

ASSESSING SDG LITERACY AND LEARNING EXPERIENCES AMONG UNIVERSITY GRADUATES

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Abstract. The Sustainable Development Goals (SDGs) mandate that graduates transcend disciplinary training to become world citizens equipped to navigate and integrate complex environmental, social, and economic imperatives. Critically, many Higher Education Institutions (HEIs) struggle to fully translate this responsibility into systemic change, resulting in a demonstrable gap in student preparedness. This study aimed to critically evaluate the efficacy of institutional efforts by comparing graduates' learning experiences with their level of knowledge and awareness of the SDGs. A quantitative investigation was executed at a prominent Malaysian state-private university. Utilizing an empirically validated, adapted instrument (Cronbach's $\alpha=0.977$), data were gathered from a large sample of 1,062 graduates across all faculties. The study meticulously mapped ten dimensions of learning experience, ranging from syllabus effectiveness and lecturer support to exposure to global issues and campus living environments, against five scopes of SDG knowledge, including its application to career planning and personal impact. The critical findings revealed that the graduates' overall SDG knowledge spanned a wide and concerning range, ranging from moderately low to moderately high. This variability underscores the inconsistent penetration of the SDG agenda across academic and co-curricular domains. The results provide diagnostic insight into the uneven implementation landscape of a major Malaysian HEI. The study concludes that the reliance on fragmented or informal efforts is insufficient. To successfully bridge the knowledge-to-action gap and adequately prepare graduates as effective agents of sustainable change, the university must immediately commit to adopting rigorous, comprehensive, and institution-wide strategies that systematically embed the SDGs across all aspects of curriculum, policy, and campus life.

Keywords: Sustainable Development Goals (SDG), Higher Education Institutions (HEIs), learning experiences, graduate knowledge, curriculum implementation

Introduction

The Sustainable Development Goals (SDGs), adopted in 2015, established a universal and urgent blueprint for global change (Fukuda-Parr, 2022). As key cultivators of future leaders, Higher Education Institutions (HEIs) are ethically and strategically tasked with ensuring graduates possess the requisite competencies, interdisciplinary thinking, and moral clarity to drive this agenda (Caporarello et al., 2023; Pacheco et al., 2022). This responsibility necessitates a profound revision of traditional curricula to integrate Education for Sustainable Development (ESD), moving beyond mere knowledge dissemination to cultivating applied skills and global citizenship (Caporarello et al., 2023; Pacheco et al., 2022). Despite this clear mandate, implementation remains critically fragmented. Multiple studies confirm that SDG integration in most Malaysian HEIs is incomplete (Ibrahim et al., 2022), directly correlating with persistent findings of low to moderate SDG-related knowledge among

students (Zainal Abedin and Yaakob, 2023; Ang, 2021). This constitutes a significant readiness deficit in the nation's human capital, compromising future progress toward the 2030 Agenda. While the potential of university involvement is clear, a more robust and continuous study is urgently required to move beyond readiness rhetoric and critically scrutinize the effectiveness of implementation, particularly within the influential state-private university sector. Therefore, the primary objective of this study was to analytically assess graduates' specific learning experiences against their achieved level of SDG knowledge and awareness at a Malaysian private state-funded university. By rigorously examining how institutional factors shape SDG literacy, this research provides vital, actionable evidence to enhance curriculum development and pedagogy, thereby strengthening the institution's verifiable contribution to sustainable societal outcomes.

Literature review

While government involvement in higher education funding aims to reduce public dependency and enhance accountability, it does not inherently guarantee commensurate quality impact or systemic change (Mgaiwa and Poncian, 2016). This tension is particularly relevant in Malaysia, where several state governments have recently established university-level institutions to meet market demands and project local prestige. These institutions, including the state-private university under study, are incentivized to adopt global best practices such as the Sustainable Development Goals (SDGs) to boost national and global rankings. However, a critical review reveals a significant implementation challenge. Despite the widely recognized role of universities in producing SDG implementers and providing solutions (Kestin et al., 2017), the sector often uses the SDGs more as a marketing tool to reinforce its societal role than as a blueprint for systemic change (Cuesta-Claros et al., 2023). This difficulty is compounded by curricular rigidity tied to industry demands and a need for ministerial approval (Albareda-Tiana et al., 2018). Furthermore, corporate engagement, which universities are meant to support, is itself uneven and often involves simply matching existing business practices to the SDGs rather than generating new initiatives (Song et al., 2022). This complex landscape necessitates empirical scrutiny. While positive associations exist between SDG course content and graduate occupational success (Alimehmeti et al., 2024). The difficulty of full SDG implementation in curricula remains a persistent barrier. This study evaluates SDG literacy and learning experiences of graduates in Malaysia's state-private sector to determine effectiveness and areas needing transformative change. A framework to justify the importance and contribution of the university to the SDGs is shown in *Figure 1*.

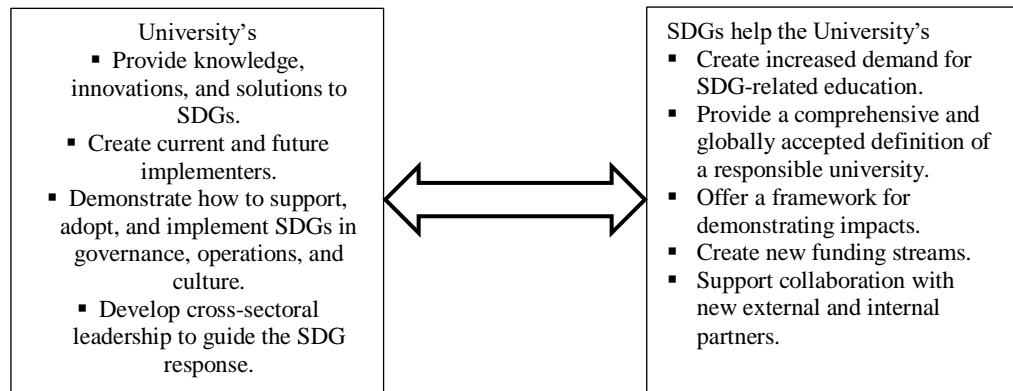


Figure 1. The case for university engagement in the SDGs.
Source: Kestin et al. (2017).

Materials and Methods

The questionnaire is adapted from Yuan et al. (2021), Zamora-Polo et al. (2019) as well as OECD (2018). A senior member of the faculty with a doctoral qualification has been asked to evaluate the items of the adapted version questionnaire. In addition, the questionnaire was shown to a group of students for their feedback. The questionnaire is divided into three parts. The first part is for classifying the respondents. The second part is for evaluating graduates' learning experiences regarding SDGs within their program, and the last part is to evaluate the level of graduates' knowledge of SDGs. An established state-private university is selected as the location of study. The questionnaire is distributed to students, especially to those staying at the university residential college. The researcher approached the respondents in groups, explaining to them the requirements of the survey, and spent time with the respondents to ensure they understood clearly the requirements of the study and responded accordingly.

Results and Discussion

Background of the respondent

The analysis included data from 1,062 returned questionnaires, representing all faculties across the campus. The cohort was predominantly domestic, with only 15 international students (1.4%). A significant proportion of the study's insight is derived from the Faculty of Education and Social Sciences (FESS), which accounted for the largest single group (45.2% of respondents). The majority of the surveyed students were enrolled in either a Diploma (37.3%) or a Bachelor's degree (33.5%) program. Crucially, the cohort demonstrated a strong academic foundation, with 59.8% of respondents reporting a Cumulative Grade Point Average (CGPA) between 3.00 and 3.50. The respondent profile also included unique segments relevant to the Malaysian context: students from the special Smart Tahfiz program and 115 local students (10.8%) who had received early schooling abroad, contributing diverse educational backgrounds to the assessment of SDG literacy (Table 1).

Table 1. The background of the respondents.

Faculty			Level of program		
Faculty	No. of students	%	Program	No. of students	%
Education and Social Sciences	482	45.2	SPM (Tahfiz)	138	12.9

Communication, Visual Art, and Computing	193	18.1	Foundation	106	9.9
Engineering and Life Sciences	148	13.9	Diploma	398	37.3
Foundation and General Studies	106	9.9	Bachelor degree	377	35.3
Faculty	No. of students	%	Program	No. of students	%
Total	1,067	100	Total	1,067	100

Graduate learning experiences and SDG alignment

Curricular and Pedagogical Effectiveness. Analysis of the syllabus of the program study confirmed a strong focus on intercultural education (Table 2). A high percentage of respondents agreed their curriculum addressed multicultural and multi-lingual teaching (77.6%), equality and diversity (70.1%), and communicating with people from different cultures (58.8%). However, this formal integration contrasted with a weaker reported contribution from associated student activities. In terms of teaching and learning activities (Table 3), more than half of the respondents (52.2% to 65.0%) reported exposure to essential information-searching skills. The highest reported competency involved detecting subjective or biased information, but a lower percentage indicated confidence in comparing, deciding the most relevant information, or trusting online sources. This suggests a potential gap between exposure to global information and the critical evaluation skills needed for SDG literacy.

Table 2. Graduates' feedback about the syllabus of the program.

Questions	Study program (in %)	Student activities (in %)
Were any of the topics listed below included in your study program or activities that you attended during your study?		
Teaching in a multicultural or multilingual setting.	828 (77.6%)	37 (3.5%)
Communicating with people from different cultures.	624 (58.5%)	186 (17.2%)
Teaching about equity and diversity.	748 (70.1%)	52 (4.9%)

Table 3. Graduates' feedback (in descriptive analysis).

Questions	N	%
In your program, have you ever taught any of the following?		
How to use the short description below the links in the list of results of a search.	710	66.5
To understand the consequences of making information publicly available online on <Facebook>, <Instagram>, etc.	694	65.0
How to detect whether the information is subjective or biased.	692	64.9
How to detect phishing or spam emails.	662	62.0
How to compare different web pages and decide what information is more relevant for the student's school work.	594	55.7
How to decide whether to trust information from the Internet.	558	52.3
How to use keywords when using a search engine such as <Google>, <Yahoo>, etc.	557	52.2
In your program, do you have opportunities to promote the following skills?		
Critical thinking skills	799	74.9
Respect for cultural diversity	788	73.9
Foreign languages	772	72.4
Knowledge of different cultures	754	70.7
Openness to people from other cultural backgrounds	743	69.6
Communicating with people from different cultures or countries	735	68.9
In your program, are you exposed to the following global challenges and trends?		
Global health (e.g., epidemics)	731	68.5
Climate change and global warming	724	67.9
International conflicts	673	63.1
Migration (movement of people)	663	62.1
Causes of poverty	627	58.8
Equality between men and women in different parts of the world	634	59.4
Hunger or malnutrition in different parts of the world	614	57.5
Were any of the topics listed below included in your program of study, or any activities that you attended during your study?		
Conflict resolution strategies.	657	61.6
Intercultural communication.	588	55.1
Confronting discrimination in all its forms.	539	50.5

Note: N=Frequency (Yes); %=Percentage.

Competency Development and Global Exposure. The institution appears highly effective in promoting general skill enhancement (*Table 3*), with the majority of respondents agreeing (68.9% to 74.9%) that they had opportunities to develop skills such as critical thinking and respecting other cultures. Conversely, the lowest reported opportunities concerned the practical application of these skills: openness to and communicating with people from different cultural backgrounds. Similarly, exposure to current global challenges and trends (*Table 3*) was significant, with the highest agreement on global health (68.5%) and climate change (67.9%). However, exposure to core SDG targets like hunger/malnutrition (57.5%) and the causes of poverty (58.8%) was notably lower, indicating an uneven focus on the holistic SDG framework. Campus Environment and Self-Efficacy. The living environments were perceived as successfully exposing students to conflict resolution strategies (61.6%) and intercultural communication (55.1%) (*Table 3*). Only 50.5% of respondents felt their environment effectively addressed discrimination, indicating that its inclusiveness for SDG goals remains limited (*Table 4*). Regarding immigrant issues (*Table 5*), the overall acceptance level was high (mean score: 0.284), with the greatest acceptance given to immigrants' opportunity to continue their customs and lifestyle (mean score: 0.290). Furthermore, graduates rated their self-competence in managing cultural diversity highly (overall mean: 2.70), particularly in reducing ethnic stereotypes among students (mean score: 2.95) (*Table 5*).

Table 4. Score interpretation.

Range of scores	Level of acceptance
1 – 1.75	Very low
1.76 – 2.5	Low
2.6 – 3.25	High
3.26 – 4.00	Very high

Table 5. Graduates' feedback (in mean score, standard deviation and variance).

Questions	MS	SD	V
How much do you agree with the following remarks regarding immigrants?			
Opportunity to continue their customs and lifestyle.	2.90	.881	.775
Children have the same education opportunities.	2.88	.841	.708
Opportunity to vote in elections (after several years).	2.79	.885	.784
Same rights as everyone else in the country.	2.78	.927	.859
Overall	2.8379	.71851	.516
How do you evaluate your abilities regarding cultural and ethnic diversity?			
Reducing ethnic stereotypes among the students.	2.95	.775	.601
Raising awareness of cultural differences.	2.91	.789	.622
Working together with the immigrant.	2.71	.889	.791
Adapting to learning with a diversity of students.	2.66	.891	.794
Coping with the challenges of a multicultural classroom.	2.59	.910	.827
Overall	2.7638	.67421	.455
To what extent do the following statements reflect an opinion expressed by the lecturer?			
Students must learn as early as possible about other cultures.	3.04	.816	.666
Students of different cultures must recognize the similarities that exist between them.	2.96	.801	.641
Students must be aware that individuals from other cultures can have different values.	2.95	.832	.692
When there are disagreements between students of different backgrounds, they should be encouraged to resolve the dispute by finding common ground.	2.95	.847	.718
Overall	2.9756	.68143	.464
Please indicate the degree to which you currently require for your professional development.			
Communicating with individuals from different cultures.	2.39	.993	.985
Learning about equity and diversity.	2.34	1.008	1.015

Learning in a multicultural or multilingual setting.	2.29	1.030	1.061
Overall	2.3424	.90203	.814

Note: MS=Mean Score; SD=Standard Deviation; V=Variance.

Lecturers and Institutional Support. Lecturer engagement emerged as a strong positive influence (Table 5). The average score for lecturer encouragement for SDGs was high (mean: 2.97), driven by a very high score for encouraging students to learn as early as possible about other cultures (mean: 3.94). This finding suggests that individual faculty commitment is a significant driver of SDG awareness. Finally, respondents indicated a low demand for training and professional development (mean: 2.34) (Table 5), potentially reflecting satisfaction with the current teaching resources or a lack of awareness regarding advanced needs.

Graduate knowledge of the Sustainable Development Goals (SDGs)

Measurement Reliability. The construct of graduate knowledge regarding the SDGs was comprehensively measured across five scopes, encompassing the basis of the goals, information sources, coursework/activities, impact on personal life, and career planning. The reliability of the measurement instrument was exceptionally high, with the overall Cronbach's Alpha (α) for all 59 statements reaching 0.977 (Table 6). This value significantly exceeds the accepted threshold of 0.70 (Barbera et al., 2020), confirming the scale's excellent internal consistency. Overall Knowledge and Key Scopes. Analysis of the aggregated mean scores (Table 7) indicates that the graduates' overall knowledge of the SDGs can be categorized as moderately high. A critical finding is the disparity between specific knowledge domains: (a) Highest Score (Applied Knowledge) (Table 8): The scope of career planning recorded the highest mean score (3.37). This suggests graduates perceive the strongest relevance and integration of SDG concepts when considering their future professional roles. (b) Lowest Score (Foundational Knowledge): Conversely, the lowest recorded score was for self-reported foundational knowledge of the SDGs (2.60). This discrepancy suggests that while graduates can apply SDG concepts to real-world scenarios (career), their basic, declarative recall and awareness of the goals themselves remain only moderate (Table 9).

Table 6. The Cronbach Alpha Value (α , or coefficient alpha) for each dimension of the SDGs.

SDGs dimension	No. of Items	α value	Reliability level
Self-reported knowledge of SDGs	4	.926	High consistency
Information sources of SDGs knowledge	4	.922	High consistency
SDG's involvement in courses	17	.958	High consistency
Impact of Personal Life on SDGs	17	.945	High consistency
Career planning related to SDGs	17	.948	High consistency
Overall	59	.977	High consistency

Table 7. Graduates' feedback on SDG statements.

Scope of SDG statements	MS	SD	V
Career planning related to SDGs	3.3765	.812	.660
Impact of Personal Life on SDGs	3.2940	.814	.664
SDGs in courses/corresponding subjects	3.2100	.865	.750
Information sources of SDGs knowledge	2.8739	1.053	1.110
Self-reported knowledge of SDGs	2.6073	1.095	1.198

Note: MS=Mean Score; SD=Standard Deviation; V=Variance

Table 8. Score interpretation for Graduates' feedback on SDG statements.

Range of scores	Level of knowledge
1.00 – 1.80	Low
1.81 – 2.60	Moderate Low
2.61 – 3.40	Moderate High
3.41 – 4.20	High
4.20 – 5.00	Very high

Table 9. Graduates' feedback (in mean score, standard deviation and variance).

Category	MS	SD	V
Career planning related to SDGs			
Partnerships for the Goals	3.48	1.578	2.490
Decent Work and Economic Growth	3.41	1.001	1.002
Clean Water and Sanitation	3.40	1.016	1.032
Affordable and Clean Energy	3.39	1.042	1.085
Industry, Innovation and Infrastructure	3.39	1.015	1.030
Peace, Justice and Strong Institutions	3.39	1.086	1.180
Sustainable Cities and Communities	3.38	1.006	1.012
Good Health and Well-being	3.37	1.053	1.108
Quality Education	3.37	1.052	1.107
Reduced Inequalities	3.37	1.037	1.075
Responsible Consumption and Production	3.37	1.031	1.062
Life on Land	3.37	1.064	1.133
Zero Hunger	3.36	1.373	1.886
Gender Equality	3.36	1.074	1.153
Climate Action	3.35	1.037	1.076
Life below Water	3.35	1.055	1.112
No Poverty	3.30	1.025	1.051
the impact of personal life on SDGs			
Partnerships for the Goals	3.36	1.875	3.517
Decent Work and Economic Growth	3.35	1.039	1.079
Clean Water and Sanitation	3.35	1.053	1.108
Affordable and Clean Energy	3.34	1.047	1.097
Industry, Innovation and Infrastructure	3.32	1.021	1.042
Peace, Justice and Strong Institutions	3.32	1.045	1.092
Sustainable Cities and Communities	3.31	1.049	1.100
Good Health and Well-being	3.31	1.039	1.079
Quality Education	3.30	1.058	1.119
Reduced Inequalities	3.30	1.034	1.070
Responsible Consumption and Production	3.30	1.061	1.126
Life on Land	3.30	1.040	1.082
Zero Hunger	3.27	1.030	1.061
Gender Equality	3.26	1.064	1.131
Climate Action	3.25	1.052	1.106
Life below Water	3.20	1.071	1.148
No Poverty	3.16	1.107	1.225
SDGs in courses and the corresponding subjects			
Partnerships for the Goals	3.34	1.247	1.554
Decent Work and Economic Growth	3.29	1.119	1.252
Clean Water and Sanitation	3.25	1.409	1.985
Affordable and Clean Energy	3.25	1.110	1.232

Industry, Innovation and Infrastructure	3.24	1.076	1.157
Peace, Justice and Strong Institutions	3.23	1.090	1.187
Sustainable Cities and Communities	3.22	1.069	1.144
Good Health and Well-being	3.22	1.090	1.189
Quality Education	3.21	1.102	1.214
Reduced Inequalities	3.21	1.081	1.168
Responsible Consumption and Production	3.21	1.103	1.217
Life on Land	3.21	1.074	1.153
Zero Hunger	3.20	1.079	1.164
Gender Equality	3.19	1.093	1.195
Climate Action	3.19	1.096	1.202
Life below Water	3.09	1.072	1.150
No Poverty	3.02	1.095	1.200
Sources of SDGs knowledge			
I have obtained SDG information through social networks.	2.79	1.180	1.393
I have received SDG information from the traditional media.	2.88	1.156	1.337
I have received information about the SDGs in formal education.	2.95	1.177	1.385
I have obtained information about the SDGs in informal training.	2.88	1.170	1.368
training self-reported knowledge of SDGs			
I know what the 17 SDGs are.	2.48	1.234	1.524
I know the countries to which the SDGs are addressed.	2.57	1.192	1.420
I know the time horizon for which the SDGs are designed.	2.62	1.206	1.454
I know the number of SDGs and could indicate one.	2.76	1.209	1.463

Specific Item Analysis. Drilling down to individual items reinforced the strength of applied knowledge, as the three highest-scoring items were all linked to career application: Partnerships for the SDG goals (3.48), Decent work and economic growth (3.41), and Clean water and sanitation (3.40). Across all other measured items, the level of graduate SDG knowledge exhibited significant variability, ranging widely from low to moderately high (1.81 – 3.40). This broad distribution confirms the inconsistent depth and breadth of SDG literacy achieved by the cohort, reinforcing the need for targeted curricular intervention.

Analysing the efficacy of SDG implementation and recommendations for systemic change

This study aimed to critically assess the degree to which a state-private university's learning environment cultivates SDG literacy among its graduates. The findings confirm that while a majority of graduates reported positive exposure to SDG-relevant concepts, a deeper analysis reveals an implementation that is currently effective but fragmented, necessitating a transition from ad hoc integration to systemic commitment. Inconsistent Literacy and the Role of Applied Learning. The assessment revealed a critical tension: graduates reported a moderately high level of SDG knowledge in applied scopes such as career planning and personal life impact, yet the overall knowledge score suggested persistent variability and a moderate baseline. This is highly consistent with the literature, asserting that the depth and breadth of SDG knowledge are essential prerequisites for translating awareness into sustainable behaviour (Zainal Abedin and Yaakob, 2023). The observed higher scores in applied areas suggest that the curriculum's emphasis on multicultural teaching, global challenges, and essential information-searching skills successfully fostered global citizenship competencies required by the SDGs. Furthermore, the strong influence of lecturer encouragement on

SDG achievement aligns with findings that emphasize the pivotal role of faculty commitment in driving student engagement (Zhou et al., 2022).

Institutional Drivers and the Risk of Siloed Efforts. The effectiveness demonstrated by the institution is demonstrably linked to several specific, localized drivers. Firstly, the large representation from education programs that already embed global and international subtopics related to the SDGs provides a strong, but potentially isolated, foundation for SDG literacy. Secondly, the influence of co-curricular initiatives like the "Learn in Nature" program and the institution's active pursuit of recognition via the UI-Green Metric World ranking (Bakar et al., 2021) establishes a favourable institutional ethos. However, while such initiatives are beneficial, especially given the university's increasing international student enrollment and the known socio-cultural adaptation challenges faced by this group (Al-Hidabi et al., 2023; En et al., 2023; Mustapha et al., 2021) relying on them risks siloing SDG efforts. The current model suggests a heavy dependence on individual lecturer initiative to "embed" topics without formal guidelines, and a Green Metric committee whose focus is not directly integrated with teaching activities. This presents a vulnerability where SDG implementation is neither standardized nor comprehensively supported across the institution.

Critical Recommendations for Systemic Acceleration. To maximize the university's contribution to the 2030 Agenda and ensure all graduates are the nation's future leaders (Ang, 2021). This study recommends a move toward comprehensive and rigorous intervention. The current reliance on ad hoc integration is insufficient to strengthen the crucial positive association between knowledge and sustainable behaviour (Zainal Abedin and Yaakob, 2023). (a) **Establish a Dedicated Strategic Committee:** Top university management must assume a proactive, formal role by establishing a cross-functional committee. This body must identify qualified teaching staff and be tasked with coordinating and standardizing SDG content and teaching plans across all faculties and programs. (b) **Professional Development Mandate:** Mandatory workshops and colloquia should be introduced to transition the faculty from informal embedding to guided, best-practice teaching, leveraging peer experience and external expertise. (c) **Resource Allocation and Recognition:** To ensure the sustainability of these changes, the university must allocate specific research grants for SDG teaching activities and implement a system of SDG appreciation certificates to reward outstanding faculty contributions. These proposed measures move the institution beyond simply meeting basic ranking criteria toward establishing a transformative educational model, thereby ensuring its graduates possess the deep, actionable knowledge essential for societal change.

Conclusion

This study evaluated the SDG literacy and learning experiences of graduates at a Malaysian state-private university, offering data-driven information about the effectiveness of SDG implementation in higher education. **Summary of Key Findings.** The results indicated partial success; most graduates reported beneficial exposure to multicultural education and global issues and exhibited a relatively high degree of competence in applied domains such as career planning. This success was strongly attributed to the commitment of individual lecturers and the influence of institutional drivers like the UI-Green Metric ranking and specific co-curricular programs. However, the study also identified a significant deficiency: graduates' foundational, self-reported

SDG knowledge remained moderate to low, underscoring an inconsistent penetration of the goals across the full curriculum. The institution's current reliance on fragmented, informal lecturer embedding is insufficient to create deep, actionable knowledge across the entire graduate population. Contribution and Policy Implications. The research makes a vital contribution by providing analytical evidence on the current status of SDG literacy within Malaysia's rapidly expanding state-private university sector, establishing a critical benchmark for future studies. To address the identified gap and transition from superficial engagement to genuine systemic change, the university is compelled to accelerate its strategy. The institution must move beyond relying on individual enthusiasm to establish a formal, dedicated committee for curriculum coordination. Furthermore, a strategic focus on allocating research grants for SDG pedagogy and implementing mandatory faculty development programs is essential. Only through such rigorous, institution-wide measures can the university fully meet its global obligation to equip all future leaders with the comprehensive SDG knowledge required to drive sustainable societal transformation.

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Conflict of interest

The researchers confirm there were no conflicts of interest. No external stakeholders, institutional pressures, or proprietary interests influenced the study's design or results. Furthermore, the researchers received no remuneration, and the findings will not be utilized for promotional activities by the host institution or any affiliated department, ensuring the integrity and objectivity of the reported data.

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