





# Validation and Normalization of Grasha–Riechmann Teaching Style Inventory in Faculty Members of Zahedan University of Medical Sciences

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**Introduction:** Considering the importance of teaching styles and their impact on promoting higher education, and the lack of a valid and reliable tool in universities of medical sciences for measuring this concept, as well as no instruments normalized for Faculty of Medical Sciences, the aims of this study were to 1) evaluate and normalize Grasha–Riechmann Teaching Style Inventory and 2) determine the teaching style of the faculty members of Zahedan University of Medical Sciences during 2018–2019.

**Materials and Methods:** This was a methodological study. In order to carry out this study, Grasha–Riechmann Teaching Style Inventory was translated and culturally adopted. To measure validity, reliability, and normalize the questionnaire, it was distributed among the study population composed of 361 faculty members (instructor, assistant professor, associate professor, and professor) who were taught theoretical and practical courses in Zahedan University of Medical Sciences, Zahedan, Iran, during the academic year 2018–2019. Confirmatory factor analysis (CFA) and Cronbach's alpha using SPSS version 16 were used to analyze the data.

**Results:** The results of data analysis showed that of the 361 participants, 212 were men and 149 were women. The mean age of the participants was  $42.52 \pm 7.72$  years and their average work experience was  $10.12 \pm 7.61$  years. Content validity was calculated using content validity index (CVI) and content validity ratio (CVR) for each item, and it was reported 97.4 and 68.5, respectively. Cronbach's alpha was used to determine the internal consistency, and its value was 95%. The construct validity of the Grasha–Riechmann Teaching Style Inventory was assessed using CFA by EQS version 6.1. The value of root mean square error of approximation (RMSEA) was 0.075 with the 90% confidence interval, and the GFI value was 0.74. The mean scores and standard deviations (SD) of teaching styles were  $5.61 \pm 0.61$  for Expert teaching style,  $5.23 \pm 0.72$  for formal authority teaching style,  $5.39 \pm 0.66$  for personal model teaching style,  $5.43 \pm 0.71$  for facilitator teaching style, and  $4.99 \pm 0.82$  for delegator teaching style. Our results suggested dominance of the expert (88.6%) and delegator (79.8%) teaching styles as well as the modest use of personal model (65.9%), formal authority (59.3%), and facilitator (55.7%) teaching styles among the faculty members of Zahedan University of Medical Sciences.

**Discussion:** The results of the current study will be effective in promoting education level and increasing students' satisfaction with the academic courses. Researchers and those interested in university medical education and development centers can benefit from the results of this study. For the first time, the psychometric test (normalizing and validating) of Grasha–Riechmann Teaching Style Inventory has been carried out at Zahedan University of Medical Sciences. Also, this questionnaire has been applicable to determine teaching styles of faculty members.

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**Conclusion:** Overall, the results of the present study showed that the Grasha–Riechmann teaching Style Inventory had a good internal consistency and can be used as a valid tool for evaluating teachers’ teaching style.

**Keywords:** validation, normalization, teaching style, faculty members

## Introduction

The mission of the university is to contribute to training the human resources required by the community, promoting the knowledge, expanding the research, and providing a favorable environment for the development of the country.<sup>1</sup> Experts believe that the instructor is the most important factor contributing to achievement goals in the educational environment.<sup>2</sup> Many scholars believe that the quality of teaching and training has a significant impact on enhancing the motivation, vitality, innovation, and efficiency of teacher and student.<sup>3</sup> Teaching contains the purposive interactive measures designed, implemented, and evaluated by the teacher.<sup>4</sup> In fact, teaching consists of a set of skills provided before, during, and after the teaching process, and provides students with the opportunities to learn.<sup>5</sup> Most people believe that the style is an important element in teaching.<sup>6,7</sup> Instructors have different teaching styles so that they can apply these styles in any situation based on specific circumstances.<sup>8</sup> Some instructors are somewhat aware of their practical style and use it in favor of themselves.<sup>9</sup> Teaching style reflects the quality of the behaviors that the teacher uses in classroom leadership.<sup>10</sup> Dunn believes that a good teaching depends on the teacher’s familiarity with the teaching styles. He described the art of teaching as connecting students’ needs to learning and identified the motivation of the teacher as an important factor.<sup>11</sup> In recent years, it has become widely accepted that there is no single perfect teaching style, but the most appropriate style depends on the domain in which learning and teaching processes take place,<sup>12</sup> with different categories of teaching styles are being offered. In the field of medicine, Benzie refers to four basic teaching styles, ranging from teacher-centered to learner-centered. These four styles are facilitative, collaborative, suggestive, and assertive.<sup>13</sup> Grasha also perceives the teaching style as a specific model of the beliefs and behaviors that the teacher offers, and emphasizes the facilitative role for teachers. The primary purpose of this role focusing on learners’ needs, is to develop autonomy, initiative, and accountability that allow them to have creative thinking.<sup>10</sup> The results found by Shaari’s study at the University of Malaysia show that teachers often use personal model and expert styles, and they rarely

use the delegator style.<sup>14</sup> The results of a study conducted by Roudbari (2011) indicated that the majority of faculty members of the medical sciences universities in Iran prefer the presentation of the concepts in a practical manner, in-depth learning, cognitive processing in executive way, and participatory activities.<sup>15</sup> The results of another study performed by Razeghinejad et al (2007) demonstrated that the primary teaching style of the faculty members of Rafsanjan University of Medical Sciences was the expert and delegator styles and the secondary styles included the personal model and facilitator styles.<sup>16</sup> The findings found by Azizi Nejad et al (2014) showed that the teaching styles of expert, formal authority, personal model, and facilitator are related to social adjustment of students.<sup>17</sup> The findings of the study of Hasanzadeh et al “suggested dominance of the interactive and authoritarian styles among the professors of Kurdistan University of Medical Sciences. They believed that professors may manifest their teaching styles based on beliefs, specific mentalities, or based on their own mental patterns (or other rooted and complex processes) regardless of the usual demographic variables, such as age, teaching experience, gender, college of education, level of education, academic rank and teaching style of teachers.<sup>18</sup> Due to the importance of teaching styles and their impact on the promotion of higher education, it seems necessary to conduct research that can reveal the teaching style. Considering the lack of a valid and reliable tool for measuring this concept in the universities of medical sciences, and no instruments normalized for Zahedan University of Medical Sciences which is one of the best universities in the country with a relatively large number of faculties and as determining the teaching style of its professors will play an important role in promoting the education of students at this university, aims of this study were to 1) assess the validation and normalization of the Grasha–Riechmann Teaching Style Inventory (GRTSI) and 2) determine the teaching style of the faculty members of Zahedan University of Medical Sciences during 2018–2019.

## Materials and Methods

This was a methodological study conducted on all faculty members of Zahedan University of Medical Sciences in

the academic year 2018–2019. The Persian version of the GRTSI was used for this study. In this study, the demographic variables such as age, sex, teaching experience, educational department, academic rank, and faculty of professors were evaluated.

Teaching Style Inventory (TSI), initially, the translation of the instrument was re-examined for cultural adaptation. To determine the face validity and content validity, the ideas of experts and professors were used, and qualitative and quantitative methods were utilized for this purpose. In the qualitative review of the content, health-care and medical sciences professionals were asked to give feedback about the instrument, and accordingly, the items were modified. Content validity index of each item was evaluated based on simplicity, clarity, and relevance. To this end, CVR and CVI were used, and content validity was confirmed for all items. For CVI, the scores were calculated and reported as a cumulative score for each item that received the “relevant but needs to be reviewed” and “fully relevant” scores divided by total number of experts. In order to determine the CVR, 10 health-care and medical sciences professionals were asked to rate each item on a three-point scale (necessary), (useful but not necessary) and (not necessary). Responses were then calculated according to the formula (1).<sup>21</sup>

The formula of Content validity ratio

$$CVR = \frac{n_E - \frac{N}{2}}{\frac{N}{2}} \quad (1)$$

Where  $n_E$  is the number of professionals who chose the option “essential” and  $N$  is the total number of professionals. Cronbach’s alpha was used to determine internal consistency, which was obtained 95%. Cronbach’s alpha index was used to determine the internal consistency according to this formula, if the calculated value is more than 62% according to the Lawsheh table; the content validity of each item is confirmed.<sup>19</sup>

In order to determine face validity, the Impact Score Index or IPS of each item was calculated using the formula (2).<sup>20</sup>

$$\begin{aligned} &\text{The formula of Impact Score Index (Face Validity)} \\ &= \text{Frequency \%} * \text{Importance IPS} = \text{Impact score} \end{aligned} \quad (2)$$

In addition, a relatively large sample of faculty members of Zahedan University of Medical Sciences was used for adaptation/standardization/normalization and construct

validity of the GRTSI. All subjects meeting the study criteria were informed of the purpose of the study and provided the written informed consent. Their rights were respected and protected. Researchers aimed to fulfill their ethical duty of protecting participants’ information and confidentiality. After completing the questionnaires and accessing the raw data, the norms related to standard scores were computed using the linear transformations of the  $z$  score. To measure the construct validity, confirmatory factor analysis (CFA) was performed using EQS version 6.1. Cronbach’s Alpha was used to assess the internal consistency.

In the present study, the GRTSI consisting of 40 items was used to develop the teaching styles of faculty members. The TSI was developed in 1980 and Grasha researched teaching and learning styles in 1994 and the new inventory was implemented in 1997.<sup>21,22</sup> After years of research on the subject, the last version of the inventory was completed in 2002. The GRTSI is a self-reporting tool containing the five different teaching styles including items regarding expert style (8 items), formal authority style (8 items), personal model style (8 items), facilitator style (8 items), and delegator style (8 items). In other words, each subset contains eight items on a 5-point scale with indicators of the degree of agreement to disagreement of the respondents.<sup>10</sup>

Distribution of Items based on the teaching style is shown in Table 1.

The method of scoring in this questionnaire is obtained by summing the frequency and calculating the mean score obtained to determine the dominant style among the professors.<sup>22</sup>

## Results

Overall, the study population study was composed of 361 faculty members, 212 males (58.7%) and 149 females (41%). The mean age of the participants was  $42.52 \pm 7.72$  and their average work experience was  $10.12 \pm 7.61$  years. The faculty members included 81 instructors, 222 assistant professors, 41 professor assistants, and 17 professors. Content validity of each item was assessed using CVI and CVR. Because CVIs for all items were greater than 70, the content validity was confirmed using CVI for both each construct and the whole inventory (Table 1).

Content validity index (eg, simplicity, clarity, and relevance) for expert style formal authority style, personal model style, facilitator style, and delegator style was 97.1, 93.33, 97.91, 99.16, and 99.58, respectively (Table 1).

**Table 1** Distribution of Items Based on the Teaching Styles

Items	Teaching Styles	Row	Items	Teaching Style	Row
38-33-28-23-18-13-8-3	Personal model	4	36-31-26-21-16-11-6- 1	Expert	1
39-34-29-24-19-14-9-4	Facilitator	5	37-32-27-22-17-12-7-2	Authority	2
			40-35-30-25-20-15-10-5	Delegator	3

According to Lawsheh table, content validity ratio was also confirmed and its value was above 62%. For assessing the face validity, the inventory was distributed between the two groups to comment on the significance of the items (10 samples and 10 experts). Face validity was calculated using the Impact Score Index (IPS) for each item.<sup>20</sup> Since the IPS for each item was greater than 1.5, the face validity of the instrument was confirmed by sample and expert groups.<sup>20</sup>

Cronbach’s alpha was used to assess the internal reliability and its value was 95%. The internal reliability was confirmed because its value was above 70% (Table 3).<sup>23</sup> The comparison of the internal reliability of the GRTSI used in the present study with that of Grasha’s study (2002) and Hasanzadeh’s study (2013) is presented in Table 2 and Table 3.<sup>22</sup>

The construct validity of the Grasha–Riechmann Teaching Style Inventory was assessed using confirmatory factor analysis. Since the RMSEA ranged between 0.05 and 0.10 and its related 90% confidence interval does not include 1–0.10,<sup>24</sup> and Goodness of fit index (GFI) was 0.74, so the construct validity of the inventory was confirmed. This indicates that the constructs (dimensions) of the GRTSI in Zahedan University of Medical Sciences faculty members are the same as the standard dimensions.

Table 4 shows the range of low, medium, and high scores for all styles based on their score. This table is a 7-point rating scale, in which score 1 means “This is highly non-important in my teaching” and score 7 means “This is very important in my teaching”. This table represents the index of the GRTSI based on which each

teaching style falls into one of the low, medium, or high classes (depending on intensity), which is characteristic of the individual’s teaching style. According to Table 4, the expert and delegator styles were the most dominant teaching styles among the faculty members of Zahedan University of Medical Sciences (Table 4).

From the comparison of two Tables 4 and 5, it can be concluded that based on the mean score of expert style (5.61) is between 4.9 and 7.0, the expert style and then the delegator style widely used by professors.

Instructors applied the expert teaching style (73%) while professors used it (94.1%) as seen in Table 5.

Our findings showed a statistically significant relationship between formal authority teaching styles in terms of academic rank and delegator and facilitator teaching styles in terms of School ( $p < 0.05$ ) (Table 7). There was no statistically significant association between teaching styles and other demographic characteristics such as age, teaching experience, gender, education level, educational department, and type of employment ( $p > 0.05$ ).

## Discussion and Conclusion

This research has conducted to evaluate and normalize Grasha–Riechmann Teaching Style Inventory for faculty members. For the first time, the psychometric test (normalizing and validating) of Grasha–Riechmann Teaching Style Inventory has been carried out at Zahedan University of Medical Sciences. Also, this questionnaire has been applicable to determine teaching styles of faculty members.

**Table 2** Evaluation of Content Validity of Each Construct

Teaching Style	Simplicity (%)	Clarity (%)	Relevance (%)	Total CVI (%)	CVR (%)
Expert	96.25	97.50	97.50	97.1	62.5
Formal authority	83.75	96.25	100	93.33	65
Personal model	98.75	97.50	97.50	97.91	80
Facilitator	97.50	100	100	99.16	72.5
Delegator	98.75	100	100	99.58	62.5
Total	95	98.25	99	97.4	68.5

**Table 3** Reliability of Teaching Style Questionnaire Used in Zahedan Study

Teaching Style	Reliability (Grasha, 2002)	Reliability Hasanzadeh's Study	Reliability Zahedan Study
Expert	0.78	0.72	73%
Formal authority	0.82	0.80	80%
Personal model	0.74	0.78	71%
Facilitator	0.80	0.85	75%
Delegator	0.72	0.81	83%

**Table 4** The Range of Scores (Low, Medium, and High) for Each Style Based on Their Score (Grasha 7-Point Scale)

Teaching Style	High Application	Medium Application	Low Application
	Score	Score	Score
Expert	4.9–7.0	3.3–4.8	3.2–0.1
Formal authority	5.5–7.0	4.1–5.4	4.0–1.0
Personal model	5.8–7.0	4.4–5.7	4.3–1.0
Facilitator	5.4–7.0	3.8–1.0	3.7–1.0
Delegator	4.3–7.0	2.7–4.2	2.6–1.0

According to the results of the study conducted in Zahedan University, which showed preference of using expert and delegator styles by the faculty of the university, and considering these styles lead to the development of the student's capacity to gain autonomy, responsibility, participation, and build mutual trust and confidence, it is important that teachers increase students' intellectual excitement while teaching. The overuse of expert style for inexperienced students and the use of delegator style (performing affairs independently by students) for students with low self-esteem can threaten learning.<sup>25</sup> It is also necessary to use student-centered styles because of the active role and involvement of the students in

learning and self-centeredness to use their abilities. Giving students the opportunity to express their opinion, responsibility, confidence, and encouragement in independent study and determining the criteria available for competency are also effective in enhancing the students' motivation and satisfaction.<sup>21</sup> The results of a study conducted in UUM University in Malaysia also show that many professors use personal model and expert teaching styles,<sup>14</sup> and the delegator style is the least teaching style used in this university, while most professors at Zahedan university use expert and delegator styles, and the least used styles are formal authority and personal model styles (Table 6). Considering the differences between the two research samples, it is necessary to compare the styles of professors with different fields of study. In examining the preferred teaching style of faculty members based on bachelor, master, professional doctorate, doctoral, and sub-doctoral degrees, the expert and delegator teaching styles are more preferred than other teaching styles. Based on academic rank, professors, instructors, professor assistants and associate professors, preferred expert, delegator, and facilitator styles, respectively.

The expert and delegator styles are the primary teaching styles used in the faculties of medicine, paramedical, School of Health, rehabilitation, nursing and midwifery, and dentistry schools (Table 8). The expert and delegator styles were the most dominant teaching styles used in Zahedan University of Medical Sciences' professors in terms of gender of male and female, respectively. The facilitator teaching style is next in line and the application of formal authority and personal model teaching styles is moderate. In addition, it has been reported that men use the dominant teaching styles more than women. This difference in gender may be due to the mental state of the females which needed further investigations and research in large population or other universities.

**Table 5** The Mean Scores Based on Teaching Styles of Faculty Members

Delegator	Facilitator	Personal Model	Formal Authority	Expert	Variable
99/4	43/5	39/5	23/5	61/5	Mean
824/0	705/0	664/0	719/0	612/0	SD

**Table 6** Frequency of Teaching Styles Based on Range of Low, Average, and High Scores for Professors of Zahedan University of Medical Sciences

Teaching Style	Expert	Formal Authority	Personal Model	Facilitator	Delegator
No.	320	214	238	201	288
Percent	88.6	59.3	65.9	55.7	78.9

**Table 7** Relative Frequency Distribution of Teaching Styles According to Academic Rank of Faculty Members of Zahedan University of Medical Sciences

Teaching Style	Expert		Formal Authority		Personal Model		Facilitator		Delegator	
	High Percent	Medium Percent	High Percent	Medium Percent	High Percent	Medium Percent	High Percent	Medium Percent	High Percent	Medium Percent
Instructor	73	8	31	49	22	57	46	34	68	13
	90.1	9.9	38.3	60.5	27.2	56.4	8	42.0	84.0	16.0
Assistant Professor	194	28	65	140	52	146	121	100	176	46
	87.4	12.6	29.3	63.1	23.4	65.8	54.5	45.0	79.3	23.7
Associate Professor	37	4	23	14	17	22	27	14	31	10
	90.2	9.8	56.1	34.1	41.5	53.7	65.9	34.1	75.6	24.4
Professor	16	1	5	11	3	13	7	10	13	4
	94.1	5.9	29.4	64.7	17.6	76.5	41.2	58.8	76.5	23.5
Total	320	41	124	214	94	238	201	158	288	73
	88.6	11.4	34.3	59.3	26.0	65.9	55.7	43.8	79.8	20.2
P-value	0.7		0.008		0.059		0.6		0.6	

**Table 8** Relative Frequency Distribution of Teaching Styles According to Colleges of Zahedan University of Medical Sciences

Teaching Style	Expert		Formal Authority		Personal Model		Facilitator		Delegator	
	High Percent	Medium Percent	High Percent	Medium Percent	High Percent	Medium Percent	High Percent	Medium Percent	High Percent	Medium Percent
Medicine	175	19	69	109	56	121	116	78	159	35
	90.2	9.8	35.6	56.9	28.9	62.4	59.8	40.2	82.0	18.0
Paramedicine	20	3	5	17	5	15	11	12	20	3
	87.0	13.0	21.7	79.3	21.7	65.2	47.8	522.2	87.0	13.0
Public Health	24	3	7	19	9	18	19	8	24	3
	88.9	11.1	25.9	70.4	33.3	66.7	70.4	29.6	88.9	11.1
Rehabilitation	4	0	0	3	1	2	2	2	3	1
	100.0	0.0	0.0	75.0	25.0	50.0	50.0	50.0	75.0	25.0
Midwifery Nursing	52	3	26	29	14	40	33	22	47	8
	94.5	5.5	47.3	52.7	25.5	72.7	60.0	40.0	85.5	14.5
Dentistry	45	13	17	37	9	42	20	36	35	23
	77.6	22.4	29.3	63.8	15.5	72.4	34.5	62.1	60.3	39.7
Total	320	41	124	214	94	238	201	158	288	73
	88.6	11.4	34.3	59.3	26.0	65.9	55.7	43.8	79.8	20.2
P-value	0.075		0.103		0.205		0.007		0.004	

Whereas the teaching style used by faculty members in a study conducted by Razeghinejad et al (2007) indicated that the Faculty of Dentistry and the Faculty of Nursing and Midwifery preferred the facilitator and expert and delegator styles, and the preferred teaching style of the clinical faculty members in educational health centers are expert, delegator, facilitator, and formal authority styles. The delegator style is the preferred teaching style used by associate professors. Instructors prefer expert and delegator styles. The assistant professors prefer the expert and formal authority styles and associate professors prefer expert teaching style. However, in the current study, the preferred teaching styles used by teachers in terms of all variables are delegator and expert styles, which may be due to the difference between the time of establishment and the years of experience and background of the educational core of universities, and this needs further investigation. Many studies have shown that a variety of teaching styles encourage students to learn, and each of them is of particular importance based on the student's learning style. For example, when delivering lessons to students, the use of personal model teaching style is crucial for learning. Teachers and professors who encourage students to try and strive usually use this teaching style, but the results show that the professors of Zahedan University of Medical Sciences rarely applied personal model teaching style.<sup>14</sup>

The results of the study of Shaari et al (2014) showed that there was a direct relationship between teachers' teaching styles and the students' academic participation. Therefore, college students need to identify their own academic activity style so that they can adjust themselves to the teaching style of their teachers. Thus, the university and faculty should provide students with an appropriate teaching and learning environment, so that students can improve their development.<sup>14</sup> Various studies have shown that there is no teaching style or teaching method that can be applied at any time and under any circumstances.<sup>26</sup> This is why the flexibility of teachers in choosing teaching methods is an important factor in student learning.<sup>27</sup> Flexible teaching style can create a wide variety among learners according to their learning time preferences and commitments. It is also suitable for the experienced and proficient learners. Emphasizing the flexibility in teaching style can make a successful teacher.<sup>28</sup> Stenberg also argues that when teachers use a wide range of teaching styles and use them when interacting with learners, they work best.<sup>29</sup> Morgan also concludes that teacher teaching style must fit the needs of learners.<sup>18</sup>

In some of the studies, one of the causes of stress in teachers is their unfamiliarity with teaching styles and incompatibility of teaching style with the students' learning styles, which ultimately leads to the lack of learning.<sup>30</sup> In order to increase the students' learning, it seems necessary to enhance the faculty members' awareness of different teaching styles and pay more attention to new teaching methods and use different teaching styles appropriate to the needs of the learners. Therefore, teachers are recommended to evaluate their teaching styles, and educational planners should provide workshops for teachers with little or high experience.<sup>18</sup> It is also recommended the researchers implement the following research suggestions leading to the promotion of the higher education of the country.

1. Assessing the students' satisfaction with teachers' teaching styles.
2. Investigating the relationship between the students' learning style and teachers' teaching style.
3. Comparing students' satisfaction with different teaching styles of teachers and relationship between students' learning style and teachers' teaching style.

## Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Ethics Approval and Consent to Participate

Ethical approval was obtained before the commencement of the study from the Ethics Committee of School of Medical Education, Shahid Beheshti University of Medical Sciences, Tehran, Iran in which its Reference No: IR.SBMU.SME.REC.1398.018. The participants were assured that their participation was voluntary and would remain confidential.

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## Author Contributions

All authors contributed to data analysis, drafting or revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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