
Adaptation and Validation of Academic Self-Concept Questionnaire (ASCQ) for College Students

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ABSTRACT

The primary purpose of this study was to establish the validity and reliability of Academic Self-Concept Questionnaire (ASCQ) in the context of Filipino college students. The Academic Self-Concept Questionnaire (ASCQ) has been validated in Singapore and Vietnam and considered as a valid tool to measure academic self-concept of children. Data were gathered from 500 college students of Samar State University. To investigate the factor structure of the Academic Self-Concept Questionnaire (ASCQ), an exploratory factor analysis with the Principle Component Analysis using parallel analysis factor extraction and varimax rotation method was conducted. The factor analysis produced a meaningful three factor dimension with a total of 19 items. These three factors were Academic Motivation, Academic Persistence, and Academic Ability. Reliability was supported by internal consistency values as reflected in acceptable Cronbach's coefficient alpha for the three factor dimensions. Hence, this instrument may be used to measure academic self-concept of college students. Thus, the researcher proposed that this adapted and validated instrument be named as Academic Self Concept Scale for College Students.

Keywords: *Academic Self-Concept, Academic Motivation, Academic Persistence, Academic Ability, Exploratory Factor Analysis, Principal Component Analysis, Parallel Analysis*

INTRODUCTION

College students are subjected to many different challenges, stressors, and opportunities. An important factor in overcoming these challenges is a positive self-concept. Self-concept is the perception that individuals have of their own worth. This includes a composite of their feelings, a generalized view of their social acceptance, and their personal feelings about themselves (Belmore & Cillessen, 2006). It is a perception formed through experiences in relation to one's environment based on self-knowledge and evaluation of values (Eccles, 2005). One dimension of self-concept is the academic self-concept which is the main focus of this study.

Academic self-concept is referred to as a person's self-evaluation regarding specific academic domains or abilities (Trautwein, et al. 2006). It is how students do school work and feel about themselves as learners. The construct of self-concept is grounded primarily in self-worth theory (Covington, 1992). Briefly, self-worth theory suggests that all individuals have a motivational "tendency to establish and maintain a positive self-image, or sense of self-worth" (Eccles & Wigfield, 2002, p. 122). It asserts that since children spend most of their time being evaluated in school, it is noteworthy to maintain and develop a positive academic self-concept.

This academic self-concept is one of the most important variables in the academic domain, due to its significant influence on appropriate cognitive functioning. It is the perception and evaluation that a student has or does about his or her academic abilities (Marsh & Rhonda, 2002). Studies shows that academic self-concept helps to create various cognitive and self-regulative strategies (Zimmerman, 2000), which reflect on academic performance. Hence, it can be said that academic self-concept directly affects learning processes, academic achievement, and expectations of students (Henson & Heller, 2000).

Empirical studies have found important divergence between students with high academic self-concept and students with low academic self-concept. Students with high academic self-concept value their own abilities, accept challenges, take risks, try new things (Bong & Skaalvik, 2003), and also create multiple cognitive strategies (González-Pineda *et al.*, 1997). Moreover, they possess a higher motivation to complete difficult academic tasks and set higher goals (Pintrich, Roeser, & De Groot, 1994). In this sense, most students with high academic performance show high academic self-concept (Campo-Arias *et al.*, 2005; Schunk, Printrich, & Meece, 2008).

Students showing low academic self-concept exhibit less confidence in their academic aptitudes (Amezcu&Fernández, 2000; Broc, 2000). They undervalue their talent, avoid situations that cause anxiety (Ommundsen, Haugen, & Lund, 2005); i. e., they have less cognitive and motivational resources than students with positive self-concept (Núñez *et al.*, 1998). And this is reflected on low academic performance (Möller, & Pohlman, 2010).

Academic self-concept is significant for students' personal adjustment and for the effect it has on other desired educational outcomes such as school completion, educational aspirations, academic achievement, and subsequent school attendance. The link with these outcomes is based on the idea that individuals are likely to accomplish more if they feel more competent, have high self-confidence and have more positive perceptions of themselves (Marsh & Hau, 2003; Tan & Yates, 2007).

According to research it has been noted that academic self-concept becomes more stable as students grow older (Guay, et al. 2003). Moreover, In a study by Liu and Wang (2005) it was found out that academic self-concept tends to decline from early to middle adolescence and also extends to adulthood. Similarly, Marsh (1989) asserted that perceptions of their academic ability formed in conjunction with parents, peers and teachers. He also found out that academic self-concept reaches its lowest point in middle adolescence, but also, found out that academic self-concept increase through early adulthood. Thus, it has been discovered that academic self-concept has a relationship with academic achievement (Awad, 2007; Tan & Yates, 2007; Marsh, 2004; Cokley, 2000).

Nevertheless, although various researchers concur with the academic self-concept's relationship with academic achievement, only a few studies have been done to highlight the different subscales to measure academic self-concept and its importance in explaining and predicting behavior in academic domain. The aim of this study was to validate psychometrically the Academic Self-Concept Questionnaire (ASCQ) designed by Liu and Wung (2005). The development of the ASCQ reflects the conceptualization of 20 items academic self-concept questionnaire with two dimensions namely: academic confidence and academic effort. This was used to assess children in Singapore and Vietnam. The validity and reliability of the ASCQ (Liu & Wang, 2005) have been established in previous studies in

Singapore with cronbach's alpha (α) ranging between 0.70 and 0.89. Answers to the individual items were rated on a four point scale ranging from 'strongly agree' (1) to 'strongly disagree' (4). In this study, the Academic Self-Concept Questionnaire (ASCQ) was adapted and validated in Filipino context with college students as respondents.

METHODS

Item Review

As noted by Schwab (1980), content validity is critical to the item construction process. Content validity is the degree to which a specific measure reflects a particular intended content domain (Carmines & Zeller, 1991). To aid in assessing the content validity and clarity of the ASCQ, expert opinions were solicited. The researcher selected 5 experts to review the original instrument. All the experts are Psychology teachers. In order to get the instrument to measure adequately and clearly the construct, each expert was asked individually to validate the content of each item. They were requested to cross the items that were inadequate for measuring academic self-concept, and also to provide input on writing clarity. All of the 20 items put to validation were approved. However, there are words and phrases that were suggested to be changed, such as "If I work hard I think I can go to the college or university" to "If I work hard I can do better in college or university" and the word "lessons" to "discussions."

Data were randomly collected from 500 college students coming from the five colleges of Samar State University, namely: College of Education, College of Arts and Sciences, College of Nursing, College of Industrial Technology and College of Engineering.

Pilot Testing of the Instrument

Before administration to college students, an informed consent form was requested to school authorities, and teachers, as well as group participants. A brief explanation on the purpose and importance of completing the questionnaire was provided and they were asked to agree. Group administration to sample college students was used. Coding of the data generated from the instrument. Answers for each item were coded as follows: 1- Strongly Disagree; 2- Disagree; 3- Agree; and 4- Strongly Agree. Items that were expressed in negative format were coded the opposite. These items are as follows: Item number 2,7,9,11,13,14,16,17 and 20.

Data Analysis

Exploratory Factor Analysis was carried out on the 20 items of the Academic Self-Concept' Questionnaire (Liu and Wang, 2005) using Principal Components Analysis with Varimax rotation to investigate the internal structure questionnaire. Principal Component Analysis (PCA) is a dimension-reduction tool that can be used to reduce a large set of variables to a small set that still contains most of the information in the large set. It aims at reducing a large set of variables to a small set that still contains most of the information in the large set (Abdi, 2010).

In order to produce scale unidimensionality, and simplify the factor solution several criteria in determining factor extraction should be considered. This is reinforced by Thomson and Daniel who stated that the "simultaneous use of multiple decision rules is appropriate and

often desirable.” Hence, in this study several criteria were used to determine how many factors should be retained.

(1) The point of inflection displayed by the scree plot; (2) The eigenvalues criterion. Since several studies show that the ‘eigenvalues>1’ rule leads to an overestimation of the number of factors to retain (Henson & Roberts 2006); (3) The ‘proportion of variance accounted for’ criterion. A component was retained if it minimally explained an approximate additional 5% of the variance; (4) The interpretability was investigated using Hatcher’s interpretability criteria (Hatcher 1994). To find the best solution in terms of interpretability and theoretical sensibility, the researcher decided to investigate the interpretability of the best solution according to the current three psychometric criteria and that of solutions with up to two factors more and two factors less (Lee & Hooley 2005). The interpretability criteria read: (4a) A given component contains at least three variables with significant loadings, a loading of 0.40 being suggested as the cut-off point; (4b) Variables loading on the same component share the same conceptual meaning; (4c) Variables loading on different components appear to measure different constructs; (4d) The rotated factor pattern demonstrates ‘simple structure’, which means that, most variables load relatively high on only one component and low on the other components and most components have relatively high factor loadings for some variables and low loadings for the remaining ones. The interpretation process for each rotated solution started with the elimination of double-loading items (criterion 4d), which are items that load at least 0.40 on more than one factor (Hatcher 1994); (5) A good practices for retaining the number of factors is called *parallel analysis*. This procedure is based on the work of Horn, which consists of randomly creating the same number of variables as the number of items analyzed, correlating them and extracting eigenvalues against which the eigenvalues derived from the empirical data under analysis are compared (Hayton, 2004).

To determine the internal consistency of Academic Self-Concept Questionnaire (ASCS) reliability analysis using Cronbach alpha was used. An item has an acceptable level of internal consistency if its Cronbach alpha is at least 0.70 (Nunally, 1978; Streimer & Norman, 2008). An item is considered to contribute highly to the construct being measured if its corrected item-total correlation has a value of more than 0.3 (Yusoff et al, 2010)

To assess the suitability of the data, prior to performing PCA, Bartlett’s test of sphericity (Bartlett, 1954) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser, 1970, 1974) were conducted. A KMO correlation of 0.60-0.70 is considered adequate. To check whether the correlation matrix is not an identity matrix, a Bartlett’s Sphericity test was done which provides a chi-square output that must be significant (Burton & Mazerolle, 2011).

RESULTS

The KMO index was found to be 0.79 which was considered adequate and above the recommended minimum of 0.6. The result of the Bartlett’s test of sphericity was significant ($p \leq 0.01$) indicating that it was appropriate to conduct principal component analysis.

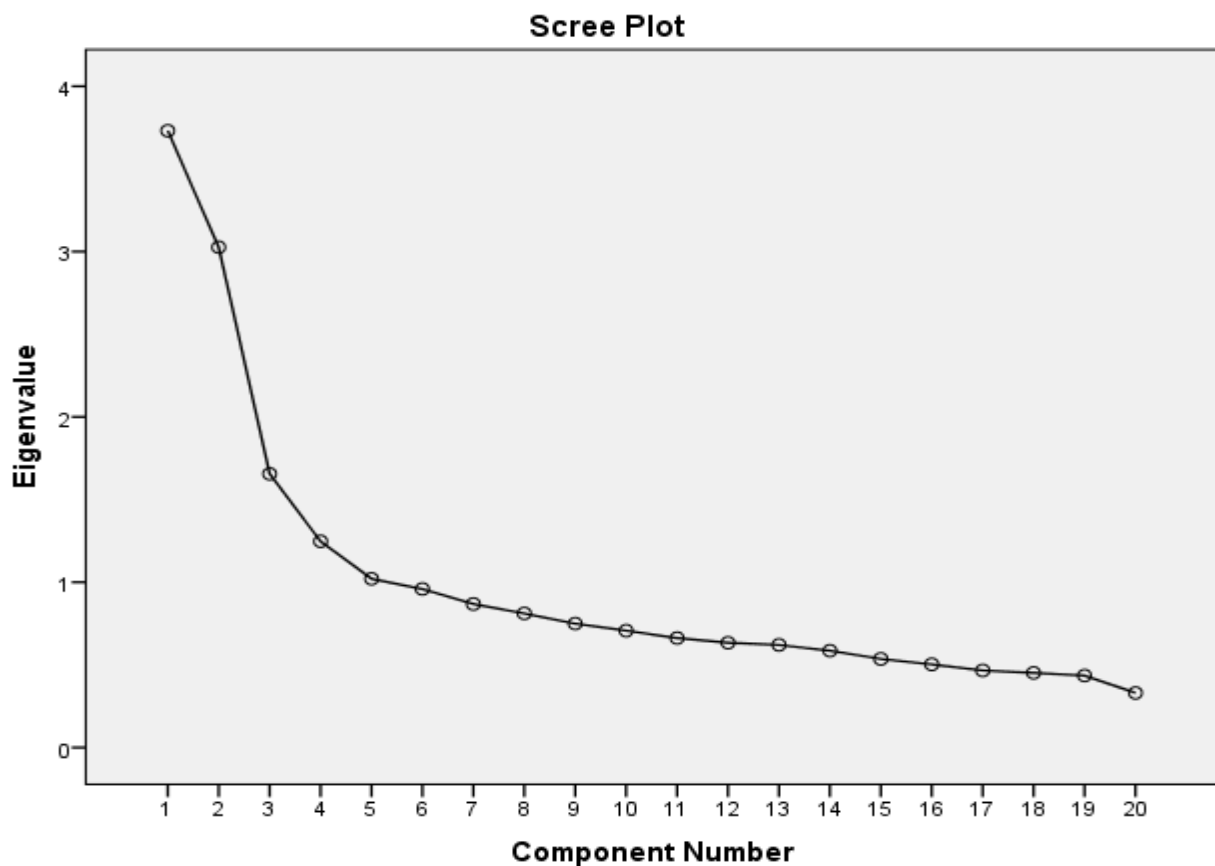
Results of the principal components analysis revealed the presence of five (5) components with eigenvalues exceeding 1. This explains a total of 48.2% of the variance with each dimensions contributing 18.6%, 15.1%, 8.2%, 6.2% and 5.1% respectively.

Table 1. Eigenvalues greater than 1 from PCA

| | PC1 | PC2 | PC3 | PC4 | PC5 |
|-------------------|------------|------------|------------|------------|------------|
| Eigenvalue | 3.731 | 3.026 | 1.655 | 1.247 | 1.021 |
| Proportion | .186 | .151 | .082 | .062 | .051 |
| Cumulative | .186 | .337 | .420 | .482 | .53 |

The scree plot showed a sharp point of inflection after the first factor (Figure 1) and started to level off after the five factor. The factors that lie before the point at which eigenvalues begin to drop can be retained. There were five factors which had initial eigenvalues greater than 1, the scree plot also suggests the same number of factors to be considered.

Fig.1 Scree Plot of the Items and their Corresponding Eigenvalues



Moreover, another factor extraction technique used in this study is the Parallel Analysis. In parallel analysis, actual eigenvalues are compared with random order eigenvalues. Factors are retained when actual eigenvalues surpass random ordered eigenvalues. In this study, parallel analysis revealed three factor model as shown in Table 4. Since parallel analysis is more conservative and accurate approach to factor extraction that takes into account the biasing influence of sampling error (Zwick and Velicer, 1986), the researcher consider this factor extraction technique to be the best fit and can make the most conceptual sense.

Table 2: Parallel Analysis (Monte Carlo PA Output)

| Component Number | Actual Eigenvalue from PCA | Random Order from Parallel Analysis | Decision |
|------------------|----------------------------|-------------------------------------|----------|
| 1 | 3.730921 | 1.437693 | Accept |
| 2 | 3.026279 | 1.351977 | Accept |
| 3 | 1.655360 | 1.293467 | Accept |
| 4 | 1.247258 | 1.247381 | Reject |
| 5 | 1.020754 | 1.205913 | Reject |
| 6 | .958940 | 1.163424 | Reject |
| 7 | .868139 | 1.128821 | Reject |
| 8 | .811113 | 1.093982 | Reject |
| 9 | .749528 | 1.061383 | Reject |
| 10 | .706873 | 1.027347 | Reject |
| 11 | .662285 | .997723 | Reject |
| 12 | .633889 | .968822 | Reject |
| 13 | .620517 | .941402 | Reject |
| 14 | .585620 | .910705 | Reject |
| 15 | .535952 | .882356 | Reject |
| 16 | .503003 | .851089 | Reject |
| 17 | .466039 | .821296 | Reject |
| 18 | .451626 | .789497 | Reject |
| 19 | .435296 | .757761 | Reject |
| 20 | .330607 | .716746 | Reject |

The principal component analysis using parallel analysis extraction technique revealed a three factor model. Item three was not able to load in any factor. Nineteen items were able to load higher than 0.400. As can be seen in Table 3, there are items that loaded to more than 1 factor such as item number 15 loaded to factors 2 and 3, item number 18 loaded to factors 1 and 3 and item 19 loaded to factor 1 and 3. Since the criterion for retaining an item was a factor loading ≥ 0.400 , the researcher opted to consider the item in the factor where it was loaded higher. Nineteen items were retained, however, it was re-categorized into three dimensions compared to its original which was composed only of two dimensions. The following items were re-categorized under each corresponding factor: items 1, 5, 6, 8, 10, and 12 for Factor 1, for Factor 2 items 2,11,13,14,16,17,18 and 20, and items 4, 7,9, 15 and 19 for Factor 3.

Table 3. Sorted Rotated Factor Loadings and Communalities of the three dimension solution for Academic Self-Concept Questionnaire (ASCQ)

| Variable | Factor 1 | Factor 2 | Factor 3 | Communality |
|----------|----------|----------|----------|-------------|
| Q1 | 0.000 | 0.488 | 0.000 | .262 |
| Q2 | 0.458 | 0.000 | 0.000 | .221 |
| Q3 | 0.000 | 0.000 | 0.000 | .222 |
| Q4 | 0.000 | 0.000 | -0.500 | .300 |
| Q5 | 0.000 | 0.451 | 0.000 | .275 |

| | | | | |
|-----|--------|-------|-------|------|
| Q6 | 0.000 | 0.714 | 0.000 | .555 |
| Q7 | 0.000 | 0.000 | 0.412 | .321 |
| Q8 | 0.000 | 0.668 | 0.000 | .507 |
| Q9 | 0.000 | 0.000 | 0.610 | .379 |
| Q10 | 0.000 | 0.674 | 0.000 | .479 |
| Q11 | 0.592 | 0.000 | 0.000 | .416 |
| Q12 | 0.000 | 0.646 | 0.000 | .475 |
| Q13 | 0.565 | 0.000 | 0.000 | .401 |
| Q14 | 0.700 | 0.000 | 0.000 | .512 |
| Q15 | 0.000 | 0.494 | 0.509 | .504 |
| Q16 | 0.608 | 0.000 | 0.000 | .386 |
| Q17 | 0.718 | 0.000 | 0.000 | .525 |
| Q18 | -.0443 | 0.000 | 0.367 | .532 |
| Q19 | 0.000 | 0.410 | 0.673 | .623 |
| Q20 | 0.696 | 0.000 | 0.000 | .517 |

Table 4. New item groupings of the 19 retained items based on Rotated Factor Loadings and Communalities

| Items | Factor |
|--|-----------------------------|
| 1. I can follow the lessons easily. 2. If I work hard I think I can go to the college or university. 3. I pay attention to the teachers during lessons 4. I study hard for my tests 5. I am usually interested in my schoolwork 6. I am willing to do my best to pass all the subjects. | Academic Motivation |
| 7. I day dream a lot in class. 8. I often forget what I have learnt. 9. I get frightened when I am asked a question by the teachers. 10. I often feel like quitting school. 11. I am always waiting for the lessons to end. 12. I always do poorly in tests. 13. I am not willing to put in more effort in my schoolwork. 14. I do not give up easily when I am faced with a difficult question in my schoolwork. | Academic Persistence |
| 14. Most of my classmates are smarter than I am. 15. I am good in most of my school subjects. 16. I often do my homework without thinking. 17. My teachers feel that I am poor in my work 18. I am able to do better than my friends in most subjects. | Academic Ability |

Internal consistency reliability was tested by Cronbach's alpha coefficient. In this study, Cronbach's alpha coefficient was greater 70% for all domains. For the Academic motivation domain Cronbach's alpha is .711, Academic Persistence domain Cronbach's alpha is .769 and Academic Ability Cronbach's alpha is .701

DISCUSSION

This study validated the psychometric properties of Academic Self-Concept Questionnaire of Liu and Wang (2008) in a sample of college students in a state university in the Philippines. Measuring one's academic self-concept is significant for students' academic achievement, school attendance, school completion and school aspirations. The link with these outcomes is based on the idea that individuals are likely to accomplish more if they feel more competent, have high self-confidence and have more positive perceptions of themselves (Marsh & Hau, 2003; Tan & Yates, 2007).

An exploratory factor analysis exploring the underlying constructs of the Academic Self-Concept Questionnaire produced a three factor dimension consisting of 19 items of the initial pool of 20 items developed for the academic self-concept. Findings supported underlying factors that emerged from the three factor dimension. The extraction methods used in this study is parallel analysis that indicated that a three factor domains formed the best conceptual fit and clarity of the instrument. The factor structure derived from the data was conceptually appropriate and easy to interpret. The final factor model of the Academic Self-Concept Questionnaire in this study provided adequate domains that encompassed the content areas and appeared to be useful in the academic field. The domains specifically were labeled "Academic Motivation", "Academic Persistence", and "Academic Ability."

Hence, the three domains obtained from the factor analyses were consistent with existing academic self-concept literature. The researcher's finding was supported by the study of Shavelson (1976) in which he found out that academic self-concept in specific school subjects has been shown to influence subsequent task choice; motivation; effort; persistence which, in turn; leads to improved achievement and academic self-concept. One interesting finding in this study is that students' motivation, persistence and ability were part of the final factor dimension as distinct factors of academic self-concept.

In general, this data supports an acceptable level of reliability for the Academic Self-Concept Questionnaire as the overall Cronbach's alpha values for each dimension were more than 0.7 (Nunnally, 1978; Streiner & Norman, 2008). Thus, this study may suggest that students' motivation, persistence and ability encompasses academic self-concept.

CONCLUSION

In summary, though the loading of the different items of the Academic Self-Concept Questionnaire (ASCQ) and its dimensions were different from the original Academic Self-Concept Questionnaire (ASCQ) of Lui and Wang (2008), since it has good reliability index, this instrument may be used to measure academic self-concept of college students. In this regard, the researcher proposed that this adapted and validated instrument be named as Academic Self Concept Scale for College Students.

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