

## Scale Construction and Validation for Evaluation of Training Performance in Hormozgan University of Medical Sciences, Iran

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### ABSTRACT

The objective of the present study was scale construction and validation for evaluation of professor's performance. This is a combined study based on the Delphi technique. The population included all professors of Hormozgan University of Medical Sciences. The population was also related to the questionnaire implementation for standardization of all students in the Hormozgan University of Medical Sciences. A total of 30 faculty members in Bandar Abbas University of Medical Sciences were selected as elites of the project. For standardization, 200 students were selected with the random sampling method. In the first step, the 30 experts who were members of focal groups were asked to design suitable questions or statements. After classification and removal of similar items, the number of statements reached 393. In the third step, the statements were given to the executive team for analysis in order to select the best and most complete items. Thus, the number of items was reduced to 150. In this dimension, each expert selected the best five statements in each index from his/her viewpoint. The statements that were most frequent in the index were selected. Finally, the total number of statements reached 26 statements in eight subscales. Based on the results, Cronbach's alpha coefficient was obtained 0.85 for the total scale, 0.69 for the use of a variety of teaching methods, 0.72 for exercise preparation, 0.76 for establishing a positive classroom atmosphere, 0.65 for expression of problem solving strategies, 0.78 for classroom management techniques, 0.71 for focusing on the course, 0.72 for maintaining appropriate classroom behaviors suitable for faculty members, and 0.64 for questioning skills. The Root Mean Square Error of Approximation (RMSEA) was obtained 0.08 which indicates almost perfect fit of the model.

**KEYWORDS:** Evaluation, professors, Hormozgan University of Medical Sciences.

### 1. INTRODUCTION

In teaching, the role of educator or professor (as a person who implements the education program) is undeniable in achieving education goals. In universities of medical sciences, faculty members are among valuable educational elements and their most important activity is to teach students [1].

Due to its particular nature and function, evaluation in the educational system is one of the most important issues of the educational process so that the educational reform process in universities will be unreliable without paying attention to evaluation results [2].

Despite of the importance of this issue, most universities do not yet have an optimal system to evaluate how faculty members teach. For this reason, most universities consider the evaluation by students as the most important or the only source for the teaching evaluation. Despite disagreements about student opinions for evaluation of faculty members, this method is widely applied for evaluation of these individuals at different levels of higher education in the country. Students are those who are taught by faculty members. Thus, some experts believe that the feedback from students is the best practice for educator evaluation [2].

One of the major problems in medical education is a lack of effective and efficient codified teaching measures. Effective teaching is a set of attributes and actions of the educator through which educational goals are achieved. It can be said that the learning process is influenced by several factors such as learner's behavior, willingness to learn, content, environment and physical resources. However, researchers in the field of education consider effective and efficient teaching as the most important factor in improving student's learning [1]. In universities and centers of higher education, the teaching quality of faculty members is usually evaluated annually through distributing questionnaires between students. Faculty members will be informed of the results confidentially so that they can improve their teaching quality by eliminating loopholes and improving their teaching methods, while enjoying the views of students [3].

As the main elements of education, students can be the best source of information needed for determining the quality of teaching. Clearly, in this context, it is of particular importance to understand the perspectives of students and professors as those who evaluate and are being evaluated because if students do not have a positive attitude on the way in which the evaluation is performed, there will be serious doubts about the accuracy of

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results. On the other hand, if professors do not have a positive attitude about their evaluation by students, they will not accept the results [4].

Ryan *et al.* [5] showed that professor evaluation by students will decrease the satisfaction and encouragement of professors and will lead to lower standards and the lack of enthusiasm in teaching and education. The results of a study by Baxter [6] showed that student evaluations did not decrease professor satisfaction. Jacobs [7] found that the majority of professors do not believe that student evaluations do not have a negative impact on professors' behavior.

On the contrary, they believe that student evaluations are necessary. Rich [8] found that those professors who are opposed the use of student evaluations spend most of their time on research and do not consider teaching and training of students important. Spencer *et al.* [9] found that only 23% of professors reported that they have changed their teaching methods based on student evaluations.

The results of a study by Wahhabi *et al.* [1] indicate a lack of proper evaluations of training programs which leads to a lack of proper feedback on the success of the curriculum and finally, failure to achieve final goals of educational programs at this university. Based on the study by Ghorbani *et al.* [10] the main characteristics of a powerful professor from the perspective of student are the professor's mastery on the content, eloquence of speech, how to organize the course, and eager to teach, respectively. Firmness and strictness, interest to research and teaching experience are characteristics with the least importance from students' viewpoint. Mazloumi *et al.* [11] conducted a study entitled "Characteristics of an excellent educator from the perspective of students in Shahid Sadoughi Yazd University of Medical Sciences. Ability to communicate, teaching experience and general knowledge in teaching, flexibility on criticism, creativity and elegance, attention to essential concepts, content presentation with logical order and teaching with simple words are the most important characteristics of a competent educator from students' viewpoint. In their research Dargahi *et al.* [12] showed that a professor can create a situation to facilitate learning by applying variables such as clear speech, using appropriate and varied teaching methods, mastery on the subject, creativity and innovation, identifying individual differences, enjoying working with students, fair dealing, and having a good relationship with students. Given above items in evaluation of faculty members and also according to the criteria of an effective educator, this study aimed to determine the most important priorities from the viewpoint of professors and students in Hormozgan University of Medical Sciences on different performance characteristics of a professor and finally, on constructing a suitable scale based on priorities.

In this study, the author's objective is scale construction and validation for evaluation of training performance and faculty members in Hormozgan University of Medical Sciences. For construction of this tool, indices of a competent professor for effective teaching were considered. Moreover, for designing this tool, its suitability with the study site, acceptance of the results and its effectiveness, the author sought the collaboration of students in the construction of this scale and also plans to review the validity and reliability of the tool and to determine to what extent it can evaluate educator performance from students' viewpoint.

## 2. MATERIALS AND METHODS

This is a Delphi-based combined study. In the section for applying the Delphi technique, it is qualitative, and in the section for determining reliability and validity, it is quantitative. The statistical population included all professors of Hormozgan University of Medical Sciences. Moreover, the statistical population related to the questionnaire implementation for validation included all students of Hormozgan University of Medical Sciences. A total of 30 faculty members of Bandar Abbas University of Medical Sciences were selected as the project's elites. To validate the questionnaire, 200 students were randomly selected. In the first step, 30 experts who were members of focus groups were asked to design suitable statements or questions from their views and deliver them to the author, among which 18 professors did so. The statements were classified. After excluding similar items, the number of statements reached to 393. In the third step, the 393 statements were delivered to the executive team for analysis so that the best and most complete statements are selected. Thus, the number of statements was reduced to 150.

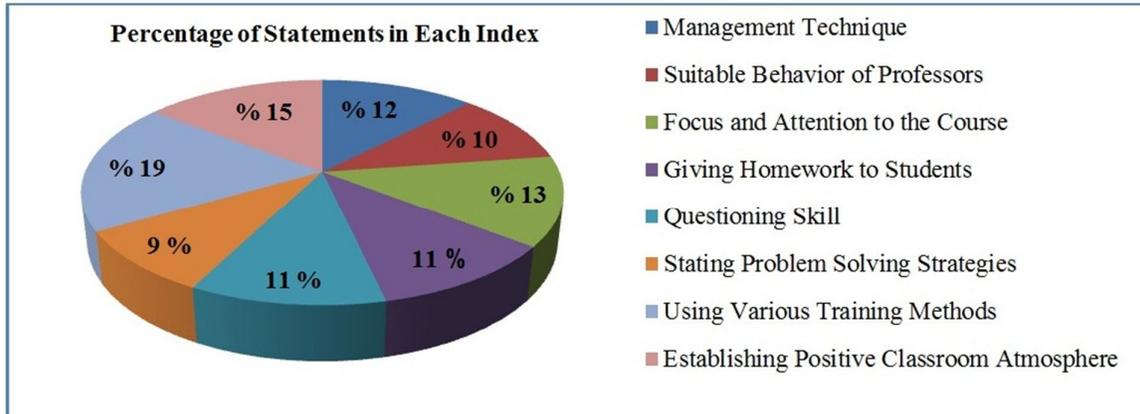
In this dimension, each expert selected the best 5 statements in each index from his/her viewpoint. Then the most frequent statements were selected in each index. The total number of statements finally reached 26 in eight subscales. Then a questionnaire was given to a group of students as the sample. For this purpose, the questionnaire was completed by them. The obtained data were analyzed using SPSS and the reliability of the questionnaire was determined. Amos was used to determine the validity of the questionnaire. Accordingly, in order to test the hypothesized relationships in the proposed model, the structural equation modeling statistical method was used. For this purpose, model fit parameters were calculated such as chi-squared, comparative fitness index (CFI), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and root mean square error of approximation (RMSEA).

## 3. RESULTS

Graph 1 shows the percentage of statements in each index. The Table 1 shows the reliability of the subscales of this scale with three different methods: Cronbach's alpha, Spearman-Brown bisection, and Guttman

bisection. As the table shows Cronbach's alpha coefficient was obtained 0.85 for the overall scale, 0.69 for the use of different teaching methods, 0.72 for preparing homework for students, 0.76 for establishing a positive classroom atmosphere, 0.65 for stating problem solving strategies, 0.78 for classroom management techniques, 0.71 for focusing on the course, 0.72 for maintaining classroom behaviors appropriate for academic staff, and 0.64 for questioning skills.

Figure 2 shows the factor structure of the scale. As can be seen in this figure, in implementing the confirmatory factor analysis of the scale, all subscales had a suitable factor loading, i.e. all standard coefficients were above 0.40. In other words, subscales significantly put loadings on their related factor (p<0.001).



**Graph 1.** Determination of the percentage of statements in each index

**Table 1.** Reliability of the questionnaire subscales

Scale	Cronbach's Alpha	Spearman-Brown Bisection	Guttman Bisection
Overall scale	0.85	0.84	0.82
The use of different training methods	0.69	0.68	0.68
Preparing homework for students	0.72	0.72	0.70
Establishing a positive classroom atmosphere	0.76	0.75	0.75
Stating problem-solving strategies	0.65	0.65	0.64
Classroom management techniques	0.78	0.77	0.76
Focus and attention to the course	0.71	0.71	0.70
Maintaining classroom behaviors appropriate for academic staff	0.72	0.71	0.71
Questioning skills	0.64	0.62	0.62

**Figure 2.** Beta coefficients (factor loadings) for the scale

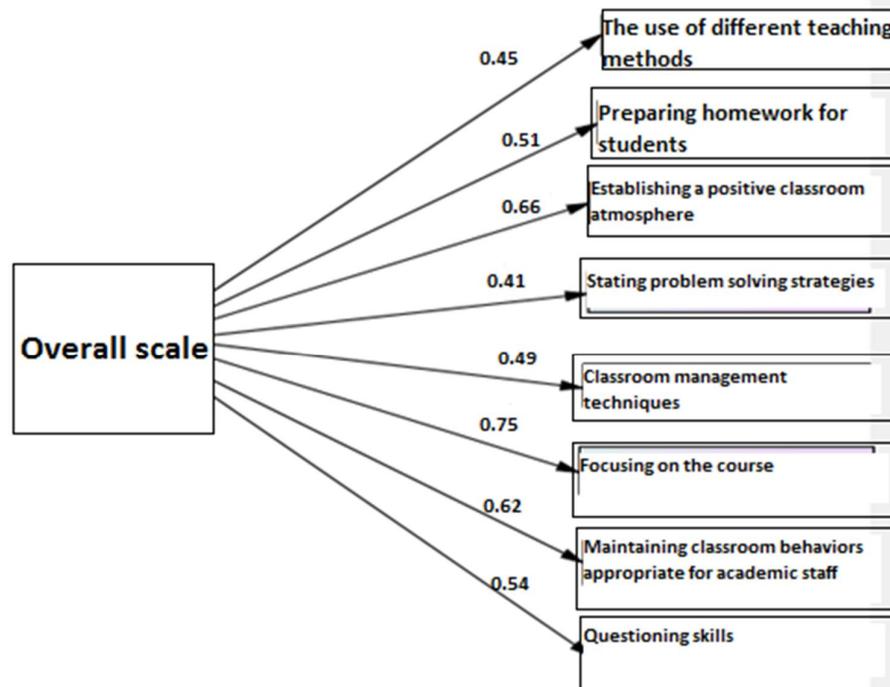


Table 2 shows the values of fitness indices for the questionnaire. This model has a medium fitness. The confirmatory factor analysis results show that the root mean square error of approximation (RMSEA) coefficient was obtained 0.08, comparative fitness index (CFI) 0.74, goodness of fit (GFI) 0.75, adjusted goodness of fit index (AGFI) 0.70, normalized fitness index (NFI) 0.63, incremental fitness index (IFI) 0.74, and Toker-Lewis index (TLI) 0.71. These numbers imply almost perfect fit of the model with data.

**Table 2.** Goodness of fit indices of confirmatory factor analysis for the questionnaire

Fitness Indices	Value
Goodness of fit index (GFI)	0.75
Adjusted goodness of fit index (AGFI)	0.75
Normalized fitness index (NFI)	0.63
Comparative fitness index (CFI)	0.74
Incremental fitness index (IFI)	0.74
Toker-Lewis index (TLI)	0.71
Root mean square error of approximation (RMSEA)	0.08

#### 4. DISCUSSION AND CONCLUSION

By comparing the designed statements presented as the best statements in the last step with superior and selected statements in other studies, we seek to confirm the final statements of the questionnaire.

Some important studies are as follows:

In a study entitled "Competent educator indices from the viewpoint of students of Babol University of Medical Sciences Navabi et al. [13] reported criteria such as timely presence in the classroom, movements and gait suitable for the educator in the classroom, experience and mastery of the educator on the course, updated information, flexibility in the classroom and the correct and appropriate use of teaching aids as important criteria for a competent educator. Although in the present study, statements similar to timely presence and movements and gait suitable for the educator in the classroom were not selected, some other statements such as efficient use of class time, teaching methods and mastery of the educator on the course, the use of new and authoritative sources and literature, and flexibility on suggestions and criticism were consistent with the study by Navabi et al. [13].

Wahhabi [1] showed that professors consider academic ability, the ability to speak eloquently, communication skills, the ability to develop critical thinking in students, specialization degree and the ability to solve problems in students as the most important factors for teaching effectiveness. Most professors believed that the educator's research activity has a big role in the success of education [2].

As a confirmation for Wahhabi's results [1], Kyriacou suggests that effective teaching depends on a positive atmosphere in the classroom and having effective communication skills with students is involved in creating a positive atmosphere in the classroom. By having good and effective communication skills, an educator can increase students' learning motivation. In his study, Spencer [14] concluded that the educator's communication skills have great effects on the effective learning in educational environments. In another study, it is concluded that professors should treat the class as a family and focus on interpersonal and emotional aspects. Therefore, communication skills training can be considered as one of the training principles in all fields and specialties and can be used in workshops for effective teaching strategies [1]. The present study introduced the ability to establish appropriate relationships with students as one of the best statements in the section for establishment of a positive classroom atmosphere. Therefore, our study is consistent with the study by Wahhabi et al. [1]. Some other studies concluded that good and effective teaching is strongly correlated with the individual's knowledge content and his/her abilities to convey this knowledge to others. In our study in "the focus and attention to the course" section, the teaching method and the mastery of the professor on the course were designed.

In the study of Clement et al. [15] from the viewpoint of faculty members, the ability to manage the class, mastery on the course, planned use of class time, timely presence in the learning environment, stating the importance of the course, application of examples and practical exercises during the course were identified as the best statements for the evaluation form of the theoretical teaching quality. In our study, the efficient use of class time, class management with partnership and cooperation of students, teaching methods and the educator's mastery on the course, the use of real issues in course design and its applications were selected as better statements [15].

In the study by Peyman et al. [16], education level and academic rank, the ability to respond to students' questions and problems, expressive power, skills in summarizing the content and the educator's mastery on the course are four important characteristics of a good educator in the field of medical sciences. In contrast, in the present study, no statement was selected about the educator's education level and academic rank but the statements such as the explaining power and conveying the course concepts, teaching methods and the educator's mastery on the course were selected as appropriate statements which is consistent with the educator's expressive power in the study by Peyman et al. [16].

Adhami et al. [17] conducted a study in the Kerman University of Medical Sciences for determining valid criteria for evaluation of clinical education and theoretical teaching of faculty members. They concluded that academic proficiency, trying to understand and convey the content and the educator's discipline obtained the

highest scores. The explaining power and conveying the course concepts statement in the "focus and attention to the course" section, and the ability to convey content in the problem-solving strategies index are consistent with the first part of the results by Adhami et al [17]. About the educator's discipline, in the first step of this research in the classroom management techniques index, many statements were designed about the educator's discipline but the following were selected as the best statements in this index: the efficient use of class time, planning, delivering the content coherently, and class management with the participation of students.

Having self-confidence, establishing close relationships with students, observing the class start and finish times, the use of accurate and comprehensive questions for assessment of educators from the viewpoint of students were reported as the most important properties for a good educator [18]. In our study, in the establishment of a positive atmosphere in the class index, the statements of raising the self-confident of students and the ability to establish appropriate relationships with students were selected, but instead of the class start time, the efficient use of class time was selected, and instead of accurate evaluation, giving a part of the final score to activities in the classroom was identified.

In the study by Siamian et al. [19] in Mazandaran, timely presence in the classroom, the use of all class time, monitoring student presence in the class, content presentation with practical examples, and mastery on the course were selected as the best statements from the viewpoint of students and professors. In our study, no statement was selected about timely presence of students and professors but the efficient use of class time and the use of real issues in the course presentation, and the explaining power and conveying concepts were the selected statements of the study.

With an emphasis on maintaining the appropriate behavior of faculty members, top statements for this study include observing ethics and professionalism, having friendly, respectful, and positive relationships with students, creating motivation in students and flexibility for critics and suggestions.

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