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Development of an attitude scale towards asking questions for elementary education students[1]

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Abstract. In this study, an instrument assessing elementary education students' attitudes towards asking questions in the classroom was developed. Items were determined based on interviews with students and teachers and scaled according to five-point Likert scale, "Never", Rarely", "Sometimes", "Usually", "Always". Validity and reliability analyses of the instrument were conducted with two different study groups. Firstly, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were done with Study Groups 1 (203 fourth-grade students). Then, CFA was repeated with data obtained from Study Group 2 (334 fourth-grade students). According to EFA results, two constructs were determined and these constructs including 24 items were named as *Openness towards asking question* and *Anxiety towards asking question*. CFA goodness of fit indices obtained from both groups showed that the scale with two constructs was acceptable. Cronbach's α reliability coefficients for each construct were respectively .78 and .80 for Study Group 1 and .76 and .77 for Study Group 2. As a result of analyses, reliability and validity of the developed instrument was ensured.

Keywords: Students' questions, asking questions, attitude towards asking questions, scale development

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INTRODUCTION

Science is the process of asking questions and finding answers to that query (Vale, 2013). Therefore, the act of asking questions dating back to Aristotle forms the basis of the advancement of positive sciences (Savran, 2002). The desire to know and understand, leading to asking questions and seeking answers in science, is also valid for effective learning in educational environments. For this reason, students and teachers need to actively participate in the questioning process. However, in educational settings, students ask fewer questions and are conventionally expected to accept facts acting as passive recipients. If a child is in an environment that does not encourage active questioning, this skill cannot become an active habit of mind (Vale, 2013). To this point, the constructivist approach that rejects the transfer of knowledge from teachers to student emphasizes the importance of activities that require students to ask questions to the teacher and their peers in order to meaningfully construct knowledge (Brooks & Brooks, 1993).

Questions asked by the student have the potential to guide learning and structure knowledge. For students, creating their own questions is the first step towards filling gaps in their knowledge. The questions asked by students, especially when they are confused or curious, encourage them to seek the answer and use deep thinking strategies; thus, these questions enable students to find information, remove missing parts in his/her mind, eliminate confusion and eventually construct knowledge meaningfully (Chin & Brown, 2000; Chin & Osborne, 2008). In addition, the process of asking questions helps students understand the new topic, realize others' ideas, evaluate their own progress, monitor learning processes, and increase their motivation and interest on the topic by arousing curiosity. In this way, when students create their own questions, they add more property to their learning and deepen their understanding (Chin & Osborne, 2008). A comprehensive question encourages students to produce their own explanations for

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complex things, while a planning or strategy question encourages students to understand how to solve a problem (Chin, 2001).

It has been advocated for many years that student questions, which have an active role in meaningful construction of knowledge as a cognitive activity, also support the development of students' thinking skills (Cornbleth, 1975; Marksberry, 1979; Stokhof, Vries, Martens & Bastiaens, 2017). It encourages students to test their assumptions, compare their own observations with the new information they learn, and to think critically (Chin & Brown, 2002). Actually, the act of asking questions and seeking answers in order to better and more deeply understand or challenge information, facts, events, situations, beliefs, theories, or perspectives is part of the critical thinking skills described by Ennis (1991) and Paul, Binker, Martin, and Adamson (1989). Moreover, student questions foster students' problem-solving skills because these questions help students better understand problems, construct hypotheses, gather information about their hypothesis, draw a conclusion and find a solution (Marksberry, 1979). In this regard, Dori and Herscovitz (1999) state that one of the effective ways to improve students 'problem solving skills is to strengthen students' questioning abilities through real-life problems. Student questions are also the first spark in the development of creative thinking skills. For this reason, Eason, Giannangelo and Franceschini (2009) and Starko (2014) suggest that students should be encouraged to create and ask their own questions in the classroom to develop their creative thinking skills.

Besides being a means for students to construct knowledge meaningfully and develop thinking skills, student questions provide students interact with each other and teacher. When students ask questions, they learn each other's questions so that a student who asks questions indirectly invites others to evaluate this question, to offer an alternative perspective, or even to speak a known answer. They can share their assumptions and discussions with each other, discuss and generate new solutions so that the student who asks the question goes beyond the only student who formulates that question (Aguiar, Mortimer & Scott, 2010; Baumfield & Mroz, 2002; Commeyras, 1995). For this reason, questions only asked by the teacher are insufficient for the development of students' communication skills (Singer, 1978).

The questions asked by students also reveal their lack of knowledge and misconceptions; therefore, these questions yield information for teachers' assessment. At the beginning of the lesson, encouraging students to produce questions about the subject, using a brainstorming technique, gives information about their preliminary knowledge. Student questions serve as a mind map, guiding the teacher in planning the course content. It makes teachers realize their students' interests and areas they want to learn. It also helps students to make a useful pre-reading and preliminary research regarding the things they want to know, the topics they want to learn, and the things they learned (Darn & Çetin, 2008). In this way, teachers become more sensitive to their students' learning (Chin & Chia, 2004). Student questions can be used as a tool for identifying students' fallacies and invalid assumptions and to evaluate students in establishing hypotheses, giving explanations, and collecting evidence that supports or rejects the hypothesis (Chin & Osborne, 2008).In addition, students' questioning each other in groups or pairs can be an alternative to traditional interaction methods by increasing participation. An educator who wants to expand the educational function with student questions can trigger discussion with questions or offer students an alternative perspective. Then, students are encouraged to evaluate the pros and cons of different perspectives of a topic, thereby the quality of speech in the classroom improves (Chin & Osborne, 2008). In this way, teachers can establish students' interest with content and participation through student questions (Darn & Çetin, 2008).

Briefly, as summed up by Aguiar, Mortimer and Scott (2010), the student questions contributed to students in gaining questioning abilities, developing themselves as active and autonomous individuals, improving their problem-solving skills, solving conflict issues and producing explanations by collaborative work and teachers in monitoring students' text-reading and understanding activities more actively, identifying their learning difficulties and adjusting instruction according to their needs. In the light of this information, it is important for teachers to encourage students to ask questions in the learning environment. Indeed, in their research, Pedrosa-de-Jesus, Leite and Watts (2012, 2016) determined that the number of questions asked

by students increased in the lessons where 'question moments' were provided. They suggested that many question production activities should be included in the program and that teachers should be trained on this subject. However, students' questioning is a skill that requires practice, education and guidance; therefore, tasks fall to teachers at this point (Vale, 2013). If this skill is taught intentionally to students throughout their education (starting from kindergarten and extending through high school), raising students who know how to ask questions, think about questioning, remain curious, and learn more effectively is ensured. Thus, it is very important to support asking questions at a very early age, especially in primary schools, as it is an entry level into the compulsory education system in our country. For this reason, teachers need to reveal to what extent students are ready affectively to be able to develop this cognitive skill. In this sense, it will guide teachers in determining students' attitudes towards asking questions, revealing their affective readiness and arranging the learning environment according to the results. Therefore, the purpose of this study was to develop a scale assessing students' attitudes towards asking questions in the classroom. Although there are studies on the use of rating scales in younger age groups, it is necessary to be cautious about the validity and reliability of the responses of primary school children to abstract, social and emotional concerns, especially when they get younger because of their cognitive and emotional development characteristics and reading skills (Chambers & Craig, 1998; Chambers & Johnston, 2002; Marsh, 1986; Mellor & Moore, 2014). Although an exact age period cannot be expressed in this research, based on their views, the scale was administered to the fourth-grade students who are the last grade of primary school level. However, the scale developed is thought to be applicable for elementary education students, especially for the 3rd grade students and the 5th grade students who started middle school levels.

METHODS

Study Groups

It is stated that in the scale development studies, the sample size should be between five and 10 times the number of items (Çokluk, Şekercioğlu & Büyüköztürk, 2010). In the current study, it was noted that the sample size was at least five times the number of items (39 items) in the draft scale. During the scale development process, two study groups were studied. Study Group 1 consisted of 203 fourth grade students selected from the schools in Beyoğlu District of Istanbul, Turkey by the purposive sampling method. Ninety-six of these students were female and 107 were male students. Study Group 2 consisted of 334 fourth-grade students from primary schools different from the former ones in the same district, of which 165 are girls and 169 are boys.

Scale Development Process

The steps that are followed during the development of the Attitude Scale towards Asking Questions for Students (ASAQ-S) are explained below.

Establishing the item pool

In order to create the attitude items related to the students' questioning process, firstly, the literature related to the students' questioning process was examined. In this way, the structure of the subject to be measured was determined and an interview form was prepared for teachers and students. Using these forms, opinions of nine primary school students and seven classroom teachers were collected. The interviews were transcribed, and after being subjected to content analysis, the expressions that were accepted to be related to the students' asking question process were arranged as an attitude item. At this stage, in writing item statements, it was paid attention to be clear and understandable by taking the characteristics of the study groups into consideration. In total, 50 item statements were written. Attitude items were scaled according to the following 5-point Likert scale (1=*Never*, 2=*Rarely*, 3=*Sometimes*, 4=*Generally*, 5=*Always*).

Evaluation of the item pool by experts

Opinions were received from experts in the field of Turkish language and literature to evaluate the items in terms of misspelling and expression disorder. In addition, the opinions of five field

experts on the comprehensiveness and adequacy of the scale items were gathered. In this process, an evaluation form was prepared and experts were asked to assign a score between 1 and 3 (1 = *This item is definitely not appropriate*, 2 = *Item is appropriate but needs to be changed*, 3 = *Exactly appropriate*) in order to evaluate how appropriate the items were in terms of meaning, content, and grammar rules. In this form, next to each item, a space was left for experts to make comments and suggestions. As a result of the feedback received from the experts, necessary arrangements were made, 11 items were removed from the scale; in the final draft of the scale, 39 items were left.

Pre-pilot study

Following these procedures, a pre-pilot study was conducted with a group of 60 students in order to see if there were any grammar or spelling errors in the scale, to measure the application time and to identify any problems that may arise during the application. As a result of the pre-pilot study, necessary arrangements were made in the light of the feedback from the respondents. In this way, the draft form with 39 items was made ready to be applied.

Pilot study

For the application, a permission from the Ministry of National Education was received. Then, during the 2017-2018 academic year the final form of the scale was administered to Study Group 1 (n= 210). After administration of the instrument, all the completed scales were examined. Seven forms that were filled incorrectly and incomplete were excluded from the evaluation and the first scale development analysis was started by entering the data of 203 forms. After initial analysis, the scale was administered to Study Group 2 (n= 342). But 8 were excluded from the analysis because of being incomplete. The number of the students left for analysis decreased to 334.

Data Analysis

For the construct validity of the scale, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed on the data obtained from Study Group 1. For the reliability analysis, the subscale total scores were calculated and ordered; then, an item analysis was performed by comparing the scores of the upper 27% and the lower 27% with the t-test. In addition, the corrected item-total correlation values of the items in the scale were calculated. For internal consistency of the scale, Cronbach's alpha coefficients were calculated for each subscale. A DFA was repeated and Cronbach's alpha coefficients were recalculated for data obtained from Study Group 2.

RESULTS

Validity Analysis of the ASAQ-S

Exploratory factor analysis (EFA) results

Factor analysis is a statistical technique that makes the measurement with few factors by gathering the variables in a group according to the measurement of the same structure or construct. In factor analysis, definitions of the related concepts can be formed according to factor-load values (Büyüköztürk, 2011). For this reason, principal components analysis, one of the factor analysis techniques, was used to reach the conceptual structure of the scale. The Kaiser-Meyer-Olkin (KMO) coefficient was calculated and Bartlett sphericity test was performed. The KMO coefficient should be greater than 0.60 and the Bartlett test should be significant. As it can be seen from Table 1, the KMO coefficient is within the acceptable limits (0.788> 0.60). In addition, the Bartlett Test is significant at 0.05 significance level ($p < 0.05$). These results indicate the suitability of the data for factor analysis.

Table 1. *KMO coefficient and Bartlett test results*

KMO Coefficient		.788
Bartlett Testi	X^2	985.011
	df	276
	Sig.	.000

Initially, principal components analysis and varimax rotation method were used without factor limitation. In this case, it was determined that the scale consisted of 13 factors; the explained variance value was 66.82, and the common factor variances of the items ranged between 0.54-0.79. When the factor component matrix obtained as a result of the first analysis was examined, it was found that these factorizations were not meaningful theoretically. However, the high variance explained in the first two factors and the stable direction of the factor eigenvalues after two factors in the scree plot (Figure 1) supported the idea that the scale was two-factored.

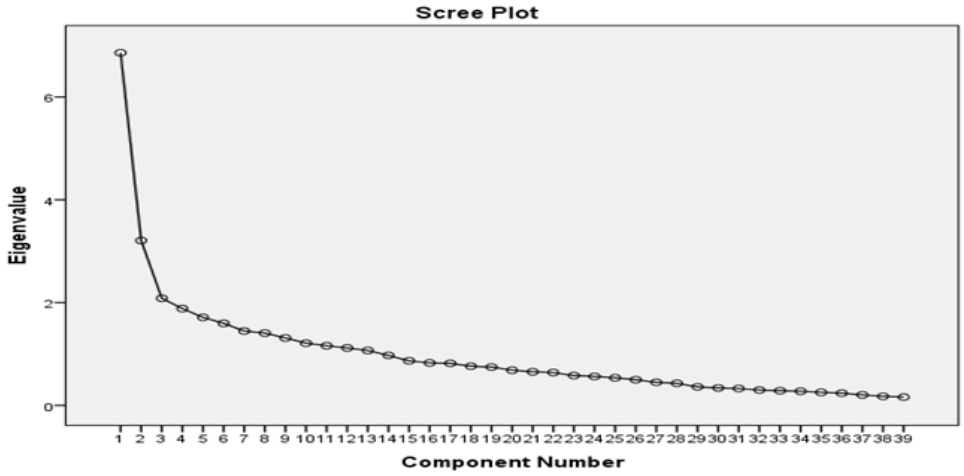

FIGURE 1. *Scree plot of factor eigenvalues*

In the second factor analysis, which was carried out by limiting two factors, two criteria were used to decide on which factors the items were loaded and which items would remain on the scale. The first one was the selection of the items having the largest factor-load value. The fact that factor loads are between 0.30-0.59 indicates a medium level, and above 0.60 indicates a high-level relationship (Büyüköztürk, 2011), and it is stated that the lowest acceptable level of each variable for factor-load values is 0.32 (Tabachnick & Fidell, 2001). Therefore, the cut-off value is determined as 0.32 and the items that take a factor load below this value are excluded from the analysis. The second criterion is the elimination of the items highly loaded on more than one factor. The difference between factor-load values was to be at least 0.10 (Büyüköztürk, 2011). The items having difference higher than 0.10 were excluded. Item reductions were made one by one and the analyses were repeated each time.

As a result of the analyses made in accordance with the abovementioned criteria, items 6, 8, 9, 10, 12, 15, 18, 24, 25, 27, 28, 29, 30, 38 and 39 were eliminated. The eigenvalues and explained variance of the factors belonging to the final form of the 24-item scale are given in Table 2.

Table 2. *Eigenvalues of factors and explained variances*

Factor	Eigenvalue	Explained Variance %	Cumulative %
1	5.21	21.73	21.73
2	2.81	11.74	33.5

Explained variance of the final two-factor scale is 33.5%. The first factor explained 21.73% of this variance and the second factor explained 11.74%. The items and factor-loads of the factors are given in Table 3.

Table 3. *Item factor loads*

Item No	Factor 1 (Anxiety)	Factor 2 (Openness)
Item 4	.40	
Item 13	.48	
Item 16	.64	
Item 26	.50	
Item 31	.66	
Item 32	.70	
Item 33	.59	
Item 34	.66	
Item 36	.55	
Item 37	.50	
Item 22		.63
Item 23		.59
Item 21		.56
Item 7		.56
Item 11		.55
Item 17		.54
Item 1		.53
Item 2		.52
Item 19		.50
Item 14		.45
Item 20		.44
Item 5		.43
Item 3		.40

As seen in Table 3, factor loads vary between 0.339-0.669. The first factor of the ASAQ-S consists of 11 items, the second factor consists of 13 items. When the items that make up the first factor were examined, it was determined that the items contained expressions about negative emotions, concerns and behavioral statements towards asking questions. For this reason, the first factor was named as *Anxiety towards asking questions*. When the items on the second factor were examined, it was identified that items were related to interest in asking questions and habits in this process. For this reason, this factor was named as *Openness towards asking questions*.

Confirmatory factor analysis (CFA) results

CFA was performed to test the validity of the factor structures obtained as a result of EFA. The two-factor model for the ASAQ-S shown in Figure 2 was tested through the LISREL 8.54 program.

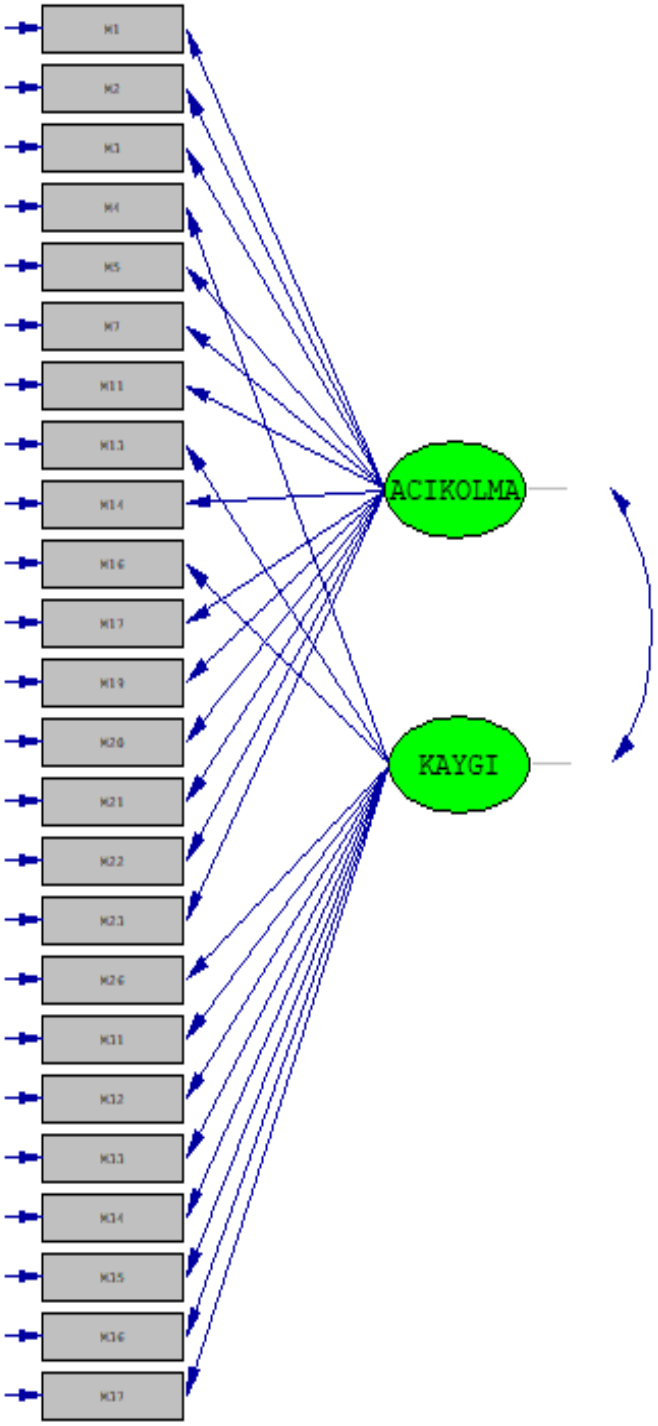

FIGURE 2. *Measurement model of the ASAQ-S*

In CFA, many goodness-of-fit indices are used to evaluate the fit between the theoretical model and real data: Chi-Square goodness index, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), normed fit index (NFI), root mean square residuals (RMR or RMS), and root mean square error of approximation (RMSEA) (Büyüköztürk, Akgün, Özkahveci & Demirel, 2004). The goodness of fit indices' values obtained in this study are shown in Table 4.

Tablo 4. *The Goodness of fit indices' values of the ASAQ-S and the acceptance limits of the fit indices (Study group 1)*

Goodness of Fit Indices	Excellent Fit Values	Acceptable Fit Values[1]	Fit Values Obtained from the Scale	Fit Level
χ2 (p)	-	-	411.51 (P < 0.05)	-
sd	-	-	249	-
χ2/sd	0≤ χ2 / df≤2	≤ 5[a]	1.65	Excellent Fit
RMSEA	0.00≤RMSEA≤0.05	≤0.08[b]	0.05	Excellent Fit
SRMR	0.00≤SRMR≤0.05	≤0.08[b]	0.07	Good Fit
GFI	0.95≤GFI≤1.00	≥0.90[c]	0.85	Moderate Fit
AGFI	0.95≤AGFI≤1.00	≥0.90[c]	0.83	Moderate Fit
CFI	0.95≤CFI≤1.00	≥0.90[b]	0.92	Good Fit
NNFI	0.95≤NNFI≤1.00	≥0.90[b]	0.91	Good Fit

[1] [a]Bollen (1989), Sümer (2000); [b] Byrne (1998), Hu & Bentler (1999), Sümer (2000), Tabachnick & Fidell (2001); [c]Hooper, Coughlan & Mullen (2008), Sümer (2000)

The ratio of Chi-square/degrees of freedom (χ2/df=1.65), was below two and RMSEA (0.05) is less than 0.08. These values show that the model has an excellent goodness of fit. The index values as SRMR = 0.07 (≤0.08, good fit), CFI = 0.92 (≥0.80, good fit), and NNFI = 0.91 (≥0.80, good fit) indicated that the model fit well. On the other hand, GFI = 0.85 (<0.90, moderate fit) and AGFI = 0.83 (<0.90, moderate fit) indicate that the model was moderately fit; however, these values are sensitive to sampling, thus, it is recommended to not be used alone in evaluating the fit of the model (Hooper, Coughlan & Mullen, 2008). As a result, when the all other index values were considered, it was confirmed that the model was well-suited to the two-factor structure; in other words, the two-factor ASAQ-S was acceptable. The CFA was repeated on the data obtained from Study Group 2 and the obtained goodness-of-fit indices are given in Table 5.

Table 5 *The Goodness of fit indices' values of the ASAQ-S and the acceptance limits of the fit indices (Study group 2)*

Goodness of Fit Indices	Excellent Fit Values	Acceptable Fit Values[1]	Fit Values Obtained from the Scale	Fit Level
χ2 (p)	-	-	454.13 (p= 0)	-
sd	-	-	249	-
χ2/sd	0≤ χ2 / df≤2	≤ 5[a]	1.82	Excellent Fit
RMSEA	0.00≤RMSEA≤0.05	≤0.08[b]	0.05	Excellent Fit
SRMR	0.00≤SRMR≤0.05	≤0.08[b]	0.06	Good Fit
GFI	0.95≤GFI≤1.00	≥0.90[c]	0.90	Good Fit
AGFI	0.95≤AGFI≤1.00	≥0.90[c]	0.88	Good Fit
CFI	0.95≤CFI≤1.00	≥0.90[b]	0.95	Excellent Fit
NNFI	0.95≤NNFI≤1.00	≥0.90[b]	0.94	Good Fit

[1] [a]Bollen (1989), Sümer (2000); [b] Byrne (1998), Hu & Bentler (1999), Sümer (2000), Tabachnick & Fidell (2001); [c]Hooper, Coughlan & Mullen (2008), Sümer (2000)

When the CFA index values of Study Group 2 were examined, they confirmed the two-factor model of the ASAQ-S. Looking at the CFA results, it was seen that the χ2/df ratio, 1.82, which was below 2 indicates that there was a perfect fit. Additionally, RMSEA value was 0.05, the GFI was 0.90, AGFI was 0.88 near to 0.90, and the CFI and NNFI values were above 0.90. According to these values, it can be said that the two-factor structure of the ASAQ-S with 24 items is confirmed again.

Reliability Analysis of the ASAQ-S Scale

As a method used to determine internal consistency, item analysis was performed and whether the attitude items were related to the attitude desired to be measured was examined with the item total correlation. A comparison of the mean scores of the lower and upper groups, which is another way in item analysis, was also made. For this, the total score of subjects were ordered; the highest 27% were ranked as the upper group and the lowest 27% the lower group. It was

expected that the mean scores of the upper groups would be higher than those of the lower group for each item. Independent sample t-test was carried out for testing significance of the difference between the two groups. These t values are also called the discrimination index (Tavşancıl, 2010). Item-total correlation values of the items in the scale and independent sample t-test results, related to the difference between the upper and lower groups, are given in Table 6.

Table 6. *Corrected item total correlations and independent samples t-test results between upper 27% and lower 27% mean scores*

Factor Name	Item No	Corrected Item-Total Correlations	t-values (upper 27%-lower 27%)
Anxiety towards Asking Question	Item 4	.36	6.61*
	Item 13	.33	9.54*
	Item 16	.49	9.10*
	Item 26	.36	7.32*
	Item 31	.60	10.93*
	Item 32	.52	10.40*
	Item 33	.46	8.48*
	Item 34	.53	7.83*
	Item 35	.57	8.59*
	Item 36	.44	10.6*
	Item 37	.41	8.0*
Openness towards Asking Question	Item 1	.42	7.78*
	Item 2	.42	6.73*
	Item 3	.34	5.66*
	Item 5	.33	4.52*
	Item 7	.42	8.69*
	Item 11	.45	8.3*
	Item 14	.41	7.17*
	Item 17	.46	6.56*
	Item 19	.32	6.53*
	Item 20	.43	8.59*
	Item 21	.38	8.48*
	Item 22	.48	9.15*
	Item 23	.55	8.05*

According to the results, the corrected item-total correlation values of the items in the scale ranged from 0.60 to 0.33. The t-test results between the upper 27% and the lower 27% group indicated that there was a significant difference for all items. A Cronbach's alpha coefficient was calculated for the internal consistency of the scale. For being a reliable measurement tool, the alpha coefficient was expected to be at least 0.70; as this value approaches 1.00, the reliability of the scale increases. The reliability coefficients calculated with the data obtained from Study Group 1 and 2 are shown for each sub-scales and the scale as a whole in Table 7.

Table 7. *Reliability coefficients of the scale as a whole and subscales for study group 1 and 2*

Study Group 1	**Cronbach Alpha Coefficients**
Anxiety towards Asking Question	0.80
Openness towards Asking Question	0.78
Scale as a whole	0.84
Study Group 2	**Cronbach Alpha Coefficients**
Anxiety towards Asking Question	0.77
Openness towards Asking Question	0.76
Scale as a whole	0.81

For Study Group 1, the reliability coefficients of the subscales were 0.78 and 0.80, and the reliability coefficient of the scale as a whole was 0.84. For Study Group 2, the reliability coefficients of the subscales were 0.77 and 0.76, respectively. The reliability coefficient of the scale as a whole was 0.81. In both cases, the scale was determined to be reliable.

DISCUSSION and CONCLUSIONS

According to constructivist education, learners' active participation, their interaction with the learned situation and their use of asking questions to make sense of knowledge are important factors for meaningful learning. While students' questions facilitate grasping knowledge and understanding the subject, other students may also learn from the answer given to the question of a student (Chin, 2001). Due to their contribution to learning, student questions are used as an educational tool for teachers (Pedrosade-Jesus, Leite & Watts, 2012). In his study, Singer (1978) came to the conclusion that, by creating students' own questions, they actively understand, direct their own thoughts, and are responsible for their own learning.

On the other hand, Tofade, Elsner, and Haines (2013) state that students does not experience a single emotion while asking questions; rather, they feel many emotions (joy, panic, excitement, fear, etc.) at the same time. They emphasize that the perception of the classroom atmosphere as frightening, hostile, or intolerant by students and creating a psychologically unsafe environment by the teacher prevent students from expressing their thoughts and questions out loud. Therefore, in terms of encouraging student questions, it is important for teachers to take into consideration this psychological aspect of students who ask questions. Aguiar, Mortimer and Scott, (2010) state that since a great majority of students feel a great fear of being considered unsuccessful by their peer group, they do not ask questions; rather, they emphasize that teachers should ensure a safe learning environment in such activities.

In this study, since students' affective characteristics were effective in asking questions, a scale (ASAQ-S) was developed in order to determine the attitudes of students towards asking questions. This study was carried out with two study groups consisting of fourth grade students. EFA was performed on the data obtained from Study Group 1, the analysis revealed the two-factor structure. According to the analysis results, the final scale consisted of 24 items and two factors, of which one included 11 items and the other 13 items. The explained variance by the two-factor scale was 33.5%. When the items that make up the subscales were examined, the first factor was named as *Anxiety towards asking questions* and the second one was named "Openness towards asking questions". After EFA, CFA was performed, and a two-factor model was supported according to CFA goodness-of-fit indices. In the second study group, CFA was repeated, and the two-factor scale structure was confirmed again.

For the reliability analysis of the scale, independent sample t-test analyses were performed to test mean differences between the upper group's scores and lower group' scores; also the corrected item-total correlation values of the items were calculated. The item analysis results supported the item discrimination and internal consistency of the scale. Finally, the reliability coefficients obtained from both study groups showed that the ASAQ-S was reliable.

In conclusion, the developed ASAQ-S was determined to be valid and reliable. It is thought that this scale can be used by teachers to determine students' attitudes. Thus, they can take

measures for negative attitudes and arrange the classroom environment accordingly. In this way, an encouraging atmosphere can be provided for students to ask questions and the culture of asking questions, which is an effective tool in meaningful learning, can be expanded. Although this study highlights student questions, the impact of teacher questions on student questions should not be ignored. It is stated that the reason for the lack of students' ability to ask good questions is that teachers asking short-answer questions, asking for clear information, asking content-based questions are not good role models (Graesser & Person, 1994; Whittaker, 2012). Therefore, in addition to encouraging students to ask questions, teachers need to improve themselves in asking good questions. An in-service training on this subject should be given and teachers should be provided a good role model in asking question.

The ATAS-S was applied to the fourth-grade students; however, it is thought to be applicable as well for the third and fifth grade students. However, there is a need for validity and reliability studies of the scale for the second grade and other secondary school grade students. In this way, it can be investigated whether the scale is valid and reliable for all primary and secondary school levels. This will contribute to the widespread use of the instrument. In further research, experimental studies on students' questioning skills can be conducted to investigate changes in attitudes with the help of the ASAQ-S. Moreover, studies can be expanded with variables such as socio-economic status, age, gender, classroom environment, etc., that would be effective on students' attitudes; thereby, the determinant variables in developing students' attitudes can be revealed. At this point, studies based on action research will be highly contributory. Given that such inquiries displaying which variables teachers should focus on, which problems can be encountered and how they can be solved, such research can guide teachers who want to develop the desired attitude in their classrooms and to encourage students to ask questions.

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