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Research Article

MEASURING STUDENT ENGAGEMENT IN HIGHER EDUCATION: A REVIEW OF SCALES ACROSS LEARNING MODALITIES

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ABSTRACT

This review synthesizes 29 studies from Scopus, ProQuest, and Google Scholar to examine the development and validation of student engagement (SE) scales in higher education across three learning modalities. Employing a structured search with keywords such as "student engagement" and "development," the study identifies a diverse range of SE constructs, including cognitive, behavioral, emotional, social, and agentic dimensions. Analysis reveals variability in item counts (9-100 items, with an exception of three items) and factor structures (3-9 factors, with an exception of 1 factor), with original scales (e.g., USEI, OSE) providing foundational frameworks and adapted versions (e.g., I-HESES, A-USEI) tailoring these to cultural or modal contexts. Despite robust psychometric properties, limitations include self-report bias and limited cross-cultural invariance, suggesting a need for more comprehensive models and longitudinal validation to enhance SE measurement.

Keywords: blended; higher education; student engagement; scales to measure engagement

1. Introduction

Student engagement (SE) has emerged as a key predictor of learning outcomes, academic success, and student satisfaction in higher education (Kuh, 2009). Defined as the energy and time students invest in educationally purposeful activities (Astin, 1999), SE is now recognized as a multidimensional construct encompassing behavioral, emotional, cognitive, and increasingly, agentic, psychological, and social components (Appleton et al., 2006; Fredricks et al., 2004; Reeve & Tseng, 2011). As learning environments diversify, including traditional face-to-face instruction, online, and blended modalities, SE measurement has evolved to match this changing context.

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Student engagement is widely recognized as a cornerstone of effective learning in higher education. It encompasses the degree of attention, curiosity, and effort students direct toward academic tasks and is closely associated with academic achievement, retention, and satisfaction (Heilporn et al., 2024). Conceptually, student engagement is multidimensional, typically comprising behavioral, emotional, cognitive, and agentic components, each contributing uniquely to students' learning experiences (Fredricks et al. 2004; Pham et al., 2025).

As higher education evolves to various learning environments, from traditional face-to-face instruction to online and blended modalities, the importance of measuring engagement in ways that are sensitive to context has intensified. Different environments offer varying levels of social interaction, learner autonomy, and technological mediation, all of which can influence how engagement manifests (Heilporn et al., 2024). Consequently, a one-size-fits-all approach to engagement measurement is insufficient.

Numerous scales have been developed to quantify engagement, ranging from institutional benchmarks such as the National Survey of Student Engagement (NSSE) to multidimensional instruments like the Online Student Engagement Scale (OSE) and modality-agnostic tools like the Multidimensional Scale of Student Engagement in a Higher Education Course (MSSEC). However, no single review has comprehensively compared these tools across modalities concerning their dimensional structures, psychometric properties, and contextual applicability.

This review focuses on reviewing the current landscape of SE measurement scales: the development and adaptation, or validation of original scales used in higher education. The goal is to compare dimensions, psychometric properties, and modality-specific applications of these tools across face-to-face, online, and blended contexts. By doing so, this paper aims to provide a consolidated reference for researchers and educators to select or adapt appropriate tools for diverse learning environments.

2. This study

2.1. Methods

This review adopts a systematic scoping approach following the Preferred Reporting Items for Systematic Reviews (PRISMA) 2020 guidelines. The goal is to synthesize and evaluate validated scales for measuring student engagement across three major instructional modalities: face-to-face, online, and blended learning. Studies were included if they met the following criteria: (a) reported the development or validation of quantitative engagement scales; (b) targeted higher education learners (undergraduate or postgraduate); (c) assessed engagement in face-to-face, online, or blended instructional contexts; (d) provided psychometric evidence (e.g., factor analysis, reliability, and validity estimates); and (e) were written in English. Studies were excluded if they either (a) focused solely on qualitative engagement data, (b) lacked scale development or validation, or (c) were editorials, conference abstracts, or grey literature without peer review.

Key search terms included "student engagement," "higher education," "university," "scale development," "scale validation," "psychometric properties," and "academic engagement." A systematic search was conducted using Boolean operators to combine keywords: searches focused on titles containing "student engagement," "development," or "validation," and "higher education," or "university," or "tertiary education" in abstracts. Google Scholar searches incorporated similar terms with citation tracking to identify additional relevant studies.

The search spanned multiple academic databases: Scopus, ProQuest, and Google Scholar, together with snowballing references. Initial searches yielded 49 articles in Scopus (reduced to 20 after screening) and 31 in ProQuest (reduced to 17 after duplicates). Combining Scopus (20) and ProQuest (17) resulted in 37 articles, with 12 duplicates removed, leaving 25. Adding 3 articles from "academic engagement" searches and 26 from Google Scholar and snowballing references, a full-text review excluded non-relevant studies, finalizing 29 articles for analysis. The literature search covered studies published between 2015 and 2025. Several articles before 2015 were added from the snowballing and cited reference searching.

2.2. Findings

2.2.1 Scale names and learning modalities

The 29 articles focus on developing, validating, and adapting student engagement scales to measure engagement in diverse higher educational contexts (Table 1).

Table 1. *Student engagement scales: "New" scales and validated ones*

No	Authors	Acronym	Scale name	Mode	Scale Development
Scale development					
1	Bae et al. (2019)	AE (SERU)	Academic Engagement	F2F	From the SERU 2012 survey
2	Xu et al. (2024)	CL Engagement Scale	Chinese Collaborative Learning Engagement Scale	F2F	Inductive, adapted for Collaborative Learning
3	Heilporn et al. (2024)	MSSEC	Multidimensional Scale of Student Engagement in a Higher Education Course	F2F	Enhanced from prior MSSEC, adding agentic engagement
4	Jaafar et al. (2012)	MUSLIS	Malaysian University Student Learning Involvement Scale.	F2F	Based on Astin's Involvement Theory
5	Gunuc and Kuzu (2015)	SES	Student Engagement Scale	F2F	Inductive, literature, interviews
6	Coates (2010)	AUSSE	Australasian Survey of Student Engagement	F2F	Qualitative and quantitative procedures to adapt SEQ from the USA. The multifaceted validation work replicated and built on the approach by Griffin et al. (2003) and Coates (2006)

7	Maroco et al. (2016)	USEI	University Student Engagement Inventory	F2F	Inductive, focus groups
8	Zilvinskis et al. (2017)	NSSE-Revised	National Survey of Student Engagement - Revised	F2F	Revised from prior NSSE
9	Schaufeli et al. (2002)	UWES-SS	Utrecht Work Engagement Scale for Students	F2F	Adapted from UWES
10	Zhoc et al. (2019)	HESES	Higher Education Student Engagement Scale	F2F	Inductive, developed from The First Year Engagement Scale, with 61 items by Krause and Coates (2008)
11	Imran et al. (2023)	SEQ	Student Engagement Questionnaire	F2F	Inductive, literature, focus groups
12	Li et al. (2023)	GSES	Generic Student Engagement Scale	F2F & O	Modified from DSES with four phases
13	Abbasi et al. (2024)	OCEQ	The Online Classroom Engagement Questionnaire	O	Inductive, literature
14	Siddiqi et al. (2022)	Not specified			Inductive, literature
15	Dixson (2010)	OSE	Online Student Engagement Scale	O	Adapted from SCEQ with focus group input
16	Dixson (2015)	OSE	Online Student Engagement Scale	O	Validated with behavioral tracking from OSE by Dixon (2010)
17	Assefa et al. (2025)	USES-Ethiopia	University Student Engagement Scale	F2F	Inductive, literature, experts
18	Gupta and Nagpal (2021)	USE Indian	University Student Engagement	F2F	Validate USES in the Indian context, from the work of Fredricks et al. (2004) and Schaufeli et al. (2002)
19	Laranjeira and Teixeira (2025)	EiHES	Engagement in Higher Education Scale	F2F	Adapted from HESES and USEI by Marôco et al. (2016) and Zhoc et al. (2019), and the engagement model proposed by Finn and Zimmer (2012).
			Validation engagement scales in different contexts		
1	Gonzalez Donoso et al. (2023)	SEOHC-Chile		O	Adapted from Dixson's OSE
2	Sulla et al. (2023)	OSE-Italian		O	Adapted from OSE
3	Sharif-Nia et al. (2024)	I-USEI, Indian (online)		O	Adapted from USEI by Maroco et al. (2016)

4	Tannoubi et al. (2023)	A-USEI, Arabic	F2F	Adapted from USEI by Maroco et al. (2016)
5	Esposito et al. (2022)	USEI, Italian	F2F	Adapted from USEI
6	Kim et al. (2024)	HESES (adapted)	F2F	Adapted from HESES
7	Marcionetti and Zammitti (2024)	I-HESES	F2F	Adapted from HESES
8	Tatha et al. (2024)	UWES-TH	F2F	Adapted from UWES for 17 and 9 items
9	Gusy et al. (2019)	UWES-9-SF and UWES-3_SF	F2F	Adapted from UWES-SF
10	Tadesse and Gillies (2017)	AUSSE-Modified	F2F	Modified from AUSSE

Note: F2F: Face to face, O: Online, SEOHC: Scale to Measure Medical, Nursing and Midwifery Students' Engagement in an E-learning Histology Course

Table 1 shows that to advance the understanding of student engagement through both development and validation efforts across diverse educational contexts, the primary purpose of the development-focused studies, such as those by Heilporn et al. (2024) with the MSSEC and Zhoc et al. (2019) with the HESES, is to create robust, context-specific instruments that capture the multifaceted nature of engagement, including cognitive, emotional, and behavioral dimensions. Validation studies, such as Marcionetti and Zammitti (2024) with the I-HESES and Sulla et al. (2023) with the OSE-Italian, seek to confirm the psychometric properties of such scales (reliability, validity, and invariance), usually adapting them to local cultural or modal settings such as online learning or specific disciplines.

2.2.2. Student engagement scales

Table 2 unpacks the methodological approaches underpinning these studies. Specifically, it highlights how different strategies, ranging from inductive construction of new instruments to adaptive modifications of existing scales, shape the robustness, cultural relevance, and applicability of student engagement measures across contexts.

Table 2. *Development and Adaptation of Student Engagement Scales*

No	Authors	Scale Name	Methodology & Data analysis	Participants (sts)	Context
1	Bae et al. (2019)	AE (SERU)	Survey, EFA, CFA, MIMIC	260	USA
2	Xu et al. (2024)	CLE Scale	Mixed methods, EFA, CFA	405	China
3	Heilporn et al. (2024)	MSSEC	Survey, CFA, invariance, SPSS	465	Canada
4	Jaafar et al. (2012)	MUSLIS	Survey, EFA, CFA, α	347	Malaysia
5	Gunuc and Kuzu (2015)	SES	Scale dev., EFA, CFA, interviews	805	Turkey
6	Coates (2010)	AUSSE	Analysis of 2008 data	2,330 (T) 25,633 (S)	Australasia
7	Maroco et al. (2016)	USEI	Scale dev., CFA, focus groups	609	Portugal
8	Zilvinskis et al. (2017)	NSSE-Revised	Canonical correlation	257 HEIs	USA
9	Schaufeli et al. (2002)	UWES-SS	Cross-sectional survey	1,661	Europe
10	Zhoc et al. (2019)	HESES	Psychometric, CFA, α	560	Hong Kong
11	Imran et al. (2023)	SEQ	Mixed methods, α, validity	210	Pakistan
12	Li et al. (2023)	GSES (O, F)	Cross-sectional, EFA, CFA	451	Hong Kong
13	Abbasi et al. (2024)	OCEQ	Mixed methods, EFA, α	560	Iran
14	Siddiqi et al. (2022)	Not specified	Scale dev., EFA, CFA, α	550	Pakistan
15	Dixson (2010)	OSE	Survey, factor analysis, chi-square	186	Online courses, 2010
16	Dixson (2015)	OSE	Correlation analysis, Pearson's r	34	Online, 2015
17	Assefa et al. (2025)	USES-Ethiopia	EFA, CFA, α	456	Ethiopia
18	Gupta and Nagpal (2021)	USE_Indian	EFA, CFA, α	470	India
19	Laranjeira and Teixeira (2025)	EiHES	Cross-sectional, EFA, CFA, ω	760	Portugal
1	Gonzalez Donoso et al. (2023)	SEOHC-Chile	Observational, EFA, CFA, α	426	Chile
2	Sulla et al. (2023)	OSE-Italian	CFA, Validate with UWES, UWES-S-9	299	Italy
3	Sharif-Nia et al. (2024)	I-USEI, Indian (online)	Cross-sectional, CFA, α	518	India

4	Tannoubi et al. (2023)	A-USEI, Arabic	EFA, CFA	864	Tunisia
5	Esposito et al. (2022)	USEI, Italian	CFA, test-retest, validity	721	Italy
6	Kim et al. (2024)	HESES (adapted)	Psychometric, CFA, α	150	USA
7	Marcionetti and Zammitti (2024)	I-HESES	EFA, CFA, SEM, α	335	Italy
8	Tatha et al. (2024)	UWES-TH	ESEM	507	Thailand
9	Gusy et al. (2019)	UWES-9-SF and UWES-3_SF	CFA, SEM, invariance	2620	Germany
10	Tadesse and Gillies (2017)	AUSSE-Modified	CFA, SEM, invariance	536	Ethiopia

The analysis of engagement scales shows that the factor structure of SE scales predominantly adopts a triadic model, often extended with additional dimensions like social or agentic engagement. For instance, the USEI and EiHES incorporate social interactions and online engagement, respectively, acknowledging modern educational dynamics, with reliabilities ranging from α .70 to .94. However, the variability in factor counts (e.g., 3 in USEI vs. 9 in Tadesse & Gillies' 2017 AUSSE-modified) and inconsistent reliability suggest a lack of consensus on the core structure, potentially due to contextual differences or methodological choices like EFA vs. CFA. This fragmentation raises critical concerns about the generalizability of these scales.

Variability in engagement constructs

This review shows significant variations in the conceptualization of student engagement. This reflects diverse theoretical frameworks and contextual priorities. Core dimensions—cognitive, behavioral, and emotional—form the triadic foundation that is evident across scales such as USEI, OCEQ, OSEQ, CL, and MSSEC. This framework is widely accepted for measuring engagement, such as in Fredricks et al. (2004), emphasizing cognitive effort (e.g., critical thinking, self-regulated learning), behavioral participation (e.g., task completion, class involvement), and emotional investment (e.g., motivation, sense of belonging). Social engagement, often divided into peer and teacher interactions, is prominently featured in HESES, EiHES, SES, and AUSSE, emphasizing the relational dynamics critical to learning environments. Context-specific constructs, such as Habits of Online in SEOHC and Class Atmosphere and Facilities in Siddiqi et al. (2022)'s study, tailor engagement to digital or institutional settings, while specialized dimensions like UWES's Vigor, Dedication, and Absorption, and MSSEC/USES's Agentic Engagement, introduce proactive psychological aspects. Additionally, NSSE and AUSSE's broad institutional focus (e.g., Academic Challenge, Supportive Learning Environment, and Enriching Educational Experiences) highlights extracurricular influences and cultural adaptations in MUSLIS. With

31 distinct dimensions, ranging from self-regulated learning and performance to teamwork and enjoyment of school life, these variations in SE scales suggest a comprehensive yet fragmented framework, where overlaps (e.g., cognitive and academic engagement) and context-specific adaptations (e.g., online engagement, a particular course) reflect both the richness and the challenge of synthesizing a unified SE model across diverse educational settings.

Comparison of SE scales by learning environment and original vs validated scales

The 29 SE scales reviewed reveal distinct approaches to measuring engagement across three modes of contexts, reflecting the diverse needs of these modalities. Scales designed for online learning emphasize dimensions like Habits of Online and Interaction of Online, which capture behaviors and skills unique to virtual settings, such as maintaining focus during online activities or using digital tools effectively. In contrast, scales for face-to-face contexts focus on traditional classroom dynamics, including social engagement with peers, teacher-student interaction, and academic challenge, which highlight in-person collaboration and institutional support. Blended learning is addressed in scales like GSES, which incorporate both academic engagement and self-regulated learning, acknowledging the need for students to navigate both modalities.

The distinction between original and validated scales across different countries further illustrates the adaptability and global applicability of student engagement constructs. Original scales were developed to establish foundational frameworks, often in specific contexts like the U.S., Australia, or Turkey. These scales introduce broad dimensions, aiming to create generalizable tools. Validated scales adapt these frameworks to local cultural and educational contexts, testing their psychometric properties. These validations ensure cultural relevance but may adjust item counts or dimensions. The global validation of scales such as USEI across Italian, Indian, and Arabic contexts highlights the universality of core engagement constructs.

3. Conclusion

Student engagement remains a vital determinant of academic success and learner satisfaction in higher education. As instructional modalities continue to diversify, the need for context-sensitive, psychometrically robust engagement measurement tools becomes increasingly urgent. This review synthesized and evaluated 29 SE scales across three categories: face-to-face, online, and blended. It found that while most instruments converge on core engagement dimensions (behavioral, cognitive, and emotional), newer tools increasingly integrate agentic, social, and technological dimensions tailored to digital and hybrid modalities. Scales such as OSE and HESES demonstrate strong psychometric integrity and contextual relevance.

This review also synthesized implications, limitations, and future research of these studies to include in the conclusion section of this paper. The scales enhance the

measurement of student engagement, offering tools for educators, counselors, and policymakers to improve teaching, learning, and student outcomes. They support evidence-based practices, intervention evaluation, and curriculum design. Many emphasize multidimensional engagement and cultural relevance. Common limitations include restricted generalizability due to single-institution or context-specific samples, reliance on self-reported data, and cross-sectional designs. Some scales face issues with small or non-representative samples, while others note specific psychometric challenges, such as weak invariance or limited validity evidence. Key directions include validating scales in broader, more diverse populations and across cultures. Longitudinal studies are recommended to explore trends and causality. Many studies suggest improving psychometric properties and incorporating multiple data sources to reduce self-report bias. Exploring relationships with outcomes like achievement and well-being is also emphasized.

This study is imperfect in various ways, including the exclusion of other databases such as Web of Science due to its restricted access, the English language selection, and the limited analysis of the scales themselves without critiques of the foundational theories underlying the concept of student engagement.

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ĐO LƯỜNG MỨC ĐỘ GẮN KẾT CỦA SINH VIÊN ĐẠI HỌC: TỔNG QUAN VỀ CÁC THANG ĐO THEO CÁC HÌNH THỨC HỌC TẬP KHÁC NHAU

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TÓM TẮT

Bài viết tổng hợp và phân tích 29 nghiên cứu từ Scopus, ProQuest và Google Scholar để tìm hiểu quá trình phát triển và điều chỉnh các thang đo đánh giá mức độ gắn kết của sinh viên đại học qua ba phương thức học tập. Sử dụng phương pháp tìm kiếm có cấu trúc với các từ khóa như "student engagement" và "development," bài viết xác định gắn kết sinh viên là cấu trúc đa dạng, bao gồm các chiều nhận thức, hành vi, cảm xúc, xã hội, và tác nhân. Kết quả phân tích cho thấy gắn kết có thể được đánh giá với từ 9 đến 100 mục (ngoại trừ một trường hợp có ba mục đo) và là khái niệm đa cấu trúc (từ 3 đến 9 nhân tố, ngoại trừ một thang đo đơn một nhân tố). Một số thang đo gốc (ví dụ: USEI, OSE) là các thang đo nền tảng, và các phiên bản điều chỉnh (ví dụ: I-HESES, A-USEI) được điều chỉnh cho phù hợp với bối cảnh văn hóa hoặc phương thức học cụ thể. Mặc dù có các đặc tính đo lường tâm lí vững, các thang đo gắn kết cũng có những hạn chế nhất định, bao gồm thiên lệch trong cách đo lường (tự đánh giá) và biến thiên phụ thuộc vào ngữ cảnh và văn hóa, cho thấy cần có các mô hình toàn diện hơn và thu thập dữ liệu theo thời gian để cải thiện các thang đo đánh giá mức gắn kết của SV.

Từ khóa: kết hợp; giáo dục đại học; mức gắn kết của sinh viên; thang đo gắn kết