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Testing adaptation and psychometric properties of survey instrument for students' perspectives on e-professionalism and social media in Iranian students: Corona crisis and medical education

Leili Mosalanejad, Saeed Abdollahifard[1]

Abstract:

BACKGROUND: 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 various fields. This study aimed to test the adaptation and psychometric properties of an instrument for students' prospective on e-professionalism in the use of social media in Iranian medical science students.

MATERIALS AND METHODS: In this questionnaire, with the aim of psychometric properties of the perception toward social media in Iranian students, this survey instrument developed by (Ness *et al.*) in five fields in 2nd-year pharmacology students in Purdue University The fields include accountability, hiring decisions, profile editing, professionalism, and privacy settings. In this study, first, a cultural adaptation was done by an expert panel. Then, psychometric properties of an instrument by content validity and construct validity using explanatory factor analysis were performed. Reliability was assessed by test–retest and internal consistency of items. The reliability of the survey instrument with three factors was 0.82 using the test–retest, and the internal consistency was good ($r = 0.94$).

RESULTS: The result of psychometric properties using the principal component method extracted three factors (accountability, hiring decision, and professionalism) to assessment of students' attitude to professionalism using social media in Iranian students.

CONCLUSION: The adapted and psychometric properties of the instrument developed by Ness *et al.*, 2013, with three dimensions and ten items proved to be a valid, reliable instrument for use for assessing perspectives on e-professionalism and social media in Iranian medical students. This questioner may be suitable for Iranian researches in medical education.

Keywords:

Ethic, IRAN, medical students, professionalism, social media

Department of Medical Education, Virtual Center, Jahrom University of Medical Sciences, Jahrom, Iran, [1]Medical Student, Student Research Committee, Shiraz Universty of Medical Sciences, Shiraz, Iran

Address for correspondence:
Dr. Leili Mosalanejad, Department of Medical Education, Virtual Center, Jahrom University of Medical Sciences, Jahrom, Iran.
E-mail: mosalanejad@jums.ac.ir

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Introduction

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 the economic, social, political, and security sectors of the countries.[1]

Accordingly, one of the issues raised in the professional field is the use of new technologies in the clinical setting. Of course, professionalism is not a new concept.[2]

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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 a physician's behavior or professional skills.[3]

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 "maintaining public confidence in the medical profession."[3] Professionalism in virtual environments goes beyond the appropriate text for E-mail or online communication rules. This includes an online character and online information in each template that shows signs of professional identity, attitude, and behavior.[4,5]

According to the Standard Technology Committee, the e-learning system is a type of learning technology that uses web search engines as a means of attracting learners, and these systems are used as a system to facilitate learning.[6] Using electronic media to quickly share more information complicates professional topics by creating an interest in subtopics known as occupational professionalism.[4]

There are important discussions about occupational or online professionalism that usually addresses student behavior in online areas such as E-mail, media sharing sites, and social networking sites. There are a lot of instructions from different professions that offer examples of good and inappropriate behaviors in online domains.[4,7,8]

While online social networking services offer students many benefits (e.g., maintaining relationships), they can also improve serious professional issues.[9] Universities and medical organizations, particularly in the United States (such as the American Medical Association [AMA]) and the United Kingdom, are developing guidelines and policies for health-care professionals to use 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.[10]

Therefore, it seems that professionalism, has an important role in vocational education. Also the role it plays in identifying people in the future.[11]

The principles of the AMA included "prioritizing the patient's well-being and attention to the patient values," "respecting the independence of the patient and not depriving him of his liberty," and "advancing social justice, especially in health-care settings."[1,12]

The growth of information and communication technology has faced challenges in terms of professionalism of medical students and professionals. These challenges include a variety of dimensions, such as the unprofessional publication of online discussions on professional health and social networking blogs, or immoral distribution of patient information.[13,14] In many cases, medical ethics are applied in the traditional environment in a variety of communications.[15]

Unfortunately, the evidence suggests that professionalism is diminishing, and today's physicians are confronted with threatening issues and cases in values, especially in online environments.[3] There are few studies on students' opinions about the lack of professionalism in virtual environments.[16] Considering the increasing use of information and communication technology in the university, especially in the field of medical sciences, clarifying and professionalizing professionalism in online environments is vital.[17]

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.[18]

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.

Therefore, this study aimed to test the adaptation and psychometric properties of an instrument for students' prospective on e-professionalism in the use of social media in Iranian medical science students.

Materials and Methods

Study design and setting

This main questionnaire was developed by Ness *et al*., 2013.[19] This instrument previously was developed by Cain *et al*. to assess pharmacy students' Facebook activity and opinions regarding accountability and e-professionalism with 13 items.[20]

This survey instrument completed by students from the University of Findlay, Butler University, and Midwestern University during the fall semester of 2011 (n516). To devolving validity and reliability of instrument,,final instrument developed in 5 dimensions and 10 items in 5 continuums on 85 pharmacy students in Purdue University as a pilot test. The dimensions included accountability, hiring decisions, profile editing, professionalism, and privacy settings.

Study participants and sampling

The population of the study was all students of Jahrom University of Medical Sciences in different groups. Sampling was from students in the field of medical (basic science), public health, and laboratory sciences by simple sampling in online mode (500 students). One hundred and fifty-seven questionnaires were completed by students in all fields. Cod number of proposal in the study was IR.JUMS.REC.1399.036.

Data collection tool and technique

Phase 1: Cultural adaptation procedures

In this study, the questionnaire was first translated and then continued by forward and backward translation by two native English translators to ensure that all questions are conceptually valid in terms of content and meaning and also ensure acquired comprehensibility, completeness, acceptability, and relevance.[21]

Phase 2: Pretesting

Ten specialists in the fields of education, medicine, and nursing were asked to comment independently on the meaning of each item. Finally, items were revised and modified. After this stage, the questionnaires were distributed among 20 medical students in different fields, the items were reviewed, and the final editing was done. This phase was aimed at the cognitive debriefing of the instrument items.

Moreover, after confirmation by the researchers and their agreement on the final clauses, they entered the next phase.

Phase 3: Validation

"Content validity refers to the relevance and representation of the test target."[22]

Due to the development of the questionnaire, psychometric assessment does not require to be measured by the content validity ratio (CVR) (the index of content validity and the CVR).

Validation assessment was reported by communalities (proportion of variance of variables that is accounted for by the common factors). Furthermore, descriptive analyses on all items and items with the total score were assessed using Pearson's coefficient.[22,23]

Phase 4: Construct validity

In the next step, construct validity was performed using the explanatory factor analysis. Bartlett's Chi-square test and the Kaiser–Meyer–Olkin (KMO) test were carried out to see the suitability of analysis and sampling adequacy in this study.

The following technical criteria were considered: eigenvalue >1, varimax rotation loading >0.5 and the significance level was set at $P < 0.05$.[23]

Phase 5: Reliability

Furthermore, reliability checked by test–retest with an interval of 2 weeks ($n = 30$) ($r = 0.82$) was good. Interclass correlation coefficient (ICC) or stability was collected by using kappa tests and Cronbach's alpha coefficient, respectively ($r = 0.94$) on 150 students. The criteria for assessing the ICC was >0.75 = excellent, between 0.40 and 0.75 = moderate, and <0.40 = poor.[24-26]

Ethical consideration

Proposal extracted from the article approved by the Ethical Committee at Jahrom University of Medical Sciences. Students completed the online questionnaire according to their wishes. There was no insistence on completing the questionnaire. Furthermore, no reward was provided for participation (Flowchart 1).

Results

Descriptive analysis showed that the attitude toward professionalism in all items is higher than mean [Table 1].

The lowest score was observed for item 6 – "do you plan on making changes to your social media profiles prior to an upcoming career fair or meeting?" Students scored highest on item 8 "professional students be held to higher standards than others regarding the image they portray on social media." All items were positively correlated with the total score. The correlation coefficients were all positive (0.56–0.91).

To perform factor analysis, there should be a reasonable correlation between the variables (questionnaire questions). Not many correlations between variables should be <0.3, because then observations are not suitable for performing factor analysis due to low correlation. Likewise, many correlations should not exceed 0.8 as this would create a multiple linear relationships between the variables. By examining the correlation matrix between the variables, the correlation between the variables was appropriate; therefore, observations were made to perform a corresponding factor analysis [Table 2].

To determine the suitability of the data for factor analysis, the KMO Index and the Bartlett Testing Capability were reported. The minimum acceptable value for the KMO index is 0.5, and the closer to one, the better. Bartlett's test is also used to determine which variables are unrelated and unsuitable for structure detection.

According to the results of these tests, as presented in Table 2, it is observed that according to the above indicators, the available observations are sufficient to perform factor analysis and factor analysis can be justified [Table 2].

Table 1: Item descriptive statistics and correlations in survey instrument

Questions	Mean	SD	SE	Skewness	Kurtosis	Correlation
Should a student pharmacist be accountable for an illegal act discovered through social media site postings?	3.5909	1.02015	0.08	−0.68	0.47	0.91
Should a student pharmacist be accountable for unprofessional behavior discovered through social media site postings?	3.9156	0.79993	0.06	0.19	3.45	073
If an employer of graduates chose to review a prospective employee's social media sites, should the profile information be considered when making a hiring decision?	3.8506	0.82274	0.07	−0.50	0.26	0.69
Do you feel it is justified for a residency director or supervisor to research a candidate online and make decisions based on the information they find?	3.8247	0.94373	0.08	−0.58	−0.04	0.81
Do you feel it is important to edit your social media site prior to applying for a job?	3.4545	1.04219	0.06	−0.54	−0.16	0.56
Do you plan on making changes to your social media profiles prior to an upcoming career fair or meeting?	3.2922	0.85501	0.07	−0.90	0.36	0.69
Do you feel that photos, groups, postings, comments, and other information posted on your social media sites affect people's opinion of you as a professional health-care provider?	3.5844	0.98817	0.07	−0.52	0.001	0.90
Should professional students be held to higher standards than others regarding the image they portray on social media sites?	3.9610	0.74871	0.06	−0.78	0.99	0.77
Are you aware of the privacy settings on your social media sites?	3.8117	0.83054	0.07	0.83	−049	0.78
Do you use the privacy settings available in your social media sites to limit public access to your information?	3.8831	0.94245	0.08	0.94	0.43	0.71

SD=Standard deviation, SE=Standard error

Table 2: Correlation coefficient of each question together in survey instrument

Items	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Q1	1.000									
Q2	0.262	1.000								
Q3	−0.019	0.209	1.000							
Q4	0.163	0.361	0.530	1.000						
Q5	0.108	0.282	0.171	0.088	1.000					
Q6	−0.169	0.084	0.127	0.032	0.268	1.000				
Q7	0.952	0.195	−0.013	0.139	0.108	−0.157	1.000			
Q8	0.184	0.857	0.277	0.379	0.350	0.100	0.225	1.000		
Q9	0.040	0.301	0.810	0.683	0.228	0.069	0.023	0.324	1.000	
Q10	0.140	0.334	0.508	0.844	0.161	0.043	0.137	0.373	0.548	1.000

Selecting the analysis method and the number of factors

In this research, factor analysis by the main component method and with varimax rotation was used to evaluate the governing structure of ten questions of the research questionnaire. In addition to choosing the method of factor analysis and type of rotation, deciding on the number of factors is also important.

One way to determine the number of factors is to plot the special value chart against a number of factors called the scree plot to determine the number of factors [Figure 1].

The manner of specifying the number of factors with this graph is that the point where the chart begins to flatten is considered as the number of factors.

A more precise method to determine the number of factors is to check the special value of factors extracted. In this study, it was found that three factors have a specific value >1. Therefore, taking this criterion into account, a maximum of three factors can be extracted [Figure 1].

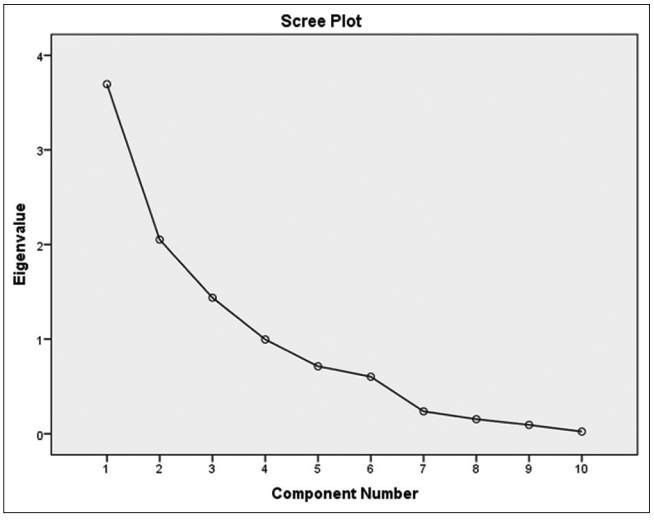
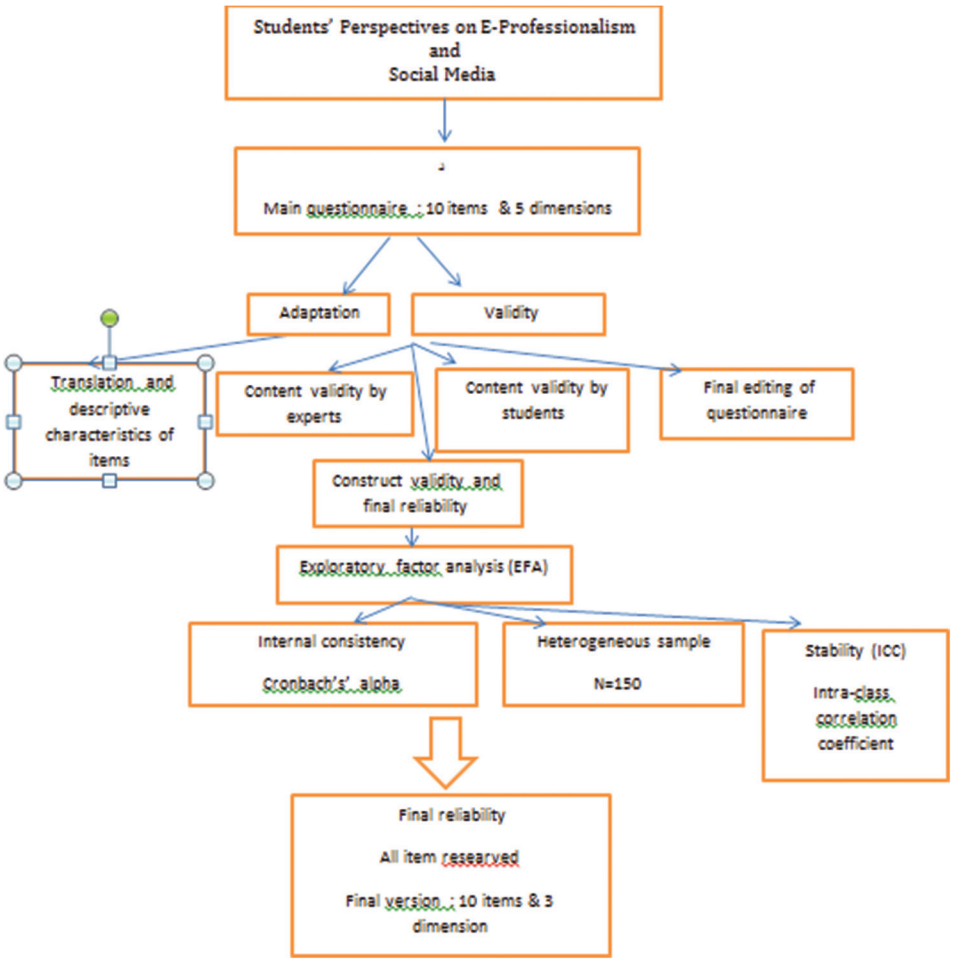


Figure 1: Scree plot to determine the number of factors to retain in an exploratory factor analysis (FA)



Flowchart 1: Study design and stage of evaluation of instrument

Another important factor to consider in 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.

One of the criteria for examining the questions in the questionnaire in the analysis of the exploration factor 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. The results show the rate of the common extraction of questionnaire questions. As a result, the questions are in a good position and there is no need to remove one.

The matrix of the rotated factor is shown for each of the questions on the extraction factors. In addition, the power of the relationship between factors and questions is shown by the factor load.

Table 3: Bartlett test and Kaiser-Meyer-Olkin indicator for sufficiency of sampling or analysis

KMO indicator	0.516
Bartlett test	
χ^2	1182.802
Df	45
P	<0.001

KMO=Kaiser-Meyer-Olkin

The result of factor analysis by the principal component method and varimax rotation with three factors is presented in Table 3. It should be noted that the cutting threshold of 0.4 is the minimum acceptable factor load. It can be seen that the factor loads of each question in 3 factor [Table 4].

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

Reliability of questionnaire

Given the extraction factors and related questions,

reliability is obtained using Cronbach's alpha method, as follows. It has been observed that the alpha value is appropriate for the extracted factors.

The correlation coefficient of each question with the total score of the questionnaire is also appropriate. All correlation coefficients are higher than (0.7).

The correlation coefficient of each extracted factor with the total score of the questionnaire is presented in Table 5.

Correlation coefficient of each extracted factor with the total score of the instrument was significant [Table 6].

The reliability of the test (internal consistency) was obtained at 0.94. Furthermore, test–retest correlation of items was 0.82, which is a good value.

Resent results by testing adaptation and psychometric properties of survey instrument on e profesioanlism and social media was assessed in Iranisan students. This instrument with three dimensions (accountability, hiring decision, and professionalism), it may be used as a valid and reliable questionnaire in Iranian research.

Discussion

By assessing the validity and reliability of the questionnaire in the standardized sample and by analyzing the exploratory factor results, the questionnaire was divided into three items including "editing profile, professionalism, and privacy settings." Validity and reliability also indicate that the use of this questionnaire is appropriate as a questionnaire of attitudes toward professionalism in social networks in medical sciences in Iran.

A literature review identified students' perspectives on social media and professionalism. Also many survey developed. The use of social media was common in students so that a significant percentage of health-care professions students reporting social media participation.[20,27-29]

This evidences showed that most of the students primarily used social media for personal reasons; others also used social media for academic purposes. Some of the results emphasize that participants believed, they should be responsible for any unprofessional behavior and effect to sudents'professional behavior in virtual environment.[20,30,31]

It is necessary to the separation between personal and professional life. It is important to note that the lack of attention to professionalism is associated with unethical and unprofessional behaviors in the social media space.[32]

Table 4: Matrix of the rotated factor loads with main component method and varimax rotation with three factors in survey questionnaire

Questions	Factor 1	Factor 2	Factor 3
Q4	0.880	0.148	0.120
Q9	0.871	−0.049	0.155
Q10	0.821	0.136	0.152
Q3	0.817	−0.123	0.113
Q1	0.030	0.949	0.115
Q7	0.019	0.943	0.112
Q8	0.293	0.200	0.805
Q2	0.254	0.238	0.782
Q5	0.052	−0.025	0.676
Q6	−0.022	−0.407	0.475
Eigenvalue	3.029	2.113	2.042
Percentage of variances	30.289	21.126	20.422
Cumulative of variances	30.289	51.415	71.836

Table 5: Matrix of factor loads by the principal component and varimax rotation in survey questionnaire

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Table 6: Correlation coefficient of each extracted factor with the total score of the instrument

Factor	Correlation coefficient	*P*
F1	0.791*	<0.001
F2	0.503*	<0.001
F3	0.723*	<0.001

Level of significance *P*<0.05

All above emphasize the attitude of users about e-professionalism and the importance of assessment in social media users.

A study by Hussain *et al*. on pharmacy and medical students (575 people) aimed to assess students' attitudes and perspectives on social media e-professionalism in the United Arab Emirates. The questionnaire was adapted from the study by Cain *et al*. and Shcherbakova *et al*. In this study, minor revisions were made, and this questionnaire was a valid tool in the United Arab Emirates.[20,33,34]

Research from Cain *et al*. was developed to assess students' opinions regarding accountability and e-professionalism in Facebook. In this study, a 13-item questionnaire was initially developed and presented to 128 pharmacy students as a pilot study. The questionnaire was slightly modified based on the results of the experimental test. The final questionnaire reviewed by students about the clarity and purpose of the questionnaire, also the instrument reviewed by the pharmacy faculty. The final revised questionnaire consisted of 21 questions and was administered to pharmacy students. Attitudes toward Facebook emphasize the need for e-professionalism in students.[20]

Many participants felt that they should edit their social media profiles before applying for any job.[20,35]

These results similar to recent results confirmed the main dimensions in e-professionalism in social media.

Recent results also have an item about that and confirmed these results above.

Social media misconduct can have devastating effects on students' future opportunities, but it gives medical students little opportunity to reflect on ways to integrate their social media identities with newly formed professional identities.[36]

In Cain *et al*., study opinions regarding accountability and e-professionalism in pharmacy students' Facebook activity were assessed. A 21-item questionnaire was administered to 299 pharmacy students. Attitudes toward accountability for information provided through social networks e-professionalism should be included in the definition, training, and evaluation of medical careers. Furthermore, it should include new approaches to the appropriate and professional use of social media for learners. This impacts medical professionalism and involves a commitment to quality improvement in health care.[36]

Research from Chisholm-Burns *et al*. aimed to develop the instrument for the student attitude to social media professionalism on 197 1st-year pharmacy students. Six dimensions of professionalism by Hammer *et al*. were used. These results showed that the social media professionalism scale with five tenets of professionalism (integrity, accountability, duty, excellence, and respect to others) had validity and reliability to assess students' attitudes regarding social media professionalism.[37]

Some aspects extracted from the research above are similar to the present study.

Focus on online professionalism and attention to consequences and best practices help students build awareness of their electronic professional identity. Social media as a professional skill is necessary for dentistry practice in the 21st century.[38]

Student pharmacists' perspectives on e-professionalism and social media were developed through qualitative research by Ness *et al*. In this qualitative study, various issues were discussed, which indicated the separation of individual and academic life in the use of social networks. It was also stated that how to respond to actions should differ in terms of the intensity of response. This helps to represent students' personalities on social media.[19]

In the present study, the importance of paying attention to the social media environment and emphasizing how to send messages was emphasized.

All instruments above have similar dimensions to resent results in some aspects.

Assessing validation of professionalism using social media in Iranian students, also assessing students 'attitude to professionalism and social media are an important issue in education. Also these results are important in corona pandemic due to increasing use of social media in education and learning. These results may be helpful to ethical and educational policymakers to adopt better strategies.

Limitation and recommendation

One limitation of this study was the assessed instruments in one university. It is a need for the applied instrument in the multicentral university. We recommend assessing this instrument in another field in IRAN.

Conclusion

By examining the abovementioned articles and their relationship with the three components of professionalism, it can be stated that the questionnaire can be used as a survey in the field of virtual professionalism in medical sciences. It also emphasizes the important role of professionalism in medical science and in the use of social networks. According to the questionnaire and psychometric properties, it can be stated that this questionnaire. This questioner may be suitable for Iranian researches in medical education.

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Conflicts of interest

There are no conflicts of interest.

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