

The C.S.E.P Measure of Student Subjective Wellbeing: A Study on Psychometric Properties

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Abstract

This study, consisting of two phases, focused on developing a scale to measure perceived wellbeing of secondary school students in Vietnam. In the first phase, a framework of student wellbeing was developed, resulting in a prototype questionnaire hypothetically measuring four wellbeing factors. In the second phase, 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. The psychometrics of prototype student wellbeing scale was tested, using exploratory factor analysis, confirmatory factor analysis and reliability analysis. A four-factor structure was defined, including cognitive, social, emotional and physical wellbeing, abbreviated as C.S.E.P with consistent goodness and badness of fit indexes, high reliability and adequate measurement invariance. 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

Over the last few decades, there has been increasing agreement among politicians, psychologists, teachers and educational activists about the importance of student wellbeing (Govorova et al., 2020). Instead of merely relying on academic accomplishment, modern schools have increasingly identified holistic happiness and positive experiences of students as the criteria for school success (Hascher, 2012). When students experience positive wellbeing, they are more likely to visit schools consistently, actively engage in lessons, efficiently recall information, positively socialize with their peers and teachers and proactively become a part of 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, measuring the school's effectiveness has been universally adhered to both the common approach of student's acquisition of knowledge and skills, and an emerging focus on aspects of school-based well-being (Govorova et al., 2020; Hascher, 2007). The need for effectively assessing and monitoring student wellbeing has become vital (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 (Hossain et al., 2022). 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; Yao et al., 2017), 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), concentrate on academic and social functioning, such as classroom social functioning (Holfve-Sabel & Gustafsson, 2005), educational meaning, and academic efficacy (Renshaw et al., 2015). However, other studies proposed that student wellbeing should be unspecific contextually, leading to the incorporation of various psychological constructs related to effective functions and flourishing experiences (Seligman et al., 2009) beyond school context into measures of student wellbeing (Furlong et al., 2013; Renshaw et al., 2015; Renshaw & Bolognino, 2014).

Recent studies on student wellbeing adopted an integrative approach, which theorizes student well-being based on both perspectives of hedonism and eudaimonia. Kern et al. (2016) developed adolescence wellbeing model adopted from Seligman's PERMA theory, and revised five indicators of P.E.R.M.A into E.P.O.C.H elements, including: engagement (E), positivity

(P), optimism (O), connectedness (C), happiness (H). Whereas, as per the Organization for Economic Co-operation and Development, student wellbeing encompasses various aspects of psychological, cognitive, social, and physical functioning essential for a content and meaningful life (OECD, 2017). The recent emergence of integrative approach in student wellbeing conceptualization indicated that although subjective well-being and eudaimonic constructs are theoretically discriminant (Tsurumi et al., 2021), it is evident that they have strong association and constitute complementary psychological aspects for an integrative model of wellbeing (Courtney et al., 2023; Huta, 2015; Rudolf, 2020; Seon & Smith-Adcock, 2021; Strelhow et al., 2019)

Research Gap

Such various theoretical approaches provide a diverse understanding of student wellbeing, but also lead 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) pointed out that in spite of numerous measures of student wellbeing, there is a lack of systematic development of holistic and psychometrically sound instruments and a requirement of an unified concept. In addition, cultural implications of child and student wellbeing are not well understood (Statham & Chase, 2010) due to the dominance of wellbeing studies in Western cultural contexts (Hossain et al., 2022), 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 this study 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 to fill the above gaps in literature and contribute 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 an integrative concept founded upon both facets: subjective well-being and eudaimonia. It reflects a perceived holistic optimal state across multiple domains, including cognitive, social, emotional and physical aspects, by which students can subjectively experience wellness and demonstrate adaptive functions (Peterson & Seligman, 2004). Feeling well and positive on diverse biopsychosocial dimensions (Kern et al., 2016; OECD, 2013) lays the foundation for students to cope with academic challenges effectively, be alert in learning endeavors, and become an efficient member to their communities (Sayers, 2001). In broad terms, student wellbeing can be conceptualized as their perceived state of holistic wellness, demonstrating cognitive, social, emotional, and physical functioning and capacities required for a contented and efficient experiences within and beyond school.

This study adopted the Student Wellbeing Framework developed by The NSW Department of Education (DEC), which acknowledges the multidimensional aspect of wellbeing in personal and organizational levels, focusing on healthy connections in school community, student's strengths, student's thrive for success and overall positive school environment (NSW Department of Education, 2024). For the current study, DEC's framework was modified into a significantly different student wellbeing model. Firstly, only the personal level of DEC's framework was adapted, focusing on subjective experiences of students instead of a widespread scope of school environment. Secondly, the current model was developed beyond the context specificity of school, considering students' subjective experiences in a comprehensive manner. For example, the emotional resilience student experiences in dealing with a school exam is not distinguished with one experienced in a long hiking trip. Lastly, integrating subjective experience of pleasure (hedonism approach), and adaptive functions for flourishing (positive psychology approach), the study aimed to capture the comprehensive nature of student experiences, across four domains: cognitive, emotional, social, and physical, omitting the spiritual component proposed by DEC due to its irrelevance to Vietnamese school culture, considering the consultation with local school counsellors and teachers. That is, narrowing the DEC framework to students' positive experience, the Vietnamese student wellbeing model defines four wellbeing domains with 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 intrinsic motivation to attain knowledge and satisfaction of gained outcomes, resulting in experiences of positive learning.

When students are cognitively well, they are alert to learn and easily engage in learning activities. 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 healthy relationships and connectedness with others (NSW Department of Education, 2024). Student social wellbeing is reflected on how good the quality of students' relationships with others (such as their family, their peers and teachers) is, and students' overall feelings about their communities in diverse levels. Social wellbeing promotes students' solidarity, tolerance, prosocial behaviors and general positive attitudes towards others (Moliner et al., 2021).

The student social wellbeing demonstrates itself as students' adaptive interpersonal functioning to effectively integrate in and contribute to their school community (Kiuru et al., 2020). On the other hand, that effective interpersonal functioning reflects whether the school communities are positively and effectively influential to students' life (NSW Department of Education, 2024).

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

- Social acceptance (Feelings of being accepted, such as being listened and understood, and belief of social goodness, such as the general trust on good intention of peers and teachers)
- Social actualization (Sense of the development of social entities, reflected in the feeling of proud on the success and progress of friends or school communities)
- Social contribution (Feeling that one has a contribution to make to society, reflected in the willing to help and support others)

- Social coherence (Perceiving the social world as predictable, comprehensible, reflected in the sense of familiarity with aspects of school life)
- Social integration (Feeling as a part of the community with common things, reflected in the strong sense of membership and shared interests with others in groups)
- Social safety (Feeling safe and comfortable in social situations)

Emotional wellbeing: A person's emotional wellbeing is typically defined as the ability to feel and express human emotions in a healthy manner (Meshko et al., 2021) and emotional strength (OECD, 2017). Particularly, it is reflected on the generated and maintained positive emotions and feelings (Hascher, 2007), as well as skills to manage negative emotions, and stressful situations (OECD, 2017). Therefore, teachers can realize student's emotional health based on not only the demonstration of positive affect (happiness, fun, enthusiasm or cheerfulness, etc.) but also how effectively students cope with adversity and unpleasant circumstances, shedding light on their level of emotional resilience.

Students' emotional wellbeing not only plays a crucial role for a general adaptive development of personality (Meshko et al., 2021), but also allows students to efficiently manage the various elements of their experiences both inside and outside the school environment. It includes building up close relationships with others, and maintaining efforts in academic performance through enhanced social-emotional skills (Barry et al., 2017).

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 is reflected in the sense of healthfulness, vigor and vitality (Bevans et al., 2010) and demonstrated by healthy habits including balanced eating, actively doing exercise, preventive healthcare, sleep hygiene practices and responsibly avoidance of detrimental behaviors such as substance abuse or unsafe sexual conducts (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 in most aspects. 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 (referring to the sense of safe from physical harm and injury)
- Sleep quality (referring to the vitality and alertness resulted from healthy sleep and sleep hygiene practices)
- Healthy diet (referring to the healthy appetite and balanced diet)
- Physical activities (referring to the sense of vigor and energy resulted from physical activities)
- Healthy lifestyle (referring to the conscious choices of behaviors to stay fit and active, and avoiding harmful habits).

Study Objectives and Methods

In this paper, the C.S.E.P model of student wellbeing is introduced. The main aim of this study is to develop a valid and reliable scale for schools and educational organizations to assess secondary school students' 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. That is, the scale is designed to capture and describe the general wellbeing and 4 domains of subjective positive experiences, not aim to generate any particular criteria for diagnostic purposes.

The research questions and corresponding hypotheses of this project are following:

1. What is the factor structure of the student wellbeing scale in a Vietnamese student sample?

***Hypothesis 1:** The second-order model of student wellbeing, including the general wellbeing 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 second-order 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 expert group through a substantive validation process. Student well-being 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, tailoring to the practical needs of Vietnamese schools for an easy-to-use school wide screening tool within a multi-tiered system of supports (MTSS), a format of Likert scale was chosen because its straightforward nature, high reliability and ease of administering for school staff and answering for pupils is beneficial in school settings (Nonoda & Okada, 2022). A multidimensional measure of student wellbeing was identified, focusing on the experienced positive affect and adaptive psychological functioning at school. 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 positivity and functioning that students need to live a happy and fulfilling life.

Third, 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. Following the procedure by Mondo et al. (2019), 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 (subsample 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 (subsample 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 second-order model, checking if the model fit is adequate to the data. 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 second-order model was compared with the correlated trait factor model, evaluating the chi-square difference and Akaike Information Criterion (AIC) (Brown, 2015) to choose the preferred model. Further, 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 5 items with ambiguous meaning, resulting in 3 items removed and 2 items reworded. A last round of review by experts pointed out a group of 4 items and 2 items with overlapped meaning, resulting in 4 items removed. 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) loaded on emotional wellbeing domain; and two items hypothesized to be in emotional wellbeing (All in all, I am satisfied with my life; When I think about what I want from life, I find nothing missing) loaded to 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. 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 (see discussion). Therefore, it was dropped, resulting in 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 loaded on factor different from the hypothesized model

** 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 second-order model (Model 1). We found an acceptable fit (Hu & Bentler, 1999) with the following indices: $\chi^2 = 10997.614$, $df = 559$, $p < .00$, $NFI = 0.902$, $CFI = 0.906$, $RSMEA = 0.059$, $SRMR = 0.044$. Reviewing the modification index values, we found an unusually high value ($MI > 300$) among error terms of 2 items “I feel safe and secure at my school” (social wellbeing) and “I feel safe at school because necessary measures are taken against the accidents” (physical wellbeing). Further qualitative investigation revealed that they were not adequate to the developed wellbeing conceptualization (see details in discussion). In addition, further checking variances of these two items, and testing how model fit and internal reliability improved if they were deleted, lead to the decision to remove them. The CFA for the second-order model was run again for 33 items. As highlighted by Gerbing & Anderson (1984) and Brown (2015), instead of blindly following the MI to reach the common cut-offs for good model fit, review of wording and specific item content should be conducted to justify any correlated error (CE). Therefore, errors were allowed to correlate only between items having similar wording and belonging to the same factors in the model, reducing the RMSEA to .054, and resulted in a good fit with $GFI = 0.904$, $CFI = 0.923$ and $SRMR = 0.0419$ (see model 1 with CE in table 4 for other fit indices). The magnitude of the standardized estimate for each item ranged from 0.457 to 0.803 (see Fig. 1). The dimensions were shown to have standardized regression weights of 0.924 (Emotional), 0.838 (Cognitive),

0.914 (Social), 0.933 (Physical) on the underlying latent construct (General Student Wellbeing). Therefore, the model of four manifested dimensions with one latent variable model is supported, and hypothesis 1 is confirmed.

In addition, the CFA were run for both correlated trait factor model (Model 0 after CE) and second-order model (Model 1 after CE) with same correlated errors and two models were compared using AIC and chi-square difference. Results demonstrated that the correlated trait factor model yielded good fit indices with almost same values of indices (See Model 0 after CE in Table 4). In comparison to the second-order model, the slightly smaller AIC value ($4355.020 < 4359.460$) and statistically significant chi-square difference ($\Delta\chi^2 = 28.44$, $\Delta df = 2$, $p < .001$) suggested that Model 0 with fewer degrees of freedom fits the data better than Model 1. However, the effect size measured by Cramér's V ($V = 0.0517$) was very small, indicating that the practical difference in fit between the two models is negligible according to the guideline of Cohen (1988) and Rea & Parker (2012). Following the suggestion of Renshaw et al. (2015), that conceptual and psychometric parsimony should be qualitatively considered alongside psychometric indicators, the second-order model was selected as the optimal measurement structure for the SWS.

Table 4

The Fit Indices of The Model

Type fit index	Fit index	Model 0 with CE	Model 1	Model 1 with CE	Adequate fit index
Absolute Fit Index	Standardized Root Mean Square Residual (SRMR)	0.0414	0.044	0.0419	SRMR < .08 (Hu & Bentler, 1999; Kline, 2016).
	The Goodness of Fit Index (GFI)	0.904	0.876	0.904	GFI > .90 = good (Kline, 2016).
	The Adjusted Goodness of Fit Index (AGFI)	0.888	0.862	0.888	AGFI > .90 = good (Hair et al., 2019).

Incremental Fit Indexes	The Comparative Fit Index (CFI)		0.923	0.906	0.923	CFI > .90 = good (Hu & Bentler, 1999)
	Tucker-Lewis Index (TLI)		0.916	0.900	0.916	TLI > .90 = good (Brown, 2006)
Parsimony- Adjusted Indexes	Root Mean Square Error of Approximation		0.054	0.059	0.054	RMSEA < .05 = good (Kline, 2016).

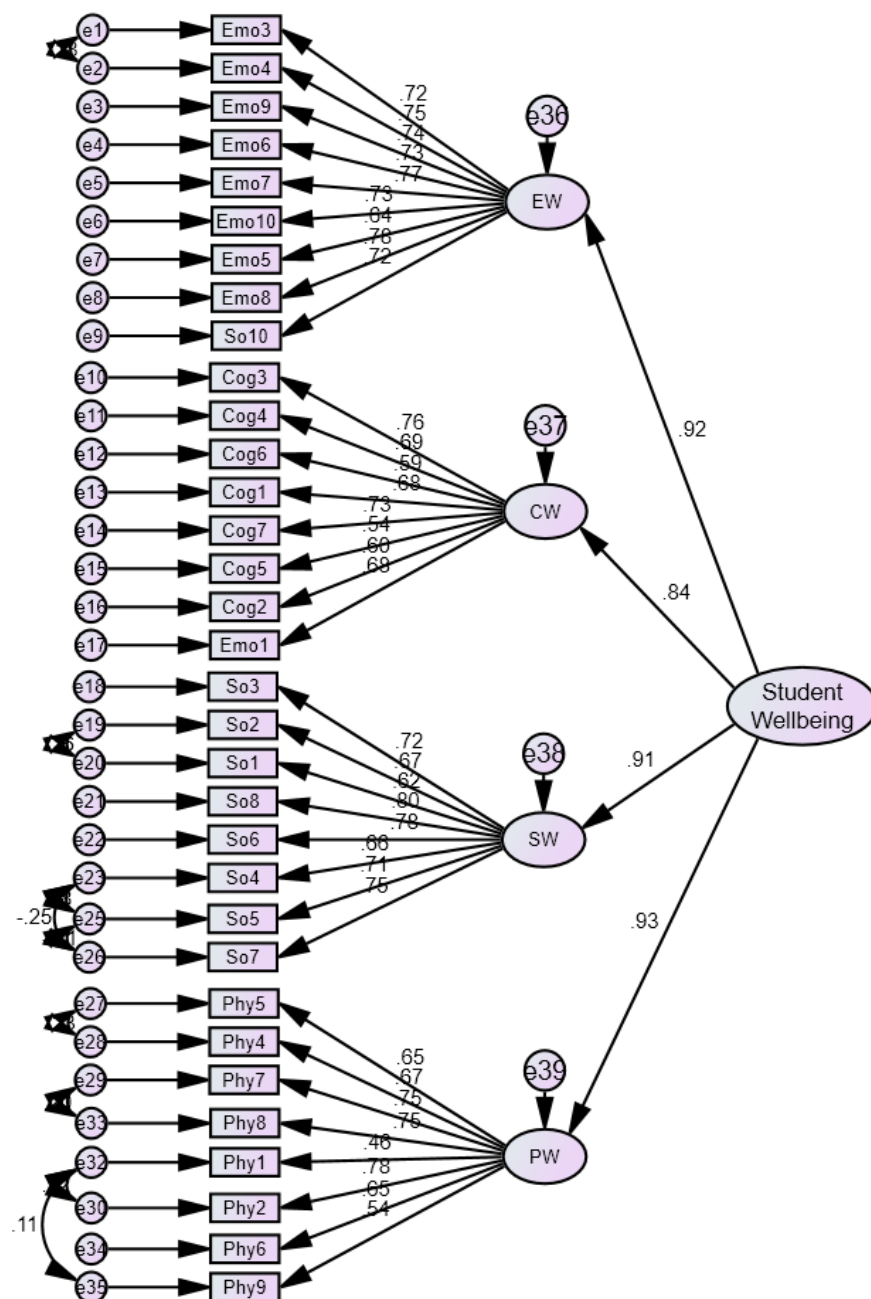


Figure 1. Final CSEP measurement model of Student Wellbeing

Measurement Invariance Across Gender and City-levels

Gender invariance of SWS was evaluated across boys and girls. 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 0.03 and 0.01 respectively. Therefore, the model can be applied similarly for boys and girls. 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). Therefore, hypothesis 2 is confirmed.

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	7880.394	964	8.175	0.000	0.925	0.037	0.036 - 0.038	0.932	-
Model 2 Metric	7915.182	993	7.971	0.000	0.928	0.036	0.035 - 0.037	0.932	0.000
Model 3 Scalar	8803.887	1026	8.581	0.000	0.921	0.038	0.037 - 0.039	0.923	0.009
Model 4 Residual variance	9104.698	1063	8.565	0.000	0.921	0.038	0.037 - 0.038	0.921	0.001

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	7784.518	964	8.075	0.000	0.925	0.036	0.036 - 0.037	0.931	-
Model 2 Metric	7849.835	993	7.905	0.000	0.927	0.036	0.035 - 0.037	0.931	0.000

Model 3 Scalar	8270.129	1026	8.061	0.000	0.925	0.036	0.036 - 0.037	0.927	0.004
Model 4 Residual variance	9215.332	1063	8.669	0.000	0.919	0.038	0.037 - 0.039	0.918	0.009

Internal Consistency Reliability

For the reliability analysis, a Cronbach's alpha of 0.960, a Spearman-Brown coefficient of 0.912 and a Guttman split-half coefficient of 0.909 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	8	6.1407	1.56042	0.896	.721**	1		
EWI	9	6.1411	1.67116	0.919	.680**	.751**	1	
PWI	8	5.9940	1.61826	0.877	.672**	.724**	.781**	1

The analysis by gender did show that boys had a significantly higher wellbeing than girls in 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 student 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 of student subjective wellbeing and a scale to measure it. Considering the practical needs of Vietnamese schools in MTSS, student wellbeing scale (SWS) was developed to work both as the whole-school independent screening tool and supplementary scale for case-specific needs of evaluation of wellbeing and other mental health problems. Serving both functions, SWS is expected to become a basic, common and easy-to-use measurement, providing a comprehensive picture of student mental health to inform schools' decision and policy making within the multi-tiered system of supports.

In order to gain that, the study was designed with two phases. For the first phase of substantive validation, the student wellbeing was conceptualized based on both subjective wellbeing and positive psychology, capturing student's experiences of positivity and adaptive functions for a fulfilling life. Four sub-constructs, including cognitive, social, emotional and physical domains, were built up and operationalized with specific content and items to measure. Through the face validity and feasibility analysis, the prototype SWS was formed with 36 items, which later went through the empirical testing.

For the second phase, SWS's psychometric properties were investigated on the sample of secondary school student. Reliability, exploratory factor analysis and confirmatory factor analysis were conducted, resulting in consistent goodness and badness of fit indexes, measurement invariance across gender and city levels, and adequate reliability coefficients. Three items were removed during the data analysis process. In the end, the measure SWS demonstrated sound psychometrics and the second-order model of student subjective wellbeing was confirmed, suggesting that the 33-items scale can be used to measure general wellbeing and 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. The third dimension, called emotional wellbeing, refers to general positive emotions such as happiness and optimism and emotional resilience.
4. The fourth dimension – physical wellbeing - contained items on the subjective perception of their physical health, state of energy and healthy behaviors related to eating and sleeping.

During the data analysis process, three items were omitted. The item “All in all, I am satisfied with my life” reflects the sense of life satisfaction, which was widely used as an overarching construct of wellbeing (Diener et al., 1985; Ruggeri et al., 2020). Recent empirical results indicated a certain distinguishment between life satisfaction and overall wellbeing (Fen et al., 2013; Ruggeri et al., 2020) and emotional wellbeing (Fors Connolly & Gärling, 2024). It explains why the item did not load well to any wellbeing factors in our model but slightly to physical wellbeing. Considering the psychometric parsimony, the item was omitted. The other two removed items were “I feel safe and secure at my school” and “I feel safe at school because necessary measures are taken against the accidents”. The abnormally high MI between their error terms indicated a potential subconstruct of safety in the student wellbeing model. It is consistent with the wellbeing model of Flack et al. (2022), which conceptualized student wellbeing as sense of belonging, resilience, and safety. To ensure the temporal psychometric parsimony, these items were not included in the final scale, but should be reconsidered for a potential fifth wellbeing domain when the safety is operationalized in detail in future studies.

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, 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; Qidwai et al., 2016). 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 state. 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 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 substantive 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., 2023). 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 representative 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. In terms of sample, the scale has not yet been tested with primary school students from 1st to 5th-grade students, considering their reading comprehension levels. When the study was initially proposed to school principals, the research team was asked if the current version of SWS can be used also for students from 3rd grade, who are supposed to read properly. However, due to the limitation of the research team's expertise, this request was not fulfilled yet. Therefore, an adaptation of SWS for students of primary school would be necessary for future research.

Also, in terms of scale items, all items are positively worded. Additional negatively worded items are beneficial for a brief scale in school settings because they help to avoid response bias (Kern et al., 2016). For future research, items capturing negativity should be considered to strengthen scale validity.

Lastly, 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.

Conclusion and Recommendation

This study presents a validated scale that allows us to measure wellbeing of secondary school students. Its sound psychometrics indicates that SWSW can help school psychologists and teachers to describe and estimate dimensions of student wellbeing, which are cognitive, social, emotional and physical wellbeing. Based on the results of SWS, lower scores on specific dimensions may be addressed by educational - psychological strategies in different organizational levels of school settings. For example, it is beneficial to utilize individualized instructional designs for students with lower cognitive wellbeing at individual levels, organize healthy eating campaign for classes which shows low indexes of physical wellbeing at class level, or even promote a policy on peer-to-peer supports to promote student social 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.

Declaration of Artificial Intelligence Usage: *I declare that I have used an AI tool while writing this paper. Particularly, Chat GPT has been used as a Grammar assistant to correct typographical and grammar errors, ensuring concise wording in several sentences while maintaining strict adherence to the author's original ideas and sentence structure initially written by the author.*

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