DEVELOPMENT AND VALIDATION OF SECONDARY SCHOOL STUDENTS' ACADEMIC MOTIVATION QUESTIONNAIRE (SAMQ)

Hafiz Muhammad Salman Naveed,
PhD Scholar, Department of Education, University of Gujrat
Dr. Mobeen Ul Islam,
 Assistant Professor, Department of Education, University of Gujrat

Abstract

The main objective of the present study was to develop and validate a tool to measure academic motivation among secondary school students called the secondary school student's academic motivation questionnaire (SAMQ) with two sub-dimensions: Intrinsic Motivation (IM) and Extrinsic Motivation (EM). The initial draft, comprising nineteen (19) items, was pilot-tested on 248 secondary school students enrolled in 10th grade at public schools. Confirmatory factor analysis (CFA) was also ensured to make the model fit through AMOS software. The results of the test affirmed that the model is valid and reliable; it reduced to thirteen (13) items with α =0.743, out of which seven (7) items retained for the Intrinsic Motivation (IM), and six (6) items retained for the Extrinsic Motivation (EM). Thus, the results provided evidence for using secondary school students' academic motivation questionnaires (SAMQ) to identify and measure academic motivation among secondary school students.

Keywords: Secondary School Students; Academic Motivation; Intrinsic Motivation; Extrinsic Motivation.

Introduction

Academic motivation is one of the major predictors of student engagement, learning behaviors, and academic achievement (Schunk & DiBenedetto, 2021). Motivation can be classified as intrinsic motivation, meaning participating in learning for inherent satisfaction and personal interest, and extrinsic motivation, or learning due to outside pressures or rewards (Deci & Ryan, 2000). They are vital motivational constructs that influence students' academic behaviors and achievement outcomes, especially in secondary school, where they must cope with rising academic challenges and standards (Ryan & Deci, 2020).

Intrinsic motivation occurs when students have a natural or inherent desire or need to learn for its own sake (Deci & Ryan, 1985). We have been straining to break this down into parts. However, students with high intrinsic motivation in their work correlate with higher self-efficacy, higher cognitive engagement, and increased persistence (Howard et al., 2021). The Self-Determination Theory (SDT) depicts intrinsic motivation as a behavior that thrives when students feel autonomous (a sense of control over their learning), competent (a belief in their success), and connected with peers and teachers (Ryan & Deci, 2017). Research has shown that students with high levels of intrinsic motivation are likelier to use deep-learning strategies, think critically, and self-regulate learning than students primarily motivated through extrinsic means (Vansteenkiste et al., 2020).

Moreover, intrinsically motivated students learn because of their genuine interest in the subject matter and demonstrate better academic success and emotional well-being in the long term than their peers (Jang et al., 2021). More specifically, student-centered, project-based, and inquiry-based instruction at the secondary school level has led to a significant increase in students' intrinsic motivation and interest in learning, which has translated into better academic performance (Patall et al., 2022)

According to Ryan & Deci (2000), Intrinsic motivation describes students' inclination to learn because of personal satisfaction stemming from engagement and achieving mastery, while extrinsic motivation, on the other hand, covers students' desire to learn considering external rewards like grades, teacher approval, parent expectations, or competition winnings. Reward can also be an external motivator to complete the task and attend to the work in the short term; however, over-reliance on rewards from external sources can decrease students' intrinsic interest in learning (Corpus et al., 2022) and thus should be implemented with caution.

However, Extrinsic motivation can be subdivided into various types of regulation, including external regulation (where rewards entirely govern the behavior) and identified regulation, where the students recognize the significance of learning but still need external stimuli to reinforce it (Howard et al., 2021). For instance, those who study to escape punishment or gain a reward (external regulation) are more likely to use the surface learning approach, and the students who internalize the value of education (identified regulation) are more likely to pursue meaningful learning experiences than those whose environmental controls constrain them (Deci et al., 2022).

While studies debate the efficacy of extrinsic versus intrinsic motivation in achieving meaningful academic outcomes, the prevailing conversation between models suggests that optimal learning experiences include both types of motivation (Schunk & Usher, 2022). Well-designed extrinsic incentives (like constructive feedback, recognition, and mastery-based grading) can help students' motivation without decreasing their intrinsic interest in learning (Vansteenkiste et al., 2020).

Moreover, intrinsic and extrinsic motivation is essential in shaping students' learning experiences, and developing reliable and valid measures is paramount for assessing these motivational constructs in secondary education. Pintrich et al. (1993) developed the Motivated Strategies for Learning Questionnaire (MSLQ), and the Academic Motivation Scale (AMS) was established by Vallerand et al. (1992); those existing motivation scales have only been developed for the higher education sector, potentially neglecting distinctive motivation patterns in younger secondary school students (Howard et al., 2021).

The present study aims to develop and validate the Secondary School Students' Academic Motivation Questionnaire (SAMQ) to measure students' intrinsic and extrinsic motivation. This analysis will assess the reliability and applicability of the instrument across different educational domains (Hair et al., 2022). This study's findings will provide educators, policymakers, and researchers substantial insight, allowing them to adopt targeted approaches to increase students' academic motivation and results.

Literature Review

Academic motivation is important in educational psychology, influencing students' engagement, persistence, and achievement. Deci & Ryan (2000) described numerous theoretical approaches that have been advanced to explain academic motivation; perhaps none has been more influential than the Self-Determination Theory (SDT). Based on Self-determination theory (SDT), motivation includes intrinsic motivation, which refers to students being engaged because of their interests and sensations, and extrinsic motivation, where students are compelled to exhibit behaviors in school due to outside factors such as incentives or obligation (Ryan & Deci, 2017). Eccles and Wigfield (2020) proposed Expectancy-Value Theory (EVT), and Achievement Goal Theory (AGT) was established by

Elliot & Murayama (2008), both having theoretical perspectives and can help explain factors that make a difference when students pursue their studies.

Several academic motivation instruments have been built for different educational levels. The most used tool is the Motivated Strategies for Learning Questionnaire (MSLQ), developed by Pintrich et al. (1993) and intended to measure students' motivational orientations and learning strategies. This tool is for candidates in higher education only and likely will not apply in secondary schooling. A well-known tool developed by Vallerand et al. (1992) is the Academic Motivation Scale (AMS), often used to assess intrinsic and extrinsic motivation based on the SDT.

However, limited evidence has arisen from studies with younger students in which the motivational landscape can be more dynamic (Howard et al., 2021). Deci et al. (1991) highlighted the Self-Regulated Questionnaire (SRQ-A) for self-regulated learning. It does not fully evaluate all dimensions of academic motivation of secondary school students. Although these tools have their merits, they are limited in some way (e.g., teachers' lack of affordance for learners' motivational factors, applicability for secondary school learners, education or demographic diversity, etc.). This gap underscores the developmentally and contextually relevant need for an academic motivation assessment tool for this age group.

The complexity of academic motivation makes it difficult to measure. It is worth mentioning that cultural and contextual differences play a crucial role. Socio-cultural factors significantly drive motivation and impose limitations on existing instruments to apply to different educational systems in different contexts (Dai & Cromley, 2021). Secondly, the issue of age appropriateness for younger learners exists, as many available tools were primarily designed for university students (Wang et al., 2020). Motivation is not fixed but changes over time as students learn, develop, and receive feedback. This dynamic nature makes it a methodological challenge to capture (Schunk & DiBenedetto, 2021).

Methodology

The Secondary School Students' Academic Motivation Questionnaire (SAMQ), According to Eccles & Wigfield (2020), a psychometrically sound measure explicitly designed for secondary school students, has been constructed to address these limitations. The researcher followed a systematic approach to develop and validate SAMQ, starting from item generation and theoretical underpinning to ensure that items were derived from Self Determination Theory (SDT), Expectancy-Value Theory (EVT), and Achievement Goal Theory (AGT). These items are then validated by experts and piloted by educational psychologists and secondary school teachers, assessing the contents for validity before the pilot version is given to a sample of students (Howard et al., 2021). EFA and CFA follow this to identify the motivating constructs while confirming the structural model and establishing construct validity (Hair et al., 2022). Finally, the questionnaire is tested for reliability, including internal consistency (Cronbach's alpha) and test-retest reliability, to show stability and effectiveness over time (Vansteenkiste et al., 2020).

By doing so, two overarching facets of academic motivation emerged: Intrinsic Motivation (IM) and Extrinsic Motivation (EM). Using these dimensions, an initial version of the Secondary School Students' Academic Motivation Questionnaire (SAMQ) was developed with 19 items representing the two factors. For measuring students' internal drive, interest, and enjoyment with academic tasks, the Intrinsic Motivation (IM) subscale consisted of ten (10) items. On the contrary, the Extrinsic Motivation (EM) subscale was built with nine (9) items focused on motivation generated by external performance, awards, or pressure. All

items in the questionnaire were designed in a way that was straightforward, easy to access, and comprehended for students in secondary schools. Participants were asked to respond using a 5-point Likert-type scale with Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree values. The assigned scores were as follows: 1 for Strongly Disagree, 2 for Disagree, 3 for Neutral, 4 for Agree, and 5 for Strongly Agree.

The development involved ensuring that the resulting measure would be valid and reliable. This allowed for more precisely measuring the multidimensional construct of academic motivation and ultimately produced helpful information for educators, researchers, and policymakers.

Expert Validation of Secondary School Students' Academic Motivation Questionnaire (SAMQ)

Validity means the quality of the tool being suitable, meaningful, accurate, and effective. Expert use for systematic review improves the quality and representativeness of the instrument. Regarding content and face validity, the items of the Secondary School Students' Academic Motivation Questionnaire (SAMQ) were developed from several pieces of literature and contents mentioned above, as well as detailed consultations with experts and respondents.

Subject matter experts reviewed and commented on the appropriateness, clarity, comprehensibility, plausibility, language fit, linkage, and relevance to the construct of each item in the initial draft of the questionnaire. They additionally evaluated the items for suitability for survey research.

In addition, the draft was amended and strengthened in response to extensive consultation sessions with the experts. The first draft of the initial item list was refined according to comments received from experts about the defined factors and items. The draft was circulated among ten (10) educationist experts from different universities in Pakistan. Experts were then requested to test language suitability for secondary school students, scope relevance to individual items, overall appropriateness and clarity, and plausibility.

Content Validity of Secondary School Students' Academic Motivation Questionnaire (SAMQ)

To enhance the quality and establish the validity of the questionnaire, the Content Validity Ratio (CVR) was calculated for each item, and the overall Content Validity Index (CVI) of the Secondary School Students' Academic Motivation Questionnaire (SAMQ) was calculated. The questionnaire's validation also considered that items with values less than 0.78 have been eliminated. The content validity ratio (CVR) for the retained items was 0.80 to 1.000, and the content validity index (CVI) was 0.91 for the overall questionnaire as the 10 experts. A value greater than 0.78 is deemed acceptable (Lynn, 1986).

Table 1: Content Validity Ratios (CVR) of the items and Content Validity Index (CVI) of the Secondary School Students' Academic Motivation (SQAM)

Item No.	Statement	CVR	Decision
IM 1	I researched additional educational material related to the topic for my interest.	0.90	Retained
IM 2	I choose topics that match my interest	**0.50**	**Dropped**

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IM 3	I participate in academic discussions with enthusiasm	1.00	Retained
IM 4	I feel happy to understand any lesson deeply.	0.90	Retained
IM 5	I am satisfied with achieving my academic goals daily.	0.80	Retained
IM 6	I appreciate the relevance of the course content.	0.90	Retained
IM 7	I solve problems in day-to-day situations with the help of the knowledge learned in the classroom.	0.90	Retained
IM 8	I feel great when I understand a difficult concept.	**0.60**	**Dropped**
IM 9	I am curious about how the articles I read apply to the real world.	**0.70**	**Dropped**
IM 10	I am interested in learning new concepts.	1.00	Retained
EM 1	I work hard to get good grades.	0.90	Retained
EM 2	I work hard to create a better academic identity in class.	0.80	Retained
EM 3	I do my best to get a reward for good results.	1.00	Retained
EM 4	I also work hard so that I do not fall behind my friends.	0.90	Retained
EM 5	I study only to get a good position in the class.	0.90	Retained
EM 6	I study to fulfill my parents' expectations.	1.00	Retained
EM 7	I study to avoid being punished.	**0.40**	**Dropped**
EM 8	I also study so that I can get a better job.	**0.60**	**Dropped**
EM 9	I am only interested in studying to earn wealth.	**0.50**	**Dropped**

CVR= (Essential by the expert – Number of necessary & unnecessary by experts) / total exports

CVI (Academic Motivation) = $\sum$ CVR / No. of retained items= 11.09/13 = 0.91

The Content Validity Ratio (CVR) for each item and the overall Content Validity Index (CVI) were calculated to improve the quality and ensure the validity of the questionnaire. This resulted in removing six items (IM 2, IM 8, IM 9, EM 7, EM 8, EM 9) with CVR lower than the acceptable value of 0.78. The CVR for the remaining items varied between 0.80 to 1.00. The questionnaire's content validity index (CVI), which ten (10) experts measured, was 0.91. According to Lynn (1986), a CVR value that exceeds 0.78 is acceptable.

Pilot Testing

A minimum sample size of 10–15 subjects per item is required for factor analysis (Hof, 2012). So, the Secondary School Students' Academic Motivation Questionnaire (SAMQ) was piloted on a sample of 248 class 10th students enrolled in public schools in district Gujranwala; factor analysis verified the construct and discriminant validity of the scales. Confirmatory factor analysis was carried out to verify the validity of the questionnaires.

Model fit of Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) is a technique employed to confirm a factor structure for a questionnaire. Its purpose is to calculate the probability of correlations between observed variables and their latent constructs (Ramakrishnan & Arokiasamy, 2019). Different fit indices are available to evaluate model fit. In this study, these indices applied by the researcher include the comparative Fit Index (CFI), Chi-Square Goodness of Fit (CMIN), Adjusted Goodness of Fit Index (AGFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) and standardized Regression Weights. The generally accepted

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cut-off for a good fit of the model is CFI≥. 90, AGFI ≥. 90, TLI ≥. 90, and RMSEA ≤. 08 (values under 0.05 are excellent). Moreover, an SRMR value ≤ . 08 is deemed acceptable.

Table 2: Criterion values for Confirmatory Factor Analysis of Academic Motivation

Fit Indices	Recommended value	Source(s)	Obtained Value
P	Significant	Bagozzi and Yi (1988)	.011
CMIN/DF	3-5	Less than 2 (Ullman, 2001) to 5 (Schumacker & Lomax, 2004)	1.452
GFI	>.90	Hair et al (2010)	.944
CFI	>.90	Bentler (1990)	.948
TLI	>.90	Bentler (1990)	.937
SRMR	<.08	Hu and Bentler (1998)	.067
RMSEA	<.08	Hu and Bentler (1998)	.043
PCLOSE	>.05		.724

Confirmatory factor analysis (CFA) was conducted using AMOS to test the measurement model. Thirteen items across two factors were analyzed. Model fit indices (CMIN/DF, GFI, CFI, TLI, SRMR, RMSEA, and PCLOSE) indicated a good fit, with all values within acceptable ranges (Ullman, 2001; Ho & Bentler, 1998; Bentler, 1990). The two-factor model (Intrinsic Motivation and Extrinsic Motivation) demonstrated a good fit: CMIN/DF = 1.452, GFI = .944, CFI = .948, TLI = .937, SRMR = .067, RMSEA = .043, and PCLOSE = .724.

Figure 1: Structural Model Diagram of Academic Motivation
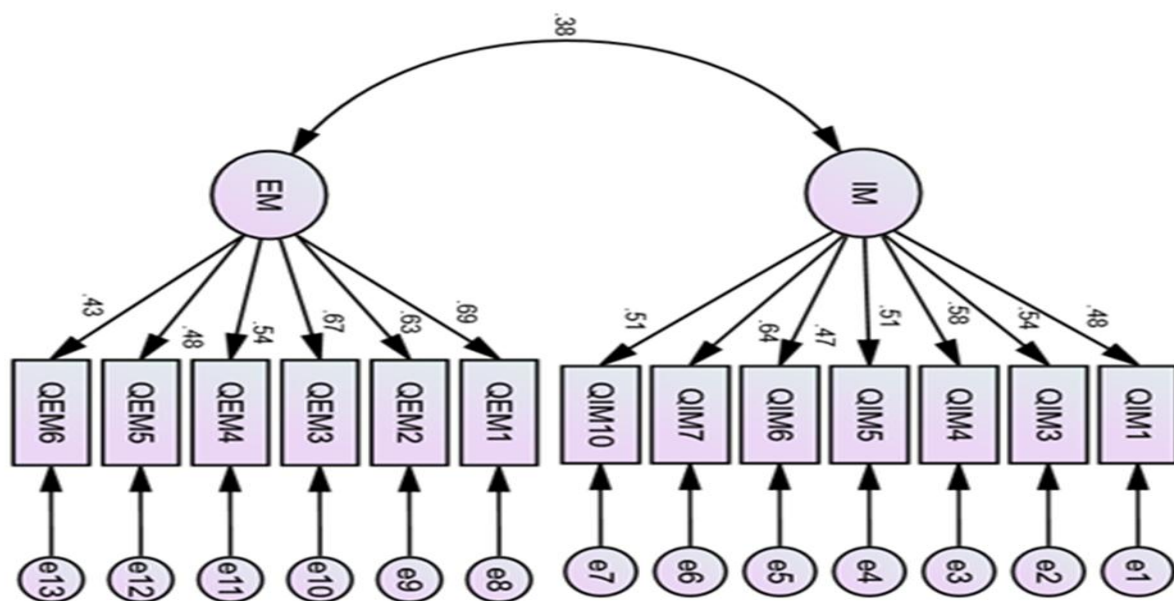
Table 3: Standardized regression weights of Academic Motivation

Sub Scale	Item	Standardized regression weights
Intrinsic Motivation	IM1	0.477
	IM3	0.536
	IM4	0.578
	IM5	0.509
	IM6	0.471
	IM7	0.642
	IM10	0.507
Extrinsic Motivation	EM1	0.690
	EM2	0.631
	EM3	0.670
	EM4	0.539
	EM5	0.477
	EM6	0.427

The figure above indicates that academic motivational items were loaded onto two sub-factors (Intrinsic Motivation (IM) and Extrinsic Motivation (EM). Seven (7) items were loaded against EM, and six (6) items were loaded against EM. Also, the covariance matrix between the variables was calculated, and the highest covariance was observed between EM 4 and EM 5. Therefore, the covariance of these two best fits the model.

Table 4: Reliability Values of Secondary School Students' Academic Motivation Questionnaire (SAMQ)

Scale	No. of Statements	Mean	Std. Deviation	Reliability Coefficient
Intrinsic Motivation	7	29.54	6.113	0.750
Extrinsic Motivation	6	25.54	5.816	0.736

The secondary school student's academic motivation questionnaire (SAMQ) is a dependable instrument for assessing academic motivation. The reliability coefficients of intrinsic and extrinsic motivation were 0.750 and 0.736, respectively, which showed strong internal consistency, indicating that the items effectively measure the construct of academic motivation.

Discussion

The study aimed to develop and validate a questionnaire measuring the academic motivation of secondary school students. The current research study provides evidence for the reliability

and validity of the secondary school student's academic motivation questionnaire (SAMQ) for the students of 10th grade who are enrolled in the public sector. Literature has been reviewed, and two sub-factors have been decided to measure the academic motivation of secondary school students. Later, nineteen (19) items were developed for the questionnaire. First, content validity was ensured through subject matter experts, through which six (6) items were excluded from the questionnaire. After this, confirmatory factor analysis was conducted to check the factor analysis of the questionnaire items. Moreover, the purpose of factor analysis was to ensure the convergent and discriminant validity of the questionnaire. Consequently, a questionnaire comprised of thirteen (13) items were obtained. The present results were also consistent with the authors' conclusions of the original version in that the two-factor structure of the secondary school student's academic motivation questionnaire (SAMQ) found sufficient support in CFA. The internal consistency of all the sub-factors and the Questionnaire reflected reasonable results. The internal consistency of the questionnaire was 0.743, which is considered a reliable measure (Vallerand et al., 1992). The two factors showed adequate reliability. The secondary school student's academic motivation questionnaire (SAMQ) has sufficient evidence to be a valid and reliable instrument for measuring the academic motivation of secondary-level students.

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