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Validación del marco tripartito del interés individual en la educación física superior filipina: evidencia del cuestionario de interés individual del estudiante

Validation of the Tripartite Framework of Individual Interest in Philippine Higher Physical Education: Evidence from the Student Individual Interest Questionnaire

Validação do marco tripartido do interesse individual na educação física superior filipina: evidências do questionário de interesse individual do estudante

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RESUMEN

Este estudio validó el marco tripartito del interés individual en la educación física en la educación superior filipina utilizando el Cuestionario de Interés Individual de los Estudiantes en Educación Física. Se analizaron datos de 1659 estudiantes universitarios mediante modelado de ecuaciones estructurales basado en covarianza (CB-SEM) para examinar la estructura factorial y la consistencia interna del modelo. Los resultados de los análisis factoriales confirmatorios de primer y segundo orden respaldaron la coherencia dimensional del modelo, con altas cargas factoriales, una sólida consistencia interna y una validez convergente y discriminante adecuada. Las cargas factoriales estandarizadas oscilaron entre 0,809 y 0,901, lo que indica un gran tamaño del efecto. Los índices de ajuste del modelo demostraron un ajuste excelente (CFI = 0,993, TLI = 0,991, RMSEA = 0,040, SRMR = 0,018). Los hallazgos respaldan la aplicabilidad del marco y sugieren que el instrumento puede utilizarse en contextos similares, aunque se recomienda una mayor validación en poblaciones diversas.

Palabras clave: interés individual, educación física, educación superior, modelado de ecuaciones estructurales, validación de instrumentos, Filipinas.

ABSTRACT

This study validated the tripartite framework of individual interest in physical education in Philippine higher education using the Students' Individual Interest in Physical Education Questionnaire. Data from 1,659 college students were analyzed using covariance-based structural equation modeling (CB-SEM) to examine the model's factorial structure and internal consistency. Results from first- and second-order confirmatory factor analyses

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supported the model's dimensional coherence, with high factor loadings, strong internal consistency and adequate convergent and discriminant validity. Standardized factor loadings ranged from 0.809 to 0.901, indicating a large effect size. Model fit indices demonstrated excellent fit (CFI = 0.993, TLI = 0.991, RMSEA = 0.040, SRMR = 0.018). Findings support the applicability of the framework and suggest that the instrument may be used in similar contexts, although further validation across diverse populations is recommended.

Keywords: individual interest, physical education, higher education, structural equation modeling, instrument validation, Philippines.

RESUMO

Este estudo validou a estrutura tripartida do interesse individual pela educação física no ensino superior filipino, utilizando o Questionário de Interesse Individual dos Estudantes em Educação Física. Os dados de 1.659 estudantes universitários foram analisados através da modelação de equações estruturais baseada na covariância (CB-SEM) para examinar a estrutura fatorial e a consistência interna do modelo. Os resultados das análises fatoriais confirmatórias de primeira e segunda ordem corroboraram a coerência dimensional do modelo, com elevadas cargas fatoriais, forte consistência interna e validade convergente e discriminante adequadas. As cargas fatoriais padronizadas variaram de 0,809 a 0,901, indicando um tamanho de efeito grande. Os índices de ajuste do modelo demonstraram um excelente ajuste (CFI = 0,993, TLI = 0,991, RMSEA = 0,040, SRMR = 0,018). Os resultados suportam a aplicabilidade da estrutura e sugerem que o instrumento pode ser utilizado em contextos semelhantes, embora seja recomendada uma validação adicional em populações diversas.

Palavras chave: interesse individual, educação física, ensino superior, modelagem de equações estruturais, validação de instrumentos, Filipinas

INTRODUCTION

Sustaining long-term motivation and meaningful engagement in physical education (Wintle, 2022) remains a central concern in higher education, particularly as institutions seek to promote health, well-being and lifelong physical activity among students (Carvalho & Vilaça, 2024; Han et al., 2025; Pulimeno et al., 2020). In the Philippine context, PE is often perceived as a peripheral component of the academic curriculum, with many students demonstrating limited intrinsic motivation and weak affective investment (Santiago, 2024; Tagare & Villaluz, 2021). This results in low levels of voluntary participation, disengagement and minimal transfer of physical literacy beyond academic settings (Campoamor-Olegario et al., 2025). These challenges underscore the need to identify and validate theoretical models that explain how stable forms of motivation develop and function in PE environments.

Although foundational motivational theories such as Self-Determination Theory (Deci & Ryan, 2015; Ryan & Deci, 2018) and Expectancy-Value Theory (Eccles & Wigfield, 2002) have contributed significantly to the understanding of student motivation, these frameworks often emphasize the initiation of motivation rather than its long-term development. In contrast, the construct of individual interest has emerged as a promising lens for explaining sustained engagement (Harackiewicz et al., 2016; Renninger & Hidi, 2015). Hidi and Renninger (2006) defined it as a relatively enduring predisposition to reengage with content over time. Moreover, Renninger and Hidi (2022) further emphasized that individual interest develops through meaningful affective experiences, internalized value and repeated positive exposure. In physical education, students' motivation is influenced by embodied experience (Faella et al., 2025), prior exposure (Yli-Piipari et al., 2009) and sociocultural perceptions of value (Shen et al., 2022). Thus, individual interest offers a promising lens for understanding long-term learner engagement (Shen et al., 2022).

One of the most recent and theoretically comprehensive frameworks is the tripartite model proposed by Roure et al. (2021), which conceptualizes individual interest as a multidimensional construct consisting of three latent

dimensions: perceived affect and willingness to reengage (PAWR), stored utility value (SUV), and stored attainment-value and knowledge-seeking intentions (SAVKSI), which was also used by Roure et al. (2021) on their subsequent study (Roure & Lentillon-Kaestner, 2022). These dimensions collectively capture the emotional, functional and value-driven mechanisms that sustain learners' interest in PE (Roure et al., 2021). Although the model has demonstrated strong psychometric properties in European secondary school contexts (Roure et al., 2021), its structural validity in non-Western and higher education settings remains untested. Hence, cross-cultural and level-specific investigations are essential to determine its applicability in diverse educational environments (Zhao et al., 2024).

Localized validation efforts play a critical role in establishing the cultural and contextual relevance of theoretical models (Borsa et al., 2012; Garcia-Pardina et al., 2026; Kūkea Shultz & Englert, 2021). The Philippine higher education system, shaped by unique curricular, linguistic and sociocultural features, may influence how students experience and express individual interest in PE. Without empirical testing in such contexts, even robust frameworks may fail to accurately represent students' motivational structures (Cook & Hatala, 2016). Therefore, psychometric validation must extend beyond replication and engage with contextual sensitivity and practical relevance (Cruchinho et al., 2024; Fenn et al., 2020).

Accordingly, this study serves as a phase-one validation of the tripartite theoretical framework of individual interest in physical education within Philippine higher education. Although recent studies in the Philippine context have begun to examine individual interest in relation to student engagement across various physical education settings using correlational, regression-based and variance-based modeling approaches (Lobo, 2023, 2025a, 2025b, 2025c, 2026a), as well as preliminary intervention-based designs (Lobo, 2026b), including large-scale and multi-institutional investigations (Bautista et al., 2023; Lobo, Martin, et al., 2023; Lobo, Peralta, et al., 2023), these scholarly works did not involve a full covariance-based confirmatory validation of the multidimensional measurement structure. As such, there remains a need to establish the structural validity of the tripartite model within this context. Drawing on a large-scale dataset from multiple HEIs, the present study applies covariance-based structural equation modeling (CB-SEM) to examine both first-order and second-order measurement models. The objectives are to confirm the factor structure of the proposed constructs, assess the internal consistency and dimensional coherence of the model and provide preliminary evidence of its applicability among Filipino college students. This foundational effort contributes to the gradual localization of interest theory and informs future research aimed at predicting outcomes such as engagement, achievement and persistence in physical education.

Review of Related Literature

Theoretical Foundations of Individual Interest

Interest has long been established as a key construct in motivation and educational psychology, particularly as it relates to students' sustained engagement and meaningful learning (Wang & Jiang, 2025). According to Hidi and Renninger (2006), interest develops progressively through phases, beginning with externally triggered situational interest and evolving into a stable, self-sustaining form referred to as individual interest. *Individual interest* is characterized by a consistent disposition to reengage with content over time, accompanied by positive affect, internal value and a growing sense of personal relevance (Harackiewicz et al., 2016; Kirchhoff et al., 2024; Luo et al., 2019). Unlike momentary attention or compliance-driven behaviors (Haag et al., 2025), individual interest is rooted in both emotional and cognitive mechanisms (Hidi et al., 2004), making it a particularly relevant construct in promoting long-term learning outcomes. Foundational motivational theories such as Self-Determination Theory (Ryan & Deci, 2018) and Expectancy-Value Theory (Eccles & Wigfield, 2002) have contributed significantly to our understanding of how motivation arises from perceived competence, autonomy and task value. However, these models often emphasize the initiation of motivation rather than the process by which it becomes internalized and sustained. In physical education, understanding how learners develop long-term interest is critical (Lin & Zhu, 2022). As a result, scholars have increasingly turned to multidimensional models that capture the complexity of motivation, such as the emerging framework of individual interest.

The Tripartite Framework of Individual Interest by Roure et al. (2021)

To operationalize the complex structure of individual interest, Roure et al. (2021) introduced a tripartite model composed of three interrelated factors: PAWR, SUV and SAVKSI. These factors reflect the emotional, functional and value-driven components of interest (Roure et al., 2021). Furthermore, their integration offers a more nuanced understanding of how learners sustain motivation over time (Roure & Lentillon-Kaestner, 2022).

Perceived affect and willingness to reengage (PAWR)

PAWR refers to learners' positive emotional responses during engagement and their subsequent motivation to reengage with similar content (Lobo, 2024). Grounded in Interest Development Theory of Hidi and Renninger (2006), PAWR emphasizes how enjoyment, satisfaction and pride experienced during an activity contribute to long-term interest (Roure et al., 2021). In physical education, such affective responses are especially salient due to the embodied and interactive nature of the subject (Dismore & Bailey, 2011; Fuchs & Koch, 2014). For example, a Filipino college student enrolled in a PE dance course finds unexpected enjoyment in cultural dance rehearsals and gains confidence during their midterm performance. As a result, he/she voluntarily joins a university-led folk dance club, demonstrating reengagement driven by affective experiences.

Stored utility Value (SUV)

SUV refers to the perceived usefulness of PE in achieving personal or professional goals (Roure et al. 2021). This dimension aligns with Expectancy-Value Theory of Eccles and Wigfield (2002), where utility value influences one's willingness to invest effort in a task (Ennes et al., 2023; Wang & Xue, 2022). When students recognize long-term benefits from PE, such as stress management, physical readiness, or transferable skills, they are more likely to retain interest despite potential difficulties or lack of immediate enjoyment (Lahti et al., 2018; Reiner et al., 2013). For an instance, a criminology student participating in a self-defense PE course understands its relevance to his future fieldwork. Even if the training is physically challenging, the perceived utility of the subject reinforces his engagement and interest.

Stored attainment value and knowledge-seeking intentions (SAVKSI)

SAVKSI reflects the degree to which students place importance on excelling in PE and voluntarily seek additional knowledge or skills (Roure et al. 2021). This construct draws from both attainment value of Eccles and Wigfield (2002) and self-directed learning theory of Zimmerman (2002). It captures how learners internalize the significance of PE and take initiative beyond curricular demands. As an illustration, a student introduced to ultimate frisbee during PE classes begins practicing during weekends, watching online tutorials and inviting peers to scrimmages. His/her drive to improve stems from personal curiosity and a desire to master the sport, not from course requirements.

Empirical Support and Gaps in Literature

The tripartite model has been supported in several European studies involving secondary students (Roure et al., 2021; Roure & Lentillon-Kaestner, 2022), demonstrating acceptable psychometric properties and predictive validity. However, empirical testing in higher education contexts, especially in non-Western and Southeast Asian settings, remains limited. Cultural, institutional and pedagogical differences may influence how the factors of individual interest manifest in Philippine universities. For example, Filipino students may view PE as a non-academic subject, often secondary to major coursework, thus influencing their valuation and affective engagement. Moreover, most existing Philippine research on PE motivation tends to focus on singular variables such as enjoyment, physical activity levels, or short-term engagement. There is a scarcity of studies that utilize

multidimensional models or perform structural. To date, few studies have employed multidimensional models or applied rigorous psychometric validation procedures such as covariance-based structural equation modeling (CB-SEM) within the Philippine PE context. This lack of validated, context-sensitive models restricts the development of culturally aligned instructional approaches and evidence-based policy reforms in Philippine physical education programs.

MATERIALS AND METHODS

Research Design

This study employed an instrumental research design (Carretero-Dios & Pérez, 2007), also referred to as a test validation study, aimed at examining the psychometric properties of a measurement framework within a specific context. A quantitative, cross-sectional approach was adopted to validate the tripartite theoretical model of individual interest in physical education proposed by Roure et al. (2021). The primary objective was to assess the factorial structure, internal consistency and higher-order dimensional validity of the model using covariance-based structural equation modeling (CB-SEM). A two-step confirmatory factor analysis (CFA) was employed to examine both first-order and second-order factor structures. This study represents the first phase of a larger validation project, focusing solely on the factorial and construct validity of the instrument among Filipino college students.

Participants

The dataset used in this study was drawn from a previously published research project conducted in 2022, which explored the relationship between individual interest and school engagement in physical education (Lobo & Dimalanta, 2024). The original study gathered responses from 1,659 college students enrolled in general physical education courses across two higher education institutions (HEIs) in the Philippines. For the purpose of the present validation study, the dataset was repurposed to specifically examine the internal structure of the individual interest instrument. Although the original study focused on predictive relationships, a full covariance-based confirmatory validation of the instrument's measurement structure had not yet been conducted. Therefore, this study provides a novel contribution by confirming the measurement model's structural soundness within the Philippine higher education context. Demographic variables were collected during the original study but were not included in the current analysis, as they were not relevant to the objectives of scale validation. A non-probability purposive sampling approach was employed, as the dataset was derived from a pre-existing study involving selected institutions. This approach is appropriate for validation studies where sample adequacy and variability are prioritized over representativeness (Hair et al., 2019). However, this sampling strategy may limit the generalizability of the findings to other institutional contexts.

Instrument

The instrument used in this study was the 14-item English version of the Students' Individual Interest in Physical Education Questionnaire developed by Roure et al. (2021). It measures students' individual interest in physical education across three theoretically grounded factors: positive affect and willingness to reengage (PAWR), stored utility value (SUV), and stored attainment-value and knowledge-seeking intentions (SAVKSI). Responses were collected using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with higher scores indicating greater levels of individual interest. Furthermore, the instrument was administered in English, consistent with the medium of instruction in Philippine higher education. No modifications were made to the wording, structure, or scaling of the items prior to analysis. The instrument was subsequently subjected to confirmatory factor analysis (CFA) to examine its structural validity within the Philippine higher education context.

Procedures

The data used in this study were obtained through a secondary analysis of a previously collected dataset from 2022 (Lobo & Dimalanta, 2024). In the original study, institutional permission was secured from the participating higher education institutions prior to data collection. The questionnaire was administered to students enrolled in general

physical education courses, through online distribution, with an estimated completion time of approximately 10-15 minutes. For the present study, the dataset was accessed in anonymized form. Data screening and preparation procedures were conducted prior to analysis, including checking for missing values, response consistency and outliers. Only complete and valid responses were retained for subsequent analysis.

Data Analysis

Data analysis was conducted using SmartPLS 4, utilizing its covariance-based structural equation modeling (CB-SEM) module. A two-step confirmatory factor analysis (CFA) approach was employed. First, first-order CFA was performed to assess the measurement properties of each latent construct, including standardized factor loadings, internal consistency (Cronbach's alpha and composite reliability) and convergent validity through average variance extracted (AVE). Discriminant validity was evaluated using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio.

Second, second-order CFA was conducted to examine the hierarchical structure of individual interest as a higher-order latent construct composed of PAWR, SUV and SAVKSI. Model fit was assessed using multiple goodness-of-fit indices, including the chi-square to degrees of freedom ratio (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI). Model evaluation followed established criteria from Hu and Bentler (1999) and Hair et al. (2019). All analyses focused on confirming the factor structure and overall model fit of the proposed framework.

Ethical Statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki for research involving human participants. The dataset used in this study was derived from a previously conducted research project (Lobo & Dimalanta, 2024). During the original data collection, participants were informed of the purpose of the study, the voluntary nature of their participation, the confidentiality of their responses and their right to withdraw at any time without penalty. Informed consent was obtained prior to participation. The present study involved a secondary analysis of anonymized data. No personally identifiable information was accessible to the principal investigator and all data were handled in a manner that ensured participant confidentiality and privacy. The original study protocol was reviewed by the College of Sports, Exercise and Recreation – Local Research Ethics Committee (CSER-LREC), Bulacan State University, Philippines, and was granted an exemption from full ethical review due to the nature of the data collection. This secondary analysis adhered to the conditions of the original ethical clearance and no additional ethical approval was required. In addition, this study complied with established ethical standards in sport and exercise science research as outlined by Harriss et al. (2019). Finally, all data processing was conducted in accordance with applicable data protection regulations, including the General Data Protection Regulation (GDPR) and the Spanish Organic Law 3/2018 on the protection of personal data, ensuring that all data were handled securely and exclusively for research purposes.

RESULTS

Normality Estimates

Prior to conducting confirmatory factor analysis, the assumption of normality was assessed by examining the skewness and kurtosis values of each retained item. As presented, all items demonstrated skewness and kurtosis values within the acceptable range of -2 to +2, indicating no substantial deviations from normality (see Table 1). These results support the appropriateness of using covariance-based structural equation modeling (CB-SEM) for subsequent analyses.

Table 1

Normality Estimates of retained items of the Individual Interest in Physical Education Questionnaire

Items	Mean ± SD	Skewness	Kurtosis
PAWR1	3.73 ± 0.98	-.443	-.076
PAWR2	3.49 ± 0.98	-.212	-.203
PAWR3	3.61 ± 1.00	-.343	-.295
PAWR5	3.54 ± 0.94	-.184	-.307
SUV1	3.50 ± 1.02	-.225	-.415
SUV3	3.60 ± 1.00	-.243	-.483
SUV4	3.51 ± 1.04	-.224	-.515
SAVKSI2	4.06 ± 0.96	-.895	.441
SAVKSI3	4.09 ± 0.93	-.866	.346
SAVKSI5	4.15 ± 0.95	-1.008	.614

Note: Mean and Standard Deviation values are presented as Mean ± SD. All skewness and kurtosis values fall within the acceptable range (−2 to +2), indicating approximate normality.
Legend: PAWR- Perceived affect and willingness to reengage, SUV- Stored utility value, SAVKSI- Stored attainment value and knowledge-seeking intentions.

In addition, multicollinearity diagnostics were conducted at the item level using Variance Inflation Factor (VIF) and tolerance values. As shown, all VIF values were below the threshold of 5 and all tolerance values exceeded 0.20, indicating the absence of multicollinearity (see Table 2). These results confirm that each item contributes uniquely to its respective construct.

Table 2

Multicollinearity diagnostics of retained items of the Individual Interest in Physical Education Questionnaire

Item	Tolerance	VIF
PAWR1	0.438	2.283
PAWR2	0.419	2.389
PAWR3	0.346	2.891
PAWR5	0.426	2.346
SUV1	0.552	1.812
SUV3	0.466	2.147
SUV4	0.526	1.901
SAVKSI2	0.383	2.612
SAVKSI3	0.379	2.640
SAVKSI5	0.359	2.786

Note: All VIF values are below the recommended threshold of < 5 and all tolerance values exceed > 0.20, indicating no multicollinearity among the retained items.
Legend: PAWR- Perceived affect and willingness to reengage, SUV- Stored utility value, SAVKSI- Stored attainment value and knowledge-seeking intentions.

First-Order Confirmatory Factor Analysis and Convergent Validity Assessment

A first-order confirmatory factor analysis (CFA) was conducted to examine the revised measurement model of Roure (2021) tripartite framework of individual interest in physical education (See Table 3). Based on item-level diagnostics, four items were removed from the original 14-item instrument (PAWR4, SUV2, SAVKSI1 and

SAVKSI4). Items were removed due to low factor loadings (< 0.70) or poor model fit contribution during preliminary CFA, following Hair et al. (2019) criteria for item retention. The retained 10 items yielded high standardized factor loadings, ranging from 0.809 to 0.901, exceeding the recommended threshold of > 0.70 (Hair et al., 2019). The internal consistency and convergent validity metrics further confirmed the psychometric adequacy of the three factors: PAWR (α = 0.905, CR = 0.906, AVE = 0.706), SUV (α = 0.873, CR = 0.874, AVE = 0.698) and SAVKSI (α = 0.919, CR = 0.919, AVE = 0.791). All composite reliability (CR) values exceeded the minimum criterion of ≥ 0.70 and all average variance extracted (AVE) values surpassed the ≥ 0.50 threshold (Fornell & Larcker, 1981), indicating excellent internal reliability and convergent validity. This refined model maintains the conceptual integrity of the tripartite framework while improving statistical parsimony and clarity.

Table 3

First-Order Confirmatory Factor Analysis (CFA) and Convergent validity assessment results

Factors	Item	Factor loadings	CA	CR	AVE
PAWR	PAWR1	0.828	0.905	0.906	0.706
	PAWR2	0.831			
	PAWR3	0.887			
	PAWR5	0.814			
SUV	SUV1	0.809	0.873	0.874	0.698
	SUV3	0.857			
	SUV4	0.840			
SAVKSI	SAVKSI2	0.901	0.919	0.919	0.791
	SAVKSI3	0.891			
	SAVKSI5	0.877			

Note: Note: Items with factor loadings < 0.70 during the measurement model evaluation were removed prior to the final analysis. Item loadings > 0.70, Cronbach's Alpha (CA) and Composite Reliability (CR) > 0.70, AVE (Average Variance Extracted) > 0.50.
Legend: PAWR- Perceived affect and willingness to reengage, SUV- Stored utility value, SAVKSI- Stored attainment value and knowledge-seeking intentions.

Discriminant Validity Assessment

Discriminant validity was supported through the Fornell–Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. As shown, the square roots of the AVE values, PAWR (0.840), SUV (0.835) and SAVKSI (0.890), exceeded their respective inter-construct correlations, satisfying the Fornell-Larcker condition and indicating adequate conceptual separation between constructs (see Table 4). Moreover, all HTMT values met the conservative threshold of < 0.85, with PAWR-SAVKSI (0.717), PAWR-SUV (0.803) and SAVKSI-SUV (0.705), thereby confirming strong discriminant validity among the factors. These findings affirm that each latent variable represents a distinct yet interrelated facet of individual interest in physical education.

Table 4

Discriminant validity testing using Fornell-Larcker Criterion and Heterotrait-Monotrait Ratio (HTMT)

	PAWR	SAVKSI	SUV
	Fornell-Larcker Criterion		
PAWR	0.840		
SAVKSI	0.715	0.890	
SUV	0.792	0.706	0.835
	Heterotrait-Monotrait Ratio (HTMT)		
PAWR			
SAVKSI	0.717		
SUV	0.803	0.705	

Note: HTMT ratio value < 0.85 (conservative) < 0.90 (liberal) approach.

Model Fit Indices

A first-order confirmatory factor analysis (CFA) was conducted to evaluate the measurement model of the individual interest framework (See Table 5). The analysis yielded a Chi-square value of 117.675 with 32 degrees of freedom ($p < .001$), resulting in a χ^2/df ratio of 3.677. Although this value slightly exceeds the ideal threshold of 3.0, it remains within the acceptable range of ≤ 5.0 for complex models. Notably, the Chi-square statistic is highly sensitive to large sample sizes (N = 1,659), often producing statistically significant results even when the model fit is acceptable (Byrne, 2016; Kline, 2016). As such, χ^2/df is considered a more stable and interpretable index under these conditions.

Additional fit indices confirmed the model's adequacy. The Root Mean Square Error of Approximation (RMSEA) was 0.040, with a 90% confidence interval of [0.033, 0.048], reflecting excellent approximate fit. The Standardized Root Mean Square Residual (SRMR) was 0.018, indicating minimal residual discrepancies between observed and predicted correlations. Incremental fit indices also showed excellent values: Comparative Fit Index (CFI) = 0.993, Tucker–Lewis Index (TLI) = 0.991 and Normed Fit Index (NFI) = 0.991, all exceeding the recommended threshold of ≥ 0.95 (Hu & Bentler, 1999; Hair et al., 2019). These results indicate that the first-order measurement model provides a statistically sound and well-fitting representation of the latent constructs.

Table 5

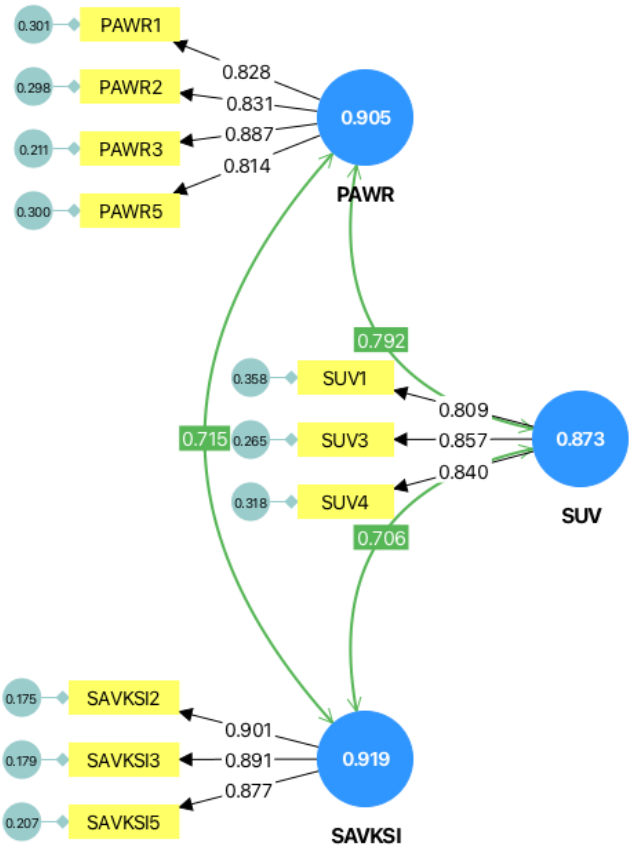
Model Fit Indices for the first-order Confirmatory Factor Analysis (CFA)

Fit index	Value	Threshold	Interpretation
Chi-square/df (χ^2/df)	3.677	≤ 5.00	Acceptable
Root Mean Square Error of Approximation (RMSEA)	0.040	≤ 0.06	Excellent
Standardized Root Mean Square Residual (SRMR)	0.018	≤ 0.08	Excellent
Comparative Fit Index (CFI)	0.993	≥ 0.95	Excellent
Tucker–Lewis Index (TLI)	0.991	≥ 0.95	Excellent

Note: Recommended thresholds were based on Hu and Bentler (1999) and Hair et al. (2019). Values within these ranges indicate acceptable to excellent model fit.

Figure 1

First-Order Confirmatory Factor Analysis (CFA) Model showing standardized factor loadings and construct correlations for PAWR, SUV and SAVKSI



Second-Order Confirmatory Factor Analysis and Convergent Validity Assessment

Convergent validity for the second-order construct *Individual Interest* was supported by high standardized path coefficients to its first-order dimensions (See Table 4 and Figure 2): PAWR (0.896), SUV (0.884) and SAVKSI (0.798), all exceeding the $\geq$ 0.70 threshold (Hair et al., 2019). Composite reliability (0.895), AVE (0.740) and Cronbach's alpha (0.895) were manually computed and confirmed internal consistency, as SmartPLS does not automatically provide these for second-order constructs.

Discriminant Validity Assessment

Discriminant validity was assessed among the first-order constructs (PAWR, SUV, an SAVKSI) using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, yielding satisfactory results. In the context of the second-order model, discriminant validity between the higher-order construct and its dimensions is not applicable, as the first-order constructs are conceptualized as reflective components of the overarching latent variable (Hair et al., 2019). Instead, the validity of the second-order construct is supported by the strong and significant factor loadings of the first-order dimensions onto the higher-order factor.

Model Fit Indices

Model fit indices for the second-order CFA remained consistent with those observed in the first-order model, indicating an excellent overall fit: $\chi^2/df = 3.677$ (≤ 5.00), RMSEA = 0.040 (≤ 0.06), SRMR = 0.018 (≤ 0.08), CFI = 0.993 (≥ 0.95) and TLI = 0.991 (≥ 0.95). These results meet the recommended cutoff criteria by Hu and Bentler (1999) and Hair et al. (2019), confirming the structural adequacy of the second-order model (see Table 6).

Table 6

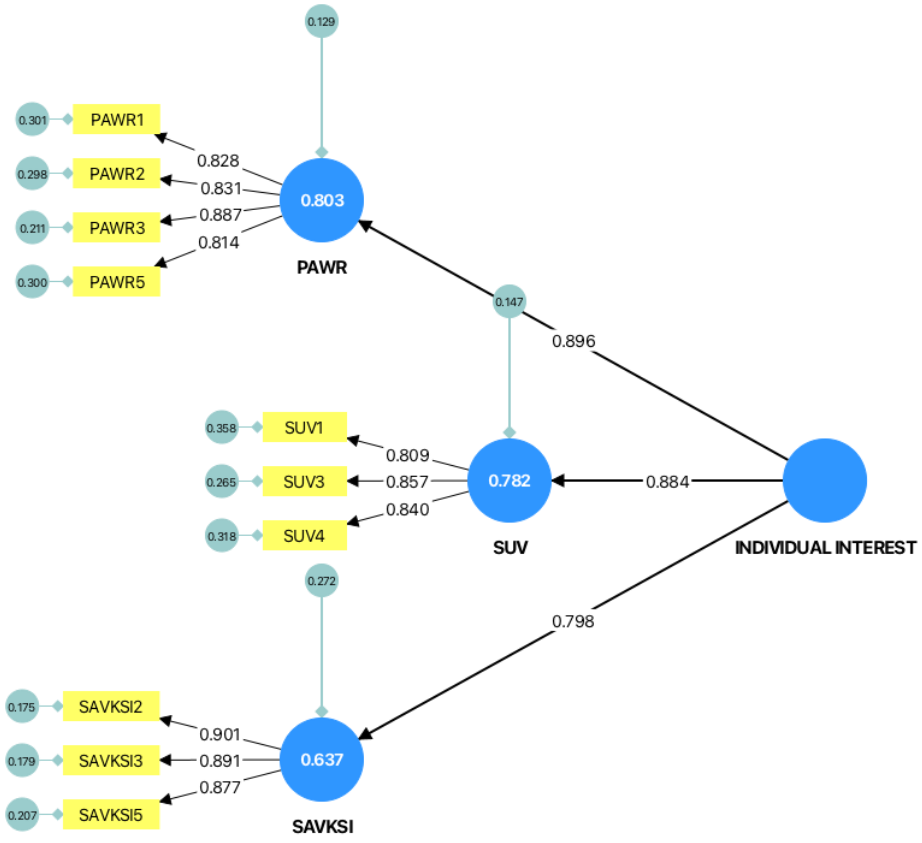
Convergent Validity Indicators of the Second-Order Construct

First-Order Constructs	Path Coefficients (Standardized)	CA	CR	AVE
PAWR	0.896	0.895	0.895	0.740
SUV	0.884			
SAVKSI	0.798			

Note: CA for the second-order construct was manually estimated since SmartPLS does not compute it automatically. The value (0.895) was derived using the average of standardized loadings, following Hair et al. (2019) and exceeds the ≥ 0.70 threshold for internal consistency.

Figure 2

Standardized Path Coefficients and Measurement Model for the Second-Order Construct Individual Interest (Note: The second-order construct Individual Interest is composed of three first-order reflective dimensions: PAWR, SUV and SAVKSI. Standardized item loadings and latent variable path coefficients are presented)



The results of both the first- and second-order measurement models confirm the robustness of the tripartite framework of individual interest, aligning with prior work by Roure et al. (2021) and extending its psychometric applicability to the Philippine higher education context.

DISCUSSION

This study aimed to validate Roure et al. (2021) tripartite model of individual interest in physical education within the context of Philippine higher education. The findings supported the factorial structure of the model through both first-order and second-order confirmatory factor analyses, confirming that PAWR, SUV and SAVKSI are conceptually cohesive yet statistically distinct components of individual interest. The strong item loadings and internal consistency coefficients mirror those reported in Roure et al. (2021) original study conducted in European secondary schools, where the tripartite structure demonstrated robust construct reliability and discriminant validity (Roure et al., 2021). Similarly, the results are consistent with prior research establishing individual interest as a multidimensional construct composed of affective, cognitive and value-based components (Ainley et al., 2002; Hidi & Renninger, 2006). This study extends the findings by demonstrating that the model retains its psychometric strength in a non-Western higher education context, specifically the Philippines, where curricular and sociocultural conditions differ significantly from those of prior validation sites (Pacadaljen, 2024). Notably, this paper represents the first phase of a broader validation effort, focusing exclusively on establishing factorial and construct validity.

Most importantly, the removal of selected items may also reflect contextual and environmental factors influencing students' experiences in physical education. For instance, items related to practicing activities during free time may be less applicable in settings where access to facilities, equipment or safe recreational spaces is limited. Similarly, certain expressions of reengagement or self-directed learning may not fully align with the structured and requirement-driven nature of PE participation in higher education. These considerations suggest that item performance may be shaped not only by statistical criteria but also by contextual realities experienced by students.

Furthermore, the second-order CFA confirmed that the three first-order factors collectively define a higher-order latent construct. This reinforces the notion that individual interest functions not merely as a sum of parts, but as a hierarchical construct defined by its interrelated factors. This finding aligns with theoretical perspectives from expectancy-value theory (Eccles & Wigfield, 2002) and self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2018), both of which highlight the integrated roles of affect, perceived usefulness and internalized values in sustaining motivation. While similar multidimensional models of interest have been validated in disciplines such as science, mathematics and music (Harackiewicz et al., 2008, 2016; Krapp, 2002), relatively few studies have examined this framework within the domain of physical education, particularly in higher education settings across Asia. Particularly, in the Asian higher education contexts. The good-to-excellent fit indices of the second-order model further support its structural soundness, aligning with validation studies in sport and exercise psychology, such as that of Cao et al. (2024). These results confirm that the model is both statistically valid and theoretically adaptable, reinforcing its potential for use in PE research and instructional design. Moreover, the high standardized loadings of the three subdimensions onto the second-order factor emphasize the importance of holistically addressing students' enjoyment, perceived relevance and personal meaning to foster sustained interest in physical activity education. Compared to prior validations in Western educational systems, this study highlights that the structural coherence of the tripartite model is preserved even in a culturally distinct environment. However, the relative emphasis on each dimension may be shaped by local values and contexts. For instance, the strong factor loadings of SAVKSI suggest that Filipino students may place particular value on the personal and societal relevance of physical education, such as its contributions to well-being, cultural identity and family expectations. This supports the notion that value-based motivation plays a central role in sustaining interest in PE in collectivist cultures.

Beyond their statistical strength, the prominence of SUV and SAVKSI highlights the potential of physical education to move beyond its traditional perception as a peripheral subject in Philippine higher education. When students recognize the practical relevance of PE to their future goals and attach personal importance to their

performance and learning, the subject becomes more than a curricular requirement and instead functions as a meaningful domain for personal and academic development. This suggests that strengthening these value-oriented dimensions may play a critical role in repositioning PE as a more integral component of higher education.

In addition, the value of physical education in the Philippine context may extend beyond individual outcomes to include social and relational dimensions (Purnomo et al., 2025). Students may engage in PE not only for personal development but also as a means of connecting with peers through shared activities such as team sports, traditional games and dance. In this sense, the perceived value of PE may also reflect forms of "social utility," where participation fosters a sense of belonging and collective engagement within the learning environment (Habyarimana et al., 2022).

Although the present findings establish strong factorial and structural validity, it is important to recognize that this phase of the study does not yet address the predictive utility of the model. Specifically, the extent to which PAWR, SUV and SAVKSI translate into sustained behavioral engagement, academic outcomes, or long-term physical activity participation remains to be empirically tested. Furthermore, while recent studies in the Philippine context have explored individual interest in physical education and its association with student engagement across different instructional contexts using variance-based and regression approaches, as well as preliminary intervention-based designs (Lobo, 2023, 2026b), these investigations were not anchored on a fully validated covariance-based measurement framework. As such, the present study addresses this methodological gap by providing a more rigorous confirmatory validation of the tripartite model. Future research should extend beyond measurement validation to examine the model's applicability using longitudinal and intervention-based designs, particularly within real-world physical education settings.

It is also important to consider the temporal context of the data collection, which took place in 2022 during the transition from pandemic-related restrictions to the resumption of in-person classes. The relatively strong affective responses reflected in PAWR may, in part, be influenced by students' renewed opportunities for physical interaction, social engagement and embodied learning following prolonged periods of limited mobility and remote instruction. This potential rebound effect should be considered when interpreting affect-related findings and may warrant further investigation in more stable instructional contexts.

From a practical standpoint, the validated instrument provides instructors and curriculum planners with a culturally responsive tool to assess and monitor motivational factors among students enrolled in general PE courses. In particular, each dimension of individual interest may be supported through targeted instructional strategies. For example, PAWR may be enhanced through engaging and interactive activities that promote immediate enjoyment and active participation. Meanwhile, SUV may be strengthened by explicitly linking physical education content to real-world benefits such as stress management, health promotion and lifelong fitness. Lastly, SAVKSI may be supported through approaches that recognize student progress, encourage mastery, and provide opportunities for deeper exploration of skills and concepts. By identifying which aspects of interest are underdeveloped (e.g., low SUV or SAVKSI scores), educators can tailor interventions that address students' specific motivational needs. Furthermore, the scale may be used in future program evaluations or research examining the influence of teaching strategies, instructional climate, or technological integration on student interest and engagement. However, it is important to acknowledge that this phase of the study focused solely on measurement validation and did not directly assess the predictive or longitudinal utility of the model within the present dataset, as the analysis was centered on covariance-based structural equation modeling (CB-SEM) for confirmatory purposes. Finally, this study contributes to a growing body of literature advocating for rigorous validation of motivational models in diverse educational and cultural contexts (Cheung & Lau, 2017; Marsh et al., 2004). It affirms that Roure et al. (2021) tripartite framework is not only conceptually grounded but also psychometrically valid in the Philippine higher education setting, and may serve as a reliable basis for further investigations on engagement, persistence and achievement in physical education.

CONCLUSION

This study validated the tripartite theoretical framework of individual interest in physical education, originally developed by Roure et al. (2021), within the context of Philippine higher education. Using covariance-based structural equation modeling, both the first-order and second-order measurement models were confirmed, demonstrating the robustness, coherence and contextual applicability of the framework in a non-Western, multi-institutional setting. Ten items from the original 14-item scale were retained following confirmatory factor analysis, with four items removed due to suboptimal loading performance. The final model exhibited strong psychometric properties, with high standardized loadings, internal consistency and structural coherence among Filipino college students. Convergent and discriminant validity were established, and model fit indices indicated excellent alignment—particularly in modeling individual interest as a higher-order latent construct composed of affective, utilitarian and value-based components. Therefore, the findings affirm that individual interest in PE is a multidimensional construct shaped by emotional resonance, perceived usefulness and long-term attainment value. More importantly, the successful validation of this framework provides a solid foundation for future research, curricular planning and instructional design in physical education, particularly in contexts aiming to foster deeper and more sustainable student engagement. This first phase validation offers empirical evidence that the Roure et al. (2021) tripartite model is theoretically sound and practically relevant in the Philippine higher education setting, serving as a valuable tool for both scholars and educators seeking to understand, measure and enhance individual interest in physical education. Future phases of this research should extend beyond factorial validation to examine predictive validity, particularly in determining whether individual interest dimensions significantly influence physical activity participation, academic performance and sustained engagement in physical education. In addition, future research may now pursue a full-scale national validation across a broader range of Philippine HEIs to examine measurement invariance, regional variability and the robustness of the tripartite structure in more diverse academic contexts.

Implications

The successful validation of Roure et al.'s (2021) tripartite model of individual interest carries both theoretical and practical significance. Theoretically, the findings expand the generalizability of the model beyond its original European context, confirming that its three dimensions hold relevance among Filipino college students in physical education. Importantly, by employing covariance-based structural equation modeling (CB-SEM), this study provides a more rigorous confirmatory validation of the model's multidimensional structure within a non-Western higher education context. Practically, the model offers educators a structured lens for designing and evaluating motivational strategies. Emphasizing emotionally engaging experiences (PAWR), highlighting real-world application (SUV) and connecting PE lessons to students' long-term aspirations and self-concept (SAVKSI) may foster deeper and more sustained interest. Curriculum developers and administrators may also adopt this framework to inform evidence-based program improvements and promote student-centered learning environments. Moreover, this study contributes a validated instrument that future researchers can use in examining individual interest, motivation and instructional effectiveness in PE and related disciplines within the Philippine higher education setting. It establishes a foundational model for subsequent investigations into how personal and contextual variables interact to shape sustained engagement in physical activity education.

Limitations

Despite its contributions, this study has several limitations. First, the use of secondary data and purposive sampling restricts the generalizability of the findings beyond the participating institutions. Although the sample size was large, responses were drawn from only two public higher education institutions (HEIs), potentially limiting representation across the wider tertiary education landscape, including private or specialized institutions. In addition, the use of secondary data limited the researcher's control over contextual variables and potential sources of bias, as the dataset was originally collected for a different research purpose. Second, the absence of complete demographic data prevented subgroup analyses (e.g., by sex, year level or program type), which could inform more nuanced interpretations of the findings. Future studies should incorporate demographic variables to examine moderation effects across subpopulations. Third, while this study confirmed the model's factorial validity using

structural equation modeling, it did not assess the predictive validity of the framework or its relationship with behavioral or performance outcomes in physical education. As such, the extent to which PAWR, SUV and SAVKSI influence sustained student motivation, engagement or physical activity behaviors remains to be empirically established. Future research is therefore encouraged to employ longitudinal or experimental designs to determine the causal and predictive roles of these dimensions in real-world psycho-instructional and intervention contexts. Fourth, the dataset was collected in 2022. Shifts in student perspectives, institutional policies or instructional strategies during that period may have influenced the results. Thus, future replications using more recent data are recommended. Finally, the instrument was administered in English, consistent with its original version and the language of instruction in Philippine higher education. Although no comprehension issues were reported, future validation efforts may benefit from culturally adapted or translated versions, especially for use in linguistically diverse regions. Future validation efforts may also consider developing culturally adapted versions of the instrument, including Tagalog or "Taglish" translations, to enhance clarity, cultural relevance and response accuracy among diverse student populations. Moreover, future research may consider conducting a full-scale national validation across a broader range of Philippine higher education institutions to further assess the model's stability, cross-institutional invariance and applicability in various academic and regional contexts.

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Declarations

Conflicting interest

The author declares no conflict of interest.

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Data Availability

The dataset supporting the findings of this study is available from the corresponding author upon reasonable request. The data were derived from a prior study conducted by the authors and are used in this study with appropriate permission.

AI and Generative Tools Disclosure

The author declares that ChatGPT 5.4 Pro (OpenAI) was used solely for language refinement, sentence restructuring, and manuscript organization. No AI tool was used in data analysis, results generation, or interpretation. The author assumes full responsibility for the accuracy, integrity, and originality of the work.

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