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New roles of students as partners: Importance of students' roles, level of preparedness and available opportunities on the basis of a validated self-assessment questionnaire

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Abstract

Background Unlike in the past, when students were considered clients of universities, today, students are expected to be partners in designing, implementing and evaluating educational programs.

Methods In this explorative study, a questionnaire was designed and validated to assess the importance of health professions students'roles, the level of opportunities available and the level of students' preparedness to fulfill their roles from their own perspectives. Its face, content and construct validity and reliability were assessed in different steps by 25 faculty members and 468 students. The validated questionnaire was completed by 626 students to have a pilot assessment of the existing status at our university. The Mann–Whitney U test and Kruskal–Wallis test were used to compare the mean scores of different groups of students. The data were analyzed via SPSS version 25.

Results The questionnaire with 43 items was compiled in nine roles, namely, reflective trainee; interactive knowledge seeker; active listener; role model as student/apprentice; collaborative learner; mentor; assessor; strategic and critical learner; and active participant. The validity and reliability of the questionnaire were verified by acceptable measures. The mean scores of importance, opportunities and preparedness were 175 ± 27, 149 ± 29, and 145 ± 27, respectively, out of 215. A moderate correlation between the scores of preparedness and importance and a strong correlation between the scores of preparedness and opportunity were reported ($P < 0.001$). There was no significant difference in the mean scores across the different groups of students, except for the mean scores of importance and preparedness, which indicated higher scores of importance and readiness in female students than in male students.

Conclusion For the first time, a valid and acceptable questionnaire was designed and validated to assess health professions students' roles, and the 13 previously defined roles for students were redefined and categorized into9 new roles. The importance of these roles, the levels of available opportunities, and students'preparedness to play them at Tabriz University of Medical Sciences were insufficient from students' perspectives. It is recommended that the status of SaP in other Persian- or English-speaking countries be assessed via the validated questionnaire in this study.

Keywords Students, Health occupations, Role, Psychometrics, Validity and Reliability

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Background

In the past decade, students as Partners (SaPs) have been welcomed as an approach to transform higher education, with a move from neoliberal and economically based higher education (in which everything is subject to managerial requirements) toward student collaboration in conceptualizing, decision-making, implementing and evaluating educational programs [1], so that students have been introduced as partners, not as mere clients of educational institutions [2–4].

SaP is an emerging ethos and growing practice. It is a reciprocal and collaborative process that provides students with opportunities to work together with other students, educational staff, university administrators and faculty members, or even with people working in the industry [4]. Partnerships in SaP may focus on teaching and learning processes or on activities leading to quality improvement in other areas of concern to universities [5]. SaP does not mean"increased choice"for students. It has created a radical cultural shift in education, in which teachers do not make decisions for students; rather, they work in partnership with their students to achieve common goals [5].

SaP has increased trust, respect and responsibility in the curriculum [6, 7], and it has become one of the requirements of digital learning and teaching in the twenty-first century [8]. Different international approaches to student–teacher partnerships have been reported worldwide [9]; however, the concept of the SaP is still undertheorized [1]. Although SaP can include a variety of policies and practices, "their common thread is a repositioning of the roles of students and staff in the learning endeavor" [2]. The SaP stresses the ever-changing roles of teachers and their student partners in teaching and learning processes [5]. The roles of teachers and students have already been defined, and it is believed that attention to the roles of students needs to be part of the culture of educational institutions [10].

Considering the crucial role of paying attention to the roles of students and staff in the institutionalization of SaP in educational institutions [2], it is believed that teachers and students are better able to embrace SaP and that they are better able to simultaneously play their defined roles in educational contexts to improve learning and teaching processes [10]. In 2000, Ronald Harden and his colleague Joy Crosby introduced the twelve roles of a good teacher in fulfilling the demanding tasks of teaching [11]. Later, in 2012, to complete the two-way process of teaching and learning, into a double helix of student and teacher roles, students'roles were published in analogy with teachers'roles [10]. In 2018, in line with many educational necessities in the twenty-first century, teachers' roles changed to eight roles [12]. However, in accordance with the changes in the roles of teachers, no change in the roles of students has been reported yet. On the basis of the latest evidence, students' roles are defined in six areas of information reception and seeking: role modeling in the job and learning contexts; facilitation of the teaching process; assessment of the teacher and curriculum; curriculum planning and active collaboration; and resource exploitation and consumption. Students' roles in the above six areas include being a listener; a clinical/practical learner; choosing role models; an on-the-job role model; a learning role model; a teaching facilitator; a mentee; a curriculum evaluator; a teacher assessor; a keeper up with the curriculum; an active participator; a study guide user; and a resource material consumer [10].

Given the importance and necessity of embracing SaP in higher education focused on students' roles, providing students with opportunities to play their roles has been mentioned as one of the prerequisites for students'partnership in the twenty-first century [13–15]. Given the importance and necessity of students' partnerships in educational institutions, students should know about their roles. In addition, they should plan to play their roles and should do their best to fulfill those roles in their educational institutions. At the same time, it is necessary for educational institutions to plan for students' preparation and to create the necessary opportunities to fulfill the roles of the students [4, 16].

There is a body of published literature focused on SaP, but up to the time of conducting the present study, what we know about SaP is that nearly all studies have been conducted with high school students. Among the few studies conducted in higher education, according to a 2017 systematic review, most studies have been conducted in Western countries, and the disciplinary context of only 22% of the included studies was medical and health [2]. In another example, 15 (73%) of the included studies in a scoping review published in 2023 were conducted in the United States, Canada, Australia, and New Zealand. In this context, very few studies have been conducted in Eastern and Asian countries (China, Malaysia and Israel) [3].

In Western countries, invaluable steps have been taken to achieve student partnerships [17, 18], and three models have been introduced to embrace students'expertise to improve educational programs in the U.S. [17]. In Asian countries, the implementation of the SaP is an evolving and debated topic and has faced challenges [19]. Regardless of the context and location where the previous studies were conducted, their common recommendation is that pedagogies focused on SaP are better supported by contextualized practices and cross-culturally or interculturally responsive initiatives [2, 3, 5]. It is believed that practicing SaP should be planned on the basis of cultural considerations, including the dichotomy of teachers and students in Asian culture

[19]. Taking cultural considerations into account, SaP in Asian countries needs more understanding, and initiatives should be cautiously implemented. Despite the definition of the students'roles by the educational experts worldwide and their introduction by the European Association for Medical Education [10], according to searches in both Persian and English in the available databases, up to the time of the present study, no tool has been designed and published to assess the tasks and roles of health professions students. On the basis of the corresponding author's several years of experience (as the head of the student committee for the development of education at the university), there were challenges and beliefs about SaP at Tabriz University of Medical Sciences. The students had little participation in various education development committees at the university and did not have any demands in this regard. It could be assumed that the students were not familiar with their roles at the university.

Given the aforementioned research gaps regarding the lack of a valid and reliable research tool to assess students' roles and the unclear status of playing the roles of students in Asian countries such as our university in Iran, we developed and validated a questionnaire to assess students'roles. Then, we asked the participating students to assess the importance of their roles, the level of available opportunities and the level of preparedness to fulfill their roles from their own perspective via the validated questionnaire. In this article, the questionnaire and its psychometric properties are introduced, and the existing status at Tabriz University of Medical Sciences is reported.

Methodology

This explorative study was conducted in two stages at Tabriz University of Medical Sciences from 2020–2024. Explorative studies include three different types of research studies: psychometric, qualitative and descriptive studies [20]. The flowchart of the methods is presented in Fig. 1.

First stage of the study: A psychometric study to develop and validate the research questionnaire

Through a psychometric study [20], a questionnaire was designed and validated to assess health professions students' perspectives on SaP.

Participants and sampling

The participants in this stage of the study were expert faculty members and health professions students from different universities in Iran. Health professions students are students who are studying in one of the schools of Medicine, Dentistry, Pharmacy, Nursing and midwifery, Management, Rehabilitation, Health, Nutrition or Allied Medicine. The participants' characteristics in both the first and second stages of the study are presented in Table 1.

Instruments and procedure

Drafting the first draft of the research questionnaire

The initial items of the research questionnaire were developed mainly on the basis of the content of the article by Karakitsiou and colleagues about students' roles [10]. The students'roles in the article by Karakitsiou and colleagues were determined on the basis of a review of the content of AMEE Guide No. 20; a review of papers from AMEE conferences held between 2001 and 2009; a review of papers from Medical Teachers, Medical Education and Clinical Teachers; reflections by the scholars who wrote it; and a group discussion and brainstorming of 90 third-year medical students [10]. The content of the systematic review article reported in 2017 [2] and the scoping review published in 2023 [3] verified the content of the items.

The items of the research questionnaire were proposed and formulated with a deductive approach [21] on the basis of the research team's discussions. The first version of the research questionnaire was composed of 57 items, including the tasks that the students had to perform to fulfill all their thirteen roles [2, 10]. To lessen participants'cognitive processing, similar response anchors for all items of the questionnaire were used. The use of negatively worded (reverse-coded) items was also avoided [22]. Five experts were asked to revise the initial items of the questionnaire. The experts were faculty members who were teaching health professions students and had enough experience in collaboration with students as their partners in educational institutions. They evaluated the clarity, simplicity and comprehensibility of the items and recommended revisions to make the items simpler and more transparent.

Face and content validity assessment

Ten other faculty members were asked to assess the necessity of the tasks written under each of the students'roles on a three-point Likert scale (not necessary = 1, useful but not necessary = 2 and necessary = 3) [23]. Ten faculty members were also asked to assess the relevance and appropriateness of each task to its corresponding role on four (not relevant = 1, somewhat relevant = 2, relevant = 3 and completely relevant = 4) and five (very appropriate = 5, somewhat appropriate = 4, moderately appropriate = 3, slightly appropriate = 2, and not appropriate = 1) point Likert scales. On the basis of

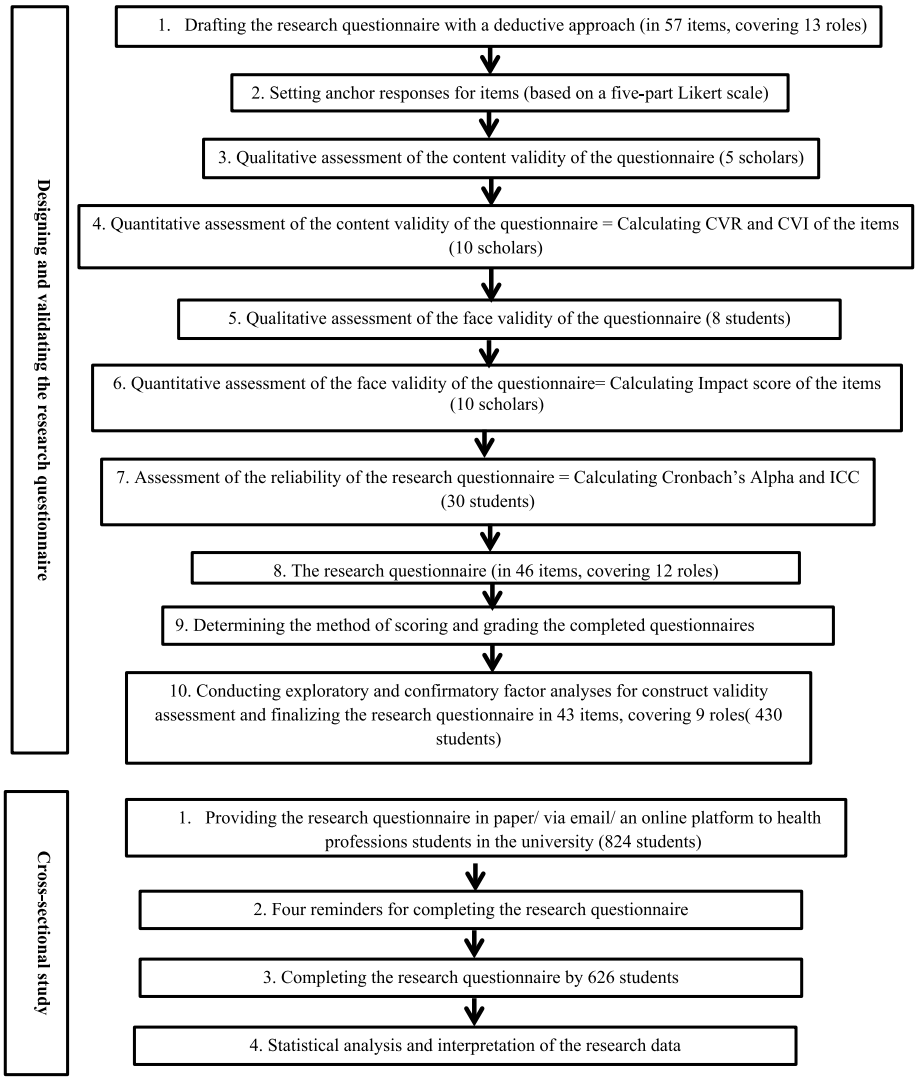

Fig. 1 The Methods flowchart of two stages of the explorative study (Psychometric study in 10 steps and cross-sectional study in 4 steps)

the results of the assessments by those ten people, the content validity ratio (CVR), the content validity index (CVI) and the impact score (IS) for all the items were calculated [23, 24]. The formula of $\frac{Ne-N/2}{N/2}$ was used for calculating the CVR [23]. The formulas of $\frac{\text{The number of faculty members who chose 3 and 4 for the items}}{N}$ and (Impact Score = Frequency (%) × Importance) were used for calculating the CVI and IS of the items.

Anchor responses for all items were set on a five-part Likert scale to assess the level of importance of their roles, the level of preparedness and, finally, the level of available opportunities to fulfill them.

Eight health professions students were asked to report any problems related to their understanding of each question. They were also asked to suggest their recommendations for revising that item so that all the questions were easily clear and understandable to the participating students.

Construct validity assessment

The construct validity of the questionnaire was assessed through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) [23, 25]. For this purpose, considering at least ten samples for each item (based on the "10 times rule") [26], all 430 students were invited to complete the research questionnaire through a non-probability convenience sampling method.

It was necessary for the students to be familiar with the concept of SaP and their roles. For this reason, all students who had attended face-to-face/online

Table 1 Characteristics of participants to assess health professions students' perspectives regarding three aspects of their roles in universities of medical sciences

Characteristics of participating students	Characteristic	Level of variable	Psychometric study ($n = 38$*)	Cross-sectional study ($n = 626$)
			N (%)	**N (%)**
	Gender	Male	15(40%)	298(47.6%)
		Female	23(60%)	328(52.4%)
	Age(years)	≤ 20	0(0%)	23(3.7%)
		21–25	20(53%)	294(47%)
		26–30	18(47%)	155(24.8%)
		> 30	0(0%)	154(24.6%)
	Educational level	Bachelor	2(5%)	52(8.3%)
		Master	10(26%)	64(10.2%)
		Doctorate	14(37%)	266(42.5%)
		Residency	3(8%)	102(16.3%)
		PhD	9(24%)	142(22.7%)
	Major of study	Medicine	18(47%)	204(32.6%)
		Dentistry	7(19%)	158(25.2%)
		Others	13(34%)	264(42.2%)
	Year of study	Two years and less	6(16%)	146(23.3%)
		More than two years	32(84%)	476(76.7%)
Characteristics of participating faculty members	**Characteristic**	**Level of variable**	**Psychometric study (n = 25**)**	
	Gender	Male	16(64%)	
		Female	9(36%)	
	Work experience (Years)	Ten years and less	6(24%)	
		Twenty years and less	12(48%)	
		More than twenty years	7(28%)	
	Academic rank	Assistant professor	8(32%)	
		Associate professor	10(40%)	
		Professor	7(28%)	
	School	Medicine	11(44%)	
		Dentistry	4(16%)	
		Others	10(40%)	

* 8 students in the step of face validity assessment and 30 students in the step of reliability assessment

** 5 faculty members in the step of revising the initial items of the research questionnaire; 10 in the step of face validity assessment and 10 in the step of content validity assessment

classes or training workshops with the main researcher focused on SaP between 2020 and 2024 were invited to participate in the research. The students were invited regardless of their study major or educational level.

The main researcher, in all her classes or workshops with students from different schools, introduced the research and its objectives. She also described how to complete the research questionnaire.

To decrease the effect of the mode of administration, a research questionnaire was provided using mixed methods (in paper or via email or an online platform). Neutral wording, identical and standard instructions at the beginning of the survey questionnaire, and equal response options were used to reduce the instrument design effect [22].

At least four reminders were sent to each student to complete the questionnaires online or in person.

The Kaiser–Meyer–Olkin (KMO) index was calculated. Bartlett's test of sphericity was used to verify the data suitability for factor analysis [21, 23]. Principal component analysis was performed for data extraction, and the rotation method of the factors was varimax rotation with Kaiser normalization [21, 23]. Confirmatory factor analysis was conducted to verify the findings obtained from the exploratory factor analysis.

Reliability assessment

Thirty students were asked to complete the questionnaire twice at 10-day intervals. The internal consistency of the items of the questionnaire was assessed via Cronbach's alpha, and the stability of the results was assessed via intraclass coefficient [23] calculations.

Data analysis

Items with a CVR less than 0.62 were removed, and items with a CVI less than 0.79 and an impact score less than 1.5 were edited [23, 27]. In the context of this study, KMO values greater than 0.7 were deemed optimal, whereas loadings exceeding 0.3 were considered acceptable.

The alpha coefficient was calculated after the questionnaires were completed for the first time by calculating the average correlation coefficients between the items. The intraclass correlation coefficient was calculated after the questionnaires were completed twice in the form of the ratio of between-group variance to total variance (absolute agreement) [21]. Data analysis was performed via the Statistical Package for Social Sciences for Windows version 25 (IBM Corporation, Armonk, USA). SPSSv.25.

Second stage of the study: pilot assessment of the current status of students'partnerships

In this stage, the current status of health profession students'partnerships at Tabriz University of Medical Sciences was investigated to provide officials and policymakers at the university with an initial description of the status quo.

Participants and context

The participants in this stage of the study were students from different schools at Tabriz University of Medical Sciences; these students were selected through nonprobability convenience sampling.

At Tabriz University of Medical Sciences, 9,825 students are studying in 11 schools at various levels of education under the guidance of 954 academic faculty members. Like other medical universities in the country in recent years, our students have been provided with the opportunity to work on the student committees of education and research development. Students can volunteer to participate in the planned mentorship programs or participate in the curriculum planning committees according to ad hoc requests in some schools.

Sampling

Using G-Power software and considering a power of 95%, an effect size of 0.3 and an α error probability of 0.05, the sample size from a population of 9825 students at our university was estimated to be 824 students. Repeated follow-ups for completion of the questionnaires were performed. The time of the study was extended to recruit more participants; however, the follow-up and time extension resulted in the completion of 626 questionnaires at all. At this stage, in addition to the 430 questionnaires completed in the construct validity assessment phase, another 196 questionnaires were completed, and in total, the current status was described on the basis of data from 626 completed questionnaires.

Instruments and procedure

The participating students were requested to complete the research questionnaire in two sections. The first section of the research questionnaire focused on students' sociodemographic information, including their gender, age, major and year of study, educational level, school name, and father's and mother's occupation. Students were asked to declare their father's and mother's occupations on the basis of the assumption that if their parents were university faculty members or staff, they might feel more prepared to perform their roles or might know more about the available opportunities.

By completing the second section of the questionnaire, the students assessed the importance of tasks under each role, the level of available opportunities and the level of their own preparedness to perform each task on a 5-point Likert scale (Great = 5, Considerable = 4, Some = 3, little = 2 and None = 1). In cases where the students did not specify the answers to more than twenty percent of the questions of the questionnaire, the data from those questionnaires were not analyzed.

Data analysis

Using the Statistical Package for Social Sciences for Windows (SPSS) v.25, the total scores of the importance of performing the relevant tasks to fulfill their roles from the students'point of view, the level of available opportunities, and the level of students' preparedness to perform those roles were calculated. The total scores ranged from 43 to 215 for all 43 questions. Accordingly, scores between 43 and 86, between 87 and 172, and between 173 and 215 were considered low, moderate and high, respectively. The score for every role is calculated as a composite score of the scores for the tasks covering it.

The normality of the distribution of the scores related to the main variables of the research, as well as the scores of the roles, was examined via the Kolmogorov–Smirnov test. After the data were entered into the statistical software, data cleaning was performed. The data obtained after evaluation were entered into the analysis. Owing to the large sample size of the studies, the analyses were

evaluated without considering missing data. Owing to the nonnormal distribution of importance, opportunity and preparedness scores, nonparametric tests (Mann–Whitney U test and Kruskal–Wallis test) were used to compare the mean scores in different student groups on the basis of their sociodemographics. Correlations of the self-assessment score of each role with other roles were analyzed to identify potential intervariable relationships by calculating Pearson's correlation coefficient. Spearman's correlation coefficient test was used to examine the pairwise correlation between the mean scores of importance, opportunity, and preparedness. The significance of the difference between and among the groups was confirmed with a P value less than 0.05.

Ethical considerations

The participants were told that their participation in this study was voluntary and that they could withdraw from completing the questionnaire at any time. They were assured that each of the participants would have been assigned a code and that the information from the questionnaires they completed would be used only in line with the study objectives. The completion of the research questionnaire by expert faculty members in the steps of determining content and face validity and by students in the steps of determining face and construct validity and reliability, as well as in the second stage of the study, was considered their informed consent to participate in the study. This sentence was added to the other explanations in the first paragraph of the research questionnaire (Appendix 1).

To improve the style of the manuscript and its readability and to ensure that the text is free of errors in spelling, grammar, tone and punctuation, the text was revised via Curie (https://beta.springernature.com/pre-submission/writing-quality.). The final version of the text was reviewed by the authors, and it was ensured that the AI-revised version of the text reflected its original version."

Results

The characteristics of the participants in both stages of the study are presented in Table 1.

The mean CVR, CVI and IS of the items of the questionnaire were 0.93, 0.93 and 4.89, respectively. The items of the questionnaire and their CVR, CVI and IS are summarized in Table 2.

Eleven items were deleted on the basis of the CVR calculation. Following the removal of those 11 items, one of the 13 roles was also removed. The deleted role was"on the job role model". Therefore, only two roles,"choosing role models"and"learning role models", were included in the area of role modeling. In this phase, the questionnaire was developed with 46 items covering 12 roles. The simplicity and clarity of the items were ensured after the recommendations suggested by the students were applied.

In the phase of construct validity assessment, three other items were deleted. The remaining 43 items were loaded in nine factors. The eigenvalues of all nine extracted factors were greater than one. These nine factors were able to explain 75.54% of the total variance. The extracted factors were named in parallel with the newly defined roles for medical teachers. By doing so, nine roles, namely, 1- reflective trainee; 2- interactive knowledge seeker; 3- active listener; 4- role model as student/apprentice; 5- collaborative learner; 6- mentor; 7- assessor; 8- strategic and critical learner; and active participator, were defined for health profession students. The students'roles and the tasks related to each role are presented in Table 2. The total variance explained by each role, on the basis of the results of the exploratory factor analysis, is presented in Table 3.

The rotated matrix of the factors and factor loadings of their assigned items based on the EFA and CFA are presented in Table 4 and Table 5, respectively. The KMO value of 0.80 and the results of Bartlett's test of sphericity (df = 1035, Sig < 0.001) confirmed the adequacy of sampling for factor analysis. The initial communalities of all the items with extracted factors were equal to one. The extraction communalities of the items ranged from 0.64–0.86.

The internal consistency of the items of the questionnaire and the stability of the results were confirmed by Cronbach's alpha values of 0.95 and 0.69, respectively. The results related to the internal consistency of the items of each role are presented in Table 6.

The mean scores of importance of playing the roles, the level of available opportunities and the level of students' preparedness were 175 ±27, 149 ±29, and 145 ±27, respectively, out of 215. The results of the Kolmogorov–Smirnov test indicated that the data distributions of all three variables were not normal ($p < 0.001$).

Spearman's correlations between the main variables of the research were as follows: importance score and opportunity ($n = 617$, $r_s = 0.18$, $p < 0.001$), between the importance score and preparedness ($n = n = 621$, $r_s = 0.37$, $p < 0.001$), and between the opportunity score and preparedness ($n = 617$, $r_s = 0.63$, $p < 0.001$).

Approximately 42.2 percent of the students did not write the name of their school, and more than seventy percent of the students did not specify information about their father's and mother's occupations.

The mean score of the importance of each role, the mean score of available opportunities and the mean score of the students' preparedness to perform those roles on the basis of the participating students' points of view are

Table 2 The items of the research questionnaire and their Content Validity Ratio (CVR)*, Content Validity Index (CVI) and Impact Score (IS)

Role**	Row	Task	CVR	CVI	IS
Reflective trainee	1	Studying the course plans before attending classes and training sessions	1	0.93	5
	2	Reflecting on the reasons for attending a learning session before attending	0.8	0.93	4.8
	3	Reflecting on him/her goals for attending a learning session by reviewing the course plan	1	0.93	4.9
Interactive knowledge seeker	4	Reviewing him/her previous knowledge about the subject of the learning session before attending	0.8	0.86	4.6
	5	Focusing on acquiring the goals intended for that session during the session	0.8	0.86	4.8
	6	Making connections between new content and him/her previous knowledge and experience	1	0.93	4.8
	7	Effective communication with patients and their companions	1	1	4.9
Active listener	8	Trying to find answers to the questions formed in his/her mind	1	1	5
	9	Applying his/her knowledge and information received in practice	0.8	0.86	4.7
	10	Assessment level of achievement of his/her learning goals at the end of the session and course	0.8	0.93	4.8
	11	Being a self-regulated learner based on education quality standards	1	0.86	4.7
Role model as student/apprentice	12	Observing the thought processes of teachers and peers	1	0.93	5
	13	Acting as a good role model for peers to encourage them to learn more and better	1	1	5
	14	Timely and accurate completion of assignments	1	1	5
	15	Interaction with other members of the educational or care teams	1	1	5
	16	Developing an individual learning plan	1	1	5
	17	Planning for group learning in all learning sessions and settings	0.8	0.86	4.7
	18	Practicing evidence-based learning and not blindly consuming information available on the Internet	1	0.93	5
	19	Acquiring active search skills for information and educational resources on websites	1	1	5
	20	The ability to critically appraisal of the available scientific sources regarding the validity, relevance, and applicability of the information	1	0.93	5
	21	Acquiring the skills of processing, analyzing and organizing the searched information	1	0.93	5
Collaborative learner	22	Challenging thoughts of him/herself, of classmates, of the teacher in a session	1	1	5
	23	Being an active listener instead of being passive in the learning session	1	1	5
	24	Interacting with teachers in order to facilitate their teaching by asking good, logical and timely questions	0.8	0.86	4.8
	25	Criticizing teachers'teaching process, their statements and educational materials after having enough interaction with them	0.8	0.93	5
	26	Providing constructive feedback to teachers in order to create motivation, interest and enthusiasm in teachers for more activity	1	0.93	5
	27	Evaluating the written and formal curriculum	0.8	0.86	4.7
Mentee	28	Discuss what you have learned with your classmates	1	1	5
	29	Interacting with classmates and teaching the learned material to peers	1	0.93	5
	30	Active participation in peer evaluation	1	0.93	4.9
Assessor	31	Fair evaluation of teachers with the aim of helping their professional development	1	0.93	4.8
	32	Evaluation the outcomes of the predetermined learning objectives in the curriculum	0.8	0.86	4.7
Strategic and critical learner	33	Actively and critically choosing his/her role models	1	1	5
	34	Reflection on learning activities and his/her own daily experiences in different contexts	1	0.93	5
	35	Monitoring his/her own learning process and identifying his/her mistakes and problems	1	1	5
	36	Evaluating his/her learning skills to identify his/her learning strengths and weaknesses	1	0.93	5

Table 2 (continued)

Role**	Row	Task	CVR	CVI	IS
Active participator	37	Participation in determining the effectiveness of courses and curriculum	0.8	0.86	4.8
	38	Participation in evaluation of the quality standards of education in her/his school	0.8	0.93	5
	39	Participating in determining the importance, priority and weight of each course in curriculum	0.8	0.86	4.7
	40	Active participation in educational plannings in the university	0.8	0.93	5
	41	Participation in determining the quality standards of education in his/her school	0.8	0.86	4.6
	42	Cooperation with teachers in writing study guides and course plans	0.8	0.93	4.9
	43	Playing the role of a rational and critic consumer for educational resources produced by teachers	1	1	5
The whole questionnaire			**0.93**	**0.93**	**4.89**

* Based on the assessment by ten scholars

** These 9 roles are the roles that were renamed based on the results of the exploratory and confirmatory factor analyses

Table 3 Total variance explained by each role based on the results of the exploratory factor analysis

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
Reflective trainee	7.143	16.611	16.611
Interactive knowledge seeker	4.779	11.114	27.725
Active listener	3.611	8.399	36.123
Role model as student/ apprentice	3.573	8.310	44.433
Collaborative learner	3.067	7.132	51.565
Mentee	2.798	6.506	58.071
Assessor	2.750	6.396	64.467
Strategic and critical learner	2.524	5.870	70.337
Active participator	2.236	5.201	75.538

shown in Table 7. The distribution of these scores was normal. The Pearson's correlation coefficients of the self-assessment scores of each role with other roles are presented in Table 6.

The results of the comparison of the mean scores of the importance of the roles from the students'point of view, the available opportunities and the students'preparedness to perform those roles in different groups divided by the sociodemographic characteristics of the participating students are presented in Table 8. Overall, there was no significant difference between these mean scores of importance, opportunities and preparedness in different levels of students' sociodemographic characteristics. The only exception was related to the mean scores of importance and preparedness between male and female students; thus, the mean scores of female students were significantly higher than those of male students.

Discussion

This study aimed 1- to develop and validate a questionnaire to assess health professions students' roles and 2- to evaluate the importance of student roles, as well as the availability of opportunities and the level of preparedness to perform them from students' perspectives at Tabriz University of Medical Sciences. Students' roles have already been acknowledged in the literature [10]; however, to the best of our knowledge, no questionnaire has been developed to assess students' roles. For the first time, in this study, the roles of health professions students were structured into an educational questionnaire.

On the basis of the recommended values for validity assessment, the mean CVR = 0.93, CVI = 0.93 and IS = 4.89 indicated acceptable face and content validity for the questionnaire [28]. The results of the reliability assessment of the questionnaire revealed that the items of the research questionnaire were internally correlated with each other to an acceptable extent. The results revealed that the items of the research questionnaire were rationally consistent in measuring the roles and tasks of health professions students [29]. Moderate agreement between the results of two assessments ten days apart indicated the stability of the results of the students'role assessment by the developed questionnaire [29, 30].

In this study, the research questionnaire used to evaluate students' roles included 43 items. It can be considered a rather long questionnaire. Research findings from long questionnaires differ. Some believe that long questionnaires may lead to increased response burden and decreased engagement and fatigue [31]. For these reasons, some strategies, such as combining some questions, removing redundancies or prioritizing questions, have been recommended to shorten the later versions of long questionnaires [22]. The recommended strategies

Table 4 Rotated matrix of the factors and factor loadings of their assigned items, based on the exploratory factor analysis

Task	Student role								
	1	2	3	4	5	6	7	8	9
q2					0.695				
q3					0.826				
q4					0.800				
q5								0.548	
q6								0.561	
q7								0.546	
q19								0.746	
q9						0.564			
q10	0.553					0.371			
q11						0.571			
q13						0.772			
q15		0.424							
q16		0.328	0.652						
q17		0.390	0.542						
q18		0.539							
q20	0.446	0.397				0.429			
q21	0.563	0.372							
q8				0.550					
q12				0.813					
q22				0.706					
q23				0.624					
q24				0.680					
q25				0.466					
sq7			0.727						
q28			0.740						
q29			0.455						
q32									0.736
q33	0.509								0.451
q14							0.457		
q34	0.616						0.370		
q35							0.713		
q36							0.737		
q30	0.570								
q31	0.804								
q37	0.556								
q38	0.860								
q39	0.846								
q41	0.790								
q42	0.667								
q43		0.841							
q44		0.875							
q45		0.725							
q46		0.804							

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 10 iterations

Table 5 Rotated matrix of the factors and factor loadings of their assigned items, based on the confirmatory factor analysis

	Student role								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
q2					0.695				
q3					0.826				
q4					0.800				
q5								0.548	
q6						0.445		0.561	
q7			0.368				0.354	0.546	
q8	0.401		0.357	0.550					
q9		0.427		0.358		0.564			
q10	0.553					0.371	0.366		
q11					0.358	0.571	0.358		
q12				0.813					
q13						0.772			
q14	0.366						0.457		
q15	0.369	0.424	0.429						
q16			0.652						
q17		0.390	0.542					0.384	
q18		0.539						0.501	
q19								0.746	
q20	0.446	0.397				0.429			
q21	0.563	0.372							
q22				0.706			0.435		
q23	0.456			0.624					
q24	0.442			0.680					
q25				0.466				0.409	0.449
q27			0.727						
q28			0.740						
q29	0.416		0.455		0.404				0.382
q30	0.570								0.534
q31	0.804								
q32		0.433							0.736
q33	0.509								0.451
q34	0.616						0.370		
q35							0.713		
q36							0.737		
q37	0.556								0.459
q38	0.860								
q39	0.846								
q41	0.790								
q42	0.667								
q43		0.841							
q44		0.875							
q45		0.725							
q46		0.804							

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 10 iterations

Table 6 Results related to the internal consistency of the items of each role and the correlation coefficients of the self-assessment score of each role with other roles

Student role	Reflective trainee	Interactive knowledge seeker	Active listener	Role model as student/ apprentice	Collaborative learner	Mentee	Assessor	Strategic and critical learner	Active participator
Cronbach's Alpha	**0.921**	**0.908**	**0.811**	**0.882**	**0.78**	**0.80**	**0.865**	**0.79**	**0.75**
Reflective trainee	1								
Interactive knowledge seeker	0.377**	1							
Active listener	0.466**	0.543**	1						
Role model as student/ apprentice	0.334**	0.538**	0.648**	1					
Collaborative learner	0.297**	0.460**	0.621**	0.529**	1				
Mentee	0.424**	0.465**	0.650**	0.640**	0.593**	1			
Assessor	0.352**	0.309**	0.524**	0.501**	0.528**	0.435**	1		
Strategic and critical learner	0.450**	0.481**	0.647**	0.681**	0.617**	0.640**	0.573**	1	*
Active participator	0.399**	0.431**	0.559**	0.511**	0.650**	0.584**	0.588**	0.677**	1

** Pearson's correlation is statistically significant at the 0.01 level (2-tailed)

Table 7 = The status of three different aspects of students'roles in medical sciences universities from their own point of view ($n = 626$)

Student role	Number of items	Range	Mean ± SD		
			Importance	Available opportunities	Students' preparedness
Reflective trainee	3	(3–15)	11 ± 2	9 ± 3	9 ± 3
Interactive knowledge seeker	4	(5–20)	17 ± 2	14 ± 3	14 ± 3
Active listener	4	(5–20)	17 ± 3	14 ± 3	14 ± 3
Role model as student/apprentice	10	(10–50)	41 ± 6	32 ± 8	35 ± 7
Collaborative learner	6	(6–30)	25 ± 4	20 ± 5	20 ± 5
Mentee	3	(3–15)	12 ± 3	9 ± 3	10 ± 2
Assessor	2	(2–10)	8 ± 2	6 ± 2	7 ± 2
Strategic and critical learner	4	(5–20)	16 ± 4	13 ± 4	13 ± 3
Active participator	7	(7–35)	27 ± 7	18 ± 8	22 ± 6
Total	43	(43–215)	175 ± 27	149 ± 29	145 ± 27

were employed in the current study. Redundant items were removed, and some items were merged together on the basis of the experts'recommendations. Accordingly, 11 items were deleted in the content validity assessment phase, and the research questionnaire was somewhat shortened. Others believe that the number of items in a questionnaire is highly dependent on the purpose of the study and the number of dimensions of the research topic. Sometimes, some topics, such as students'roles, have diverse dimensions, and designing a rather long questionnaire, which covers multiple dimensions, is inevitable [32, 33]. The findings of a meta-analysis, focused on the relationship between the length of questionnaires and response burden, indicate that comparing questionnaires of different lengths is problematic and that the first

Table 8 The status of three different aspects of students'roles in medical sciences universities from their own point of view, divided by the different levels of their characteristics ($n = 626$)

Characteristic	Level	Mean ± SD*		
		Importance	Available opportunities	Students' preparedness
Gender	Male	173 ± 28	140 ± 29	142 ± 27
	Female	177 ± 26	145 ± 30	149 ± 25
	***P*-value**	****0.046**	****0.066**	****0.001**
Age(years)	≤ 20	173 ± 26	135 ± 25	144 ± 28
	21–25	175 ± 26	144 ± 29	145 ± 25
	26–30	176 ± 27	144 ± 33	145 ± 29
	> 30	174 ± 29	139 ± 28	147 ± 27
	***P*-value**	**¥0.91**	**¥0.24**	**¥0.92**
Educational level	Bachelor	177 ± 24	141 ± 27	142 ± 28
	Master	182 ± 22	146 ± 34	149 ± 30
	Doctorate	173 ± 28	144 ± 30	145 ± 26
	Residency	172 ± 28	145 ± 30	147 ± 26
	PhD	175 ± 27	138 ± 27	144 ± 27
	***P*-value**	**¥0.22**	**¥0.18**	**¥0.57**
Major of study	Medicine	172 ± 28	144 ± 31	146 ± 26
	Dentistry	174 ± 27	144 ± 28	145 ± 25
	Others	177 ± 26	141 ± 29	145 ± 28
	***P*-value**	**¥0.21**	**¥0.43**	**¥0.9**
Year of study	Two years and less	172 ± 27	142 ± 29	144 ± 27
	More than two years	175 ± 27	143 ± 30	146 ± 26
	***P*-value**	****0.32**	****0.60**	***0.41**

* The distribution of importance, opportunity, and readiness scores was not normal. Mean ± SD is reported in this table instead of the Median ± IQR, merely to describe the comparison of scores in different groups

** Mann–Whitney U test

¥ Kruskal Wallis test

priority should be given to the content of the questionnaires, not merely their length [33].

In this study, in the phase of the construct validity assessment of the research questionnaire, three more items were deleted. The initial structure of the research questionnaire was changed, and the final 43 items were grouped into 9 different dimensions. The number of research questionnaire dimensions (students' roles) decreased from the previously defined 13 to 9 roles. A similar reduction in the number of teacher roles was reported in 2018, and the number of teacher roles decreased from 12 to 8 [12]. In 2012, 13 roles for students were defined in parallel with the 12 roles for teachers [11]. With a similar approach, the students'9 new roles were named in parallel with the teachers'8 new roles as follows: interactive knowledge seeker vs. information provider and coach; role model as student and apprentice vs. role model as teacher and practitioner; strategic and critical learner vs. scholar; and reflective trainee vs. professional. Conducting similar studies to assess the situation of SaP in other countries via a designed questionnaire with larger sample sizes can help refine the research questionnaire and design a shorter version of the questionnaire in the future. Until then, priorities can be given to some roles of students. On the basis of the specified priorities, students can be requested to complete certain parts of the designed questionnaire [32]. In this way, the quality of the data between the long and split versions of the questionnaire can be compared to help decide on more shortening of the questionnaire.

On the basis of these findings, our students at Tabriz University of Medical Sciences rated the importance of their roles as moderate. To the best of our knowledge, until the present study was conducted, no similar study has been conducted to assess students' roles in other Asian countries. The findings of a study in Australia were similar to the findings of our study. In that study, the participating students had not participated enough in educational planning, and there was resistance in the implementation of the SaP in Australian universities [34]. These findings show that familiarizing students with their

roles and the importance of playing them should be considered educational priorities at universities.

On the basis of the self-assessment of the students included in this study, the opportunities available at Tabriz University of Medical Sciences as well as students' preparedness to play their roles were moderate. Moreover, a strong correlation between preparedness and opportunity scores was reported. There was also a moderate correlation between the preparedness and importance scores. On the basis of these findings, we infer that creating suitable opportunities for students to play their roles should be considered the first priority in the institutionalization of SaP at our university. The logic behind this inference is that creating suitable opportunities can highlight the importance of roles for students and emphasize the necessity of preparation to fulfill the roles of students. The findings of previous studies also confirm this inference. On the basis of these findings, students' partnerships should be programmatically planned in universities, and SaP should be reinforced by providing appropriate opportunities [35]. In this context, important insights have been proposed to create opportunities to enact students' partnerships on the basis of a qualitative synthesis in 2020 [35]. Additionally, different strategies with a special focus on the roles of students and teachers have been recommended for promoting SaP in universities [36]. On the basis of those recommendations, students should be empowered for engagement. They are better able to provide opportunities for formal peer education. Formal representation in governance processes should be considered. Opportunities for integration into research communities should be considered for them, and feedback in every communication should be given to them [37]. Considering the different characteristics of new generation students, technology should be employed in the service of education more than before [38]. Flipped classrooms should be implemented to increase student engagement and grappling with complex and difficult concepts [39].

In addition to considering the numerous strategies proposed to increase student participation, the implementation of SaP, like many other social movements, might face many challenges. The implementation of SaP may destroy and even erase traditional culture and boundaries in communication among students, teachers and staff [40]. According to the results of semistructured interviews conducted in 2016 with a total of 16 students and staff from 11 Australian universities, the participants questioned the traditional relationships between teachers and students. They proposed an integrated approach to replace traditional relationships. According to the findings of that study, the power imbalance between teachers and students must be adjusted with the engagement of students as partners. Potential academic resistance to institutionalizing the culture of the SaP in universities should also be investigated [34].

On the basis of the search in the Persian and English languages in the available databases, the importance of students'roles, the level of available opportunities and the level of students' preparedness to play their roles have not been investigated or reported in previous studies. The research methods used in most SaP-oriented studies conducted worldwide include individual reflection, individual/group interviews, and autoethnography [2, 3]. The types of published articles have generally included editorials, personal reflections and opinion pieces [2, 3]. In one reflective essay, one student believed that partnership had shown her strengths and potential for deeper learning and academic achievement. The SaP helped her step out of his comfort zone and gain the confidence she needed to succeed [41]. However, the most important and common recommendation of previous studies is to provide positive learning/teaching experiences for both students and teachers by creating a stimulating and supportive context for culturally diverse students [36–39]. In this way, students can believe in their power in contributing to their community of practice. Partnership in such a supportive context enables students to be committed to actively playing their roles and to avoid exercising their power"simply through choice-making, complaint or by responding to consultation" [42].

According to the"mere-measurement effect", simply asking students to complete this validated questionnaire may increase their awareness of their roles at the university and positively affect their future attitudes and behaviors to play their roles [43]. In other words, asking students to complete this questionnaire at other universities may polarize their awareness and attitudes toward choosing their role-related behaviors and improve the quality of the educational process.

Limitations

Readiness, opportunity, and importance were self-reported measures in this study. Students might overestimate or underestimate these scores because of personal biases or social desirability. Therefore, taking into account the bias of self-reporting and to perform a more complete and reliable assessment of the status of students'role-playing in universities, triangulating the data through observations or interviews with teachers is recommended.

The findings of the second stage of the current research captured a snapshot of students' SaP perceptions at a single time point. The collection of longitudinal data in the future could offer more detailed insights into how student perceptions evolve over time, which would be

valuable for policy and curriculum development in medical education. Moreover, while completion of 824 questionnaires was necessary for status quo description, only 626 questionnaires were completed after frequent follow-ups. Although the results of the analysis of the 626 questionnaires depict an initial picture for university officials, the participation of a larger number of students in the future could provide a completer and more accurate picture of the current situation.

The lack of detailed diversity variables, such as socioeconomic variables, can be considered a limitation of this study. This limitation can restrict deeper insights into the impact of diversity on SaP engagement. Therefore, to increase the study's generalizability across different student demographics and contexts, future studies in other contexts with different student demographics are needed.

Another limitation of this research was the nonprobability sampling method. Owing to the novelty of the concept of SaP and the low number of students familiar with the concept of SaP and their roles at the university, random cluster or quota sampling was not possible at the time of the present study. After promoting students'partnerships at universities and familiarizing all students with their roles, a probability sampling method should be used for student recruitment in similar studies.

Another limitation of the present study was that the mean scores of different student groups were analyzed on the basis of their demographic characteristics. Because some students had answered only role-related items of the questionnaire and had not fully completed their characteristics, we were not able to report the data about some characteristics of the participating students in detail.

Applications

- If we are thinking about the institutionalization of the"students as partners", we need to familiarize students with their different roles.
- If the students are not familiar enough with their roles, if they are not provided with the necessary opportunities to fulfill those roles, and if they do not have the necessary preparedness for playing those roles, our efforts to institutionalize SaP will not be useful.
- For the first time, the details of the roles of health profession students were explained in the form of various tasks under each role (in the form of a valid and reliable questionnaire).
- The questionnaire can be used to evaluate the roles of students in all schools and all levels of study.
- The questionnaire can be used as a useful tool to teach the roles and tasks of health profession students.
- The inadequate level of opportunities and students' preparedness to fulfill their roles at Tabriz University of Medical Sciences can be considered a serious warning in terms of preparation for students'participation in educational quality improvement programs in the twenty-first century.
- The insufficient importance of roles from their students' point of view indicates the necessity of applying suitable reinforcements to motivate students to understand and play their roles.
- The institutionalization of SaP in universities needs to create suitable opportunities for students to play different roles.

Conclusion

In this study, health profession students' roles were defined in nine roles and were structured into a valid and reliable questionnaire. This questionnaire allows students, educational planners and policy makers to understand the importance of student roles, as well as the availability of opportunities and the level of preparedness to perform them. The results of the students'self-assessments revealed that students' roles were not important enough to be played and that the level of available opportunities and the level of students' preparedness to fulfill their roles at Tabriz University of Medical Sciences were inadequate. Future studies in different contexts and universities are recommended to evaluate the importance of student roles, as well as the availability of opportunities and the level of preparedness to accomplish them. Research on how institutions can overcome implementation barriers and increase student partnerships in educational improvement is also recommended.

Abbreviations

ICC	Intraclass correlation coefficient
IS	Impact score
CVI	Content validity index
CVR	Content validity ratio
SaP	Students as Partners
SPPS	Statistical Package for Social Sciences

Supplementary Information

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Supplementary Material 1.

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Clinical trial number

Not applicable.

Authors' contributions
SGH and SA conceived the study. SA, MA and YKM collected the data. All authors analyzed data and interpreted the findings. YKM wrote the first draft of the manuscript. All authors read and critically revised the first draft and confirmed the final version of the manuscript.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The ethical committee of Tabriz University of Medical Sciences approved this study (IR.TBZMED.REC.1399.320). The participants were informed about the research and its objectives by researchers. The research team also described how to complete the research questionnaire. They emphasized that participation in the research would be voluntary and that completion of the research questionnaires would be considered participants' informed consent. The participants were told that each participant would be assigned a code and that the research data would be used only in line with the study objectives.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Publisher's Note