

DEVELOPMENT OF THE ACADEMIC RESPONSIBILITY SCALE (ARS): A VALIDITY AND RELIABILITY STUDY

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ABSTRACT

When the universities undertake the tasks related to the learning environments and conditions, they await students to fulfill responsibilities such as attending courses and regularly going to school, avoiding disciplinary problems and obtaining academic success. The purpose of this study is to develop a valid and reliable instrument which measures the academic responsibilities of university students. For this purpose, four-point Likert type with 51 items Academic Responsibility Scale is prepared. It is applied for 350 students at Mersin University Education Faculty for doing validity and reliability studies of the scale. Exploratory and Confirmatory Factor analysis is applied for testing the structure validity and according to result of analysis; the scale has five factor structure and 25 items. Factors explain 58.530 % of variance. The Cronbach α coefficient is .91 for whole scale, validity coefficients of sub-factors are changing between .78 and .82.

Key words: Academic Responsibility, Academic Responsibility Scale, Scale Development

1. INTRODUCTION

Nowadays, mission of the universities for development of students is increasing in parallel with the changes on the society. UNESCO (1998) was reported that 'help student to comprehend the abilities which direct them as having responsibility sense and being dedicated citizen (quote by Baskan, 2000).

University students entrance a new period in which they gain autonomy. This autonomy loads students having responsibility sense. The autonomy concept is that university student gain new responsibility about personal, social, academic and they have to change their habits so that is foundational. UNESCO (1998) emphasized that university students are responsible for themselves for own learning process and faculty member has limited responsibility. According to these statements, universities have responsible for preparing the learning environment and conditions, university students must evaluate these environment and conditions by own selves. Education and training institutions and educators aspect from students to continue to class, never face with discipline problem, gain academic achievement (Glasser, 1999).

When the students meet this expectation, it is not only an institutional mission but also a contribution to the country's cognitive development. For this reason, academic responsibility is a very important content. So this content and its elements must be known more closely. If the students, educators and institutions have more information about the academic responsibility content and the characteristics of a person that have academic responsibility, academic goals will be easy to reach.

The responsibility content is a daily life structure but, there isn't clarity on the studies related to this concept. The responsibility concept is defined by different types other studies. Some researchers express the responsibility concept as a feeling, while some researchers assert that the responsibility is an act, judge or personality.

Owens (1983) describes the responsibility concept as being aware of behavior or events that he/she can interfere with and as taking the result of these behavior and events. Yalom (1999), the individual that is having responsibility; has a respect to other and him/her, who fulfill its duties on time, do own their own business.

Responsibility concept is analyzed into two parts as personal and social in most research. There are some claims that these concepts revealed an analogous situation (Abdi Golzar, 2006). According to this research, academic responsibility concept would be described. In this study, the academic responsibility concept is that university students define their tasks in academic environment, describe themselves academically and do the academic tasks on time. According to this definition, responsibility is as a trait in this research. Responsibility arises with the attitudes and skills in the family and it can be learned by living (Ozen, 2009). In this way, It can be said that responsibility is a learning behavior (Ruyter, 2002; Ellenburg, 2001; Flowers ve Marby, 2001; Sengeeta ve Jerre, 2001).

Guidance and Counseling Department has duties such as describing behavior and presenting the researches to contribution the changing the behavior, so that this research can help for related field. When field scanning, there isn't any scale for the responsibility concept. So the aim is to present a new concept to the field.

The purpose of this study is to develop a scale that measures the academic responsibility level of the university students and doing validity and reliability studies.

2. METHOD

In this part, the topics such as study groups, developing the collecting data tool, collecting and analyzing data are mentioned.

2.1. Study Group

The research' study group is comprised of 350 undergraduate students that are studying on spring term 2012-2013 at Mersin University Education Faculty Math, Physic, Turkish, English, Pre-School, Primary School Teaching, and Guidance and Counseling departments, 1.,2.,3.,4. classes. The distribution of the students according to programs and class levels are shown in table 1.

Table 1. The distribution of the study group according to programs and gender

Variables Classroom Level	1.Class	2.Class	3.Class	4.Class	Total	%
Math Teaching	39	37	24	3	103	29.4
Physic Teaching	-	-	-	24	24	6.9
Turkish Teaching	42	-	-	-	42	12
Guidance and Counseling	-	-	27	25	52	14.9
English Teaching	6	18	15	12	51	14.6
Pre-School Teaching	-	14	23	8	45	12.9
Primary School Teaching	33	-	-	-	33	9.4
Total	120	69	89	72	350	100

2.2. Preparing the Scale

Collecting data tool aims to determine the responsibility sense regarding to academic life of the students. First, the trial form of the scale is prepared for developing the scale that determines the academic responsibility levels of the university students. The trial form is created according to processing ways of Likert type scale (Tavsancil, 2006). Related process ways: (a) attitude items creating stage, (b) expert opinion contact stage, (c) pre-trial stage are done at three stages. For developing the trial form of the scale, two forms that are included two open-ended questions are given to research assistance and researchers wanted them to fill the forms. In this form, the questions as to what is academic responsibility and what are the characteristics of a student academically asked to research assistance. Trial form of academic responsibility scale is prepared with the help of experts. Written items are reviewed again and 51 items are included to trial form. 2 items are negative, 49 items are positive. Trial form is prepared as Likert type scale and all participants marked one of the option; completely appropriate, appropriate, not appropriate, not exactly appropriate.

2.3. Scoring of the scale

The answers to items of the scale are rated four point as "4= completely appropriate", "3= appropriate", "2= not appropriate" and "1= Not exactly appropriate". While positive scale items are scored as four to the most positive degree, one to the most negative in four points graduated scale; negative scale items are weighted by scoring oppositely. The total scores of the scale items can vary between 51 and 204. It can be evaluated that having scores between 51 to 102 have a low level of academic responsibility, scores between 102 to 153 have medium level of academic responsibility, while score between 153 to 204 have high level of academic responsibility.

2.4. Data Analysis

The scale is applied to volunteer participants in the classes and aren't requested identification information. Applying the scale that is mentioned takes about 10-15 minute period.

Reactions that are given 350 students to the expressions in the trial form of the scale were transferred to a computer. The data obtained were analyzed by using "SPSS 15 for Windows" and Lissrel programs. Descriptive statistics were calculated for each scores of item in the study. Cronbach's alpha and split-half reliability coefficient was used for reliability calculation of the scale. Content, structure and criterion validity scores of scale were calculated for the study of the validity. Exploratory and confirmatory factor analysis was conducted for testing the content validity of the scale. The level of significance $p < .05$ was accepted in the analysis of the data.

3. FINDINGS

Findings and interpretations of the scale that is prepared with 51 items related to validity and reliability studies according to data obtained from the application of 350 university students were included. Descriptive statistics, item analysis, factor analysis, reliability analysis of the factors and stages that are description of the relations are given in the development process. Findings that are related to the reliability and validity of the scale are presented and interpreted in this stage.

3.1. Descriptive Analysis

Because this study is a Likert type study, analyzing the distribution of scores of the scale is necessary (Tezbasaran, 1997). For this reason, first, total scores' distribution obtained by applying the trial form is analyzed.

Since the trial form of the academic responsibility scale is 51 items, expected the lowest score is 51.00, the highest score is 204.00, and width is 153.00. As a result of the research, the lowest scale score' average is 102.00, the highest score is 196.00, and width is 94.00. The scale covered expected width. The average of the scale scores is 153.28, median is 153, mod is 154.5, and standard deviation is 16.59. The skewness coefficient is -.04, kurtosis coefficient is -.341. According to these data, it can be said that the scores has a distribution close to normal distribution.

3.2. Item Analysis

After analyzing the dispersion characteristics of the scores that are obtained from trail form of academic responsibility scale, doing analysis for each items is necessity for developing Likert type scale (Tezbasaran, 1997). Hence, item total-test correlation and internal consistency of the criteria were examined on the selection of item that will be included in scale. If item total-test correlation is positive and high, internal consistency would be high (Buyukozturk, 2009). Here, benchmark item that provides a making-decision regarding to item selection and conformity of item total test correlation value is admitted as .30.

Table 2. Item-Scale Correlation

Items	Items Total Cor.	Items	Items Total Cor.	Items	Items Total Cor.
1	.316	18	.593	35	.387
2	.096	19	.612	36	.433
3	-.025	20	.626	37	.614
4	-.194	21	.571	38	.577
5	.616	22	.529	39	.613
6	.554	23	.552	40	.538
7	.474	24	.455	41	.686
8	.413	25	.518	42	.522
9	.549	26	.492	43	.404
10	.594	27	.407	44	.387
11	.325	28	.222	45	.451
12	.384	29	.329	46	.464
13	.565	30	.409	47	.532
14	.513	31	.598	48	.586
15	.509	32	.564	49	.583
16	.554	33	.561	50	.416
17	.507	34	.405	51	.379

According to findings in Table 2, "2., 3. and 4." items are excluded from the scale because they have the values that are lower than .30. The trail form of the scale is remained 48 items and decided to make factor analysis of 48 items.

3.3. Validity Studies

According to this research, evidence for content validity, construct validity and criterion validity are searched. The results are presented below in titles.

3.3.1. Content Validity

Within the framework of this research, trial form with 51 items that is prepared to serve as evidence for the content validity is examined by 5 expert, there is consensus about that these items exhibit the properties relating to the concept.

3.3.2. Structure Validity

Explanatory and confirmatory factor analysis is done for providing evidence of construct validity of the scale. Results are expressed as follows.

3.3.2.1. Explanatory Factor Analysis

For determining the factor structure of the scale and providing evidence to content validity, principal components factor analysis by using varimax rotation method is applied to scores that are obtained from the reactions of 350 people to the scale. Benchmark factor load value that provides basis for decision-making regarding to article selection and conformity of article is .30 and higher. The results of Bartlett test and Kaiser-Meyer-Olkin (KMO) test are taken into account for conformity of data to factor analysis (Kalayci, 2005; Munro, 2005; Tavsancil, 2006). At principal components factor analysis, Kaiser-Meyer-Olkin (KMO) value is .909 and therefore it is very appropriate for principal components factor analysis.

The Bartlett test is applied for testing that data has normal distribution or not. When the Bartlett test results are analyzed, the value that is obtained is .01 level and significant ($\chi^2 = 3603.421$; $p < 0.01$). This result shows that data comes from multivariate normal distribution and therefore it means that another assumption of factor analysis is met (Cokluk, Sekercioglu and Buyukozturk, 2010). In other words, it can be said that data is appropriate for factor analysis.

As a result of the exploratory factor analysis, before varimax rotation, a structure with 12 factors is obtained (eigenvalues are respectively 14.062; 2.693; 2.523; 1.911; 1.714; 1.533; 1.368; 1.263; 1.191; 1.137; 1.096; 1.035).

In the study, the operation is made on the factors with eigenvalues greater than 1 (Cokluk, Sekercioglu and Buyukozturk, 2012; Tabachnick and Fidell, 2001). It is observed that these twelve factors explain the 61.818% of total variance. (explanation rates of the variance respectively: 27.573%, 5.280%, 4.947%, 3.747%, 3.362%, 3.007%, 2.683%, 2.476%, 2.335%, 2.230%, 2.149%, 2.029%). First factor's eigenvalue is more than three times the next factor's eigenvalue and first factor explain alone the 25.578% of the variance. Considering the item total-test correlation, it can be thought that the scale is tended to be one-dimensional. In addition to this, when component matrix is analyzed, almost all items give the load to the first factor. On the basis of this information, it is decided that factor structure is emerged more clearly by varimax rotation method. In the process of item throwing, item-total correlation, factor analysis and internal consistency coefficient are evaluated together. After removing of each item, item-total correlation is calculated again and analyzed the factor structure. The items which aren't appropriate the stated measuring is removed from the scale. As a result of the Explanatory Factor Analysis that is performed with the help of Varimax rotation, 23 items [1., 8., 9., 10., 11., 12., 14., 18., 19., 24., 27., 28., 29., 30., 31., 32., 33., 34., 41., 42., 43., 44. ve 49.items] which aren't appropriate or load more than one factor are removed from the scale.

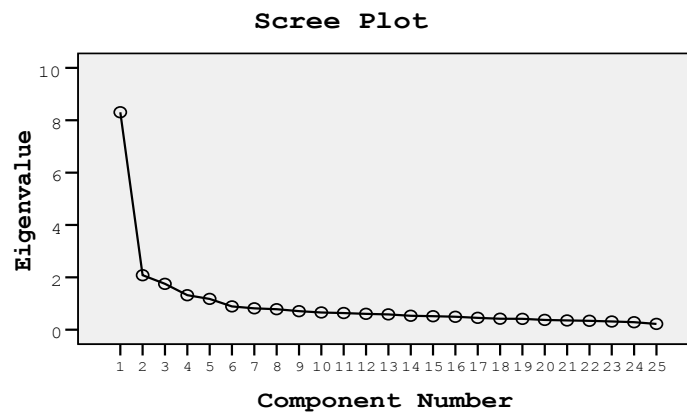


Fig. 1. Eigenvalue Graph

According to the results of factor analysis, 5 factors were collected under 25 items. The first factor consists of six items (13., 15., 16., 17., 20. and 25. items). Eigenvalue of this factor is 8.307. The first factor describes alone 33.227% percent of academic sense of responsibility. Second factor consists of five items (46., 47., 48., 50. and 51. items). Eigenvalue of this factor is 2.081. The contribution of the second factor to total variance is 8.326 %. Third factor consists of five items (21., 22., 23., 26. and 40. items). Eigenvalue of this factor is 1.751. The contribution of the third factor to total variance is 7.003 %. The fourth factor consists of 5 items (35., 36., 37., 38. and 45. items) again. Eigenvalue of this factor is 1.317. The contribution of the fourth factor to total variance is 5.270 %. Fifth factor consists of 4 items (5., 6., 7. and 39. Items). Eigenvalue of this factor is 1.176. The contribution of the fourth factor to total variance is 4.704 %. Five factors together explain 58.530 % percent of academic sense of responsibility. The common variance of five factors is changing between.419 and.751. It can be seen that scale items gathered under the five-factor according to the line graph that obtained by eigenvalue in Figure 1. The statistics for scale items are presented in Table 3. When items' averages are analyzed, it has been observed to vary between 2.737 and 3.630. The deviation value of the items is between 3.489 and.822, item-scale correlations is between 0.402 and 0.621 and factor loadings is between.515 and.845.

Table 3. Arithmetic mean of items, standard deviation, scale correlations and factor loadings

Items and Factors	Arithmetic Mean	Standard Deviation	Item-scale Correlation	Factor Loadings
I. Factor "Responsibilities related to the academic environment"				
13. I struggle to solve problems encountered in courses.	3.163	.545	.558	.529
15. I apply plans for school.	2.971	.624	.505	.761
16. I apply decisions concerning academic plans.	3.009	.564	.550	.770
17. I try to eliminate elements that disrupt the academic plans.	3.077	.554	.513	.706
20. I fulfill my school duties most effectively.	3.066	.619	.608	.537
25. I set goals to myself for each course.	2.856	.670	.501	.515
II. Factor "Responsibilities related to Education and Training process"				
46. I respect to the information given in school.	3.275	.576	.475	.559
47. I keep clean educational environment.	3.435	.545	.558	.675
48. I avoid behaviors that disturb education and teaching.	3.398	.538	.592	.624
50. I respect to my teachers in school.	3.630	.489	.443	.845
51. I respect to my friends in school.	3.578	.503	.412	.830
III. Factor "Responsibilities related to Vocational Areas"				
21. I do plans related to profession that I will have in the future.	3.290	.655	.548	.673
22. I attend to scientific activities related to my department.	2.814	.708	.484	.765
23. I follow the innovations related to my department.	3.054	.620	.553	.770
26. When I graduate. I have vocational goals that I want to achieve.	3.443	.582	.496	.454
40. I follow the agenda related to my department.	3.051	.658	.540	.720
IV. Factor "Responsibilities related to courses"				
35. I am in the lesson in time.	3.063	.731	.402	.691
36. I don't have absenteeism to the classes.	2.737	.822	.452	.801
37. I accomplish the course requirements on time.	2.977	.601	.621	.653
38. I come to class with tools and equipment that are required for the course	2.920	.655	.585	.676
45. I take notes in the lesson.	3.060	.801	.459	.619
V. Factor "Responsibilities related to research and development"				
5. When something is stuck in my mind about the course, I certainly research it.	2.997	.686	.587	.615
6. When I study on the course, I use many sources relevant to topics..	3.112	.657	.540	.762
7. I try to correct deficiencies according to exam results.	3.200	.576	.488	.741
39. I use different sources while preparing to academic affairs..	3.106	.636	.608	.548

Factors are named taking into consideration the material expressions of each factor in Table 3. In this context, it is decided to be called for first factor "Responsibilities related to the academic environment"; second factor "Responsibilities related to Education and Training process"; third factor "Responsibilities related to Vocational Areas"; fourth factor "Responsibilities related to courses" and fifth factor "Responsibilities related to research and development".

3.3.2.2. Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) is applied for examining the factor structure of Academic Responsibility Scale. CFA is made using Lisrel 8.71 (Joreskog and Sorbom, 2004). The most Maximum Likelihood (ML) is used in the analysis. Various criteria of conformity index is used for evaluating the goodness of fit of model. χ^2 is the oldest and most often used statistic which is calculated by CFA with regarding the consistency of the model-data. Because it is sensitive to sample size, χ^2 fit statistics created a problem especially the number of samples is more than 250 samples. In addition to the χ^2 different fit indices are also recommended to us for eliminating this problem (Bentler, 1990). In this direction, frequently used fit indices are used such as χ^2/sd , GFI (Goodness of fit index; Joreskog and Sorbom, 1981), RMSEA (Root mean square error of approximation; Steiger and Lind, 1980), CFI (Comparative fit index; Bentler, 1990), RMR (root mean square error of approximation), SRMR (Standardized root mean square error of approximation). 3 and the lower value of χ^2/sd is considered as a good model fit, but the values up to 5 is considered as an adequate model fit (Kline, 1998; Marsh and Hocevar, 1988). It is acceptable that GFI and CFI values can be greater than .90, being greater than .95 is considered as an indicator of good fit (Hu and Bentler, 1999; Schermelleh-Engel, Moosbrugger and Muller, 2003). On the other hand, being under .05 of RMSEA and RMR indices indicate to very close model data fit, until .08 is indicates to acceptable fit, $\geq .10$ models indicate to poor model data fit (Browne and Cudeck, 1993; Schermelleh-Engel, Moosbrugger and Muller, 2003). Five component structure of Academic Responsibility Scale obtained by the result of Exploratory Factor Analysis (EFA) is tested for conforming. Findings which are obtained from the results of Confirmatory Factor Analysis (CFA) are shown in Table 4.

Table 4. Indicators of model fit of Academic Responsibility Scale (ARS) according to results of Conformity of Factor Analysis

UIBO-OF	χ^2	sd	χ^2/sd	GFI	RMSEA	CFI	RMR	NNFI
	604.47	265	2.28	0.88	0.061	0.97	0.022	0.96

When the findings that are related to conformity factor analyze and made in table 4 are analyzed RMSEA and GFI values are seen as having an acceptable level of fit and because it is above the value .95, CFI, RMR and NNFI values are seen as having a good fit. In this case, the results indicate the acceptable fit and it show that it justify the five-component structure of the scale ($\chi^2=604.47$, $df=265$, $p=.000<.001$; $\chi^2/df=2.28$; $GFI=.88$;

RMSEA=.061; CFI=.97; RMR=.022; NNFI=.96). According to these results, it can be said that five-component structure of the scale of (ARS) is verified on college students which are research participants and can also be used on this population.

3.3.3. Validity Criterion

Correlations between corrected total scores and factor scores are calculated for analyzing the criterion validity of the scale, shown in Table 4.

Table 4. Correlations between factor scores and corrected total scores

Factors	Number of items	N	x	ss	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	6	350	18.14	2.58					
Factor 2	5	350	17.32	2.03	.409(**)				
Factor 3	5	350	15.65	2.42	.533(**)	.469(**)			
Factor 4	5	350	14.76	2.69	.479(**)	.461(**)	.384(**)		
Factor 5	4	350	12.42	1.99	.624(**)	.430(**)	.530(**)	.444(**)	
Total	25	350	78.28	8.94	.810(**)	.707(**)	.765(**)	.747(**)	.778(**)

* $p < .01$

When table 4 is analyzed, correlation between factors and total test scores is very high; the correlation between the factors is at medium level. It can be said that the scale is proper to use with five-factor or one-factor.

3.4. Reliability of the scale

Reliability can be defined as the consistency between individuals' answers to test items, if we are talking about the reliability of a measurement tool, it is expected that the scale must be consistent. In this study as regards the reliability of the scale, Cronbach α internal consistency coefficients and Spearman Brown split-half reliability are separately calculated for all scale items and each factor and shown in table 5.

Cronbach's α coefficient of whole scale (25-item) is found .91; $\alpha = .82$ for the first factor that has 6 items; $\alpha = .82$ for the second factor that has 5 items; $\alpha = .81$ for the third factor that has 5 items; $\alpha = .79$ for the fourth factor that has 5 items; $\alpha = .78$ for the fifth factor that has 4 items.

Reliability coefficients that are obtained by dividing the scale in to two halves is as follows; .80 for the first factor, .72 for the second factor, .82 for the third factor, .74 for the fourth factor, .76 for the fifth factor and .86 for total. In light of all these values, it can be said that reliability of the scale is high.

Table 5. Reliability Coefficients that are calculated by internal consistency and split-half reliability methods for total and Sub-Size of Academic Responsibility Scale

Factors	internal consistency coefficients	Spearman Brown split-half reliability
1. Factor	.82	.80
2. Factor	.82	.72
3. Factor	.81	.82
4. Factor	.79	.74
5. Factor	.78	.76
Total	.91	.86

4. RESULT

This research is prepared to measure the academic responsibility sense of the students. The scale items that are prepared for this purpose are prepared with authority opinions as 4 point likert scale with 51 items. It is applied to 350 students at Mersin University Education Faculty for the validity and reliability studies of the scale. 26 items are excluded from the scale in accordance with the analysis of the validity and reliability of data obtained from trial application. Factor structure of the scale is analyzed with exploratory factor analysis that is performed by varimax rotation method. As a result of the analysis, the scale has a structure with 25 items and 5 factors, and that the factors explain the 58.530% of the total variance together is determined. Cronbach alfa internal consistency coefficients of the scale is .91, half-split reliability coefficient is .86.

Findings related to validity and reliability analysis show that Academic Responsibility Scale has valid and reliable structure. In this state, Academic Responsibility Scale is considered as a valid and reliable measurement tool for measuring the responsibility related to academic field.

University students are the research group that the validity and reliability studies of the scale are carried out. For this reason, studies on the different samples are extremely important for the validity and reliability of the scale. The scale can be applied for various education levels. Besides, validity study of the scale can be done again with the help of another measurement tools that measure the same structure.

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