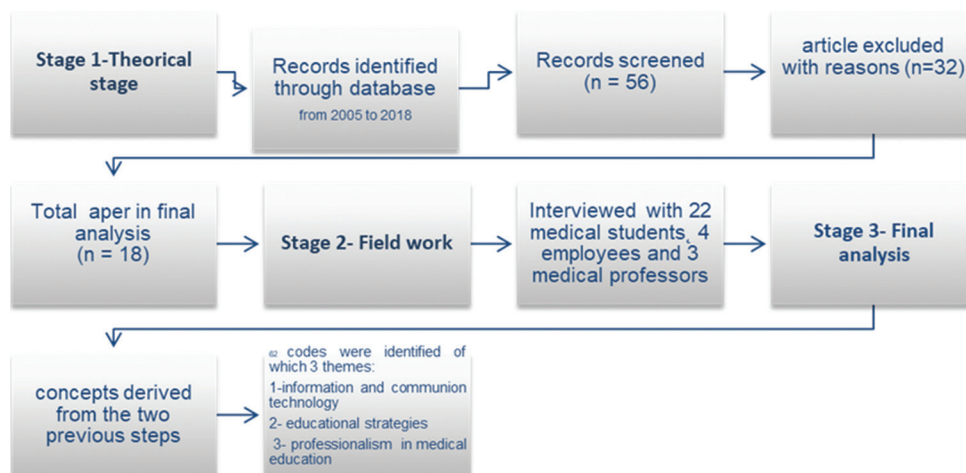

Figure 1: The hybrid concept analysis process

Table 1: Summary of articles reviewed in the theoretical phase

Number	Title	First author, year	Methods	Codes and key concepts	Results and suggestions
1	Social Media in Professional Medicine: New Resident Perceptions and Practices	Lefebvr, 2016[1]	Prospective observational study	Online behavior Online professionalism Policy-making Influential factors in professional behavior	This demonstrates the relationship between training about online professionalism and a more watchful online behavior Improving the content and release of social media policy may help maintain organizational priorities, defend patient information, and protect young professionals from online misfortunes.
2	It's Your Own Risk: Medical Students' Perspectives on Online Professionalism	Chretien, 2010[14]	Qualitative methods	Warnings about online personal hazards Role of educational environment in restriction	Medical students watched online information through personal danger. They wished suggestions but were susceptible to feeling restricted by their school.
3	To Be friend or Not to Befriend? Social Networking and Faculty Perceptions of Online Professionalism	Chretien, 2011[15]	Descriptive analytics	Common use of online communication between the students Differences of e-professionalism between faculty members and trainees	Some internal medicine students communicate online with their trainees. Their opinions on the suitability of social networking behaviors offer some harmony for professional limitations between faculty and trainees in the realm of digital world.
4	Graduating Pharmacy Students' Perspectives on E-Professionalism and Social Media	Ness, 2013[16]	Survey	Importance of e-professionalism or postgraduate Using social media in students Rising alertness about professionalism in the virtual environment	Most of pharmacy alumni use social media Nevertheless, there seems to be a rising alertness of the significance of offering a more professional illustration Online as they get close to the graduation point and begin looking for Employment as pharmacists.
5	Nursing Students' Use of Electronic and Social Media: Law, Ethics, and E-Professionalism	Westrick, 2016[17]	Case studies	The importance of law and ethics in a virtual environment	Schools call for procedures that noticeably found anticipations and the aftermaths of exploitation of social media stands. Lessons educated from the legal cases offered grant auxiliary direction for both nursing students and nursing programs.
6	Social media use, attitudes, behaviors, and perceptions of online professionalism amongst dental students	Kenny, 2016[18]	A cross-sectional study	Professional and unprofessional behaviors in the social media Mainstream of online behaviors in students Suitable educational use of social media	Shows that undergraduate dental students are conscious about perils related with social media and distribute analogous outlooks of what comprises professional and unprofessional manners online Discloses that the mainstream of undergraduate dental students have been uncovered to amateurish behavior online Proposes that undergraduates get education in the suitable use of social media and overseeing risks online.
7	Development of an Instrument to Measure Pharmacy Student Attitudes toward Social Media Professionalism	Chisholm-Burns, 2017[19]	Pre- and post-test survey	The role of education in e-professionalism Appraising Pharmacy students through virtual environment	Mounting and certifying a range appraising pharmacy students' thoughts in the direction of social media professionalism, and evaluating the influence of an educational arrangement on social media professionalism.
8	Teaching veterinary professionalism in the Face (book) of change	Coe, 2011[20]	Review	Role of education on professional identity	Veterinary students should be conscious and embark on educating students on the linked hazards and consequences of smearing one's confidential life and one's promising professional identity through personal online revelation.

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Table 1: Contd...

Number	Title	First author, year	Methods	Codes and key concepts	Results and suggestions
	Nurses' online behavior: lessons for the nursing profession	Green, 2017[21]	Exploratory discussion	Tricky behaviors by unprofessional people Margins between the personal and the e professional Importance of legal protocols in virtual environment	Improper content and posts, violating professional limitations, infringing patient confidentiality, and discretion are tricky behaviors. These consequences imply social media and require plotting a course to margin between the personal and the professional. Nurses are required to be taught to make equilibrium to raise the effectiveness of social media with the legalities and protocols of the online surroundings.
9	Why people use social media: a uses-and-gratifications approach	Whiting, 2013[22]	Exploratory study	Application and gratification of using the social media	This study recognized ten applications and satisfaction for using the social media. The ten applications and gratifications are social communications, information seeking, time spending, amusement, entertainment, communicatory usefulness, expediency utility, and expression of attitude, information sharing, and supervision/awareness about others.
10	Social media policies at US medical schools	Kind, 2010[23]	Assess 132 websites	Common use of social media Lack of strategies and manners in virtual communication Importance of policy development	Medical students and their educators are using the social media. Nearly all US medical schools have a Facebook incidence. However, most of them do not have strategies to deal with student online social-networking manners. Whereas social media use increases, policy notifying the suitable behavior in medical schools falls behind. Developed policies at some medical schools can afford an outline for others to assume and become accustomed.
11	Pharmacy students' Facebook activity and opinions regarding accountability and e-professionalism	Cain, 2009[24]	Descriptive analytic	Importance of e-professionalism	More than half of the pharmacy educators planned to make modifications to their online posting behavior in response to the e-professionalism arrangement Outlooks toward liability for information offered by social networking highlight the need for e-professionalism education of next pharmacy students[24]
12	Opinions of students from a Brazilian medical school regarding online professionalism	Rocha, 2014[25]	A cross-sectional survey	Unprofessional online behavior being more unsuitable in doctors compared to students Unprofessional online behavior in medical students	They accounted observing the sought instances of unprofessional online behavior with altering frequencies, ranging from 13.7% for "infringement of patient's solitude" to 85.4% for "photos describing use of alcoholic beverages." Most participants felt unbiased about posting "pictures in bathing suits," while the enormous majority measured "breaching of patient's privacy" as completely unsuitable. When presented with a case sketch demonstrating defiance of patient's privacy (publication of pictures of hospitalized children or neonates in social media), nevertheless, most participants felt neutral about it. Participants viewed all explored examples of unprofessional online behavior more unsuitable if done by doctors rather than by students.
13	The intersection of online social networking with medical professionalism	Thompson, 2008[26]		Importance of professional identity in virtual environment	Although social networking in medical trainees is ordinary in the existing culture of rising professionals, a majority of users let anyone go through their profile. With a considerable fraction having individually unsuitable substance, ACGME aptitudes in professionalism are required to comprise training on the meeting point of personal and professional identities.

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Number	Title	First author, year	Methods	Codes and key concepts	Results and suggestions
14	Unprofessional behavior on social media by medical students	Barlow, 2015[27]	Survey	Unprofessional behavior in virtual environment Assessing own online behavior activities Importance of guiding principles in virtual environment	Exposure to guiding principles on professional online behaviors had no result on posting behavior This study suggests that students should be frequently encouraged to assess and moderate their own online activities.
15	Understanding veterinary students' use of and attitudes toward the social networking site, Facebook, to assist in developing curricula to address online professionalism	Coe, 2012[28]	Survey	Use of students' opinions by educators to develop the curriculum Use of students' opinions to respond to e-professionalism	Appreciating veterinary students' use of and opinions toward social media, such as Facebook, divulges a need, and offers a foundation, for establishing instructive programs to attend to online professionalism. Educators and supervisors at veterinary schools may use this information to help in founding veterinary curricula that tackle with the rising question about online professionalism.
16	Facebook and the professional behaviours of undergraduate medical students	Garner, 2010[29]	Online survey	Awarding students about unprofessional behaviors Importance of educational strategies in e-professionalism	More than half of the respondents stated they had viewed amateurish conduct by their coworkers on Facebook. While students state that they are conscious of the UK's GMC direction, unprofessional conduct is still visible on the site.
17	Student and faculty observations and perceptions of professionalism in online domain scenarios	Gettig, 2013[30]	Survey	Education of e-professionalism by real scenarios	There were statistical distinctions among the 3 cohorts' discernment over whether a scenario established professional behavior in 6 of the 10 most frequently observed scenarios, and 4 out of 6 of these scenarios were in the social networking realm.
18	The effects of a social media policy on pharmacy students' Facebook security settings	Williams, 2011[31]	Survey	Need to familiarize students with policy in virtual environment	After making the students familiar with the policy, a considerable proportion of students augmented their security settings (made information not observable to the public) associated with Facebook walls, information pages, and links.

GMC=General Medical Council

Interviews were semi- structured and lasted between 30 and 60 min. The interview questions were "what does come into your mind when you hear the word professionalism?" and "what is the concept of professionalism in the virtual environment and what are the indicators and factors related to it?"

All interviews were recorded with a prior permission from the participants. The interviews were then transcribed and analyzed, using Granhyme and Laundman method, which includes the implementation of interviews and its numerous reviews to get quantitative understanding of the stated issues, extracting units of meaning and classifying them as compact units, summarizing, decoding, encoding and labeling them, sorting the subcategories, comparing similarities and differences, and then categorizing them as groups.[13]

The analytical stage
At this stage, the definitions and concepts derived from the two previous steps were merged. Finally, a comprehensive definition, including all the features presented in the previous steps, was introduced.

Ethical consideration
The study was approved by the local Ethics Committee of Jahrom University of Medical Sciences (Ethics code IR. JUMS. REC.1398.039). In the second part and before collecting the data, all participants consented to participate in this study. They were also ensured about their confidentiality and anonymity. All participants voluntary participated in this study.

Results

The first stage of the study was literature review (theoretical phase). In this phase, the 18 selected papers were reviewed comprehensively [Table 1].

The literature review showed that professionalism was described as a behavior that recognizes a person who is committed to guarantee and assure a social interest. This way, community members expect their occupations to achieve important social interest and purpose.

On the other hand, professional organizations declare to the community and ensure that their members provide services, in particular, on the basis of standards set by the community, and in the case of any violation, they hold people accountable. E-Professionalism points to attitudes and behaviors that reflect traditional professional paradigms that appear through virtual environments.

Professionals must have a good understanding on how to implement privacy settings on social media. They should be aware of the sustainability of online content and maintain their professional boundaries in this environment.

E-professionalism goes beyond the proper E-mail content or online communications rules. This includes an online personality that presents professional identity, attitude, and behaviors. In other words, virtual professionalism is about how you perceive yourself in relation to your occupation. It also includes attitude, action, and following codes for the relevant profession. E-professionalism points to professional behaviors that reflect professional paradigms. This subject expresses the professional behavior of users in a virtual environment based on policies and standards, which classifies the rules of abandonment of these regulations in the category of non-professional behaviors. Furthermore, the results and implications of applying technology in medical environment, personal and professional affairs are depicted, and the need to pay attention to the principles and rules of technology use in various affairs are reminded.

The fieldwork phase

In general, the interview data confirmed the meanings of e-professionalism specified in the literature. In the field research phase, 62 codes were identified, of which 3 themes and 4 subtypes were extracted in the analysis [Table 2]. The first theme is information literacy, which includes three subthemes of recognition and proper utilization of the technical facilities, valid and up-to-date software, and knowledge management and efficient use of virtual environment. According to what people say when using virtual environment, valid software on the Internet, their familiarity and proper usage are subjects that can be a sign of professionalism and information literacy. For example, one of participants who was a student (Interview 16) said:

"Using web storage spaces like Google Drive, is one of the things that helps people not to fill their hard drives in the virtual environment. This makes it easy for them to store information in the virtual environment."

From participants' viewpoint, knowledge management is one of the information literacy criteria and is considered to be a symbol of professionalism and includes things such as professional search, the use of appropriate keywords, filtering the irrelevant information, and the search for valid sources and its usage.

Another participant (interview No. 11, a female medical student) explained:

"When we want to search something, if we know the right keywords, the number of pages and topics will be reduced and we can find the required information more precisely. We need to know what to look for and how to find the information."

As for the professional use of the virtual environment, one of the professors (interview No. 25, a professor with 10 years of work experience) said:

"The difference between a professional user of the virtual environment and amateur user is that the professional user knows how to use the correct techniques, find valid and trustworthy websites, examines and analyses the content before using it."

The second theme was the commitment to group values which included three major themes: the art of communication and two-way interaction, compliance with the rules and protocols, and adherence to virtual policies.

The discussion and reciprocal relationship includes commitment to the group, the evaluation of content, respect for the privacy of individuals, respect for group values, and the logic of criticism in group statements. One of the students in one of the central medical groups (the centralized group, No. 1 of the medical group) said:

"We should observe the red line of the group, do not raise or discuss whatever it is irrelevant in the group. It's true that it is a virtual environment, but it requires a series of behaviors and skills so that people adhere to them and can enter into this space together to discuss."

Adherence to rules and policies of virtual spaces can be a symbol of professionalism to many people so that any individual with knowledge of it can provide the context for its optimal use in this environment. One of the students in the centralized Group 2 stated:

"Things like posting irrelevant content, overloading the group environment and social networks, posting irrelevant pictures, uploading videos, images and texts for which we do not have ownership and violating intellectual property rights do not comply with ethical and professional standards."

One of the professors in interview No. 27 stated:

"When there is no limit in discussion of subjects in the virtual environment, it can lead to scandals and might fulfill individuals' expectations."

Table 2: Themes and sub-themes in field stage

Themes	Sub-themes	Sample items
Information literacy	Recognition and proper utilization of technical facilities, valid, and up-to-date software	Using storage spaces like Google Drive is one of the things that you do not need to fill your hard drive if you're familiar with it, etc.
	Knowledge management	When we want to search something if we know what to enter as keywords, the number of pages and topics will be reduced and we can find the information we need more precisely
	Efficient use of the virtual environment	The difference between a person who enters the virtual environment professionally and a person who does not know the techniques of professionalism is how to make technical search, find websites and analyze the content before using it, screen the existing knowledge and in other words, enter professionally into this space
Commitment to group values	The art of two-way communication and interaction	Observe the red line of the grade not raise irrelevant issues in the group; enter into this space to discuss
	Compliance with the rules and protocols	Posting irrelevant content, overloading group and social networks environments, posting irrelevant photos, downloading videos, images and texts that are not ours and can impair ethics and professionalism
	Adherence to virtual policies	There are a number of rules for using this space that everyone must know
Electronic services	Business and e-learning	If we adhere to morality, we can serve people with good business. Training and learning in this environment can happen in a good way
Facilitation	Education and providing cultural awareness	I have to learn to select 10 appropriate out of 1000 posts, and to delete the rest
	Role-models	As students' role models, we need to teach them how to use virtual environment. First, teach them how to work the right way, and then expect professionalism from them in the environment
	Responsiveness	When I enter into the group and I publish the person's personal photo without permission on the Instagram and other social networks, I have violated ethics
Violators	Violation of group values	When I fill out the virtual environment with irrelevant content, in fact I've violated group values
	Privacy violation	When I forget the red line in the environment and I do not even have an obligation with regard to content I'm spreading in space, this is a breach of professional ethics
	Internet addiction	If we do not use the environment not purposefully and not as much as needed, it leads to obsession and it will be harmful rather than being worthwhile

E-services were among the other themes raised by people in their statements. In participants' opinion, e-marketing and internet business are not only a professional criterion in this space, but it also can accelerate and facilitate affairs by reducing the side costs and the use of technology.

One of the students of laboratory sciences in interview No. 14 stated:

"*The internet-based business is a great thing to launch. If the business owner accepts to have less profit and meets the ethical requirements for earning money, it can build trust in the virtual environment, facilitate life affairs and reduce costs of living and facilitate things. However, we usual witness a lack of respect for ethics in this area. The business owners either tell lies or sell things with lower quality than promised.*"

People also made comments on the facilitation of the virtual environment and expressed that providing the required trainings for people and increasing cultural awareness are the factors that improve professionalism in the virtual environment.

Regarding these two factors, one of the employees (interview No. 24) stated:

"*Instead of changing the society and the people, we have to change ourselves, I have to learn to read 10 helpful posts instead of all of 1000 useless ones and delete the rest and sometimes it is necessary to forget about the virtual space altogether since time is priceless and it even harms my eyes.*"

In another part, one of the professors stated:

"*We as role models should teach students how to use virtual environment. If a student wants to write an article, we should teach him how to use data. Professionalism should start with us as role models and we should be a practical example of good performance for the student. First, teach him how to work properly and then expect a good professionalism in the environment.*"

In another part, participants talked about consequences that violators of group values and ethics cause for virtual environment and they considered it a manifestation of professionalism violation.

One of the students in the health department (interview No. 5) said:

"*When I post irrelevant content in the* virtual environment, *in fact I have violated group* values, *I've broken the privacy*

of the group and I've made the group members' time worthless."

Another participant in the central group (interview No. 2) said:

"If I put unreliable news in a group and others spend their time reading it, it means that I have violated the group and individual values in this environment and I've downgraded people."

The violation of ethics in virtual environment is one of the things that, according to the participants, could be a violation of professionalism in virtual environment.

"When I enter into a virtual group and I have access to their personal contents, I will be breaking the ethics if I put the personal photo of group members on Instagram or other social networks without their permission. This is when I cross the red line in the environment."

Addiction to Internet, according to participants' point of view, can be considered as one of the breaches of professionalism by hurting one's valuable time and using it incorrectly.

A male medical student (interview No. 6) stated:

"If we do not use the virtual environment as much as needed and purposefully, and if our use is obsessive, Internet would be hurting instead of being worthwhile. One of my friends checks his cellphone every minute. I've come to the conclusion that it's sometimes necessary to delete Telegram and Instagram applications to be able to relax."

Findings of the analytic phase conceptual description by integrating theory and fieldwork

In the final analytic phase, the findings of both the theoretical and fieldwork phases were integrated. The theoretical phase identified the importance of description of professionalism, social interaction, knowledge management, information sharing, rules and principles for professional behavior in the virtual environment, and educational strategies for improving professional behavior in the medical sciences.

In the fieldwork phase, interviews with students, personnel, and medical professionals added new categories regarding e-professionalism in medical sciences such as problems and ambiguity related to the description of professionalism, information literacy, internet commerce, the importance of communication, and group interactions.

The positive and negative components of the research samples in e-professionalism are listed in Table 3.

After analyzing and integrating the two previous stages, core concepts in redefining e-professionalism in a knowledge-based society were developed. These concepts include paying attention to technology and educational strategies to promote e-professionalism. These components play the role of information and communication intermediaries in the creation of the concept. It is necessary to consider the following points to build a solid concept of e-professionalism and to describe the person active in the virtual space as professional.

Discussion

The present study aimed to clarify e-professionalism in medical sciences through hybrid concept analysis.

The results of this study showed that the foundation of the conceptual building of e-professionalism includes the information and communication technology and educational strategies to promote medical professionalism in the virtual environment.

Medical professionalism seeks to ensure that the medical team is committed to abstain from unethical practices in this environment so that mutual trust can be sustained between the patients and online health providers.[19,20] This important issue requires appropriate educational strategies to inform medical students to

Table 3: Positive and negative components of the virtual environment from the perspective of research examples and strategies to improve it

Negative components	Positive components	Suggestions for improving it
Addiction to the Internet	Recognition and proper utilization of technical facilities, valid and up-to-date software (specialized knowledge and its improvement)	Education and culture
Violation of group values		Presentation of the role model
Privacy violations		Emphasis on the acceptance of professional responsibility
Creating a deceptive identity	Knowledge management	
	Efficient use of virtual environment	Development and improvement of social media policies
Publishing worthless and false content	Art of developing mutual communication and interaction	
	Compliance with the rules, protocols, and virtual policies	Determining the range of communication and interaction among individuals
	Providing honest, fair, and equitable electronic services	
	Responsibility and accountability	
	Compliance with the principles of information security	

know how they can behave as a professional in the virtual environment.[21-23] This finding is in line with previous research findings, emphasizing on the necessity of addressing and increasing the awareness of students regarding their professional behaviors.[24,25] Coe *et al*. emphasized on responsiveness and knowledge to these concepts as the warranty of professional behavior in the virtual environment.[26]

Our study also indicated that education can improve professional responsibility in the social media, determining the range of communication and interaction among individuals and describe an active person in the virtual environment as professional.

Another point about the concept of e-professionalism is the audience or the practitioner.[29] Although many people are involved in the virtual environment, only a special group of individuals are in a professional position, which the community expects them to act professionally.[30] The findings of the present research also showed these people including medical groups can be generally considered to have an active role in the virtual environment, in contrast to those who are passive in the virtual environment and are only required to comply with the protocols.

These professions should know that e-professionalism can affect their profession. They should know the complexity of the boundary between the personal and the professional activities.[31] Due to the popularity of media and social networks, the role of this paradigm is to apply technology to various affairs. Furthermore, the importance of professional exposure to the related topics is emphasized and the need for more attention to the art of debate and the observance of collective rights and group rights and values in its application are taken into account and professionalism appears with more specific explanation in society. Salehi *et al*. Al have pointed to the need for media literacy before commencing professional work in the virtual environment.[32] In addition, medical practitioners should have enough knowledge about information and communication facilities and barriers.[33] These include the identification and proper utilization of technical facilities, using up-to-date and viable software, knowledge management, the efficient use of virtual environment, the art of communication and interaction with each other by observing laws and protocols, adhering to virtual policies, providing honest, fair and equitable e-services, accountability and responsibility, and observance of the principles of information security.[34] Moreover, they should be able to identify suspicious behaviors, such as inappropriate content and posts, violation of professional boundaries and privacy as well as confidentiality of patients private information.[35]

Conclusions

Identifying the areas and components and effective in promoting professionalism are the important issues in medical education. These components play the role of control and communication intermediaries for establishing the concept. Given the increasing use of virtual environment in interventions that are generally effective in protecting or violating people's rights, addressing the concept of e-professionalism and designing ethical codes has become very important. On the other hand, by increasing the cultural awareness of the people, education and role model presentation, we can bring their conduct closer to professional behaviors.

These results rises new challenges to the principles of professionalism in the field of medical sciences, demanding a new research and training in this field, which is the responsibility of technology in virtual professionalism. This study was performed only in a single collage and needs to be implemented on a wider scale for generalization. Hence, further research with a larger sample size into construct and standardize questionnaire is warranted.

Conflicts of interest
There are no conflicts of interest.

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