RESEARCH ARTICLE

Questionnaire on conceptions about teaching: Factorial structure and reliability in academics of health careers in Chile. Questionnaire on conceptions about teaching

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Abstract

Objective: To evaluate the factorial structure of the questionnaire on conceptions about teaching in the domain of health careers in Chile.

Method: The cross-sectional analytical study was conducted from July 2016 to December 2016 at different cities in Chile, and comprised healthcare academics in Chile. The questionnaire on conceptions about teaching was used for data collection in addition to a socio-demographic proforma. Exploratory factorial analysis of the questionnaire was performed, and the reliability of the factors located was evaluated through Cronbach's alpha. Descriptive analysis of the data was subsequently performed.

Results: Of the 312 subjects, 196(63%) were women and 116(37%) were men. The overall mean age was 45.70±12.04 years (range: 24-73 years). A total of three factors were identified: student as an autonomous learner, professor as a content transmitter, and professor as a trained mediator. These presented reliabilities with Cronbach's alpha between 0.74 and 0.84 and had direct and statistically significant correlations among them ($p<0.05$).

Conclusions: There was psychometric evidence supporting both validity and reliability of the questionnaire on conceptions about teaching.

Keywords: Education, Medical, Educational measurement, Faculty. (JPMA 69: 355; 2019)

Introduction

There is an increasing concern in the universities about how to improve their training processes, making university teaching a priority of the system and the professor figure at the centre of the analysis.[1]

Today, teaching management is one of the quality criteria of higher education institutions and the updating of the university teacher is a central strategy for improvement,[2] becoming one of the main priorities of the teams that lead universities.[3] This implies a break with the traditional image of the professor, who usually had freedom of teaching and research and was free from evaluations and social penalties.[4]

On the other hand, the traditional idea that having good specialists and researchers ensured a good university teaching has already changed.[3] The pedagogical skills of the academic and his/her teaching capacities prove to be the main concern of the institutions seeking to ensure educational excellence.[2,3,5]

Attention in the pedagogical component would be the necessary reaction to problems evidenced by traditional university training in order to face the cultural, political, social and economic changes.[6] The accrediting, regulatory and de-autonomisingtendencies,[7] as well as the pressures to reconceptualise education as a private good instead of public,[4,8] the increase in the diversity of students and the impact of the technological advances[9] have also contributed. Specifically in the health area, this has been accompanied by variations in epidemiological patterns[9] and by changes in education and health, placing the university teacher in a scenario of decreasing resources, greater public scrutiny and greater expectations.[10]

The problems of the traditional model led to a direct criticism of the theoretical-conceptual foundations of the same[9], which was labelled as positivists, behavioural, traditional or transmission-centric conceptions that seek to develop learning sequences where students-neophytes are exposed to knowledge provided by a teacher-expert.[11] For this reason it is considered a teacher-centred education[11] and it would be associated more to a technical rationality where the teacher must control the correct appropriation of

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contents by the students, applying pertinent techniques.[12]

Contrary to the above, the academic world has been inclined to incorporate a conceptualisation of teaching, which some call constructivist,[12] student-centred[11] or andragogic.[13] These conceptualisations have in common the factor that they conceive learning as a textually depending process, where students must build knowledge from their experiences and beliefs, and where the teacher must facilitate the process by generating activities of authentic and meaningful exploration, and empowering them in the process.[13]

The greater appreciation of this second approach has caused changes in the way in which all university disciplines are taught. In this context, the effort that the medical education has promoted since the 1980s in terms of important reforms in the way of teaching should be highlighted.[11] However, the pedagogical practice is not only referred to what teachers do, but also to the reflexive processes performed around the learning context that lead them to choose a course of action.[1] For this reason, it is important to understand how teachers think about training their students and from what conceptions this process is observed.

Assuming that educational conceptions imply conviction, appreciation and predisposition to act on the educational context,[14] these would be referred to the unobservable dimension of teaching. What the teacher knows, believes and thinks is what is called teacher cognition.[15] Conceptions associated with teaching of academics would be a product, a personal construction based on their daily experience and their interactions with the cultural and social context.[16] As such, they would affect the way in which teachers perform their practices and even affect the conceptions that students have on their training.[14]

Some studies have tried to approach the way in which health academics conceptualise their teaching, from what they think of the overall formative process,[17] their pedagogical practice,[18] the academic environment,[19] teacher improvement,[20] and from their implicit theories about teaching.[21] Given the origin of this phenomenon, many of these studies are qualitative. However, there are also quantitative studies that have used measuring instruments to approximate teaching conceptions such as the questionnaire of implicit theories on teaching, which is validated in Chile.[21] Thus, this questionnaire is focussed on the way in which the teacher conceptualises his/her action[22] and not in the formative process in general.

For this reason, the Questionnaire of Conceptions about teaching (QCAT or in Spanish, 'Cuestionario de Concepcionessobre la Docencia' or CDD), developed by the authors of the current study, form the qualitative phase of a national study on university teaching.[1,20] This instrument is aimed at evaluating the way in which university academics think about the educational process in general, seeking to differentiate those who conceptualise it from a more traditional approach and centred on the teacher, and those who visualise it from a more constructivist approach and student-centred logic. From the categories identified in this phase, an outline of the QCAT was prepared whose validity of content was evaluated by a judgment of 15 experts in higher education level as medical education scientific research methods. Then it was submitted to a pilot application where the definitive version of the questionnaire was elaborated upon.

The current study planned to evaluate the psychometric properties of QCAT and to provide evidence about the validity and reliability of the instrument in healthcare academics in Chile.

Subjects and Methods

The cross-sectional analytical study was conducted from July 2016 to December 2016 at different cities in Chile, and comprised healthcare academics who taught in medical undergraduate programmes in universities across Chile, including from those universities attached to the Council of Rectors of Chilean Universities (CRUCH). Teachers were selected through a non-probability sampling by volunteers.

The study was approved by the National Commission of Scientific and Technological Research of Chile (CONICYT).

Each participant answered a socio-demographic questionnaire. The main data-collection tool was QCAT in which the respondents had to answer 36 statements about the formative process, indicating their degree of agreement with what they declared when choosing one of five choices in a Likert scale format (1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; and 5 = strongly agree).

Teachers shortlisted were sent an email inviting them to participate. The email stated the purpose of the study and the type of participation being sought. Those willing to explore further used a hyperlink within the email that took them to the questionnaire on an online platform. As the first step in the survey, the subjects had to read a page of informed consent. Those who clicked their acceptance could continue with the

questionnaire, while those who declined received a 'Thank You; note which completed the process. In addition, participants could require more background of the study via telephone or email. In order to provide evidence of the QCAT's validity of construct, the factorial structure was evaluated by performing exploratory factorial analysis (EFA), applying Principal Axis Analysis (PAA) as the extraction method.[23] Kaiser-Guttman and Catell criteria[23] as well as Horn Parallel Analysis were used to pick the more prominent factors.[23] Within PAA, the Oblimin direct rotation method presented factor loadings, and those higher than 0.30 were considered significant.[23] Subsequently, the reliability of each factor was calculated by using Cronbach's alpha coefficient, which is the most used tool for such purposes in psychometry.[23]

Finally, a descriptive analysis of factor scores was performed and the correlation between them was evaluated with the Spearman's correlation coefficient. Factor scores were calculated through a simple summation of the items of each one.[24] P<0.05 was considered statistically significant. All analyses were performed in STATA SE 11.0 software.

Results

Of the 312 subjects, 196(63%) were women and 116(37%) were men. The overall mean age was 45.70±12.04 years (range: 24-73 years), and the sample included teachers from across Chile (Table-1). Kaiser-Meyer-Olkin (KMO) statistics produced a value of 0.86, and the Bartlett's test for sphericity results were statistically significant (p<0.001), indicating that data was good enough for EFA. The number of factors in which the 36 items were organised was identified. Three factors were identified as 'student as an autonomous learner', 'professor as a content transmitter', and 'professor as a trained mediator'. All the three items presented factor loadings higher than 0.30 (p<0.05). However, one item presented higher loadings in two factors. In this case, its conceptual content was evaluated and it was defined that presented greater affinity with the second factor, where it also presented a greater loading (Table-2).

The three factors presented reliabilities with Cronbach's alpha between 0.74 and 0.84 and had direct and statistically significant correlations among them (p<0.05). Also, the first and third factors significantly differed from normal distribution (p<0.001) (Table-3).

Table-1: Sample Characteristics.

Variable	Descriptive statistics
Age (years)	M=45.70; SD=12.04; Min=24; Max=73
Sex	Men (n=116; 37.18%)
Women (n=196; 62.82%)	
Region of residence	Arica and Parinacota (n=5; 1.60%)
	Tarapaca (n=4; 1.28%)
	Antofagasta (n=10; 3.21%)
	Coquimbo (n=1; 0.32%)
	Valparaíso (n=19; 6.09%)
	Metropolitan (n=62; 20.51%)
	Libertador Gral. Bernardo O'Higgins (n=1; 0.32%)
	Maule (n=17; 5.45%)
	Bioío (n=132; 42.31%)
	Araucanía (n=21; 6.73%)
	Los Ríos (n=21; 6.73%)
	Los Lagos (n=12; 3.85%)
	Magallanes y la Antártica Chilena (n=3; 0.96%)
	Abroad (n=2; 0.64%)
Undergraduate teaching in the area of health	As main area (n=259; 83.01%)
	As secondary area (n=53; 16.99%)
Undergraduate teaching in the area of health in the last five years	In universities attached to the CRUCH (n=258; 82.69%)
	In universities not attached to the CRUCH (n=130; 41.67%)
Academics with definitive contract	In universities attached to the CRUCH (n=181; 58.01%)
	In universities not attached to the CRUCH (n=53; 16.99%)
Postgraduate studies completed	Master (n=215; 68.91%)
	Doctorate (n=81; 25.96%)

N=312; M=Mean; SD=Standard deviation Min=Minimum; Max=Maximum; n=Absolute frequency.

Table-2: Pattern matrix of the Questionnaire on Conceptions about Teaching in academics of health careers obtained through Principal Axis Analysis, with direct Oblimin rotation.

tem	Statement (translated to English from Spanish original version)	I	II	III	Communality
1	The student must accurately incorporate the contents transmitted by the teachers	0.124	-0.017	0.555[a]	0.662
2	Teachers should be specialized in technical aspects of a good evaluation	0.526	-0.026	0.081	0.718
3	The student should assume his/her role of inexpert to better incorporate the contents presented by the teacher	0.018	-0.163	0.579	0.650
4	Teachers should be able to use the new technologies to support their work	0.491	-0.089	0.077	0.777
5	The teacher must value the Diversity of profiles of the students	0.317	0.274	-0.258	0.707
6	University teaching should be a contribution to the social mobility of students.	0.300	0.202	-0.037	0.862
7	Teacher should have pedagogical abilities to perform that role	0.677	-0.075	0.077	0.565
8	University teaching should train professionals who can transform society	0.066	0.546	0.017	0.662
9	Teacher must be updated in the discoveries and discussions of his/her subject	0.337	0.177	0.150	0.760
10	Prior knowledge of students are valuable in the teaching process	0.399	0.185	-0.093	0.740
11	University teaching is aimed to transmit knowledge validated by the discipline	0.109	0.111	0.649	0.517
12	The student must know to work in disciplined teams	0.214	0.320	0.015	0.804
13	The teacher is a facilitator of the learning ofhis/her students	0.473	0.189	-0.117	0.660
14	Teacher should know various teaching strategies	0.635	-0.001	-0.024	0.601
15	Inclusion of diversity in the university is synonymous with the quality of education	0.092	0.381	0.156	0.779
16	The role of the teacher is to generate the conditions for the students achieve their own learning	0.218	0.523	-0.116	0.573
17	Teaching at university should face attitudes and values training in students.	0.309	0.371	0.007	0.658
18	The teacher should lead students to question traditional roles of the discipline	-0.012	0.577	-0.070	0.673
19	Performing well the teaching role in the university is common sense	-0.088	0.143	0.499	0.738
20	The teacher must use innovative Technologies to be adapted to the teaching context	0.566	0.100	-0.047	0.622
21	Students should enjoy learning	0.211	0.424	-0.053	0.695
22	The teacher must assume a leadership role within the class	-0.125	-0.008	0.638	0.597
23	Communicational abilities of teachers are an important part of the achievements of their students	0.468	0.091	0.224	0.653
24	Teachers should be trained in teaching planning strategies	0.698	-0.023	0.033	0.520
25	The teacher should enhance the development of values in the classroom	0.411	0.252	0.074	0.655
26	Teacher is primarily responsible of the training of the students	0.184	-0.046	0.375	0.816
27	Students should be autonomous in their learning	-0.010	0.431	-0.007	0.819
28	Students should be able to investigate the contents of the subjects on their own.	-0.129	0.442	0.094	0.831
29	The teacher should encourage critical thinking in students.	0.252	0.470	-0.094	0.608
30	The student must be an agent of social change	0.039	0.681	-0.040	0.513
31	The student must perform information independent of those indicated by the teacher	0.048	0.562	0.083	0.643
32	Personal experiences of students encourage their learning	0.103	0.511	-0.086	0.678
33	The student is primarily responsible of the training process	-0.067	0.335	0.095	0.894
34	The student should be critical of the contents presented by the teacher.	-0.057	0.611	-0.072	0.656
35	A university teacher should pass on the concepts validated by the discipline.	0.166	0.186	0.533	0.589
36	It is important that the university teacher is constantly trained in pedagogical topics.	0.741	-0.046	0.005	0.480

[a]Numbers in bold indicate loads higher than 0.30.

Table-3: Conceptual definition, incorporated items and descriptive statistics of the factors of the Questionnaire on Conceptions about Teaching in academics of health careers.

Statistics	Student as autonomous learner	Teacher as content transmitter	Teacher as trained mediator
Included items	8, 12, 15, 16, 17, 18, 21, 27, 28, 29, 30, 31, 32, 33 y 34	1, 3, 11, 19, 22, 26 y 35	2, 4, 5, 6, 7, 9, 10, 13, 14, 20, 23, 24, 25 y 36
Conceptual definition	Degree in which teacher conceives the role of students as autonomous learners that lead actively and critically their learning, enjoy the process and orient it towards an integral formation that will make them agents of change.	Degree in which the teacher conceives his/her role as the axis of the formative process, where he/she must assume an expert role in the disciplinary knowledge and generate efficient instances of transmission of this one to the inexpert students, who must incorporate it with precision.	Degree in which the teacher conceives his/her role as a mediator who must support a learning process carried out by the student, and where the teacher corresponds to be adequately trained to generate varied and relevant instances that allow students to develop.
Cronbach's alpha	0.82	0.74	0.84
Arithmetic mean	66.75	22.63	65.25
Standard deviation	5.74	4.60	4.54
%	75.61	48.08	80.37
Percentile 25	63	19	63
Percentile 50	68	22	66
Percentile 75	71	25	69
Asymmetry	-0.67	0.23	-1.12
Kurtosis	3.03	2.64	4.06
Shapiro-Wilk test of normality (Z)	4.87***	1.02	7.17***

N=312; *:p<0,05; **:p<0,01; ***:p<0,001; %=(Score obtained - Minimum possible score) / (Maximum possible score - Minimum possible score)*100.

Discussion

Results obtained showed a three-factor structure. Two of them included the conceptions that academics have their own role, whereas the third factor alluded to the role of the student.

Factors associated with the role of academics were, 'Teacher as a content transmitter' and 'Teacher as a trained mediator'. The association of the first role with the traditional teaching model is clear since it includes the idea of a specialised teacher and the responsibility of transmitting that knowledge to students.[11,12] Likewise, the second factor clearly represents a logic mode centred on the student where the integral formation is conceived as a goal of the educational process,[10] the need to generate a teaching that facilitates the learning of students in many ways,[11] and the requirement of having a trained teacher to lead it.[20]

Thus, instead of being opposed to the same dimension, the student-centred logic and teacher-centred are represented in different factors as differentiated constructs.

The above is consistent with what was found in Chilean health academics with the Questionnaire of Pedagogic Practices (QPP).[1] Although the QPP is focussed on the frequency with which teachers perform activities of their role, it also identifies that the student-centred teaching was a factor different from that centred on teachers. However, in that study both factors presented no statistically significant relation.[1] In the present study, conceptions associated with both forms of teaching were positively correlated, indicating that they coexist in the perspectives of the academics.

On the other hand, the factor 'Student as autonomous learner' clearly shows a conception of learner that belongs to andragogy[13] and is consistent with the constructivist perspectives of education.[11,12] Nevertheless, the fact that it was isolated from the other two factors indicates that the conceptions that academics have on their activity and the role the student should have are not conceived as part of the same idea. In fact, it shows that a more traditional and conductive conception of teaching can be directly associated with a view of the student as an autonomous agent, although both are theoretically opposed. In spite of this, it was the weakest of the correlations found.

In contrast, the conception of the 'teacher as trained mediator' showed the highest correlation with the conception of an independent student, indicating that both present a greater theoretical agreement and eventually they could create a virtuous circle in the practice.

Finally, the three factors obtained adequate reliabilities, showing an acceptable precision in the measurements they offer.[23]

In terms of limitations, it should be noted that although

the study had a national scope, the representation of each geographic region is not comparable. On the other hand, the present study focused on the properties of the instrument, so its use to describe and explain the reality of local academics remains pending.

Conclusion

Understanding that a complex and polyhedral construct such as the one of conception could have a deeper and detailed approximation from the qualitative approaches as having the QPP allows performing screenings, diagnoses and massive studies that lead to characterising broad population of academics. Both approaches should be complementary and not mutually exclusive.

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