

RESEARCH ARTICLE

Integrating sustainability into higher education curricula: Saudi Vision 2030 [version 1; peer review: 1 approved with reservations, 1 not approved]

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Abstract

Higher education institutions play a crucial role in pursuing a more sustainable future. Research in sustainable development education (SDE) has grown dramatically in the last two decades because of its importance and global influence. In many universities, sustainability training is restricted to courses, is segregated from the study, and is not connected with sustainable campus operations. Thus, sustainability education is often addressed separately. The study adopted the descriptive-analytical method, and the keywords were adapted and extracted from the United Nations' definition of sustainability and its 17 sustainable development goals, in addition to the Kingdom of Saudi Arabia's Vision 2030 framework. This study examined whether sustainability elements are integrated into Imam Abdulrahman bin Faisal University's curricula (i.e., courses and programs). We were particularly interested in learning how various academic fields integrate sustainability into their curricula. The study results indicated no elective or mandatory courses were designed for sustainable education in the university plan and showed a low degree of integration within the university curricula. For universities, incorporating SDE capabilities within the curriculum has practical ramifications. The curriculum review found that the courses focused chiefly on environmental concerns but enhanced the depth of coverage. Some approaches assist university leaders in devising curricula reforms to promote sustainability learning, providing students with opportunities to reflect on the topic, and bridging the gap between the activities being done at a university to foster sustainability and student perception of what needs to be achieved.

Keywords

Keywords: Sustainability, curriculum, higher education, sustainable development education, Saudi Arabia vision 2030

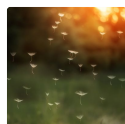
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Introduction

The integration of sustainable development (SD) into Higher Education Institutions (HEIs) has increased during the past decade (Friman *et al.*, 2018; Holm *et al.*, 2015). Increasing numbers of institutions are incorporating and institutionalizing SD into their courses, research, operations, outreach, evaluation, reporting, and interaction with internal and external stakeholders (Cortese, 2003; Lozano, 2006; Velazquez *et al.*, 2005). There has been an increasing interest in incorporating SD into the curriculum at all levels to help students comprehend their decisions and actions' impact on the environment and society (Lozano, 2010).

Higher education institutions are trying to include sustainable aspects in their curriculum (Cusick, 2009; Rusinko & Sama, 2009). Many studies were conducted on integrating sustainability in higher education (SHE). Research has investigated how higher education institutions in various countries deal with the sustainability challenge and potentially change the teaching programs in multiple disciplines. Considerable efforts need to be addressed by both the educators and the students (Mulà *et al.*, 2017). Educators need to have technical knowledge about inter- and trans-disciplinarity. On the other hand, students need to become more aware of their role and responsibility to the world (Levi & Rothstein, 2018).

Tertiary education is a forum that enables information and different pieces of training for sustainability within the community. In the last decade, factor incorporation of sustainability into higher education institutions has been thoroughly researched (Weber *et al.*, 2009).

It is hard for higher education to match the social context in modern society because of accelerated development. According to Mulà *et al.* (2017), education systems perpetuate unsustainable learning and practices. This data highlights the critical role academics play in sustainable decision-making.

Recently, there have been considerable increases in universities that incorporate sustainability curricula into university programs. (Elmassah *et al.*, 2020). The existing degree of expertise of academics in the delivery of relevant curricula to solve sustainability concerns globally remains (Reid & Petocz, 2006; Thürer *et al.*, 2018).

There is widespread agreement on the importance of incorporating sustainable development in University Missions, institutions, and operations, as well in curriculum, student and faculty life, and community support (Mróz *et al.*, 2020; Thürer *et al.*, 2018). Sustainable development should be included as an academic focus in university curricula, as evidenced by several research initiatives (Reid & Petocz, 2006). While such notions of integrating sustainability throughout the curriculum with an interdisciplinary approach might seem novel for many, in higher education, at least five decades of interdisciplinary pedagogical techniques have been investigated and applied (Hill & Wang, 2018; Tasdemir *et al.*, 2010; Tasdemir & Gazo, 2020). Dmochowski, 2016 insisted that early adopters of interdisciplinary

education move beyond the objective epistemology that he thinks aim to achieve knowledge integration's most elevated purposes. (Dmochowski *et al.*, 2016)

We strongly suggest educational institutions adopt sustainable practices to improve the community on their campuses. Higher education should prioritize research and development to ensure sustainability and social welfare. (Elmassah *et al.*, 2020)

From 2005 to 2014, the United Nations Decade for Education for Sustainable Development started (Shelley, 2006). It offered an impetus to integrate sustainable development into education. Collaborative and participatory learning requires innovative and engaging teaching and learning techniques to motivate learners to act. ESD teaches critical thinking, science, complex systems, and future planning (Glavič, 2020)

The Voluntary National Review (VNR) concludes with several lessons that have been drawn as a conclusion of the first phase of the aligned planning and development efforts and projections of the Sustainable Development Goals. You should consider the specific needs of that country. According to the existing context of the SDGs, prioritization is an effective enabler for implementing the SDGs. Another lesson is the importance of some macro-vision regarding policy coherence. These goals can be achieved by tapping into existing national frameworks, plans, and initiatives to implement the SDGs.

Additionally, consensus-based decision-making is crucial in aligning international policies with the UN SDGs. Economic diversification plays a vital role in economic growth. There should be a worthy goal of economic diversification for sustainable development because of the integration and achievement of SDGs effectively and functionally. Performance Measurement in the Public Sector is essential this year because the Kingdom is committed to strengthening the government sector's ability to monitor and track its performance (Al-Tuwaijri, 2018).

Saudi Arabia has a strong commitment to achieving sustainable development goals. Through a royal decree, the Minister of Economic and Planning has been mandated to follow the multi-dimensional strategies related to the Sustainable Development Goals. Under the committee, the MEP's role is primarily to support stakeholders and government agencies to develop well-executed policies. MEP assists the regulatory agencies in tracking and monitoring the goals of all who fall be at financial risk due to government policies (Alshuwaikhat *et al.*, 2016).

Besides, Saudi Arabia has developed several strategies and plans to promote sustainable development is seventeen goals. The National Environmental Strategy, the National Biodiversity Strategy, the Vegetation Restoration Strategy in the Riyadh region, the National Plan for Management of Natural Disasters, the National Chemical and Bacteriological Incidents, and the National Minerals and Energy Strategy have all been implemented.

Significant trends in HEIs

The concept of sustainability has become one of the most pressing mandates in recent years. Upholding sustainable behavior entails an orientation towards the future. Sustainability is a multifaceted concept that includes everything from preserving ecosystems to empowering people within organizations. For instance, the public sector has witnessed the proliferation of innovative city projects

Sustainability involves empowering people within the education system. Innovative education, such as ESD, can play an essential role in turning things around (Nasibulina, 2015). The education systems and curricula in Saudi Arabia are related to the SD guidelines. In this respect, steps to develop and enhance educational curricula at all levels have been taken to build a pool of qualified SD believers and practitioners (Reference find). However, the breadth and efficiency of ESD implementation in Saudi Arabia's HEIs are insufficient.

Teaching sustainability is not anything new, as it should be recognized while doing so in the classrooms of our universities. Sustainability-related curricula, activities, and events have also been included in universities. In contrast, most of this has been accomplished in a cross-functional, indirect, or implicit manner. In this regard, "interpersonal, human, social, or behavioral abilities needed to use technical skills and knowledge in the workplace" are the determinants of sustainable competencies."(Stillwell *et al.*, 2009).

Much research has shown how to best integrate sustainability capabilities into the university curriculum (Brundiers *et al.*, 2010). According to the study, educators' first training should integrate sustainability competencies (Cebrián *et al.*, 2015). To reach the ESD goals, educators will need to learn a new set of skills that will help them implement a transformational education vision. Future educators need to acquire these competencies since their impact extends well beyond the classroom and contributes to a more sustainable society (Shelley, 2006)

The implementation of ESD has not made adequate progress in the training of future educators (Rieckmann, 2017). As a result, researchers have produced newer, more precise competency frameworks for teachers. Sustainability is about thinking critically, working, living with complexity, and defining values (Kagawa, 2007).

Sustainable Development Education SDE

This idea soon developed into a global movement. Today, ESD is increasingly being paid attention to as an effective tool for ensuring SD, especially in HEIs (Leal Filho & Dahms, 2018). ESD aims to develop students' and persons' skills to promote and inspire them to follow sustainable economic, political, and cultural actions in the future.

As stated by Leal Filho, SDE is educational for both local and global environmental (Leal Filho & Dahms, 2018); impacts (Laurie *et al.*, 2016; Reid & Petocz, 2006), and is characterized by methods and tactics that promote knowledge of SD issues.

To learn how and measure those skills were already available in 2013, Lambrechts *et al.* (2013) researched business administration competencies, office management, and information technology related to studies programs in two Belgian universities. Study results indicate that SD's competencies in accountability and emotional intelligence competencies accountability and emotional intelligence are broadly combined. At the same time, SD has no competencies in system orientation, personal engagement, and intervention.

Albareda-Tiana *et al.* (2018) researched SD theories and strategies in the university curriculum. The study connected sustainable development SDGs with sustainable learning and teaching practices at the University of Catalonia. The challenges for potential graduates and the entire university community in SD have been given particular focus. The research illustrates a methodological investigation of SDGs and sustainable learning and higher education

The sustainability of university's courses and programs is outlined by Argento *et al.* (2020). The findings indicate that academics from a wide range of backgrounds and experiences are confronted with the problem of sustainability. Communication is essential to address fragmented ideas and promote cross-disciplinary collaboration.

There are two methods in which EDS may be implemented at an institution: vertically and horizontally. Learner-centered approaches and action-oriented learning can also be used to teach SDE. To improve SD, Barth & Rieckmann (2012) recommend the following curricular changes: Interdisciplinary collaboration, informal learning, and leadership styles all bring theory and practice together.

SD is needed, but there is a lack of resources and time and an incapacity to sustain and present curriculum material, educational standards, and external influences. Furthermore, there is no HEI support (Cebrián *et al.*, 2015).

Aktas *et al.* (2015) presented a case study about sustainability, a university-wide first-year training course. Fresh students were exposed to sustainability questions in a joint classroom team that teaches faculty from various disciplines. Finally, the system has enormous potential to create a culture for an institution that looks after sustainability issues. There is a need for restructuring (Aktas *et al.*, 2015).

The curriculum of industrial design education has recently introduced SD. Undergraduate students' projects were the focus of the research. The results show the most crucial challenge to choose between the two levels and the sustainable design approach. (Küçüksayrac & Arıburun Kırca, 2020).

Education in the context of Saudi Arabia for SD

The report reaffirms the strong commitment of Saudi Arabian to achieve the 2030 Sustainable Development Agenda through steps and inventive approaches to bringing the 2030 Agenda closer to Saudi Vision 2030; an ambitious development

plan focusing on three topics: a dynamic society, a productive economy, and an enterprising country.

The Vision 2030 Education Component focuses on three key areas: curriculum improvement, higher education promotion, and labor-market skills.

The goal of Vision 2030 is to improve educational measures on a worldwide scale and encourage people to define their work. ‘University rankings should include the top two hundred universities globally.’ (Abubakar *et al.*, 2020).

This report highlights the Kingdom’s commitment to adopting and implementing SDGs, promising to participate in the international development agenda’s global information-sharing, insight, and good practice phase. The First National Voluntary Review of Saudi Arabia presents the experience, position, adaptation, and execution.

The following questions are addressed: how do academics collaborate to incorporate sustainability into their teaching methods and plans? Do universities, colleges, and colleges and programs require good sustainability courses? What research is needed by the institution and its strategy for implementing Saudi Vision 2030’s sustainability components?

Several studies have been incorporating sustainability into higher education curricula, but these did not specifically address this issue. In addition, this study is one of the few attempts to examine what has been done in practice to meet the university’s minimum requirements for SD.

Methods

There is a greater emphasis on how sustainability is integrated into undergraduate education than on sustainability elements per se. While catalogs, modules, and programs might be helpful, they are not the primary determinant in this case.

To achieve the study’s objectives, the researchers adopted the descriptive-analytical method. Our main goal was to explore whether sustainability elements are integrated into university curricula (i.e., courses and programs). Furthermore, the research sought to understand sustainability better and how it may be integrated into the curriculum from the viewpoint of those who will benefit from it.

A set of carefully chosen keywords was used to assess the sustainability of all Imam Abdulrahman bin Faisal University (IAU) courses. The keywords were adapted and extracted from the 2030 Agenda for Sustainable Development, based on the UN’s concept of sustainability and its 17 SDGs. As outlined in Table 1, all course titles offered by the (IAU) were collected and examined for mentions of sustainability elements. If one or more of the keywords in the selection criteria is included, the path is deemed to have sustainability elements (see Table 1). In addition, two hypotheses were put forward and then tested:

First, there are no courses in sustainability required by any of the IAU’s required five courses. Second, there are no university or college courses in sustainability.

The study will answer the following questions: Q1 Do IAU require five sustainability and SD elements in their courses? Q2 Are the university colleges and program course requirements sufficient to maintain long-term viability? Q3 Is the Saudi 2030 vision reflected in the required courses at the university, college, or program level?

Results

Table 1 shows the frequency analysis using keywords and root words across all courses in the sample to answer the study’s first question: “Does IAU require five courses involving sustainability and sustainable development themes to graduate?” Two thousand eight hundred ninety-one courses were identified as potentially having SD during the screening and testing. Out of the 40 courses analyzed, 19 were related to sustainability and had at least one sustainability term. Table 1 displays the data.

Table (1) shows that only 20 out of the 40 SD keywords were associated with relevant course names for the academically oriented programs. Out of 2891 courses, 106 were identified to have SD content.

To answer the second question of the study: “Are the university colleges and program course requirements sufficient to maintain long-term viability?”, at various times, IAU’s colleges and programs are incorporating educational sustainability. However, IAU’s most popular course titles include ecology, sustainability, water, energy, and the environment. Environmental engineering, health, and environmental architecture are part of IAU’s disciplines and environmental-oriented programs.

Table 2 shows the courses that include at least two sustainability keywords. The college, with seven programs, has the second-highest number of sustainability-related terms behind the college of engineering. This is because the goal of both university environmental engineering and built environment curriculums is sustainability in the face of ecological decline.

Table 3 shows the results of the sustainability tests, including averages, minimums, maximums, standard deviations, and medians for N number of test cases.

There were 48 instances of the keyword “Environment” appearing in the course title, according to the IAU’s research, followed by 12 cases of “Water” and 17 instances of “Energy” in the list of courses under investigation. Sustainability keywords are found in an average of 6.76 courses, with a median of 4.00.

There were 40 sustainability keywords assessed, and none of the five courses had any of them. Table 4 explains the IAU university prerequisites.

Table 1. tested sustainability keywords.

#	Key world	Sustainability count	#	Key world	Sustainability count
1	emission	0	21	Green	1
2	footprint	0	22	renewable	1
3	biodegradable	0	23	Solid waste	1
4	biomass	0	24	treatment	1
5	byproduct	0	25	environmental impact	2
6	carbon	0	26	Marine	2
7	Circular	0	27	Air pollution	3
8	closed loop	0	28	reuse	3
9	composting	0	29	waste	4
10	deforestation	0	30	Climate	4
11	eco-conscious	0	31	conservation	4
12	eco-friendly	0	32	desertification	4
13	global warming	0	33	Sustainable	4
14	greenhouse	0	34	resources	6
15	Landfill	0	35	natural	8
16	life cycle	0	36	ecology	9
17	Reclaim	0	37	sustainability	9
18	Recycle	0	38	Water	12
19	Reduce	0	39	energy	17
20	Biodiversity	1	40	Environment	48

The study was limited to a single university, but it would be fascinating to apply it to other institutions to gain a complete picture. This study's internal validity might have been compromised by the screening and testing process of SD keywords. More SD-related courses may be found if the curricular unit's syllabus and methodology are examined. It may be worthwhile to investigate programs' study plans and course requirements at different educational levels and the relationship between SD competencies and the incorporation of SGDs in HEI curricula.

Research question #3: Do mandatory courses at the university, college, or program level incorporate Saudi Arabia's 2030 vision? It's all over with now. The IAU strategic plan states that each goal has a statistically significant correlation with all KSA Vision 2030 targets, ranging from 17 to 64 percent for each purpose. (University, 2019).

Discussions

This research highlights many phenomena in IAU courses where SD is mentioned. First, the analyses showed that IAU courses cover minimal sustainability issues in a relatively low balance, except for engineering and architecture college. It was

hypothesized that the five courses required by the IAU University do not include any studies on sustainability. The analyzed sustainability keywords revealed that none of the five universities' required courses assessed contained any sustainability keywords. As a result, IAU University may need to provide at least one course on sustainability in all programs curricula to ensure alignment with vision 2030.

Another Hypothesis asserts that IAU courses provide sustainability as an option in addition to the core curriculum. Following Table 2, a free elective or non-technical elective course is available at the university level to allow students to select into their study plan. The university-required courses are all required with no elective offered. The current study findings show that several mandatory courses at the program level, namely Environmental engineering and the built environment at the engineering and architecture colleges, fit in the Saudi vision 2030's sustainability components.

Limitations

A qualitative study is to be done. Any future studies should be conducted at a large scale and with the involvement of

Table 2. List of courses contains at least two sustainability keywords.

Course name	Keyword count
Water Resources and Quality	2
Water Resources	2
Wastewater Reclamation & Reuse	2
Urban Conservation and Renewal	2
Renewable Energy	2
Integrated Water Resources Man	2
Green/Sustainable Building (EI	2
Food Safety & Environmental He	2
Environmental Impacts of Trans	2
Environmental Impact Assessment	2
Environmental Assessment	2
Environment & Ecological Systems	2
Energy and Environment	2
Ecology and Built Environment	2
Eco Design and Sustainability	2

Table 3. Summary statistics of tested sustainability parameters.

Parameter	Value
Average	6.86
Min	1.00
Max	48.00
SD	10.30
Median	4.00
N number of tested cases	19

Table 4. The IAU requirement courses.

Course code	Course name	Course type
ISLM 181	Creed and Family in Islam	Must
ARAB 182	Arabic Language Skills	Must
HIST 281	History and Civilization of Kingdom	Must
ISLM 282	Islamic Ethics and Values	Must
BUS 381	Entrepreneurship	Must

all educators, whether they teach in the field of social development (SD). Research on comparable programs at other institutions would be helpful to understand better the possibilities for integrating sustainability into teaching and research activities and provide a broader base for recommending refinements in techniques and initiatives. As a part of the environmental management system, the classification process was streamlined.

The University and college levels, on the other hand, did not have any free elective sustainability courses to offer to their students. According to this, at least one course in university or college prerequisites should be designated to promote the sustainability element course. The University of IAU's experience demonstrates that it is feasible to incorporate the idea of sustainable development into higher education meaningfully and to address the critical components of sustainability - environmental, social, economic, and cultural – and their many combinations. The study's main result is that the feedback mechanism must be improved to show instructors that sustainability is vital to the university administration and encourage thorough and continual evaluation of course material.

Conclusion

Many colleges and universities have begun to emphasize sustainability in recent years, with education for SD at the heart of their mission. As far as establishing itself as a long-term institution, it is still very young. Because of this, we may conclude that Saudi Arabian institutions must work hard and focus on the future of sustainability research.

Finally, a literature analysis on how SDE is taught and integrated into schools, colleges, and universities' curricula worldwide shows that it is a developing discipline that can affect policy and practice. Integrating curriculum assessment can better understand courses and degrees' contributions to sustainability.

This study is the first attempt and among the limited studies to tackle sustainability in higher education curricula in Saudi Arabia after the declaration of Vision 2030. In addition to that, this work will provide valuable evidence to contribute toward achieving the United Nations SDGs, especially SDG number four, "Quality Education."

Recommendation

As a result of the findings, IAU programs can be improved by incorporating more sustainable practices during program review or creating a new program. Because of horizontal integration, students are taught to think about sustainability as a systemic approach. When incorporating sustainability subjects into an educational program, it is vital to include all facets of sustainability (as indicated by Davidson *et al.*, 2007). As a result, it is essential to offer degrees that incorporate sustainability throughout all the courses. Courses need to be more heavily weighted toward incorporating environmental issues. According to Segalás *et al.* (2010), active and practical teaching approaches (e.g., project-based learning and case studies) aid students in integrating

sustainability concepts into their existing body of knowledge. Ceulemans & De Prins, 2010; Peet *et al.*, 2004). We concur with Sterling (2004), who claims that incorporating sustainability into “normal” university courses and research projects is the most incredible method to reach students and equip them with practical skills and knowledge to work for sustainability in the future. Based on this research, the authors propose that IAU sustainability courses be developed and implemented.

Data availability

Zenodo: Integrating sustainability into higher education: Saudi Vision 2030. <https://doi.org/10.5281/zenodo.6102248>

This project contains the following underlying data:

- COURSE_LIST IAU 2021 redundancy removed (3).xlsx final.xlsx

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

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Open Peer Review

Current Peer Review Status: ? ✗

Version 1

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Christopher J Moon

Middlesex University, London, London, United Kingdom

The paper benefits from a focus on Saudi Arabia and ESD. However, the method is severely limited as it only uses keywords in course titles to make conclusions on course content. Thus other courses may include sustainability in their teaching even if a keyword is not included in the course title.

The authors should survey the module leaders to be more precise with their results, and then interview a cross section of tutors to identify the leaders and laggards, including best practices for teaching methods and content.

The authors would also benefit from a more in-depth knowledge of ESD developments e.g., the [UK report](#) by QAA and AdvanceHE 2021. Education for Sustainable Development. This report cites graduate competences in sustainability that all graduates (regardless of subject discipline) are expected to achieve. This can serve as a tool for reflection by students and tutors but also a benchmark for ongoing research and practice development.

Dr CJ Moon FRSA FHEA FEEUK.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

No source data required

Are the conclusions drawn adequately supported by the results?

No

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Not applicable

Is real-world evidence provided to support any conclusions made?

Not applicable

Could any solutions being offered be effectively implemented in practice?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Education for Sustainable Development, Entrepreneurship and Sustainability, Eco-entrepreneurship., Entrepreneurship Education.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 06 May 2022

<https://doi.org/10.21956/emeraldopenres.15596.r28126>

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Ferhat Karaca 

Department of Civil and Environmental Engineering, Nazarbayev University, Nur-Sultan, Kazakhstan

This research suggests assessing the level of suitability of a university curriculum, using a logical and easy to apply procedure. However, the application is limited to only one single university. Considering the novelty of the method suggested, it can be used in many other universities, and it provides a good framework for broader research challenges.

This reviewer decided to suggest it passing peer review after some revisions by considering both

the limitation and novelty mentioned above.

- It would be good if you added some findings to the abstract.
- it is not a common practice to provide opinions in the intro part; revisions might be considered, or they can be moved to conclusions (E.g., "We strongly suggest educational institutions adopt sustainable practices to improve the community on their campuses.")
- Throughout language use, punctuation and grammar checks are required.
- Some parts need to be re-written to have a critical perspective rather than using the exact language of the national documents (e.g., section Education in the context of Saudi Arabia for SD).
- The first sentence of the method hangs in the air and does not make a good intro to that section! You may consider removing it.
- The hypotheses are not clear and do not read well! I strongly suggest re-wording or removing them. They do not even offer any scientific facts in the current format, just simple statements that can be easily tested throughout the university curriculum! The following questions (Q1-Q3) are better sets of hypotheses.
- It is required to add a clear description of the method (preferably in a figure) explaining the assessment framework.
- Discussion section is weak, with zero citations in this part. It should be extended by making good comparative assessments with the existing literature.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

No

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

No

Could any solutions being offered be effectively implemented in practice?

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: sustainability and higher education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
