Psychometric Indicators of the "Students' Perceptions of Classroom Activities Questionnaire"

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Abstract

The present study aims to investigate the factorial validity and reliability of a "students' perceptions of classroom activities questionnaire" made by Gentry, Gable and Rizza (2002). In this regard, the students' perceptions of classroom activities questionnaire was carried out on 360 students (252 girls and 108 boys) who were selected through stratified sampling method from among the students of the Faculty of Humanities at Islamic Azad University of Quchan. In order to assess the questionnaire reliability, Cronbach's alpha coefficient was used, and to determine the factorial validity, exploratory and confirmatory factor analysis was applied. In line with the results obtained by Gentry, Gable and Rizza (2002) and Karshky, et al. (2009, 2011), the present study showed that this questionnaire has acceptable internal consistency and Cronbach's alpha coefficient of the test is 0.901 and for the subtests, it is between 0.662 and 0.91. Also, the results of exploratory and confirmatory factor analysis indicate that the questionnaire structure has acceptable fit to the data and all the goodness of fit indices confirm the model (AGFI= 0.85, GFI= 0.90, RMSEA= 0.056, RMR= 0.07, CFI= 0.91). So, this questionnaire can be a useful tool for assessing students' perceptions of classroom activities.

Keywords: psychometric indicators, perceptions of classroom activities, factorial validity, reliability

1. Introduction

Classroom and school environment, school management system and teacher's educational approach have undeniable effects on academic performance and cognitive processes of students. One of the major outcomes of the school environment is students' perceptions which play an important role in their motivation, cognition and academic performance (Sunger, 2007).

Studies have shown that if the classroom environment is free from anxiety and stress and a strong human and social relationship exists between the teacher and students and also among students, they will have a more favorable attitude towards learning. When a friendly atmosphere is created in the classroom, strong and harmful sense of competitiveness disappears and a joyful environment is provided for students (Rohani & Maher, 2008).

The study concerning perceptions of class environment is based on the premise that students' perception of the environment is connected with their background and personal characteristics. This, in turn, affects the way they think about their social world and also their approach to the environment (Patrick, et al., 2007). Accordingly, students' perceptions of their learning environment have an impact on their participation in classroom activities and their relationships with peers.

Psychological atmosphere of the classroom learning environment, contextual and social characteristics and teachers support have significant effects on students' learning behaviors, their goal orientation, self-efficacy, causal attributions, strategies application, academic and social motivation, emotional functioning, involvement with assignments, educational values and their academic achievement (Ames, 1992; Davis, 2002; Pintrich, 2003).

Using students' perceptions to assess the class environment has roots in Kurt Lewin's field theory (1936) and Murray's (1938) need-press theory. Lewin (1935, 1936) and Murray (1938) have emphasized the importance of environmental features in human behavior. Their theories suggest that the interaction between environmental features (such as the perception of class) and personal characteristics is in fact predictive of human development and behavior (cited in Fraser, Dorman & Aldridge, 2004).

Following the theories of Lewin and Maria, various questionnaires on the perception of classroom activities were made and introduced. One of these questionnaires is a "students' perceptions of classroom activities questionnaire" made by Gentry, Gable and Rizza (2002). This questionnaire has been widely used to measure perceptions of classroom activities on a global scale (For example, the questionnaire validity and reliability have been approved in studies conducted by Karshky, et al. (2009, 2011), Church, Elliot and Gable (2001), Gentry, Gable and Rizza (2001, 2002),

Sünger and Güngören (2009) and also in most cited studies.

According to Wang and Holcombe (2010), several studies have demonstrated that educational, organizational and social climates of learning environments affect processes such as cognitive conflict, self-regulation and academic achievement. Their research findings showed that perceptions of the school environment directly and indirectly influence academic achievement through school involvement. Church, Elliot and Gable (2001) concluded that environmental perceptions have an impact on the adoption of goal orientation and finally, motivation and performance. Karshky, et al. (2009, 2011) demonstrated that self-regulated learning is predictable through components of perceptions of the classroom, and all components of family and environmental perceptions, motivational beliefs and self-regulated learning are mutually correlated. In the research done by Hejazi, et al. (2008), it was found that class structures directly and through goal orientation and self-efficacy have an influence on math self-regulation.

Thus, the perception of classroom activities is considered as a key variable in education and other relevant fields. In order to strengthen and improve the students' learning and teaching environment, studying the students' perception of their learning environment and the factors influencing this perception is crucial both for teachers and educational researchers. Identifying and providing appropriate tools to measure perceptions of classroom activities and demonstrating its importance in various fields of study should be noted. Therefore, the research question of this study is to introduce the "students' perceptions of classroom activities questionnaire" along with reporting the results of its validity and reliability among the students of the Faculty of Humanities at Islamic Azad University of Quchan.

2. Methodology

The aim of this study is to determine the psychometric properties of the "students' perceptions of classroom activities questionnaire" (SPCA-Q). So, the present study is descriptive, a type of exploratory and confirmatory factor analysis.

3. Statistical Population, Sample and Sampling Method

Statistical population of the research consisted of all the students in the second semester of the academic year 2013-2014 in the Faculty of Humanities at Islamic Azad University of Quchan. Given the number of questions and based on Cochran's formula, a sample size of 360 students (252 girls and 108 boys) was formed.

Stratified sampling method was used to select the sample. Considering the number and proportion of classes (fields), 360 students with the following proportions were selected from among the students of different fields in the Faculty of Humanities: Clinical Psychology 55%, counseling 65%, family counseling 8%, academic advising 11%, rehabilitation counseling 14% and career counseling 7%.

For a detailed examination of students' perceptions of classroom activities, statistics class was considered, and this explanation was also added to the questionnaire guide that the researcher's aim is the statistics class. After implementing and collecting the questionnaires, 8 incomplete questionnaires were eliminated. Finally, 352 questionnaires were scored and analyzed.

4. Research Tools

The "students' perceptions of classroom activities questionnaire" (SPCA-Q) has been made by Gentry, Gable and Rizza (2002) to measure students' perceptions of classroom activities. This scale has 31 questions and 4 subtests as follows: Interest (8 questions), challenge (9 questions), choice (7 questions) and enjoyment (7 questions). Each question has five options (never, rarely, sometimes, often and always). The respondents should select the option which is closer to their opinion. Validation and factor analysis of the questionnaire were carried out by Gentry, Gable and Rizza (2001, 2002) and Karshky, et al. (2009, 2011).

In this study, the original questionnaire was first translated into Persian. Then, three professors of psychology and English language reviewed the translated text and agreed on one translation. Finally, members of the scientific board of the faculty (professors of psychology) confirmed the questionnaire content validity. This explanation was also added to the questionnaire guide that the researcher's aim is the statistics class. In addition, before the main implementation, the questionnaire was preliminarily conducted on a group of students. In cases of ambiguity and the sentences which were not easy for students to understand, changes occurred.

In the present study, exploratory and confirmatory factor analysis was applied for validation, and Cronbach's alpha coefficient was used in order to assess the questionnaire reliability. Data Analysis was performed using SPSS-21 and Amos-21 softwares.

5. Findings

5.1 Reliability

The reliability of the "students' perceptions of classroom activities questionnaire"was measured by Cronbach's alpha. The results of calculating reliability coefficients are shown in Table 1. Indicators of reliability coefficients show that this questionnaire has sufficient and acceptable reliability and the coefficients obtained are analogous to the results achieved by Gentry, Gable and Rizza (2002) and Karshky, et al. (2009, 2011).

Table 1: Reliability coefficients of the present study, Gentry, et al. and Karshky, et al.

Scales	The present study	Karshky, et al. (2009)	Gentry, et al. (2002)
Interest	0.78	0.82	0.84
Challenge	0.74	0.66	0.70
Choice	0.80	0.76	0.69
Enjoyment	0.91	0.87	0.91
total	0.901	0.93	-

5.2 Exploratory factor analysis

Before conducting exploratory factor analysis, two assumptions must be considered in order to ensure the suitability of the sample. Kaiser-Meyer-Olkin measure of sampling adequacy is equal to 0.904 and Bartlett's test of sphericity (4789.47) is significant at the level of 0.0001. This means that the sample and correlation matrix are suitable for factor analysis. Principal component analysis was performed through varimax method on 31 questions in "students' perceptions of classroom activities questionnaire". According to the scree plot and eigen values, four factors were extracted by principal component analysis and varimax rotation. The results of exploratory factor analysis are presented in Table 3. Also, correlations between the subtests are shown in Table 2. All the correlations are statistically significant.

Table 2: Correlations between the subtests in the questionnaire on perceptions of classroom activities

Subtests	Interest	Enjoyment	Choice
Challenge	0.55	0.43	0.45
Choice	0.51	0.57	-
Enjoyment	0.68	-	-

Table 3: Statistical indicators of four factors in the questionnaire after varimax rotation through principal component analysis.

Factors	eigenvalue	% of variance	% Cumulative
1	4.832	16.111	16.111
2	4.069	13.565	29.676
3	3.496	11.652	41.327
4	3.013	10.043	51.37

These four factors account for 51.37% of the variance in perceptions of classroom activities. Strictly speaking, as shown in Table 2, this tool has four significant factors with the eigenvalue greater than 1. The first factor has the highest eigenvalue (4.832) and is able to explain 16.111% of the variance. The fourth factor has the lowest eigenvalue (3.013) and is able to explain 10.043% of the variance.

Table 4: Factor matrix of the "students' perceptions of classroom activities questionnaire" after varimax rotation

Enjoyment (1)		Interest (2)		Choice (3)		Challenge (4)	
Question	Factor loading	Question	Factor loading	Question	Factor loading	Question	Factor loading
5	0.788	7	0.729	3	0.739	3	0.748
4	0.770	6	0.728	4	0.707	4	0.704

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2	0.758	1	0.70	2	0.704	5	0.649
3	0.751	3	0.664	1	0.685	1	0.612
6	0.727	8	0.627	5	0.607	6	0.454
7	0.706	4	0.536	7	0.462	2	0.395
1	0.699	5	0.512	6	0.417	9	0.33
		2	0.441			8	0.30
						7	0.28

The above table shows the factor loadings for the rotated factors. As you consider, four factors have been extracted. Factor loading is the correlation coefficient between the factor and question. The positive sign indicates a direct relationship between the factor and question. Also, its value shows the intensity of the relationship (priority of the question for that factor). Based on the results in the above table, all questions in each subtest (Enjoyment, Interest, Choice and Challenge) were loaded on their respective dimensions. Only question number 7 in challenge subtest shows relatively lower factor loadings (0.280). Other coefficients have desirable values. Kumeri and Lee (1992, cited in Sharifi, et al., 2012) have described coefficients of 0.70 as excellent, 0.63 as very good, 0.55 as good, 0.45 as medium and 0.32 as insignificant. According to this criterion, most of the coefficients are in good to excellent category (0.395 to 0.788). Therefore, the "students' perceptions of classroom activities questionnaire" with 31 questions is ready to perform confirmatory factor analysis.

5.3 Confirmatory factor analysis:

In order to confirm the factor structure of the "students' perceptions of classroom activities questionnaire", confirmatory factor analysis was performed using Amos-21 software. To carry out the analysis, maximum likelihood estimation and the following indices were used for the fit of the model: Chi-square index (x^2), root mean square error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), non-normed fit index (NFI), incremental fit index (IFI), and comparative fit index (CFI) were considered as the compliance criteria of the model with the observed data. The values of indices are listed in Table 5. The results showed that the assumed model has been satisfactorily fitted since x^2 divided by d.f should not be more than 3 and root mean square error of approximation (RMSEA) should be less than 0.1 (the value 0.05 or less is good and 0.08 is suitable). Also, the values of fit indices GFI, AGFI, RMR and CFI are in a range of zero to one, and the closer the value is to 1, the better the fit of the model will be. Based on the above data, it is concluded that the assumed model has been satisfactorily fitted. That is, the underlying factor structure of the questionnaire on perceptions of classroom activities is confirmed. Four-factor structure of the questionnaire on perceptions of classroom activities is presented in Figure 1.

Table 5: Indices of model Fit

Indices	X^2	DF	RMSEA	X^2/d.f	RMR	GFI	AGFI	CFI
Present study	716.955	340	0.056	2.1	0.07	0.9	0.85	0.91
Gentry, et al. (2002)			0.04			0.91		
Karshky, et al. (2011)	1100.77	393	0.058	2.8	0.04	0.88	0.86	
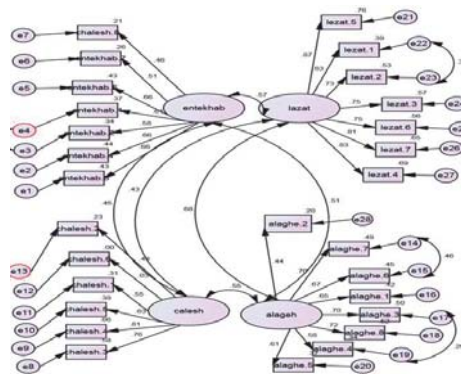
6. Discussion and Conclusion

Given the importance of the perception of classroom activities in students′ academic improvement, the present study examined the psychometric properties of ""students' perceptions of classroom activities questionnaire" made by Gentry, Gable and Rizza (2002) among the students of the Faculty of Humanities at Islamic Azad University of Quchan. Gentry, Gable and Rizza (2001, 2002) and Karshky, et al. (2009, 2011) have reported some of the psychometric properties of this scale, which indicate the validity of the scale. These reports (Table 1 and 4) are about exploratory and confirmatory factor analysis, which suggest the appropriateness of the tool.

In this study, Cronbach's alpha was used to estimate the reliability of "students′ perceptions of classroom activities questionnaire". The results showed that Cronbach's alpha for the whole questionnaire was 0.901 and for the subtests of interest, challenge, choice and enjoyment, it was respectively 0.78, 0.74, 0.80 and 0.91. According to Cronbach's alpha coefficients, the "students′ perceptions of classroom activities questionnaire" has suitable reliability for Iranian students.

To assess the validity of the "students′ perceptions of classroom activities questionnaire", exploratory and confirmatory factor analysis method was employed. Exploratory factor analysis showed that the "students′ perceptions of classroom activities questionnaire" consists of four subscales including "Interest" (8 questions), "Challenge" (9 questions), "Choice" (7 questions) and "Enjoyment" (7 questions), which are totally 31 questions.

Since the ratio of chi-square to degrees of freedom is 2.1 (less than 3) and the RMSEA value is 0.056 (less than 0.08) and the value of other model fit indices is between 1 and 2, the four-factor model has a good fit. In other words, "the questionnaire on perceptions of class activities" has fitter confirmatory factor structure, validity and reliability. These findings are consistent with the results obtained by Gentry, Gable and Rizza (2001, 2002) and Karshky, et al (2009, 2011). To explain these findings, it can be said that given the important role of students′ perceptions of class activities in the quality of their learning and education, it is essential that teachers consider the following in the teaching process to take a step towards improving the students′ environmental perceptions: Creating links between subjects and the daily lives of students, providing concrete examples to clarify the content, forming learning groups in which membership leads to individual empowerment and creating positive beliefs in students, selection of teaching methods which are proportionate to students′ characteristics, giving the students an opportunity to make comments about teaching and assessment, and finally, selecting assignments that lead to cognitive and functional learning of students in class.

Generally, providing opportunities in the classroom and giving the students the right to choose in the teaching process as a motivational tool to encourage students' learning provide conceptual learning rather than rote learning. Thus, providing opportunities for students to choose activities and learning experiences based on their own areas of interest along with enjoying their preferred learning styles should be emphasized in order to enhanced students' performance and confidence.

For the final conclusion, based on the research findings, we come to the conclusion that in line with the findings of Gentry, Gable and Rizza (2001, 2002), the questionnaire retained its structure without changing. Thus, Iranian students' racial and cultural differences and their different experiences did not cause their perceptions of classroom activities to be evaluated differently from the students in other countries. Accordingly, it can be said that the "students′ perceptions of classroom activities questionnaire" has suitable validity and reliability for use in the Iranian sample and can be used as a tool to assess students' perceptions of classroom.

The results of this study in confirming the validity and reliability of the Persian version of the "students′ perceptions of classroom activities questionnaire" are accompanied by certain limitations due to these preliminary properties. Since this research has been carried out in a small statistical population, the provided properties are preliminary, and conducting new research to complete the process of validating the Persian version of the "students′ perceptions of classroom activities questionnaire"is suggested as a matter of necessity. By conducting numerous studies, we can gain the necessary confidence about the validity and reliability of a scale.

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