ADAPTATION AND VALIDATION OF THE CLASS-RELATED EMOTION QUESTIONNAIRE FOR BANGLADESHI UNIVERSITY STUDENTS

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ABSTRACT

The main objective of the present study was to adapt and validate the Class-Related Emotions Questionnaire in Bangla. Because class-related emotions significantly impact academic achievement, the study aimed to develop a psychometrically valid tool for evaluating class-related emotions in Bangladeshi cultural settings. A six-step adaptation process was followed to ensure the questionnaire's language and cultural suitability, including forward translation, expert review, reverse translation, and pretesting. Using a purposive sampling technique, data were collected from 349 participants at four public universities. The confirmatory factor analysis indicated that the Bangla version of the Class-Related Emotions Questionnaire has excellent internal consistency (Cronbach's alpha = 0.927), test-retest reliability (r = 0.932), and construct validity. Furthermore, a significant positive correlation was found among its eight subscales. This result indicated that the Bangla version of the Class-Related Emotions Questionnaire was a reliable and valid tool for assessing the impact of emotions on academic engagement and success in the Bangladeshi educational context.

KEYWORDS: class-related emotion, academic achievement, reliability, and validity.

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Introduction

In all stages of human life, emotions play a significant role. Results from how people respond to their social surroundings and the memories of their experiences (Alparslan and Ulubey, 2019) also proved the importance of emotions in human life. When we start a new job (Sümer, 2020), a sleepover (Omrak, 2019), the beginning of a day (Ergün, 2009), and education (Brigido *et al.*, 2010; Pekrun and Linnenbrink-Garcia, 2012) may all have an impact on our emotions. Every feeling is regarded as essential, significant, valuable, and not something that should be suppressed. According to Çenesiz (2018), each emotion has a distinct significance in human existence. According to Baumeister and Bushman (2007), emotions are a subjective state accompanied by a physiological response and an evaluative reaction to certain behaviors, events, and situations.

Academic success is a complex idea with many facets that different things influence. It has long been understood that emotions play a crucial role in education, influencing students' attitudes, behaviors, and ultimately, academic success. According to Meinhardt and Pekrun (2003), emotions are a constant companion to learning, affecting attention, focus, processing, storing, and retrieval of knowledge, and giving each situation—attending class, studying, writing tests and exams, for example—a unique color. Students' academic achievement depends on their positive emotions that direct positive learning. Several studies on emotions in educational contexts have demonstrated how students' emotions influence or hinder learning and accomplishment depending on how they interact with cognitive processing, motivation, other affective components, and their learning practices (Schutz *el al.*, 2007; Pekrun *et al.*, 2014; Palam *et al.*, 2018). In addition to creating new information and discovering social connections, positive emotions also lead to the development of innovative and creative learning ideas and behaviors (Tan, 2021). According to Keleş and Çepni (2006), negative emotions might limit one's capacity for higher-order thinking and cause the brain to memorize information by preventing one from taking chances, seeing opportunities, and repeating instinctive actions. Studies also indicate that emotions and affect also have a relationship with students' perceived health issues, academic engagement, educational decisions, classroom adaptation, and social interactions (Camacho-Morles *et al*, 2021; Linnenbrink-Garcia and Pekrun, 2011; and Schutz *et al.*, 2006). Additionally, some researchers believe that emotions play a significant role in learners' accomplishments, satisfaction, physical and mental health, motivation, learning techniques, cognitive sources, self-directed learning, quality of teacher-learner interactions, classroom instruction, concentration, information processing, storing, retrieving, and learning, and ultimately academic

achievement. (Mega *et al,* 2014; Artino *et al.*, 2010; Pekrun *et al,* 2013).

According to Pekrun (2006), achievement emotions are closely tied to accomplishments, activities, and results. Pekrun *et al.* (2002) used this phrase for the first time in the context of education. In all educational contexts (before, during, and after attending the classroom, studying, and taking tests), emotions have complicated relationships with cognitive, motivational, and behavioral processes. This is especially true in the classroom and educational settings (Villavicencio *et al,* 2013, Pekrun *et al*, 2013). According to Pekrun's (2006) control value theory, people experience feelings of accomplishment when they believe they have control over or lack control over worthwhile actions and results. For example, a student might feel enjoyment in a manageable yet challenging class, while feelings of anxiety or hopelessness might arise if the tasks feel overwhelming or unimportant. Class-related, learning-related, and test-related emotions are the three subscales of the Achievement Emotions Questionnaire (AEQ), a popular tool for assessing achievement emotions (Pekrun *et al.*, 2011). Of these, the class-related emotion subscale is especially pertinent to comprehending the emotional dynamics of classroom learning as it evaluates emotions felt during classroom interactions. Students' classroom engagement and academic success are significantly shaped by class-related emotions, including pride, enjoyment, worry, and boredom (Pekrun *et al.*, 2011). To provide supportive learning settings that promote positive emotional experiences and reduce negative ones, it is important that teachers and legislators have an in-depth understanding of these emotions. Studies also reported that student success (Becker *et al.*, 2017; Lee, 2007; Sutton and Wheatley, 2003) and emotions (Frenzel *et al.*, 2009; Liman, 2021) are significantly influenced by the teacher-student connection.

Although this questionnaire is used largely in Western cultures, the AEQ has not yet been validated in non-Western cultures like Bangladesh. Therefore, we conduct the present study to adapt and validate the class-related emotion questionnaire for university students in Bangla. This study aims to offer a psychometrically sound instrument for assessing emotions associated with class in Bangladesh.

Materials and Methods

Participants

A total of 349 university students, 18 years of age and above, were selected as participants in this study. The participants were selected using a purposive sampling technique from four public universities in Bangladesh: Gopalganj Science and Technology University, Gopalganj; Khulna University; the University of Chittagong; and the University of Dhaka. The participants were of different socio-economic backgrounds and religions, ensuring a rich representation of perspectives. Among the participants, 46.7% were female, and 53.3% were male. Regarding their economic status, 6% reported their economic condition as lower than average, 28.5% as a bit lower than average, 57.9% as average, and 6.9.9% as a bit higher than average. This diverse demographic distribution added depth to the study's findings.

Description of the Instruments

The following instruments were used in this study.

Demographic and personal information questionnaire

To collect information about age, gender, socioeconomic status, last academic result, level of education, family type, etc a demographic and personal information questionnaire was used.

Class-Related Emotions Questionnaire

The Achievement Emotions Questionnaire (AEQ), is a widely used tool for assessing emotions related to academic achievement was developed by Pekrun *et al. (*2011). This scale has three subscales: class-related emotions, learning-related emotions, and test-related emotions. These subscales measure enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom-related emotions. However, this questionnaire requires the administration of 6 to 12 items per scale (*Mdn* = 10), therefore, it takes a long time to administer the AEQ and restricts the use of this questionnaire in empirical studies. To address this limitation, Bieleke, Gogol, Goetz, Daniels, and Pekrun (2021) developed the AEQ-S, a short version of the AEQ, with only 4 items per scale, with a total of 96 items. The three subscales of the AEQ can be used together or singly, and each section of the three subscales can also be used separately. Since this scale covers a very large area, we adapted only the Class-Related Emotions questionnaire of the AEQ-S in this study, which consists of 32 items. Enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom are the eight emotions that are assessed in classroom settings by this subscale. It may be administered during class and takes around 20 to 30 minutes. In this scale, students rate their emotional experiences on a five-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). By summing the items of the scale and taking their mean, the calculation procedure can be conducted.

Procedure

The adaptation process of the "The Class-Related Emotions Questionnaire" was accomplished by maintaining the international standard provided by Sousa and Rojjanasrirat (2011). The adaptation was completed following the 6 steps to ensure the linguistic and cultural validity of the scale:

Forward Translation: At first, two independent translators proficient in both English and Bangla languages, familiar with the steps of scale adaptation, translated the original version of the scale into Bangla. The translations were compared to identify discrepancies in wording, sentence structure, and meaning.

Synthesis of Translations: The researchers examined the two forward-translated versions and contrasted them with the original scale. A reconciled Bangla version was produced by resolving ambiguities and divergences while preserving the original items' conceptual integrity.

Expert Panel Review: A panel of experts with backgrounds in psychology, psychometrics, and Bengali language analysis assessed the reconciled version. The panel offered recommendations for improving the response styles, objects, and instructions to make them more linguistically and culturally suitable.

Back Translation: Then, for back translation, the Bangla-translated version was given to two other independent translators. This was done for a validity-checking procedure to ensure that the translated version accurately reflected the original version's content.

Comparison and Pre-Final Version: In the next phase, Researchers assessed the two back translations instructions, items, and answer format with the original scale regarding format, language, and grammatical structures of the sentences,

closeness in meaning, and relevance by the experts. Then, a pre-final version of the instrument was created by Bengali language specialists.

Pre-Testing with Target Population: To check the appropriateness of the pre-final Bangla version of the scale, it was administered to sixty students from the target population. By using a dichotomous scale (clear or unclear) the participants were asked to rate the instructions and items of the questionnaire. Feedback from participants who found items unclear was used to make necessary modifications.

Final Version and Retest: In the final step, after synthesizing all the documents, the final Bangla versions of "The Class-Related Emotions Questionnaire" were prepared and administered to 349 participants. After 15 days, a retest was done with interested 40 participants who had previously completed the scale to evaluate its test-retest reliability.

This rigorous adaptation process ensured that the Bangla version of the **Class-Related Emotions Questionnaire** was both linguistically and culturally valid while maintaining the psychometric properties of the original scale.

Ethical consideration

At the beginning of the data collection, participants were briefed about the general purpose of the study and were requested to cooperate. The completed informed consent form before participating in the study and human subject precautions were consistent with the ethical principles mandated in the Declaration of Helsinki (World Medicine Association, 2013). Those who were interested in taking part in the study had to click the "I agree to participate" button and electronically sign the form.

Statistical Analysis

The obtained data were analyzed using SPSS version 22. JASP. In the first phase, item analysis was done to determine the internal consistency of the scores. In the second phase, internal consistency and test-retest reliability were computed, and validity was determined.

Results

Table 1 shows the descriptive statistics of all items of the questionnaire. We can move on to further analysis because the skewness and kurtosis values of the items indicate that the data is normal. This allows us to conduct further analysis.

Table 1. Descriptive Statistics of the Bangla Version of the Class-Related Emotions Questionnaire

Item	Mean	SD	Skewness	Kurtosis	Minimum	Maximum
Item1	3.874	0.878	-1.006	1.442	1.00	5.000
Item2	4.040	0.730	-0.686	0.753	2.00	5.000
Item3	3.519	1.041	-0.718	-0.041	1.00	5.000
Item4	3.364	1.027	-0.439	-0.293	1.00	5.000
Item5	3.868	0.854	-0.857	0.883	1.00	5.000
Item6	3.914	0.847	-0.864	0.995	1.00	5.000
Item7	3.702	0.892	-0.672	0.281	1.00	5.000
Item8	3.940	0.823	-0.976	1.603	1.00	5.000
Item9	3.645	1.045	-0.617	-0.081	1.00	5.000
Item10	3.441	0.994	-0.533	-0.175	1.00	5.000
Item11	3.705	0.872	-0.723	0.587	1.00	5.000
Item12	4.132	0.851	-1.100	1.633	1.00	5.000
Item13	3.057	1.156	-0.067	-0.927	1.00	5.000
Item14	3.006	1.091	0.069	-0.735	1.00	5.000
Item15	3.960	1.050	-0.984	0.367	1.00	5.000
Item16	3.682	1.047	-0.603	-0.351	1.00	5.000
Item17	3.519	0.987	-0.322	-0.554	1.00	5.000
Item18	3.287	1.169	-0.226	-0.991	1.00	5.000
Item19	3.877	1.069	-1.016	0.518	1.00	5.000
Item20	3.544	1.084	-0.476	-0.644	1.00	5.000
Item21	3.341	1.170	-0.365	-0.818	1.00	5.000
Item22	3.481	1.159	-0.568	-0.553	1.00	5.000
Item23	3.659	1.168	-0.715	-0.399	1.00	5.000

Item	Mean	SD	Skewness	Kurtosis	Minimum	Maximum
Item24	3.430	1.203	-0.367	-0.973	1.00	5.000
Item25	3.461	1.146	-0.314	-0.939	1.00	5.000
Item26	3.865	1.001	-0.989	0.678	1.00	5.000
Item27	4.095	0.934	-1.103	1.071	1.00	5.000
Item28	3.968	1.038	-1.023	0.452	1.00	5.000
Item29	3.292	1.165	-0.104	-1.064	1.00	5.000
Item30	3.602	1.066	-0.454	-0.550	1.00	5.000
Item31	3.605	1.136	-0.550	-0.558	1.00	5.000
Item32	3.544	1.180	-0.524	-0.698	1.00	5.000

Item Analysis

Table 2 represents Cronbach's alpha (if the item was deleted) and the corrected item-total correlations. To assure scale reliability, item 14 was excluded from additional analyses due to its poor item-total correlation (<.20).

Table 2. Item-level psychometric properties of the Bangla version of the Class-Related Emotions Questionnaire

Class-Related emotions	Item	Corrected Item-total correlation	Cronbach's Alpha (If Item Delated)
Enjoyment	Item1	0.396	0.922
	Item2	0.400	0.922
	Item3	0.266	0.923
	Item4	0.379	0.922
Hope	Item5	0.503	0.920
	Item6	0.479	0.921
	Item7	0.461	0.921
	Item8	0.473	0.921
Pride	Item9	0.293	0.923
	Item10	0.326	0.923
	Item11	0.441	0.921
	Item12	0.212	0.924
Anger	Item13	0.388	0.922
	Item14	0.147	0.927
	Item15	0.527	0.920
	Item16	0.533	0.920
Anxiety	Item17	0.644	0.919
	Item18	0.506	0.921
	Item19	0.690	0.918
	Item20	0.625	0.919
Shame	Item21	0.575	0.920
	Item22	0.620	0.919
	Item23	0.601	0.919
			0.919

	Item24	0.599	
Hopelessness	Item25	0.612	0.919
	Item26	0.699	0.918
	Item27	0.627	0.919
	Item28	0.633	0.919
Boredom	Item29	0.598	0.919
	Item30	0.628	0.919
	Item31	0.666	0.918
	Item32	0.689	0.918

Table 2 shows that all items are positively correlated and item-total score ranged from .147 (item-14) to .816 (item-23). The item-14 had low item-total correlation. This item was excluded from the further analysis for determining reliability and validity of the measure.

The factor structure of the Bangla version of the Class-Related Emotions Questionnaire was evaluated using confirmatory factor analysis (CFA). The results are presented in Table 3. All items demonstrated acceptable factor loadings (above 0.4), supporting the construct validity of the scale.

Table 3. Factor Loadings of the Bangla Version of the Class-Related Emotions Questionnaire

Class-Related Emotion	Item	Factor Loading (Estimate)	Standard Error	z-value	P value	Standardized Estimate
Enjoyment	Item1	0.601	0.033	17.946	< .001	0.684
	Item2	0.498	0.027	18.273	< .001	0.682
	Item3	0.530	0.036	14.875	< .001	0.509
	Item4	0.683	0.038	18.040	< .001	0.666
Hope	Item5	0.650	0.029	22.196	< .001	0.761
	Item6	0.616	0.028	21.877	< .001	0.727
	Item7	0.632	0.030	21.312	< .001	0.708
	Item8	0.593	0.028	21.086	< .001	0.721
Pride	Item9	0.677	0.039	17.195	< .001	0.648
	Item10	0.724	0.039	18.663	< .001	0.728
	Item11	0.809	0.039	20.732	< .001	0.927
	Item12	0.444	0.033	13.670	< .001	0.522
Anger	Item13	0.605	0.035	17.103	< .001	0.523
	Item15	0.741	0.040	18.462	< .001	0.706
	Item16	0.765	0.041	18.689	< .001	0.730
Anxiety	Item17	0.762	0.027	28.753	< .001	0.772
	Item18	0.743	0.029	26.058	< .001	0.635
	Item19	0.879	0.031	28.421	< .001	0.822
	Item20	0.829	0.029	29.011	< .001	0.766
Shame	Item21	0.916	0.031	29.699	< .001	0.783
	Item22	0.999	0.032	31.045	< .001	0.862
	Item23	1.000	0.033	30.659	< .001	0.857
	Item24	1.021	0.032	32.042	< .001	0.849
Hopelessness	Item25	0.832	0.029	28.343	< .001	0.727

	Item26	0.841	0.030	28.257	< .001	0.840
	Item27	0.701	0.027	26.152	< .001	0.751
	Item28	0.813	0.030	27.310	< .001	0.783
Boredom	Item29	0.851	0.028	30.571	< .001	0.731
	Item30	0.826	0.027	30.051	< .001	0.774
	Item31	0.931	0.030	31.066	< .001	0.819
	Item32	1.015	0.032	32.156	< .001	0.860

Table 4 displays the model fit statistics for the Bangla version of the Class-Related Emotions Questionnaire. A comparative fit index (CFI) of 1.000 and a root mean square error of approximation (RMSEA) of 0.000 show that the model fits the data very well.

Table 4. Model fit statistics of Factor Structure of the Class Related Emotions Questionnaire Bangla Version.

Model	X^2/df	CFI	GFI	TLI	RMSEA	SRMR
CRE	0.982	1.000	0.998	1.005	0.000	0.050

` *Note.* CFI: comparative fit index; GFI: goodness of fit index; TLI: Tucker-Lewis index; RMSEA: root mean square error of approximation; SRMA: standardized root mean square residual

Table 5. Correlation within the Eight Subscales of the Class-Related Emotions Questionnaire

	Enjoyment	**Hope**	**Pride**	**Anger**	**Anxiety**	**Shame**	**Hopelessness**	**Boredom**
Enjoyment	-							
Hope	.617**	-						
Pride	.367**	.544**	-					
Anger	.179**	.127**	.046	-				
Anxiety	.209**	.282**	.153**	.520**	-			
Shame	.173**	.227**	.149**	.357**	.619**	-		
Hopelessness	.241**	.326**	.211**	.476**	.695**	.626**	-	
Boredom	.295**	.359**	.250**	.471**	.643**	.501**	.700**	-

**. Correlation is significant at the 0.01 level (2-tailed).

Results indicated that enjoyment was positively correlated with hope (r =.617, p < .01), pride (r =.367, p < .01), Anger (r =.179, p < .01), anxiety (r =.206, p < .01), shame (r =.173, p < .01), hopelessness (r =.241, p < .01), and boredom (r =.295, p < .01). Hope was positively correlated with pride (r =.544, p < .01), Anger (r =.127, p < .01), anxiety (r =.282, p < .01), shame (r =.227, p < .01), hopelessness (r =.326, p < .01), and boredom (r =.359, p < .01). Similarly, all the subscales of class-related emotions are positively correlated with each other but only pride and anger found to have no significant relationship with one another (r =.046, p < .01).

Reliability of the scale

To determine the reliability coefficient of "Class-Related Emotions Questionnaire", internal consistency and test-retest reliability were used. Internal consistency was assessed by calculating Cronbach's Alpha of this scale was 0.927 (95% CI [0.915, 0.937]), and test-retest reliability was (r =0.932). The internal consistency of "The CRE" was satisfactory, and these findings were quite comparable with the original version of the instrument (Bieleke, Gogol, Goetz, Daniels, & Pekrun, 2021).

Validity of the scale

The validity of the Bangla version of the "Class-Related Emotions Questionnaire" was measured by using the following methods.

Face validity

The Bangla version of the Class-Related Emotions Questionnaire had a higher level of face validity because all participants in the research, including the expert panel and researchers, acknowledged that all of the scale's items appeared to measure university students' classroom-related emotions.

Content validity

The Bangla Class-Related Emotions Questionnaire's content validity was guaranteed by the expert panels' crucial comments.

Convergent validity

Convergent validity provides evidence of the construct validity of an assessment tool by assuming that different facets of the same construct will be highly correlated with one another if the tool is valid (Colman, 2008). To assess the convergent validity of "The Class-Related Emotions Questionnaire", correlation among the individual subscales was measured in Pearson product-moment correlation.

Discussion and Summary

There were several tools available for measuring emotions, but none were specially designed or modified for measuring class-related emotions. The purpose of the present study was to adopt and validate the CREQ in Bangla to measure the emotional state of university students. To achieve this end, the scale was administered to a sample of 349 university students who were selected through a purposive sampling technique. Results indicated the CREQ has high internal consistency (Cronbach's alpha = 0.927) and test-retest reliability (r = 0.932) for administering to university students in Bangladesh. As a rule of thumb, Cronbach's Alpha should be .70 or higher for use as an instrument (Nunnally, 1978). The item-total correlations of the Bangla version of the CREQ ranged from 0.147 to 0.699. Nunnally and Bernstein (1994) an item with a minimum item-total correlation value of 0.20 or higher suggests that this item's discrimination between high and low scores on the test is adequate. One item of this scale failed to meet this criterion, and that item was excluded from further analysis. These findings align with the results of previous studies (Bieleke et al., 2021). Confirmatory Factor Analysis (CFA) supported the scale's construct validity, with all items exhibiting acceptable factor loadings. The model fit indices (CFI = 1.000, RMSEA = 0.000) confirm the strength of the instrument. In confirmatory factor analysis X^2/df value of 0.982 suggests a good fit since it is below 3 and indicates that the model is consistent with the data (Schermelleh-Engel & Moosbrugger, 2003). CFI value 1.000 indicates an excellent fit. The value .95 or greater suggests a good fit model (Hu & Bentlar, 1999). CFI values range from 0 to 1, with values above 0.95 typically being considered indicative of a good fit. In RMSEA, a value of 0.000 indicates a perfect fit, where values below 0.05 generally suggest a close fit to the data. The RMSEA value should be .06 - .08 (Schreiber, Stage, King, Nora & Barlow, 2006). SRMR value of 0.050 suggests a good fit as values below 0.08 are often considered acceptable. The SRMR value should be <.08 (Schreiber et al., 2006) indicates a better-fitted model. Overall, confirmatory factor analysis suggests that the model has an excellent fit to the data.

All the factors of the CRE scale are positively correlated with each other except pride and anger where no significant relationship was found (r=.046, p<.01). The correlational data reveal that higher levels of hopelessness are strongly associated with higher levels of anxiety and boredom. Enjoyment, hope, and pride are strongly correlated with each other, suggesting that positive emotions are interrelated. Conversely, emotions like anger, anxiety, shame, hopelessness and boredom tend to have stronger intercorrelations, indicating that they might co-occur more frequently. This result aligns with the theoretical framework of Pekrun's control-value theory. This theory links emotions to academic achievement through cognitive and motivational pathways (Pekrun, 2006).

This study follows an in-depth six-step adaptation process that ensures the CREQ's cultural appropriateness. This aligns with recommendations for cross-cultural adaptation of psychological measures (Sousa & Rojjanasrirat, 2011). Psychometric properties described and discussed above indicated that the class-related emotion subscale is a valid scale for assessing the subjective feeling of students' emotions towards class. In Bangladesh, the validation of this tool will enable the researchers to conduct further studies to understand the emotional dimensions of learning and foster positive emotional experiences in the classroom among students.

Limitations and Future Directions

Although this study achieved its objectives still this study does have certain drawbacks. A major limitation existed regarding sample selection. This study was conducted on university students only, potentially restricting the generalizability of findings to other educational contexts. Developing the norms of this scale for assessing Bangladeshi students' feelings about class will require a study with a sizable representative sample.

Another limitation of this study was its cross-sectional design. To understand how class-related emotions influence academic performance over time, future research should be conducted using a longitudinal design.

This questionnaire can be applied only to university students, which is another drawback of this study. To evaluate CREQ's applicability in diverse populations, this scale could be extended to other educational levels.

Conclusion

The present study demonstrates excellent psychometric properties of the CREQ, including high reliability and validity, confirming its suitability for assessing classroom-related emotions in the Bangladeshi context. Students with higher or lower levels of emotions could be identified using this scale. This scale would be useful to students, teachers, parents, and others related to the field. They could implement programs or intervening measures to boost students' emotional beliefs in their classroom settings to improve academic performance. All things considered, this action might help raise class-related emotional settings of students' emotional beliefs.

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Conflict of Interest Statement

The authors declare no conflict of interest regarding the publication of this study.

Consent for publication

All authors give consent to publish the article and its data.

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