

## Research Article

# The Short Version of Approaches and Study Skills Inventory for Students: A Confirmatory Factor Analysis in Vietnamese Nursing Students

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Received 13 October 2023; Revised 5 February 2024; Accepted 2 March 2024; Published 8 March 2024

Academic Editor: Marcos Venícios de Oliveira Lopes

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Students' academic performance is substantially influenced by their learning approaches, which reflect their intentions when confronted with a learning situation and the corresponding strategies they employ to fulfil these intentions. Since there was no validated questionnaire that aimed to assess students' learning approaches in the context of Vietnam, the purpose of this study is to validate a Vietnamese short version of the approaches and study skills inventory for students (ASSIST). A cross-sectional study involved translation and validation with a group of Vietnamese undergraduate nursing students. This questionnaire was translated by two independent bilingual experts and reviewed by a team of two other experts. To test the internal reliability, Cronbach's alpha was used with 102 nursing students in a nursing school. Regarding construct validity, the study checked whether the original three subscales fit the data by using confirmatory factor analysis in a group of 1340 nursing students from ten nursing schools across Vietnam. The result indicated that the internal consistency of the Vietnamese ASSIST short version was good; Cronbach's alpha of the total scale was 0.89. Cronbach's alphas for deep, strategic, and surface approaches were 0.82, 0.89, and 0.70, respectively. By using confirmatory factor analysis, the model of three subscales showed a moderate fit ( $X^2/df = 7.097$ ,  $p < 0.01$ , CFI = 0.927, TLI = 0.886, and RMSEA = 0.067). As such, this finding supported the proposed three-factor structure of the short version of ASSIST in the context of Vietnam, which will be a useful tool for educators and educational institutions to assess students' learning approaches initially.

## 1. Introduction

Learning approaches are the different methods through which students engage in and execute learning activities. In higher education institutions, three distinct learning approaches, namely deep, surface, and strategic learning, have been identified early in a conceptual framework of Marton and Saljo (1976), which is one of the most popular concepts for identifying the different individual behaviors in learning [1]. Specifically, this framework is a concept about the students' motivation for their learning and their use of appropriate strategies to balance the relationship between

themselves, context, and task during the learning process. Firstly, learners with a deep approach are mainly driven by an intention to understand and gain their knowledge through clear evidence and the connecting of ideas in the learning materials, which includes assessment of the individual's own understanding [2]. By contrast, surface learners usually have a fear of failure, which is why they attempt to reproduce knowledge and learning materials. Their predominant strategies are aimed at overcoming the exam by adopting current knowledge and learning the sign rather than exploring what exactly caused the phenomenon [3]. Finally, the third group, known as strategic learners, has

a desire to achieve the best learning results rather than interests and ideas (deep approach) or a fear of failure (surface approach) [4]. This kind of student always develops a wide range of strategies that integrate available resources and meet exam criteria to finish the courses with high scores.

By the literature review, student's study approaches and engagement directly impact their learning performances [5, 6]. As such, approaches to learning reflect individual differences in their intentions when facing a learning situation, as well as the corresponding strategies by which these intentions are accomplished. In recognition of its importance, studies focusing on learning approaches have been widely conducted among university students with the use of the Marton and Saljo framework (1976), [7, 8]. These studies reported constant evidence that demonstrated individual learning differences caused by how students' learning approaches exist, such as deep, strategic, and surface.

Students' learning approaches have been assessed as quantitative research by diverse inventories, which are the Approaches to Studying Inventory [9], the Revised Approaches to Studying Inventory [10], and the Approaches and Study Skills Inventory for Students (ASSIST) [11]. The ASSIST, the latest version to measure individual learning approaches, consists of 18 items with the level of students' agreement on a 1–5 scale and has been widely applied because of its brevity in contrast with the full instrument of 52 items. Three main scales (deep, surface, and strategic approaches to learning) would be measured by the calculation of six items for each element. This scale was used in several medical fields, such as medicine [12], psychology [13], and nursing [14].

It is clear that reliability and validity are two important steps for any kind of measurement [15]. Previous studies reported that the internal consistency of three dimensions in the ASSIST short version has been variable, ranging from a high, acceptable, or even lower range. Specifically, Cronbach's alpha ranged from 0.72–0.76, which was satisfactory [16] in the original study and became better in several studies [12, 17]; however, this index was less than 0.7 in other studies [16, 18, 19]. Regarding construct validity, three factors of the ASSIST short version were confirmed by using a confirmatory factor analysis (CFA) [17] or a principal component factor analysis of the items [18]. However, one item in the deep approach (“When I read, I examine the details carefully to see how they fit in with what's being said”) did not fit with this scale [18].

In Vietnam, the reform process in higher education, which was an element of the national strategy for innovation, namely “Doi moi,” has a dynamic influence on nursing education [20]. This project aimed to strengthen the capacity of nurse training as well as the quality of graduate nursing students' ability to adapt to international professional standards. As such, it required a need to modify current pedagogical approaches with a shift to increase active/experiential learning, reflective teaching, and learning strategy application [21]. In fact, to the best of our knowledge, there was no validated questionnaire that aimed to assess students' learning approaches and was reported to be compatible with Vietnamese context and culture. Given the pace of

educational change in Vietnam, it is necessary to validate a tool to assess nursing students' learning approaches. The purpose of this study, therefore, was to validate a Vietnamese version of the ASSIST short version by using confirmatory factor analysis.

## 2. Materials and Methods

*2.1. The ASSIST Short Version.* The ASSIST short version consists of 18 items aiming to identify students' approaches to studying [22]. The measurement has three subscales with six items each: deep, surface, and strategic approach. Each item of this questionnaire was rated in the range from 5 = strongly agree, 4 = agree, 3 = neutral or undecided, 2 = disagree, or 1 = strong disagree. The overall score (possible score: 18–90) and three subscale scores (possible score: 6–30 for each subscale) were calculated, and the higher score indicates the better perception of students regarding learning approaches.

*2.2. Translation Process.* The ASSIST short version has been translated and used in several countries which are not English-speaking, such as Norway [18], South Africa [17], and Kuala Lumpur [12]. In this study, using a back-translation process, the questionnaire was translated by two independent bilingual experts [23]. Specifically, this process was performed by a Vietnamese nurse lecturer and nursing student who all have very good skills in using English. After comparing and integrating different versions, a team of another Vietnamese nurse lecturer who is competent in using both languages and a native-speaker nursing student were responsible for the back-translation of a revised translation. Finally, the minor in-consistent in wording were adjusted, and no significant difference was found.

*2.3. Validation of the Vietnamese ASSIST Short Version.* A cross-sectional study was conducted on undergraduate nursing students for three months (November 2021 to January 2022).

*2.3.1. Participants and Sampling.* Undergraduate nursing students were recruited in this study by using a convenience sampling method. Inclusion criteria were nursing students in the bachelor program and willing to participate in the study. Students in the in-service study mode or those who could not be contacted during the period of data collection were excluded from this study.

*2.3.2. Data Collection Procedure.* An online survey was sent to students' nursing groups with the support of the local nurse lecturers. Participants had the flexibility to respond to the questionnaire using any internet-enabled device, including cell phones, tablets, or laptops. It was informed to the students that their participation in the study was entirely voluntary, and they would not receive any financial support or face any disadvantages for choosing not to participate. Prior to the completion of the questionnaire, students were

provided with the study's information sheet regarding anonymity during data collection. This ensured that they were well-informed about the study's purpose and their rights as participants. This survey was also set in "Limit to one response" mode, and all questions were placed in the "required" mode to minimize the duplication rate and missing data, respectively. By submitting the completed online survey, participants indicated their consent to taking part in the study.

**2.3.3. Reliability.** The Vietnamese version of the 18-item ASSIST was tested to establish internal reliability by using Cronbach's alpha among 102 nursing students in a nursing school in Vietnam as the recommendation of at least 100 subjects for a high-reliability estimate [24].

**2.3.4. Construct Validity.** The study invited nursing students from ten nursing schools across Vietnam to participate. The study checked whether the original three subscales fit our data by using confirmatory factor analysis (CFA). To ensure a stable factor construction, at least 300 participants should be included in the study [25]. During this phase, 1340 nursing students completed the online survey and were included.

**2.4. Data Analysis.** This study used SPSS version 20 and AMOS version 20 for data analysis.

By using SPSS, descriptive statistics were used to assess the participants' characteristics as well as the level of the students' learning approach. The internal consistency of the scale was determined by computing Cronbach's alpha, corrected item-total correlation (CITC), and Cronbach's alpha if items deleted values (CAID). For good reliability, the alpha should range from 0.70 to 0.95 [15]. And the item was considered to have made a substantial contribution to the measured construct if the CITC value exceeded 0.3 and the CAID demonstrated a decrease [26].

Confirmatory factor analysis was used to examine the factorial structure of the ASSIST short version. The model chi-square goodness-of-fit (set at  $p < 0.05$ ) and approximate fit indices were used to test the model fit [27]. For approximate fit indexes, the root mean squared error of approximation ( $RMSEA \leq 0.08$ ), the Tucker-Lewis index ( $TLI \geq 0.9$ ), the comparative fit index ( $CFI \geq 0.9$ ) were used [27, 28]. The significance of regression weighted (standardized loading factor) estimates indicates that the indicator variables are significant and representative of their latent variables. Modification indices (MI) were employed to identify potential correlations between variables. As such, standardized regression weights and MI were used as indicators to select which items fit to remain in the model [28].

**2.5. Ethical Approval.** The study was approved by the Institutional Ethical Review Board of Vinmec International General Hospital JSC, No. 114/2020/QD-VMC on 28/07/2021.

### 3. Results

**3.1. Characteristics of Participants.** A total of 1442 nursing students participated in this study (Table 1). Most of them were female (89.39%), second year students (34.26%), and studying in a public school (78.57%). The average age was  $22.16 \pm 4.31$  years old.

**3.2. Descriptive Statistics for Each Item in the ASSIST Short Version.** Table 2 shows that the mean scores of the Vietnamese ASSIST short version were  $63.94 \pm 7.45$  out of 90. The scores for deep, strategic, and surface were 21.95, 20.62, and 21.36, respectively.

**3.3. Reliability.** Cronbach's alpha of the total scale was 0.89 (Table 3), which indicates the internal consistency of the Vietnamese ASSIST short version was good. Cronbach's alphas for deep, strategic, and surface approaches were 0.82, 0.89, and 0.70, respectively. The CITC values for the scale ranged between 0.30–0.78 which indicates all items highly contributed to the constructs of the ASSIST short version.

**3.4. Validity.** In Table 4, the original model did not report a good fit. After modifying some items with high modification index covariance (i.e., 4-There is not much of the work here that I find interesting or relevant and 8-Much of what I am studying makes little sense: it is like unrelated bits and pieces), 4- and 18-Often worry about whether I'll ever be able to cope with the work properly), the fit of the second model was acceptable. The CFA for the three-subscale model showed a moderate fit ( $X^2/df = 7.097$ ,  $p < 0.001$ ,  $CFI = 0.903$ ,  $TLI = 0.886$ , and  $RMSEA = 0.067$ ).

### 4. Discussion

The main purpose of this study was to establish the reliability and validity of the ASSIST tool when translated into Vietnamese.

In this study, Cronbach's alpha scores ranged from 0.72 to 0.82 for subscales and 0.86 for the total scale, satisfying the rule-of-thumb guide of 0.70 and indicating a good internal reliability level. In fact, there have been plenty of studies that focus on the psychometric properties of the English original version of the ASSIST scale, but none have yet report on the Vietnamese version. The same pattern was seen in other studies, as Cronbach's alpha was generally above 0.80 for the deep and strategic approach scales and above 0.70 for the surface approach scale [18]. Sadler-Smith and Tsang (1998) administered a 38-item version of the RASI to 183 Hong Kong students and reported reliability coefficients (Cronbach's  $\alpha$ ) of 0.80 for the deep, 0.82 for the strategic and 0.79 for the surface scales [29]. Another study that took place in six British universities also showed that Cronbach's alpha values for the three subscales ranged between 0.80 and 0.87 [11]. In the short version of the ASSIST, it is favorable that each subscale consists of six items, facilitating a fair assessment of reliability across the three subscales.

TABLE 1: Characteristic of participants ( $n = 1442$ ).

Variables	Frequency (N)	Percentage (%)
Gender	Male	152
	Female	1289
Year of study	The 1 <sup>st</sup> year	228
	The 2 <sup>nd</sup> year	494
	The 3 <sup>rd</sup> year	345
	The 4 <sup>th</sup> year	357
	The 5 <sup>th</sup> year	18
Institution categories	Public school	1031
	Private school	309
Age	Mean = 22.16 (SD = 4.31) years old	

TABLE 2: Descriptive statistics for each item ( $n = 1442$ ).

No.	Items	Mean (SD)	Range
	<i>The ASSIST short version</i>	63.94 (7.45)	21–90
	<i>Deep approach</i>	21.95 (2.94)	6–30
C2	When i'm reading an article or book, i try to find out for myself exactly what the author means	3.61 (0.71)	1–5
C6	Before tackling a problem or assignment, i first try to work out what lies behind it	3.64 (0.70)	1–5
C10	When i'm working on a new topic, i try to see in my own mind how all the ideas fit together	3.78 (0.65)	1–5
C12	Often i find myself questioning things i hear in lectures or read in books	3.62 (0.69)	1–5
C15	Ideas in course books or articles often set me off on long chains of thought of my own	3.57 (0.69)	1–5
C17	When i read, i examine the details carefully to see how they fit in with what's being said	3.74 (0.63)	1–5
	<i>Strategic approach</i>	20.62 (3.23)	6–30
C3	I organize my study time carefully to make the best use of it	3.71 (0.71)	1–5
C5	I work steadily through the term or semester, rather than leave it all until the last minute	3.65 (0.76)	1–5
C7	I'm pretty good at getting down to work whenever i need to	3.32 (0.76)	1–5
C9	I put a lot of effort into studying because i'm determined to do well	3.86 (0.66)	1–5
C11	I don't find it at all difficult to motivate myself	3.25 (0.87)	1–5
C13	I think i'm quite systematic and organized when it comes to revising for exams	3.57 (0.71)	1–5
	<i>Surface approach</i>	21.36 (3.19)	6–30
C1	I often have trouble in making sense of the things i have to remember	3.53 (0.84)	1–5
C4	There's not much of the work here that i find interesting or relevant	3.05 (0.87)	1–5
C8	Much of what i'm studying makes little sense: it's like unrelated bits and pieces	3.05 (0.94)	1–5
C14	Often i feel i'm drowning in the sheer amount of material we're having to cope with	3.71 (0.77)	1–5
C16	I'm not really sure what's important in lectures, so i try to get down all i can	3.46 (0.81)	1–5
C18	I often worry about whether i'll ever be able to cope with the work properly	3.83 (0.76)	1–5

Regarding the validity of the scale, a three-factor solution was used in this study: deep approaches (Factor 1), strategic approaches (Factor 2), and surface approaches (Factor 3), respectively. It has been demonstrated that the items presented in the short ASSIST complied with the theoretically proposed factor structure [4, 7, 8]. To be specific, the original model reported several items with high levels of modification, including items 8 and 4, and 18 and 4. In fact, the main meaning of these three items is the level of interest related to study work. After modification, the second model was showed high levels of goodness of fit. Specifically, the goodness of fit values of the GFI, CFI, and RMSEA also reported a good fit. The value of 0.067 in this study was acceptable. The values of CFI and GFI are also both higher than 0.90, indicating an acceptable fit between the model and the data. These indices together provide a comprehensive

evaluation of the model fit and are strong evidence that there is a favorable fit between the specified measurement model and the observed data. Similarly, a study conducted among 345 first and secondary mathematics students in South Africa, reported that three factors of the short version of ASSIST were confirmed by the use of CFA [17]. The finding showed that the chi-square was statistically significant ( $X^2 = 210.94$ ,  $df = 132$ ,  $p < 0.0001$ ). Also the goodness of fit indices were TLI = 0.948, RMSEA = 0.054, and CFI = 0.947 [17]. Since then, the results suggest that the Vietnamese short version of ASSIST is a reliable and valid tool that could be used to assess students' learning approaches in Vietnam. Through the use of this questionnaire, it provides evidence for nurse lecturers and educational settings to implement proper interventions to support nursing students following the current learning approaches.

TABLE 3: Cronbach's alpha and item-total correlations ( $n = 102$ ).

No.	Variables	CITC	CAID
<i>The total scale Cronbach's alpha = 0.89</i>			
<i>Deep scale Cronbach's alpha = 0.82</i>			
C2	When I'm reading an article or book, i try to find out for myself exactly what the author means	0.48	0.80
C6	Before tackling a problem or assignment, i first try to work out what lies behind it	0.69	0.75
C10	When i'm working on a new topic, i try to see in my own mind how all the ideas fit together	0.71	0.75
C12	Often i find myself questioning things i hear in lectures or read in books	0.55	0.78
C15	Ideas in course books or articles often set me off on long chains of thought of my own	0.45	0.80
C17	When i read, i examine the details carefully to see how they fit in with what's being said	0.59	0.77
<i>Strategic scale Cronbach's alpha = 0.89</i>			
C3	I organize my study time carefully to make the best use of it	0.70	0.87
C5	I work steadily through the term or semester, rather than leave it all until the last minute	0.78	0.85
C7	I'm pretty good at getting down to work whenever i need to	0.65	0.88
C9	I put a lot of effort into studying because i'm determined to do well	0.71	0.87
C11	I don't find it at all difficult to motivate myself	0.66	0.88
C13	I think i'm quite systematic and organized when it comes to revising for exams	0.74	0.86
<i>Surface scale Cronbach's alpha = 0.70</i>			
C1	I often have trouble in making sense of the things i have to remember	0.46	0.64
C4	There's not much of the work here that i find interesting or relevant	0.35	0.67
C8	Much of what i'm studying makes little sense: it's like unrelated bits and pieces	0.30	0.70
C14	Often i feel i'm drowning in the sheer amount of material we're having to cope with	0.51	0.62
C16	I'm not really sure what's important in lectures, so i try to get down all i can	0.54	0.61
C18	I often worry about whether i'll ever be able to cope with the work properly	0.40	0.66

CITC, corrected item-total correlation; CAID, Cronbach's alpha if items deleted values.

TABLE 4: The results of confirmatory factor analysis.

	$\chi^2/df$	$p$ value	TLI	CFI	RMSEA
The original model	8.794	<0.001	0.854	0.874	0.076
The modified model	7.097	<0.001	0.886	0.903	0.067

However, there were some limitations to our study. Firstly, a cross-sectional study design was used to assess the reliability of the ASSIST short version in this study. This finding is considered as an initial report on the reliability and validity of the Vietnamese ASSIST short version; therefore, further studies are encouraged to test the stability of this instrument such as using a test-retest method. Obviously, test-retest reliability is used to assess how consistent a test is, which identifies the stability and validity of the questionnaire over a period of time [30]. Secondly, the study is limited by the use of the self-report methodology. This is said to be due to the inability to validate by objective means whether responses comply with social norms or not. This may also apply in the case of this study, where students may feel compelled to respond in a certain way if it is socially desired. Therefore, future studies may need to take a more holistic approach by integrating self-reported measures with additional measurement techniques [31].

## 5. Conclusions

Our findings supported the proposed three-factor structure of the short version of ASSIST in the context of Vietnamese

nursing students. This questionnaire is a useful tool for educators and educational institutions to initially assess students' learning approaches, which will be used for future interventions.

## Data Availability

As per the approval of the Institutional Ethics Committee of VinUniversity, the data cannot be publicly disclosed to ensure the privacy of the participants. An anonymised dataset may be provided to researchers who adapt the requirements for access to confidential data. To request access to the data, please make submissions to the VinUniversity Institutional Ethics Committee via e-mail at [research@vinuni.edu.vn](mailto:research@vinuni.edu.vn) or by mail at the following address: VinUniversity, Vinhomes Ocean Park, Gia Lam District, Hanoi, Vietnam, or the data are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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