Adaptation of the Learning Style Questionnaire (LSQ) in Bangladesh Context

Mahjabeen Haque[1] and Sadia Afrin[2]*

[1]*Associate Professor, Department of Educational and Counselling Psycholog (DECP) University of Dhaka, Bangladesh*
[2]*Educational Psychologist, Institute of Paediatric Neurodisorder and Autism (IPNA) in BSMMU, Bangabandhu Sheikh Mujib Medical University, Bangladesh*

***Corresponding Author:** Sadia Afrin, Educational Psychologist, Institute of Paediatric Neurodisorder and Autism (IPNA) in BSMMU, Bangabandhu Sheikh Mujib Medical University, Bangladesh.*

Abstract

Objective of the present study was to adapt a valid and reliable learning style questionnaire for university students in Bangla to be used in the context of Bangladeshi culture and background and also to see whether there is any gender difference in learning style among the Bangladeshi students. Data were collected from 238 students, aged between 18 to 24 years using survey method of three different universities of Dhaka city. Among the participants 115 were male and 123 were female. Psychometric analysis included item analysis, test-retest reliability and internal consistency, reliability using Cronbach's alpha. Both Internal consistency and test retest reliabilities were highly satisfactory. Significant correlations between the sub scales provided the evidence for construct validity. Obtained data were analyzed by using t-test result shows low significant gender difference in LSQ among the students of universities. Thus, the Bangla LSQ appeared psychometrically sound and hence culturally appropriate. Therefore, professionals working with students can confidently use the instrument on Bangladeshi sample for a variety of purposes.

Keywords: Adaptation; Learning; Learning Style Questionnaire

Introduction

To maximize the cultural appropriateness and minimize biases of a psychological instrument adaptation is a well greeted way. The process of changing something to make it suitable for a new culture or to the environment is known as adaptation. The traditional concept of translation is replaced by adaptation, transferring a questionnaire is more appropriate than translation to a new culture, linguistic context. Transferring produces a culturally, linguistically equivalent version of a questionnaire. Learning is the lifelong process of transforming information and experience into knowledge, skills, behaviors, and attitudes. It is acquiring new or modifying existing knowledge, behaviors, skills, values or preferences and may involve synthesizing different types of information. Learning style is not an unequivocal concept. In the early 1900's, several personality theories and classifications for individual differences were advanced; these focused especially on the relationship between memory and visual or oral instructional methods. The research in learning styles then declined due to the emphasis on the student's IQ and academic achievement. In the last half of the 1900's, however, there has been a renewed interest in learning styles research and many educators are attempting to apply the results within the classroom. Kolb's model [1] gave rise to the Learning Style Inventory, an assessment method used to determine an individual's learning style, as an individual may exhibit a preference for one of the four styles – Accommodating, Converging, Diverging and Assimilating – depending on the approach to learning via the experiential learning theory model. David A Kolb's [2,3] model is based on the Experiential Learning Theory, as explained in his book *Experiential Learning*. The ELT model outlines two related approaches toward grasping experience: Concrete Experience and Abstract Conceptualization, as well as two related approaches toward transforming experience: Reflective Observation and Active Experimentation. According to Kolb's model, the ideal learning process engages all four of these modes in response to situational demands. In order for learning to be effective, all four of these approaches must be incorporated. Based on Kolb's theories, Honey and Mumford [4] (1986) developed the Learning Styles Questionnaire (LSQ), suggested four basic learning styles: those of the activist, reflector, theorist

and pragmatist. While everyone has a mix of learning styles with have a dominant style of learning, with far less use of the other styles. Others may find that they use different styles in different circumstances. Critically, there is no correct mix. Honey and Mumford's [5] LSQ has been widely used in management training and development. Two adaptations were made to Kolb's experiential model. Firstly, the stages in the cycle were renamed to accord with managerial experiences of decision making/problem solving and the stages are: Activist, Reflector, Theorist and Pragmatist. Secondly, the styles were directly aligned to the stages in the cycle. These are assumed to be acquired preferences that are adaptable, rather than being fixed personality characteristics. The Honey and Mumford Learning Styles Questionnaire (LSQ) is a self-development tool and differs from Kolb's Learning Style inventory. A MORI survey commissioned by The Campaign for Learning in 1999 found the Honey and Mumford LSQ to be the most widely used system for assessing preferred learning styles in the local government sector in the UK. Honey and Mumford's Learning Style Questionnaire (LSQ) has been proposed as an alternative for Kolb's Experiential Learning Style Model (ELM) and a later refined version (LSI-1986) [6]. Honey and Mumford's learning style questionnaire, known as Learning Style Questionnaire (LSQ) Theory has been widely used as an instrument of detecting students' learning style in higher education [6,7] and management practices [8].

This questionnaire is designed to find out individuals' preferred learning style(s). Over the years every humans being has probably developed learning "habits" that help us benefit more from some experiences than from others. Since we are probably unaware of this, this questionnaire will help us to pinpoint our learning preferences so that we are in a better position to select learning experiences that suit our style and having a greater understanding of those that suit the style of others.

Method

A total of 238 participants were chosen covering age range from 18 to 24 years. Among them 115 (48%) were boys and 123 (51.7%) were girls. The participants were chosen following convenient sampling technique from three different universities.

For the data collection, two materials were used: (i) Demographic and personal information questionnaire, (ii) Original Learning Style Questionnaire. The Learning styles Questionnaire contains 80-items which includes 4 learning style (Activist, Reflector, Theorist, and Pragmatist) designed to know the person's learning style. This is an internationally proven tool developed and designed by Peter Honey and Alan Mumford. There is no time limit to this questionnaire. It will probably take 20 - 25 minutes. The accuracy of the results depends on how honest can be. There is no right or wrong answers. If agree more than disagree with a statement, put a tick by it or if disagree more than agree put a cross. Be sure to mark each item either with a tick or a cross. Researcher gets scores ranging from 0 - 20 for Activist, Reflector, Theorist, and Pragmatist. Since the maximum scores for each style is 20 and minimum is 0. At first sight it might conclude that the highest of four scores indicates predominant learning style. Scoring of Activist, Reflector, Theorist, and Pragmatist are calculated by summing the scores for the relevant items. The Questionnaire is scored by awarding one point for each ticked item. There are no points for crossed items. Scoring table of learning style questionnaire in table 1.

Item	Item	Item	Item
2	7	1	5
4	13	3	9
6	15	8	11
10	16	12	19
17	25	14	21
23	28	18	27
24	29	20	35
32	31	22	37
34	33	26	44
38	36	30	49
40	39	42	50
43	41	47	53
45	46	51	54
48	52	57	56
58	55	61	59
64	60	63	65
71	62	68	69
72	66	75	70
74	67	77	73
79	76	78	80
Activist	Reflector	Theorist	Pragmatist

Table 1: *Scoring Table of Learning Style Questionnaire.*

Scores can be calculated both manually and with help of computer software. The adaptation of LSQ involved several multistage procedures following the cross cultural standard guideline regarding adaptation and validation of psychometric instrument of Beaton., *et al.* [9] and Borsa., *et al.* [10]. Two independent bilingual translators whose original mother language is Bangla translated the original LSQ. After that, the researchers compared the two different translations and assessed the semantic, idiomatic, conceptual, linguistic and contextual differences. Then the synthesized version was evaluated by four experts who had the knowledge of what the instrument assessed. These experts evaluated noteworthy features, such as the structure, layout, instrument instructions and both the scope and adequacy of expressions contained in the items. This assured the linguistic and cultural validity of the adapted scale. Then blind back translation was done by two experts. The translated versions and the back translated versions were reviewed. The synthesis version and was administered to 30 students to check the strength of items concerning their meaning and difficulty. The scale was finalized after this pilot study. The final Bangla version of LSQ was administered to 238 students of three different universities of Dhaka city. After 14 days, re-test was done with 54 students. SPSS software version 21.0 was used for statistical analysis.

Results and Discussion

To determine whether an item is useful or not and how it performs in relation to other items on the questionnaire, corrected item-total correlation was computed. Item analysis is generally the detailed analysis of the individual items of a test or scale with purpose of assessing their reliability and validity [11]. The item-total statistics of the adapted version of the LSQ will be attached in abstract. Table 2 shows item no 2 and 45 have very poor Corrected item Total Correlation, but both are kept for large sample testing. Other items in Activist sub-scale have accepted corrected item-total correlation (above .199). Table 3 shows the all item in reflector sub-scale have accepted corrected item-total correlation (above .199). Table 4 shows the all item in Theorist sub-scale have accepted corrected item-total correlation (above .199). Table 5 shows item no. 11, 19 have not accepted corrected item-total correlation (below .199 except). But these two items was kept in the final version to test with the large sample. Other items in Pragmatist sub-scale have accepted corrected item-total correlation.

Concern Item No.	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Ai2	.071	.867
Ai4	.439	.850
Ai6	.919	.823
Ai10	.349	.852
Ai17	.334	.858
Ai23	.919	.823
Ai24	.371	.884
Ai32	.658	.838
Ai34	.919	.823
Ai38	.800	.830
Ai40	.515	.833
Ai43	.919	.823
Ai45	.055	.867
Ai48	-.333	.884
Ai58	.919	.823
Ai64	.439	.850
Ai71	.555	.846
Ai72	.660	.838
Ai74	-.396	.885
Ai79	.399	.852

Table 2: Item-Total Statistics and the Reliability of the LSQ; subscale activist.

Concern Item No.	Corrected Item-Total Correlation	Cronbac h's Alpha if Item Deleted
Ri7	.383	.717
Ri13	.437	.708
Ri15	.354	.750
Ri16	.475	.704
Ri125	.210	.731
Ri28	.450	.706
Ri29	.364	.717
Ri31	.622	.683
Ri33	.359	.717
Ri36	.471	.703
Ri39	.360	.717
Ri41	.318	.722
Ri46	.365	.717
Ri52	.392	.742
Ri55	.455	.707
Ri60	.466	.706
Ri62	.351	.740
Ri66	.450	.706
Ri67	.524	.698
Ri76	.377	.740

Table 3: Item-Total Statistics and the Reliability of the LSQ; subscale reflector.

Concern Item No.	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Ti1	.334	.809
Ti3	.366	.803
Ti8	.777	.773
Ti12	.341	.810
Ti14	.332	.814
Ti18	.777	.773
Ti20	.771	.773
Ti22	.511	.793
Ti26	.300	.808
Ti30	.372	.818
Ti42	.318	.812
Ti47	.417	.774
Ti51	.328	.815
Ti57	.526	.749
Ti61	.366	.809
Ti63	.777	.773
Ti68	.730	.774
Ti75	.608	.778
Ti77	.617	.823
Ti78	.617	.793

Table 4: Item-Total Statistics and the Reliability of the LSQ; subscale theorist.

Concern Item No.	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Pi5	.382	.756
Pi9	.409	.747
Pi11	.187	.766
Pi19	.110	.768
Pi21	.406	.710
Pi27	.384	.757
Pi35	.508	.737
Pi37	.364	.750
Pi44	.428	.727
Pi49	.456	.752
Pi50	.508	.740
Pi53	.352	.737
Pi54	.334	.761
Pi56	.598	.752
Pi59	.686	.737
Pi65	.382	.722
Pi69	.497	.756
Pi70	.393	.741
Pi73	.384	.747
Pi80	.337	.757

Table 5: Item-Total Statistics and the Reliability of the LSQ; subscale pragmatist.

Reliability refers to the ability of the scale to yield consistent results in every occasion of measurement, that is, internal consistency of the scale. Reliability of the LSQ was assessed by using Cornbach's Alpha for the four sub-scales separately (Activist, Reflector, Theorist and Pragmatist). Computation of Corrected Item-Total Correlations for each Sub-scale to see how individual item goes with the total score. From the table 6 it has been found that the Cornbach's Alpha of the Sub Scales of LSQ is above then .75, which indicated a good reliability according to the rules of thumb provided by the George and Mallery [12] (2003). To examine whether scores of questionnaire are stable over time, researchers administered it twice on a total of 30 students with an interval of fourteen days. The interval was chosen as to minimize the possibility of large fluctuations in the mental health states between two administrations. Researchers suggest that the test-retest interval for measures used with children should be shorter (e.g. 1 week) if characteristics being measured (such as depression) but Learning Style is a long time process for this reason it administered after 14 days. Researchers computed coefficients of correlations between the two sets of data for each questionnaire to see the temporal stability of the test scores. Table 7 shows that all the instruments are highly reliable as evidenced by the coefficients of correlations. It also indicates that the adapted version is comparable to the original version in terms of its temporal stability.

	Cornbach's Alpha	**No of Items**
Activist	.856*	20
Reflector	.834**	20
Theorist	.810**	20
Pragmatist	.762*	20

Table 6: *Internal Consistency (Cronbach's Alpha) Reliability of the Four Subscales of LSQ.*

** and * Indicate correlation is significant at 0.05 and 0.05% probability level

LSQ	**First Testing**		**Second Testing**		**r**
	M	**SD**	**M**	**SD**	
Activist	11.33	2.86	11.50	2.22	.62*
Reflector	16.53	2.32	16.23	2.27	.49**
Theorist	16.07	2.32	15.43	2.14	.55*
Pragmatist	15.43	2.329	15.53	2.06	.48*

Table 7: *Test-Retest Reliability Coefficients for Each sub scale of LSQ with an Interval of 14 days.*

Note. ** p< .01.*p<.05

Validity refers to the strength of the scale of measuring the behavior or that aspect of behavior for which it was intended to measure. In case of the LSQ validity refers to the strength of the questionnaire of measuring levels of learning style of a student. The validity of the Bangla version of the LSQ was measured by using convergent validity. Convergent validity is one method to determine the construct validity of the scale. Convergent validity of this inventory was assessed as the inventory has four sub-scales which measure the same construct. It is assumed that if the score of these subscales significantly correlate with each other, then it will be said that the inventory has convergent validity. To measure the convergent validity of LSQ correlations between the individual sub-scale totals were assessed by Pearson product moment correlation. The correlations were found significant ranging from -.100 to .700(p < .01 and p < .05), which indicated that the adapted version of the LSQ has a high level of convergent validity. The correlations among the subscales are presented in the table 8. To assess validity of the instruments, researcher determined intercorrelations among the Four Sub Scales. These provided evidences for the internal structure of the instrument. Overall, Sub Scales scores were significantly correlated with each other within the field test group. Among the questionnaires table 8 shows that, there is significant positive correlation among Activist and Pragmatist, reflector with theorist and pragmatist, theorist with pragmatist. But there is moderately significant negative correlation between activist and reflector sub-scale.

	Activist	**Reflector**	**Theorist**	**Pragmatist**
Activist	-	-.075	.038	.690*
Reflector		-	.616**	.371*
Theorist			-	.397*
Pragmatist				-

Table 8: *Inter-Correlation among the subscales (200 cases).*

**correlation is significant at the 0.01 level

* correlation is significant at the 0.05 level

Obtained data were also analyzed by using t-test to see whether there is any significant gender difference in Learning Style. Mean, SD and t value of LSQ of Male and Female sample is shown in table 9. From table 9, researchers get that there is a significant difference between Male and female in Theorist sub scale but no significant difference in activist, reflector and pragmatist subscales. Correlations which are significant ranging from -.116 to .656 for the whole sample.

	Gender	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Activist	Male	115	11.00	2.733			
	Female	123	11.71	3.049	-.677	235	.504
Reflector	Male	115	16.62	2.277			
	Female	123	16.43	2.441	.228	235	.821
Theorist	Male	115	15.69	2.651			
	Female	123	16.50	3.871	-.956*	235	.347
Pragmatist	Male	115	15.12	2.473			
	Female	123	15.79	2.190	-.770	235	.448

Table 9: Mean, SD and t value of LSQ of Male and Female sample.

*t value is significant at the 0.05 level

Sub-scales	Activist	Reflector	Theorist	Pragmatist
Activist		- .031	- .233*	.656*
Reflector	- .017		.104*	.259*
Theorist	- .087	.229*		-.116*
Pragmatist	.213*	.137	-.252*	

Table 10: Correlations of LSQ for the Field Test Sample Separately for Males and Females.

Note. Correlations above the diagonal pertain to Female and below the diagonal pertain to Male

. * $p < .05$.

The pretest version was obtained by systematic revision and comparison with the original version of these two separate translations. The pretest version was administered to a small group of sample (N = 30). From item analysis, corrected item total correlation out of 80 items some were found to be very poor, as accepted item corrected item-total correlation was above .199. For this reason, these items were revised according to the suggestion of the respondents and the decisions of the panel of experts. After the revision, the entire instrument was administered to another sample for item analysis. From 2nd stage item analysis, the 80 items were thoroughly analyzed and corrected item-total correlation was determined. Here, also we have found very poor corrected item-total correlation of some items. So, 4 items (item no.2, 11, 19 and 45) having very poor corrected item-total correlation (below .199) but researchers decided to keep it and test to a large sample. So there are total 80 items in the final version of the LSQ. The subscales are: Activist, Reflector, Theorist and Pragmatist. The results of the assessment of corrected item-total correlation indicated that the instrument is reliable and all items of the inventories are important or in other words non-redundant. The intercorrelations among four sub scales of the Bangla LSQ are indicative of convergent validity. Thus, the findings can be taken to suggest that the Bangla LSQ are suitable for assessing four different learning style of adult student in Bangladesh.

The present study demonstrated that the internal consistency reliability of all the Bangla LSQ appeared acceptable or good as the Cronbach's alpha ranged between .76 and .85. The criteria for evaluating alpha coefficients were derived from George and Mallery (2003) who provided the following rules of thumb: "$\alpha \geq .9$ – Excellent, $.9 > \alpha \geq .8$ – Good, $8 > \alpha \geq .7$ – Acceptable, $.7 > \alpha \geq .6$ – Questionable, $.6 > \alpha \geq .5$ – Poor, and $.5 > \alpha$ – Unacceptable" (p. 231). It is noteworthy that the coefficients of alpha of the original LSQ ranged from .81 to .89 which are slightly higher than those of the Bangla LSQ. However, these findings are comparable considering the criteria set by George and Mallery [12]. The study further demonstrated that the temporal stability of the Bangla BYI ($r = .55$ to $.62$) over 14 days interval was good [13]. In the process of determination of the reliability of the adapted version of the LSQ, it was found that for the four subscales: Activist, Reflector, Theorist and Pragmatist the Cronbach Alpha were .86, .83, .81 and .76 respectively. Evidences for the construct validity of the Bangla LSQ came from two sources. Firstly, sub scales scores were significantly correlated with each other for the entire field test sample as well as separately for male and female respondents. Secondly, as in the original LSQ, the correlations between the activist and pragmatist, and pragmatist has positive relation with reflector and theorist, reflector has positive correlation with theorist. In determining the validity, convergent validity method was used. The significant correlation among the subscales were found that ranged from -.075 to .69, ($p < .01$ and $p < .05$). These findings indicate that the adapted version of LSQ possessed a good reliability and convergent validity.

Collected Data was analyzed by SPSS version 21.0 to see the whether there is any gender difference in learning style. The findings suggest that, there is no significant difference between male and female students in activist, reflector and pragmatist. Result shows there is a significant difference between male and female in the theorist sub scale (Male: Mean = 15.69, SD = 2.651; Female: Mean = 16.50, SD = 3.871; $p < .05$).

It may be concluded that the present study has been able to make available a valid and reliable LSQ for the use of Bangladesh. Thus, the Bangla LSQ appeared to measure what it was actually designed to measure. The present study is not beyond its limitations, however. The big limitation was that a norm could not be established for not having selected a representative sample as due mainly shortness of time. Another limitation was that to adapt a valid learning style questionnaire this questionnaire also applied to school and college students and also for other university students. Findings of the present study warrant future research with larger samples of students within school, college, Open University, also other government and non-government university. Despite the limitations, the psychometric properties as manifested in the Bangla version of LSQ suggest that the different educational institute dealing with learning style can confidently apply the instrument to the language and cultural group of Bangladesh. The study recommends further research on large sample from different types and levels of students, as well as, different areas of Bangladesh. To explore more validation of the inventory further different methods can be used in determining reliability and validity which will enrich the psychometric properties of this inventory. Moreover this research will help future to be inspired researching on this field.

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