

The CSEP Measure of Student Wellbeing: A Study on Psychometric Properties

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Abstract

This abstract presents a study focused on exploring perceived wellbeing of secondary school students in Vietnam. A cross-sectional survey design was employed with the use of random sampling to select a sample of 10,065 students from Northern to Southern Vietnam attending lower secondary and higher secondary schools. A recently developed scale measuring student wellbeing was used. Exploratory factor analysis, confirmatory factor analysis were executed to investigate the psychometrics of scale. A four-factor structure was defined, including cognitive, social, emotional and physical wellbeing, abbreviated as CSEP with consistent goodness and badness of fit indexes and high reliability. Descriptive analyses were conducted to explore differences of dimensions of wellbeing across sex, and city levels. Overall, results offered preliminary support for a suitable measurement of wellbeing in secondary schools in Vietnam and complements existing literature about student wellbeing.

Keywords: *Student wellbeing, secondary school student, Vietnamese students, measure of student wellbeing*

Introduction

Student Wellbeing Concept

As per the Organization for Economic Co-operation and Development (OECD, 2017), student wellbeing encompasses various aspects of psychological, cognitive, social, and physical functioning essential for leading a content and meaningful life. Over the last few decades, there has been increasing agreement among policymakers, psychologists, teachers and educational researchers about the importance of student wellbeing (Govorova et al., 2020), which has been increasingly identified as the criteria for school success (Hascher, 2012). When students experience positive wellbeing, they are more likely to be able to attend school, focus during lessons, retain and recall information, engage with their peers and teachers and participate in school life beyond the classroom (Flack et al., 2022). Systematic review found that there are significant correlations between dimensions of well-being and academic performance (Govorova et al., 2020).

Therefore, instead of a common approach for measuring the effectiveness of a school based on student's acquisition of knowledge and skills, emergence of the focus on aspects such as well-being in the academic context has been universally adhered to (Govorova et al., 2020; Hascher, 2012). Fostering wellbeing and positive experiences among students is available only if assessing and monitoring student wellbeing is effective (Hossain et al., 2022), requiring effective measures of student wellbeing states and the detection of any deviations from the norm.

Although there is a shared agreement on the importance of student wellbeing measurement, it was reported that a lack of consensus exists about domains of student wellbeing. Traditional notions of student wellbeing have traditionally been shaped by clinical viewpoints, often defining it in terms of the absence of negative affect and condition (Fraillon, 2004), typically employing scales tailored for measuring school-related stress (Kiuru et al., 2020), cynicism (Pietarinen et al., 2014) and depressive symptoms (Tong et al., 2019). In contrast to the clinical perspective, psychologists have formulated a school-centric understanding of wellbeing rooted in hedonism, which underscores the dominance of positivity over negative feelings (Hascher, 2012; Hossain et al., 2022), focused on overall satisfaction related to homework, learning task, academic ability (Hascher, 2007), family and peer relationship (Mascia et al., 2020), relationship with teacher/ school staff (Van Petegem et al., 2008).

An alternative perspective is eudaimonia, which expands the concept of student wellbeing far more nuanced than a simple dichotomy of positivity versus negativity. According to the eudaimonic view, student wellbeing is conceptualized as students functioning soundly and effectively within the school context (Hossain et al., 2022). Eudaimonic theories necessitate the incorporation of various psychological constructs (Renshaw et al., 2015) that enable individuals to function effectively and derive flourishing experiences within the school context (Seligman et al., 2009). Hossain and colleagues (2023) found that most of student wellbeing theories following eudaimonia concentrate on academic and social functioning, such as classroom social functioning, educational meaning, and academic efficacy (Renshaw et al., 2015).

Recent studies on student wellbeing adopted an integrative approach, which conceptualizes student well-being on different domains of both hedonic and eudaimonic aspects. Kern et al. (2016) adopted and adapted Seligman's PERMA theory of human flourishing within the school context, and revised five indicators of P.E.R.M.A into school-related positive affect and functionings, namely E.P.O.C.H: engagement (E), positivity (P),

optimism (O), connectedness (C), happiness (H). Whereas, Danker et al. (2019) provided a holistic definition of student well-being, including academic well-being, social well-being, emotional well-being and well-becoming. The recent emergence of integrative approach in student wellbeing conceptualization indicated that although subjective well-being and eudaimonic constructs are theoretically distinguishable (Hossain et al., 2022), it is evident that they have strong association and constitute complementary psychological aspects for an integrative model of wellbeing.

Research Gap

Such various theoretical approaches provide a diverse understanding of student wellbeing, but also leads to the fragmented works on measuring and monitoring of constructs (Fraillon, 2004; Govorova et al., 2020; Hossain et al., 2022). In a systematic review, Hossain and colleagues (2022) suggested that although there were many measures of student wellbeing, a lack of systematic development of holistic and psychometrically sound instruments is still required for an integrative and unified concept. In addition, cultural implications of child and student wellbeing are not well understood (Hossain et al., 2022) due to the dominance of wellbeing studies in Western cultural contexts, leading to challenges of measuring student wellbeing in countries where there is no cultural-adapted framework of wellbeing. Student wellbeing, as a construct shaped largely by cultural aspects in the national education system and diverse social elements (Hossain et al., 2022), should be studied on non-Western population to decode its cultural specificity.

In the context of Vietnamese education, although the latest trend of focus on child wellbeing has emerged increasingly, most school wellbeing research is about adapting existing measures of student wellbeing abroad into Vietnamese student context. Consequently, while Vietnamese educational institutions are increasingly investing in wellbeing promotion, there remains a notable gap in their ability to promptly identify issues related to student wellbeing (Huynh & Giang, 2021). Therefore, the primary focus of school psychology in Vietnam is to lay the groundwork for screening and early detection of wellbeing concerns, starting with the development of tools such as wellbeing measurement instruments or questionnaires. The present study is a proactive initiative to build such a measure, aiming at filling the above gaps in literature and contributing to the first culturally-built student wellbeing scale specifically for Vietnamese secondary students.

CSEP Model of Student Wellbeing

The present study refers to student wellbeing as a core integrative concept founded upon both facets: subjective well-being and eudaimonia. Moreover, it transcends the mere absence of negative psychological states and embodies a condition wherein individuals exhibit positive functioning and wellness (Peterson & Seligman, 2004) across multiple domains, including cognitive, social, emotional and physical aspects. Student well-being, as a composite of diverse biopsychosocial dimensions of positive characteristics, and behaviors rather than a singular, overarching concept (Kern et al., 2016; OECD, 2017), enables students to cope with challenges effectively, be alert and engaging in learning endeavors, and become a meaningful and active member to their communities (Organization, 2001). In broad terms, student wellbeing can be conceptualized as the holistic wellness state of cognitive, social, emotional, and physical functioning and capacities required for a contented and meaningful life.

This study adopted the Student Wellbeing Framework developed by The NSW Department of Education and Communities (DEC), which aligns with the previously discussed conceptualizations of student wellbeing. Drawing from the two main approaches of hedonism, which links wellbeing to our subjective experience of pleasure, and positive psychology, which emphasizes the potential for flourishing, NSW Department of Education (2024) employs an approach that focuses on the comprehensive nature of student experiences, encompassing both positive affect and the capacity for flourishing. Acknowledging the multidimensional aspect of wellbeing, NSW Department of Education (2024) conceptualizes student wellbeing across five domains: cognitive, emotional, social, physical, and spiritual. However, in adapting this framework to the Vietnamese context, the spiritual wellbeing component has been omitted. Based on the NSW framework and experiences of the research team, including school psychologists, Vietnamese student wellbeing is defined as C-S-E-P as abbreviation of cognitive - social - emotional - physical domains.

Cognitive wellbeing: Cognitive wellbeing refers mainly to the quality of thinking and learning (NSW Department of Education, 2024). The foundation of cognitive wellbeing is a healthy brain, which possesses basic capacities for attention and problem solving. It is associated with the process by which judgements are made, informed by motivation and persistence to achieve and is important for attaining knowledge and experiencing positive learning.

When students are cognitively well, they can concentrate easily, engage actively in learning. As a result, they can learn things efficiently, generate a variety of solutions to problems at hand and feel satisfied with accomplished learning objectives.

In its essential, student cognitive wellbeing is closely associated with:

- Cognitive engagement (quality of attention and learning engagement)
- Cognitive satisfaction (being satisfied with achievement)
- Memory quality (memorize and recall efficiently)
- Problem-solving (able to generate ideas for tasks)

Social wellbeing: Social wellbeing concerns the extent to which students experience meaningful relationships and connectedness with others. It plays a crucial role in fostering positive attitude and helping behaviors towards others. Student social wellbeing is reflected on the quality of students' relationships with others such as their peers and their teachers, and students' feelings about their social life in and outside of school.

It is widely accepted that the student social wellbeing forms an essential part of their capacity to function effectively in their community and that this capacity for effective interpersonal functioning is under the meaningful influence of school communities.

Based on the five social dimensions of Keyes (1998), Vietnamese student wellbeing is conceptualized with:

- Social acceptance (Feelings of being accepted and belief of social goodness)
- Social actualization (Sense of the growing and development of social entities)
- Social contribution (Feeling that one has a contribution to make to society)
- Social coherence (Understanding the social world as predictable, comprehensible)
- Social integration (Feeling as a part of the community with common things)
- Social safety (Feeling safe and comfortable in social situations)

Emotional wellbeing: A person's emotional wellbeing is typically defined as he/she is possessing the ability to feel and express human emotions and emotional strength. Particularly, it is reflected on the generated and maintained positive emotions and feelings (Hascher, 2007)), as well as skills to manage negative emotions, and bounce back from adversity and stressful situations (OECD, 2017). Therefore, teachers can realize student's emotional health based on how effectively students cope with challenges, which demonstrates their level of emotional resilience.

When students are emotionally well they manage the various elements of their lives with a range of emotions without losing control. Emotional well-being allows students to focus on the positive, and manage the negative emotions they may have in a given situation. This can help them forge stronger relationships with peers, build up a strong sense of self-esteem and persist in task performance.

There has been a general consensus that emotional wellbeing consists of certain components, including:

- Presence (i.e., the generation and maintenance) of positive emotions and moods (e.g., happiness, satisfaction, optimism).
- Emotional resilience: The maintenance or return to a state of emotional normalcy when faced with challenges or adversity.

Physical wellbeing: Physical wellbeing is associated with feeling physically safe, healthy and energetic. Physical wellbeing encompasses a variety of healthy behaviors including adequate exercise, proper nutrition, healthy sleep patterns and abstaining from harmful habits such as consumption of junk food and alcohol abuse (Zaff et al., 2003).

Being physically well is important for students' overall wellbeing and school functions. When students are physically well, they are more likely to feel capable of participating in every aspect of the school day and may be more confident and resilient. Students who experience poor physical health may be prevented from attending school, completing schoolwork or participating in extracurricular opportunities.

Studies of student wellness have consistently identified the following factors that contribute to and help increase their physical wellbeing (Zaff et al., 2003).

- Physical safety
- Sleep quality
- Healthy diet
- Physical activities
- Healthy lifestyle

Study Objectives and Methods

Our study was to determine the well-being of children in Vietnam. More specifically the study aims to develop and validate a scale for secondary school students that measures their school-related wellbeing. We assumed the new scale would fit the 4-factors model of the

proposed framework, including 4 dimensions: cognitive, social, emotional and physical wellbeing.

Therefore, the research questions and corresponding hypotheses of this project are following:

1. What are the domains of student wellbeing on Vietnamese sample?

Hypothesis 1: *The higher order model of the 4-factor student wellbeing scale with (cognitive, social, emotional, and physical dimensions) would fit the response patterns of the Vietnamese student sample.*

2. Does the student wellbeing scale have measurement invariance?

Hypothesis 2: *The responses from the model of student wellbeing would be invariant across gender, and city levels.*

Apart from these two main research questions, the study also explored how the student wellbeing is different among gender, and city levels in Vietnam. There is no hypothesis for this research question.

Research context

Findings from child mental health epidemiology revealed that the caseness estimation of significant mental health difficulties were about 13 %, which predicts that around 3 million Vietnamese children need mental health support (Weiss et al., 2014). Regarding to student mental health problems and extreme behavioral risk such as suicide, Nguyen et al. (2013) reported that among the 1159 school-going children in their sample revealed that 26.3% of the students had experienced suicidal ideation, 12.9% had made a suicidal plan, and 3.8% had attempted suicide, indicating a concerning prevalence of mental health problems. A recent study on Samuel and colleagues (2022) in two Vietnamese provinces found that 28% of girls are at risk of mental ill-health compared to 14% of boys and 37% of girls are at risk of depression compared with 30% of boys, indicating a higher risk of wellbeing issues for female adolescents.

The current study was conducted in different campuses of one of the biggest Vietnamese school systems, located in four typical urban areas in Northern and Southern Vietnam, with a population of approximately ranging from approximately 144.000 in Phu Quoc (Lan Anh, 2024) as the least population to 9.5 million in Ho Chi Minh City as the highest population (General Statistics Office of Vietnam, 2023).

Participants

For the substantive validation process, volunteer experts including three full-time psychology counsellors, one university lecturer with expertise in student wellbeing and one officer of Education Quality Assurance and Accreditation of Council of International School (CIS), who provides consultation for mental health policy development at Vietnamese international schools.

For the construct validity phase, participants were selected from both secondary (from 6th to 9th grade) and high school (from 10th to 12th grade) as administratively categorized in Vietnam educational system. 10653 students graded 6th through 12th, with an average grade of 8.41 and a standard deviation of 1.896, participated in the research. 50.5% were male and 49.5% were female (see table 1). All of the participants are students of a Vietnamese education system. Legal consent to perform this research was obtained from both school's principals and the students' parents. And the ethical standards provided by the Vietnamese Ministry of Education and Training (MOET) were followed.

Table 1. *Characteristics of participants*

Variables		N	%
N		757	100
Sex	Male	5379	50.5
	Female	5274	49.5
	Missing	8	0.1
Country region	Northern Vietnam	7776	72.9
	Southern Vietnam	2885	27.1
City type	Municipality	10351	97.1
	Provincial city	310	2.9
City	Hai Phong	1277	12.0
	Hanoi	6205	58.2

	Ho Chi Minh City	2869	26.9
	Phu Quoc	16	0.2
	Thanh Hoa	294	2.8
School type	High school	3279	30.8
	Lower secondary	7382	69.2
Grade	6	2081	19.5
	7	2019	18.9
	8	2065	19.4
	9	1211	11.4
	10	1339	12.6
	11	1126	10.6
	12	812	7.6
	Missing	8	0.1

Materials

The original survey of student wellbeing was developed by the core research group through systematic review, face validation and internal construct validation. Student wellbeing in school was measured with a scale of 36 items, hypothesized with 4 subscales covering 4 dimensions, which are cognitive, social, emotional and physical wellbeing. Students answered the questionnaire on a 9-point-Likert-scale from 1 (almost never) to 9 (very often).

Procedure

For the substantive validation process, as suggested by the guideline of Clark & Watson (1995), the expert team conducted mutual meetings to determine the nature and framework of the construct, and generate an item pool. First, a multidimensional measure of student wellbeing was identified based on both hedonic and eudaimonic perspectives, focusing on the experienced positive emotions and adaptive psychological functioning at school and tailoring

to the practical needs of Vietnamese schools for schoolwide screening within a multi-tiered system of supports. Particularly, the expert team intended to develop a scale with moderate length ranging from 35 to 40 items, considering the students' experienced loss of interest and concentration once the wide-school screening scale is longer than 40 items. Second, the expert team engaged in a comprehensive literature review to conceptualize the student wellbeing framework in detail, ultimately defining aspects of perceived functioning that students need to live a happy and fulfilling life. Second, the team did a literature review on the existing scales which addressed the defined aspects of wellbeing and generated a pool of items for an initial scale following the recommendations of Wolf et al. (2016). For face validity, independent experts independently rated whether they she/he agrees that the item measures the concept of student wellbeing following the procedure of Fink & Litwin (1995). The proportion of agreement regarding whether the item assessed Vietnamese student wellbeing was calculated.

After the prototype student wellbeing scale (SWS) was formed, a research ethics permission to perform the empirical research was obtained from the Research Ethics Committee of Eötvös Loránd University, and Hanoi National University of Education. The school principals were contacted for approval of data collection. After the approval, school representative sample was recruited using random sampling to participate in the study. Letters describing the study and consent forms were sent to the students' parents. Then students whose parents provided consent to participate in the research were assembled during the Computer Science period to fill up the survey, which had been integrated into the school's online learning system. They were instructed and supervised by the assigned school psychologists at their respective campuses. All data was securely stored on the school server, where only designated researchers could access.

Data Analysis

Data analyses were performed using IBM SPSS Version 26 and IBM AMOS Version 26. The distribution of scores for each item of the CSEP was analyzed, displaying that Skewness ranged from -1.06 to 0.204, while kurtosis values ranged from -0.782 to 0.941. response scores were therefore displayed a normal univariate distribution, based on suggested cut-off values from (Hair et al., 2022), which suggested that skewness and kurtosis values should not be beyond the range -2 to +2. The 10,653 participants were randomly split into two subsamples using a random sampling of 50% of all cases to analyze the latent structure of SWS. One subsample was used for Exploratory Factor Analysis (sample A = 5339 participants; 2679 males, 50.2%; 2657 females, 49.8%; M grade = 8.44, SD = 1.902, missing value = 3), and the

other subsample was used for Confirmatory Factor Analysis (CFA; sample B = 5316 participants; 2671 males, 50.2%; 2643 females, 49.7%; M grade = 8.44, SD = 1.908, missing value = 2). There was no statistical difference among two subsamples regarding grade ($t = -0.110$, $p = 0.912$), gender ($\chi^2 = 0.03$, $df = 1$, $p = 0.953$), and school level ($\chi^2 = 0.17$, $df = 1$, $p = 0.897$).

Before conducting an EFA on subsample A, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were used to evaluate the adequacy of the sample for factor analysis. Following the procedure of Fen et al. (2013), EFA was carried out using principal axis factoring with promax rotation, retaining factors with eigenvalues greater than 1. Factor loadings of 0.25 or higher were considered significant.

CFA on subsample B using the maximum likelihood method were run to test the hypothesized higher order model, checking which models were fit better to the data. To evaluate and compare two models, the chi-square difference and Akaike Information Criterion (AIC) were evaluated (Brown, 2006). Multiple model fit indices were examined, including Bentler's comparative fit index (CFI), Joreskog Sorbom's goodness of fit index (GFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Root Mean Square Residual (RMR). The testing of measurement invariance across gender and city types was conducted using maximum likelihood in AMOS 26 with subsample B, considering pattern-indicator factor loading (configural), factor loadings (metric), item intercepts (scalar), and error variance (residual invariance) among groups.

The internal consistency of the scale was tested with Cronbach's alpha, and Spearman-Brown & Guttman split-half coefficient for each factor and the whole scale on full sample. Descriptive and inferential analyses were conducted to provide an overview about the experienced wellbeing among secondary school students.

Results

The Prototype Student Wellbeing Scale

Based on the adopted Student Wellbeing Framework originally developed by The NSW Department of Education and Communities (DEC), items were generated for each of the proposed wellbeing dimensions, including cognitive, social, emotional and physical wellbeing. Among 51 items generated initially, 43 items received more than 60% endorsement from experts in the panel and kept for further investigation. Further, short interviews with students were organized to evaluate the understanding of all items, indicating 2 items with ambiguous meaning. A last round of review by expert pointed out a group of 3

items and 2 items with overlapped meaning. Therefore, in the end, 7 items were removed, resulting in a prototype scale SWS with 36 items.

The Factor Structure of the SWS in EFA

A principal axis factoring (PAF) was conducted with promax on the subsample A's 36 items. The Kaiser Meyer Olkin value (0.980) and Bartlett's sphericity test (114742.116, $p < 0.01$) revealed satisfactory results, assuring the feasibility of carrying out a factor analysis. Table 2 presents the general information of the Kaiser method with four factors with Eigenvalues larger than 1. A 36-item version of the SWS was obtained, with overall items explained 52.09 % of the variance (Table 2).

Table 2. *Total variance explained by Kaiser method*

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Factor						
1	16.258	45.161	45.161	15.801	43.891	43.891
2	1.762	4.894	50.055	1.267	3.520	47.410
3	1.464	4.065	54.121	1.004	2.790	50.200
4	1.174	3.260	57.381	0.680	1.890	52.090

As shown in Table 3, the interpretability of factor loadings and the distribution pattern of the items in the factor supported the framework of student well-being. The first factor, namely cognitive wellbeing (CWI), is related to the state of cognitive functions, including cognitive engagement, learning satisfaction and problem solving. The second factor, namely social wellbeing (SWI), is related to students' social connection and belonging to members in the school context. Factor 3 was called emotional wellbeing (EWI), related to general positive emotions such as happiness and optimism and emotional resilience. Factor 4 – physical wellbeing (PWI) - contained items on the subjective perception of their physical health, state of energy and healthy behaviors related to eating and sleeping.

Table 3 presents the Student Wellbeing Scale after PAF, with absolute value of factor loading above 0.25. It was revealed that one item hypothesized to be in social wellbeing (I don't hesitate to seek help when I need) and two items to emotional wellbeing (All in all, I am satisfied with my life; When I think about what I want from life, I find nothing missing). However, they loaded more on emotional wellbeing domain, physical and cognitive wellbeing domain respectively. Additional qualitative review by expert panel confirmed that two items

“I don’t hesitate to seek help when I need” and “When I think about what I want from life, I find nothing missing” are relevant to the emotional and cognitive wellbeing respectively (see the discussion). On the other hand, the item “All in all, I am satisfied with my life” loaded to physical wellbeing does not make any sense in the proposed framework. Therefore, it was dropped, resulting the 35-items SWS for further analysis.

Table 3. *Principal axis factoring of the Student Wellbeing Scale.*

Items	Factor			
	1	2	3	4
1. I can see the bright side of problems	.735			
2. I easily bounce back after failure or hardship	.729			
3. I can stay focused under pressure	.709			
4. I can handle unpleasant feelings	.703			
5. Coping with stress can strengthen me	.639			
6. I am not easily discouraged by failure	.619			
7. I don’t hesitate to seek help when I need	.520		.262	
8. I generally expect positive things from my life	.490			
9. I am basically a happy person	.487			
10. I feel enthusiastic about what I am learning		.751		
11. I find it easy to remember what I am reading		.706		
12. I get so absorbed in learning that I lose track of time		.669		
13. I am alert and ready to learn		.565		

14. I feel happy about what I have learned		.564	
15. I got in my mind a variety of answers to a specific question that was asked		.536	
16. I look forward to participating in learning activities at school		.441	
17. When I think about what I want from life, I find nothing missing		.345	
18. I feel that other people at school listen to me			.733
19. I see myself as having something in common with other students at school			.675
20. I feel that people at my school are kind and considerate to each other			.666
21. I feel closely connected with others in my school	.347		.649
22. I feel everything at school is familiar to me			.568
23. I feel safe and secure at my school			.513 .256
24. I see my school as continually evolving	.300		.493
25. Everything I need to achieve my goal is provided to me by the school			.458 .317
26. I feel I am helpful to my friends at school	.400		.426
27. I have a healthy appetite			.699
28. I sleep well at night			.688

29. I feel healthy and energized		.635
30. I maintain a healthy lifestyle, such as having a regular bedtime or eating regular meals		.594
31. I rarely feel sick		.556
32. I feel fresh and energized when I wake up	.278	.508
33. I feel safe at school because necessary measures are taken against the accidents	.386	.499
34. I choose not to do things that I know have long-term negative impacts on my health		.383
35. All in all, I am satisfied with my life *	.252	.380
36. I engage in a range of physical activities that support my health		.371

* The item was dropped after qualitative consideration

Structure of the SWS in CFA

Confirmatory factor analysis (CFA) was conducted to assess the fit of the data from subsample B to the multidimensional model (Model 0) and higher-order model (Model 1) using AMOS 26. Results demonstrated that the responses from both models yielded low fit indices (except for CFI; See Model 0 & 1 in Table 4). Comparing the two-factor solution to the one-factor solution, the slightly smaller AIC value of model 0 (10881.503) to model 1 (11139.614) suggests that Model 0 with fewer degrees of freedom fits the data better than Model 1. Furthermore, the significant chi-square difference test ($\Delta\chi^2 = 268.111$, $\Delta df = 5$, $p < .001$) yielded the statistical difference, and the effect size measured by Cramér's V ($V = 0.1004$) was small but notable according to the guideline of Cohen (1988). Following the suggestion of Renshaw et al. (2015), which proposed that conceptual and psychometric parsimony should be considered qualitatively considering psychometrics indicators, multidimensional model (model 0) was chosen as the optimal measurement structure for the SWS.

The multidimensional model was refined by allowing correlated errors (CE) among items within the same factor that exhibited shared meaning and unusually high modification index values ($MI > 100$). Additionally, error correlations were permitted for 4 pairs of items from different factors that demonstrated exceptionally high MI values and overlapping conceptual meanings. One pair of items having high MI without shared conceptual meaning was not considered for error correlation. That operation reduced the RMSEA to .050, and resulted in a good fit with $GFI = 0.914$ and $CFI = 0.935$ (see model 0 with CE in table 4 for other fit indices). The magnitude of the standardized estimate for each item ranged from 0.530 to 0.823 (see Fig. 1).

Table 4

The Fit Indices of The Model

Type fit index	Fit index	Model 0	Model 1	Model 0 with CE	Adequate fit index
Absolute Fit Index	Root Mean Square Residual (RMR)	0.181	0.215	0.162	$RMR < .08$ (Hu & Bentler, 1999).
	The Goodness of Fit Index (GFI)	0.881	0.878	0.914	$GFI > .90 = \text{good}$ (Kline, 2016).
	The Adjusted Goodness of Fit Index (AGFI)	0.864	0.862	0.899	$AGFI > .90 = \text{good}$ (Hair et al., 2022).
Incremental Fit Indexes	The Comparative Fit Index (CFI)	.909	0.906	0.935	$CFI > .90 = \text{good}$ ((Hu & Bentler, 1999))
	Tucker-Lewis Index (TLI)	.902	0.900	0.928	$TLI > .90 = \text{good}$ (Brown, 2006)

Parsimony- Adjusted Indexes	Root Square Error of Approximation	Mean	.059	0.59	0.050	RMSEA < .05 = good (Kline, 2016).
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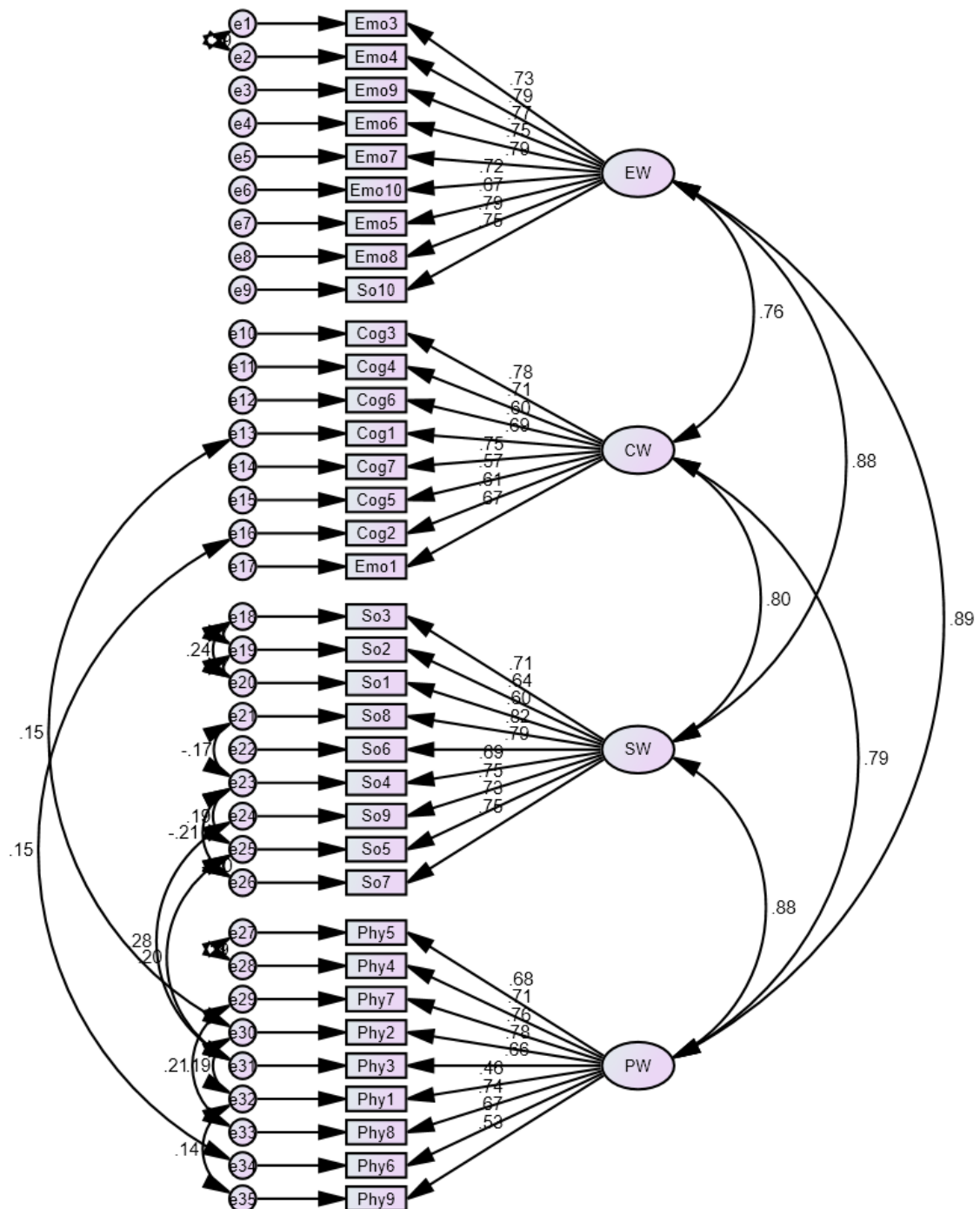


Figure 1. Final CSEP measurement model of Student Wellbeing

Measurement Invariance Across Gender and City-levels

Gender invariance of SWS was evaluated across boy and girl. The model showed adequate fit in both gender groups, that all the configural, metric, scalar, and residual invariance models were supported (see Table 5). Consistent with the recommendation of Putnick & Bornstein (2016), the result showed that the difference in RMSEA and CFI across 3 models is less than .03 and .01 respectively. Therefore, the model can be applied similarly for boy and girl. The similar procedure was run to test invariance cross city-levels, suggesting that the model was applied equivalently to special and ordinary city level (see Table 6).

Table 5

Invariance of student wellbeing across gender

Model	χ^2	df	χ^2/df	p	TLI	RMSEA	90% CI RMSEA	CFI	ΔCFI
Model 1 Configural	8672.572	1076	8.060	0.000	0.924	0.036	0.036- 0.037	0.931	-
Model 2 Metric	8717.896	1107	7.875	0.000	0.926	0.036	0.035- 0.037	0.931	0.000
Model 3 Scalar	9704.258	1142	8.498	0.000	0.919	0.038	0.037- 0.038	0.922	0.011
Model 4 Residual variance	10020.663	1177	8.514	0.000	0.919	0.038	0.037- 0.038	0.920	0.002

Table 6

Invariance of student wellbeing across city level

Model	χ^2	df	χ^2/df	p	TLI	RMSEA	90% CI RMSEA	CFI	ΔCFI
Model 1 Configural	8615.610	1076	8.007	0.000	0.923	0.036	0.036- 0.037	0.930	-
Model 2 Metric	8693.106	1107	7.853	0.000	0.925	0.036	0.035- 0.037	0.930	0.000

Model 3 Scalar	9127.653	1142	7.993	0.000	0.923	0.036	0.036- 0.037	0.926	0.014
Model 4 Residual variance	10067.915	1177	8.554	0.000	0.917	0.038	0.037- 0.038	0.918	0.012

Internal Consistency Reliability

For the reliability analysis, a Cronbach's alpha of 0.963, a Spearman-Brown coefficient of 0.918 and a Guttman split-half coefficient of 0.915 were obtained. According to Vaske et al. (2017), these values can be considered as consistent. Apart from that, Cronbach's alpha was also calculated for each factor (see table 5).

Inferential Statistical Analysis

The analysis of correlations between factors is shown in Table 5, where all the significant correlation at the 0.01 level (2-tailed) was marked with asterisks.

Table 5. *Descriptive Statistics and Correlation Matrix of SWS*

Variables	N	Mean	Std. Deviation	Reliability (α)	CWI	SWI	EWI	PWI
CWI	8	5.7508	1.38241	0.864	1			
SWI	9	6.2057	1.54796	0.906	.716**	1		
EWI	9	6.1411	1.67116	0.919	.680**	.769**	1	
PWI	9	6.0964	1.57760	0.877	.676**	.760**	.791**	1

The analysis by gender did show that boys had a significantly higher wellbeing than girls in by all four domains with small effect sizes (see table 6). Likewise, statistical differences by all four wellbeing factors were detected among city levels, informing that students in special municipalities such as Hanoi (capital city) and Ho Chi Minh City (economic center of Vietnam) had the lower wellbeing than those in ordinary cities (see table

7). Based on the suggestions of Cohen (1988), all the effect sizes were intermediate across 4 wellbeing domains.

Table 6. *Result of T-test on Gender Difference*

	Group	N	Mean	Std. Deviation	t	Mean difference	P value	Effect size (Cohen d)
CWI	Male	5379	5.9349	1.43068	14.016	0.37163	< 0.01	0.271
	Female	5274	5.5633	1.30419				
SWI	Male	5379	6.2868	1.62897	5.472	0.16369	< 0.01	0.106
	Female	5274	6.1231	1.45538				
EWI	Male	5379	6.3382	1.73220	12.380	0.39764	< 0.01	0.240
	Female	5274	5.9406	1.58081				
PWI	Male	5379	6.3393	1.62887	16.247	0.49019	< 0.01	0.315
	Female	5274	5.8492	1.48310				

Table 7. *Result of T-test on City-level Difference*

	Group	N	Mean	Std. Deviation	t	Mean difference	P value	Effect size (Cohen d)
CWI	Special	9074	5.6167	1.32494	-23.073	- 0.90071	< 0.01	- 0.670
	Ordinary	1587	6.5174	1.45305				

SWI	Special	9074	6.0744	1.51733	-21.499	- 0.88252	< 0.01	- 0.582
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Ordinary	1587	6.9569	1.50713
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EWI	Special	9074	6.0139	1.64870	-19.410	- 0.85436	< 0.01	- 0.520
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Ordinary	1587	6.8682	1.61228
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PWI	Special	9074	5.9723	1.55832	-20.336	- 0.83391	< 0.01	- 0.538
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Ordinary	1587	6.8062	1.49800
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Discussion

The aim of this study was to propose a model to measure student well-being and investigate the SWS's psychometric properties. To that end, reliability, exploratory factor analysis and confirmatory factor analysis were conducted for testing the scale psychometrics properties. Results presented validity evidence based on consistent goodness and badness of fit indexes, measurement invariance, internal structure, and adequate reliability coefficients. These initial empirical data suggest that the 35-items scale can be used to measure four dimensions of student wellbeing at secondary school:

1. The first dimension, namely cognitive wellbeing, is related to the state of cognitive functions, including cognitive engagement, learning satisfaction and problem solving.
2. The second dimension is related to students' social connection and belonging to members in the school context.
3. Dimension 3 was called emotional wellbeing, related to general positive emotions such as happiness and optimism and emotional resilience.
4. Dimension 4 – physical wellbeing - contained items on the subjective perception of their physical health, state of energy and healthy behaviors related to eating and sleeping.

These initial empirical data suggest that the 35-items scale can be used to measure student wellbeing at secondary school.

The revealed higher level of wellbeing of boys over girls is consistent with previous studies on the higher risk of mental health and wellbeing problems in girls at schools. A quantitative and qualitative research suggested that Vietnamese teenage girls are more likely to experience mental health distress than their counterparts with higher risk of mental ill-health, such as emotional difficulties and depression (Samuels et al., 2022). In a recent study, the higher prevalence of internalized problems such as depression and anxiety among school girls is also observed (Ha et al., 2024). However, it is notable that what is measured in the current study is well-being, not ill-being - such as clinical symptoms. Therefore, although the

girls demonstrated a certain lower wellbeing than boy, it needs to be considered with caution, considering the low effect size of these differences.

It is interesting in the current study that adolescents in small cities experience more wellbeing than those in big municipalities. It is widely believed that big cities, with many factors such as fast life pace, increased competition, and other environmental disturbances, are associated with a considerably higher risk of mental health problems (Gruebner et al., 2017). Finding of the current study is consistent with a recent study of La et al., (2020), that Vietnamese small cities where slow pace and natural-oriented lifestyles are dominant seems to have a certain effect on lower risks of mental health problems. A noteworthy result in the current study is that cognitive wellbeing, which is conceptualized to be directly related to quality of information process, learning quality and problem solving, is higher among students in small cities with a larger effect size over other domains. Although the other municipalities including Ho Chi Minh City and Hanoi are considered the center of educational development of Vietnam with the largest resources for educational opportunities, students in smaller cities with less opportunities may still have a chance to learn and succeed thanks to a certain stable cognitive wellbeing states. This can be tested through a longitudinal study explaining the effect of cognitive wellbeing on learning performance among students in different cities.

Limitation

Although this study provides promising evidence for the psychometric properties of the SWS, it is subject to several limitations. The first limitation of the study is the nature of cross-sectional study, that the results can make any implication in the causal relationships from cross-sectional analysis due to many certain biases (Setia, 2016). Therefore, all of what is written in the discussion section is just preliminary prediction, which needs further experimental or longitudinal studies to confirm. Secondly, the validation process involved a restricted number of experts, primarily sourced from a single school system. Although the students feedback on items' wording was considered, the study did not use a systematic qualitative method such as focus group or thematic analysis on student's understanding of wellbeing to build up its framework. This is also a limitation of many student wellbeing studies focusing on quantitative methods (Hossain et al., 2022). This limitation poses a potential for biases that could compromise the overall validity of the scale. .

Third, although the samples used in this study were large and adequate for statistical analysis, the samples were all from a system of private schools. Thus, the sample's representativeness is questionable, because there are only 6.8% Vietnamese students studying at private kindergarten, primary and secondary schools (General Statistics Office of Vietnam, 2023). Students of that school system mostly have a middle-class family background, by which their moderately high tuition fees can be afforded. Therefore, the generalizability of the study is debatable, and further research needs to be conducted in public educational sectors as well, considering the student's social-economic status.

Also, there were no validation studies to test external validity of the newly developed SWS, including the criterion validity and predictive validity yet. Thus, further research utilizing other criterion measures is needed to assess the validity and reveal potential limitations of SWS. Lastly, the scale has not yet been tested with primary school students from 1st to 5th-grade students, considering their reading comprehension levels. Therefore, an adaptation of SWS for students of these ages would be necessary for future research.

Conclusion and Recommendation

This study presents a validated scale that allows us to measure wellbeing of secondary school students. Its confirmed factor structure and reliability consistency help school psychologists and teachers to classify and estimate dimensions of student wellbeing, which are cognitive, social, emotional and physical wellbeing. Based on the results on each dimension of student wellbeing, each dimension in which students show lower scores may be addressed by educational strategies in different organizational levels of school settings, such as utilizing individualized instructional designs for students with lower cognitive wellbeing at individual levels, organizing healthy eating campaign for classes which shows low indexes of physical wellbeing at class level, or even promote a policy on child protection to promote student social and physical wellbeing in the whole school scale. SWS provides not only a quick and comprehensive screening of students' well-being with a survey time of between 10 and 12 min, but also creates a wellbeing map which can serve as a guideline for proactive – reactive actions of teachers, school counselors and school boards of management.

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