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Engineering Across Borders: Barriers to Transnational Teaching and Research Collaboration

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Abstract
Transnational academic collaboration in teaching and research is a cornerstone of knowledge exchange and transfer in higher education. The widespread adoption of digital technologies globally (accelerated by the COVID-19 pandemic), along with financial constraints faced by universities, a growing need for transnational academic collaborations, and shifts in government policies, have brought transnational academic collaborations to the forefront of both governmental and university agendas in the United Kingdom. While the barriers and drivers are broadly covered in the literature and reasonably understood, variations in national, disciplinary, regulatory, and institutional contexts mean that a one-size-fits-all approach is not feasible. Consequently, the barriers to transnational academic collaboration between institutions and across disciplines (such as occupational safety, health, and wellbeing (OSHW) in engineering) between the UK and Egypt remain poorly understood. Using document analysis and group panel discussions with Egyptian industry practitioners, academics and students in Egypt, the reported study explores the barriers to transnational research and teaching collaboration in OSHW in Engineering. The major barriers include cultural and policy differences, curriculum design, lack of resources and differences in interest and attitude between individual and institutions. A significant finding is the attraction to universities in fellow Arab countries due to cultural affinity, which has a causal inference with attitudes and interests. Co-creation of culture curriculum to ensure contextual content is recommended. Also, focusing on shared areas of interest and national country priorities of the international partner are recommended.

Keywords
Collaboration, Engineering Education, Safety Education, International Education Partnership, Internationalisation

1. Introduction and Background
Egypt has one of the fastest growing economics in Africa, contributing to the continent's position as the second-fastest growing economy globally (Vines 2024). However, the country has high (but reducing) rate of unemployment (World Bank 2025) and many graduates struggle to secure jobs that is reflective of their academic qualifications (Dhillon and Yousef 2009). This situation underscores the urgent need for upskilling Egypt's workforce through capacity development, ensuring that students possess the relevant employability skills upon graduation to meet industry needs. It also necessitates the critical revisitation of the education curriculum to ensure that they are fit for purpose. These have implications for the productivity of industries such as engineering and infrastructure development, which are already impacted by other issues such as poor occupational safety, health and well-being (OSHW) records (Umeokafor et al. 2024a). Engineering plays a strategic role in infrastructure development, technological innovation, and industrial processes. However, this is dependent on performance indicators such as OSHW. By implication, OSHW and engineering intersect.

To meet the sustainable development goals and sustain economic development, transnational collaboration in research and teaching remains a major vehicle, especially in engineering, education, development, and OSHW (Krcal et al., 2021; Podgorska and Zdonek, 2021). Consequently, Egypt is actively investing in a knowledge-based economy, as reflected in various national policies and strategies. This is reflected in many policies, strategies, and steps that the country has taken. One of the most critical and pivotal steps is Egypt's decision to join Horizon Europe **(**pending the signing of the agreement in November 2025**),** providing a platform for transnational collaboration between academics and industry practitioners in Egypt and Europe.

Transnational collaboration in research and teaching (which consists of student and faculty mobility, joint research projects, curriculum and joint-teaching, capacity development and training, and interdisciplinary collaboration) offers many benefits and opportunities to address national problems and meet the sustainable development goals (Krcal et al. 2021, Podgorska and Zdonek 2021). This can be achieved through adopting the interdisciplinary collaboration approach and team (for example, OSHW and Engineering), especially through higher education institutions and industry partners, which is reported to be efficient (Sillitoe 2004, Podgorska and Zdonek 2021, Krcal et al. 2021). Its role in addressing challenges in these areas through knowledge exchange, capacity development, improved international relationships and economic development is emphasised in the literature (Krcal et al. 2021). This fosters innovations (Podgorska and Zdonek 2021). The ability of transnational collaboration in research and teaching to deliver the benefits above and others is due to its ability to offer a diverse team, which results in diversity in initiatives, opinions, and attitudes; learning opportunities; shared resources and infrastructure; skills transfer and policy influence; and harmonisation (Dusdal and Powell, 2021; Begin-Caouette et al., 2023). However, transnational collaboration in research and teaching does not come without challenges. For example, differences in interests, language, goals, and cultures can result in conflict, as reported in Leahey et al. (2017). Such collaborations can result in complex projects due to variations in policies and procedures, which can lead to bureaucratic coordination challenges (Walsh and Lee, 2015). Communication challenges are also covered in studies such as Dusdal and Powell (2021). These challenges have implications for the successful delivery of projects**.** Nevertheless, the potential and benefits of transnational collaboration outweigh the challenges; hence, it remains at the forefront of institutions (especially universities), countries (e.g., the United Kingdom), and commercial or non-governmental organisations.

Although international organisations such as the British Council aim to address these challenges (by providing funding to support research, establish partnerships, or create environments for collaboration), transnational collaboration in research and teaching in engineering and OSHW between the United Kingdom and many developing economies, such as Egypt, remains underexplored. There is no empirical research that examines the challenges engineering academics face when working in OSHW within the context of transnational collaboration. Extant studies focus on transnational collaboration in higher education from a general perspective or within other disciplines (Podgorska and Zdonek, 2021; Dusdal and Powell, 2021; Krcal et al., 2021), or among developed countries (Begin-Caouette et al., 2023). Multidisciplinary domains like OSHW (which intersect with public health, psychology, engineering, and management) offer extensive opportunities for capacity development, curriculum development, knowledge exchange, interdisciplinary collaboration, and international partnership. These have implications for improving productivity in both countries. Consequently, using Egypt as a case study, this study examines the barriers to transnational research and teaching collaboration in OSHW within engineering disciplines. In doing so, two key areas of OSHW (Design for Safety (DfS) and Mental Health and Wellbeing (MHW)**)** are the focus.

2. Methods

An extensive literature review was conducted to develop a framework on transnational academic collaboration in teaching, research collaboration, and knowledge exchange partnerships to guide the data collection. The qualitative research approach was adopted in this study because the research problems and aim require gaining an in-depth understanding of the social phenomenon to address them, and qualitative research excels in answering ‘why,’ ‘how,’ and ‘what’ research questions (Erikkson & Kovalainen, 2008). It also offers the opportunity to gain deep insight into social phenomena, as demonstrated in this study (Umeokafor, 2015). The qualitative approach employed included document analysis and group panel discussions. First, a document analysis of institutional research policies in the UK and Egypt, as well as module/course descriptors from higher education institutions in Egypt, was used to inform the group panel discussions. This provided insight into teaching styles, programme or course content, policies, and learning outcomes. Document analysis enables triangulation of data (Ferreira Nunes et al., 2019), offers an independent perspective, and provides insights that cannot be captured through interviews or observation, hence is valuable for triangulation (Morgan, 2022). Second, panel discussions with engineering industry practitioners, engineering students, and academics in the same discipline were conducted during a workshop series in Egypt. However, before the discussion, the students were taught a core topic in engineering using the active learning method supported with digital technology commonly used in the UK, so they could experience the UK learning style while in Egypt. Group panel discussions were adopted because, unlike interviews, they enable the generation of multi-perspective insights through dynamic interactions. Also, as the discussion is in real-time, participants can respond to questions, probe views, and build upon the views of each other (Alharbi et al., 2024). This approach excels in offering insight into complex and interdisciplinary issues (Lucas et al., 2025). Convenience and purposive sampling methods were adopted for recruiting research participants in Egypt. The academics were recruited from the Faculties of Education, Engineering, and Computer Science and Artificial Intelligence. The students were from the Faculty of Engineering. They were informed about the research and encouraged to participate voluntarily. The recruitment of industry practitioners was based on the personal and professional contacts of the Egypt Principal Investigator and the Co-investigators in the country. Upon invitation, they suggested others who might be interested and had relevant expertise, and these individuals were also invited. The criterion for participation was based on involvement and interest in transnational teaching and/or research collaborations in engineering. The motivation for including industry practitioners, academics, and students was to ensure that the activities were stakeholder-led, inclusive, and co-developed, giving participants a sense of ownership and belonging. This increased the likelihood of generating workable and sustainable solutions. Ethics approvals were obtained from the respective institutions of the research partners, in line with institutional policy. Consent was obtained from all participants through consent forms after they had read the participant information sheet. The data collected was analysed thematically using Braun and Clarke's (2006) six-phase approach: familiarisation with the data; initial coding; developing or searching for themes; reviewing themes; defining and naming themes; and writing up, in the thematic analysis format. To improve the trustworthiness of the research, measures such as triangulation were implemented during the analysis.

3. Findings

3. 1 Overview of the profile of participants

Of the 49 participants in this discussion, one was an industry expert in construction and civil engineering, six were academics in mechanical engineering, civil engineering and computer sciences, and the rest were students in the same discipline. Of the 49 participants, 14 were female and 32 were male. The participants (non-students) years of experience range from 2 to 20 years (including Chief Executive Officer (CEO)), and educational qualifications include undergraduate degrees and doctorates gained from Egypt and abroad, for example, Oman, Qatar, and United States of America.

3.2 Barriers to teaching and research collaboration in occupational safety health and wellbeing in engineering

The barriers to teaching and research collaboration in DfS and MHW in engineering in Egypt consist of four themes and seven sub-themes, covering diverse areas, including human behaviour, pedagogy, contextual differences, and resources (Table 1 and Figure 1).

Local context

This theme (consisting of cultural differences and differences in education policy and standard) relates to barriers arising from regulatory, cultural, and institutional contexts in Egypt and in practice. Both the students and academics highlight the role of culture as a barrier, especially in terms of cross-cultural differences. The fear of engaging with knowledge embedded in a different culture, particularly that of a foreign partner, has led to a perceived preference for collaboration with other Arab countries. This is also linked to concern about language differences with the collaborating institution. Two students highlight difficulty of adapting to different cultural and linguistic environments, stating:

> '*Talk about the difficulties in exchange programmes e.g., learning the culture of other countries, language, and different engineering things'*. [Student 6]
>
> '*To change the programme is very hard, and to learn in other countries is hard e.g., languages and culture. The Civil engineering here and other countries may be hard'* [Student 4].

Table 1: Barriers to teaching and research collaboration in engineering in Egypt in terms of DfS and MHW

Themes	Subtheme	Evidence
Local context	Cultural differences	• Differences in culture • Reluctance to engage with difference culture or integrate into unfamiliar societies. Culture shock phobia • Language differences and reluctance to learn a different one • Lack of trust • Special attraction to Arab country because of shared cultures • Pressure to protect national culture and reputation

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Curriculum design	Difference in education policy and standard	• Varieties in education policies • Differences in certificate recognition and standards between countries, potentially affecting acceptance.
	Course content	• OSHW is not adequately covered; focus is primarily on engineering content
	Teaching style	• Difference in teaching methods and pedagogical approaches.
Resources	Limited finance/high cost	• High cost of establishing partnership and implementing programme • Limited funding sources within the country.
	Time	• Time zones difference • Exchange programmes are time consuming
	Limited local resource	• Lack of facilities in Fayoum for some types of learning • Regional disparities: Cairo students have more access to practical learning environment (e.g., construction sites) than the ones in Fayoum
Attitude	Differences in interest and attitude	• Preference for specific type of partnership (e.g., distance learning vs. exchange programmes) • Scepticism about the value of distance learning; preference for face-to-face instead. • Student reluctance due to fear of culture shock

Curriculum design

This theme covers barriers related to the design of the education curriculum. The quotation from student 4 support the point regarding differences in learning and teaching style. There is agreement among academics and students that DFS and MHW are not covered in the course content. This is despite the document analysis indicating that the construction management or related courses are offered at the university. One of the academics stated:

> '*No, we teach just civil engineering, but not safety*, not buildability. *However, in next session, we will devote to adding such in the teaching...*' [Academic 1].

This lack of DfS and MHW in the curriculum is supported in the document analysis, despite the presence management-related courses/modules within engineering programmes. This is further reinforced by findings from the focus group session with students on MHW, where evidence indicates that student wellbeing is overlooked in the curriculum, for example, through insufficient spacing between exams, over-assessment, and extended teaching times.

Resources

This theme covers barriers related to human, financial and time-related investments. There are three subthemes, highlighting how that limited resources, high costs, and time constraints (including time zone differences) can affect teaching and research collaboration. Both students and academics agree that cost is a core limitation. Two supporting quotes from the two groups are provided below:

> *'Cost, many of us will like this type of exchange, but the problem is money. If I had money, I would do that'*. [Student 5]
>
> *'For other people to get another country, it costs a lot of money. So mixed learning is very efficient'*. [Academic Panelist 4]

The issue of cost and its connection with regional differences between the capital (Cairo) and Fayoum is reflected in the following quotation:

> '*If we get funding, we can do a lot. For example, we can take students to Cairo and show them a lot on construction site that we don't have here. They learn more'*. [Academic expert 1]

Another academic highlighted time limitations:

> '*It* [exchange programmes] *takes time to travel'*. [Academic expert 5]

Attitude

The barriers in the theme mainly focus on the disposition (defined as beliefs, feelings and behavioral tendencies) of academics towards transnational research and teaching collaboration. For the students, it is more about their disposition toward programme involving transnational collaboration or partnership, such as student mobility. While there is agreement on the role of collaborative research, there is no consensus on the preferred type of teaching partnership programme. Most of participants agree that distance learning (online) has a role, particularly due to factors such as cost and time. However, some expressed a preference for blended models such as combining online distance learning with in-person session or flying facilities. There is strong enthusiasm for partnerships that involve visiting or guest lecturers from abroad delivering face-to-face sessions. However, this divergence in preferences poses a risk of limited acceptance of certain teaching partnership models.

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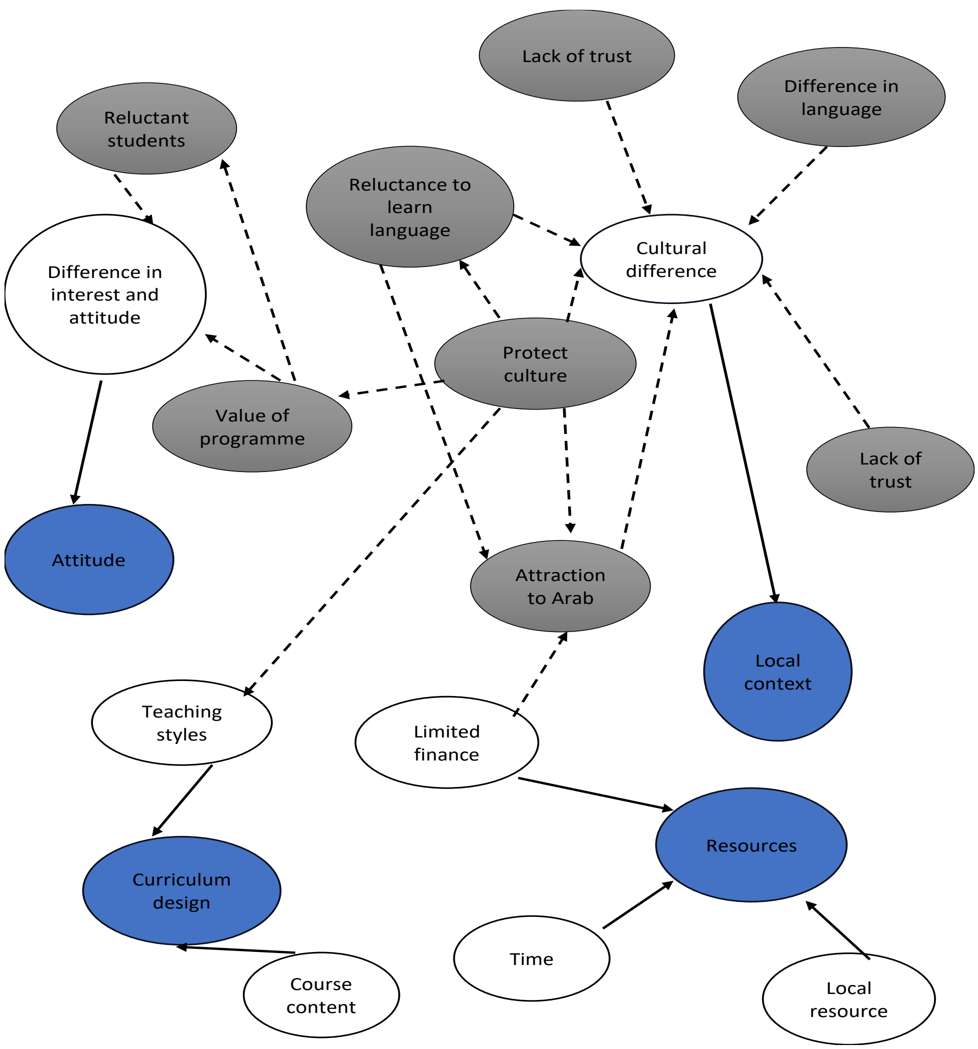
Nevertheless, few students expressed skepticism about partnership involving online learning, as they do not perceive sufficient value in such format. One of them states:

> '*There are also other limitations, instead wasting time on distance learning. I may just watch YouTube video. I will prefer to study myself instead [of] attending Zoom classes. I think that if I got the person, I get my experience if I get practical experience in the outside world'*. [Student 6]

The students demonstrated a preference for opportunities that offer practical experience, as reflected in the quotation above. Therefore, any partnership model must be designed to incorporate practical learning elements**.** This concern is particularly relevant to the theme of curriculum design.

3.3. Causal inference or interaction of the barriers to teaching and research collaboration in engineering in Egypt

Figure 1 expands Table 1, illustrating the themes, subthemes, and causal inference or interaction of the barriers to teaching and research collaboration in engineering in Egypt.



Legend:
Subthemes (sub-barriers)
Theme (main barriers)
Evidence (specific barriers)
Causal inference
Link between themes and subthemes

Figure 1: A graphic illustration of the themes, subthemes, and causal inference or interaction of the barriers to teaching and research collaboration in engineering in Egypt.

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Four main themes (Attitude, Resources, Curriculum Design, and Local Context) emerge as central organising concepts, each linked to multiple subthemes and evidence. Additionally, inter-theme connections are evident. For instance, specific barriers such as 'protect culture', 'attraction to Arab' and 'reluctance to learn language' within the subtheme of cultural difference are interconnected and feed into the theme of Attitude, particularly through 'protect culture'. For the Resources theme, subthemes such as 'time', 'local resources' and 'limited finance' feed into it. However, there is also an intra-theme connection between Resources and cultural differences as 'limited finance' feeds into 'attraction to Arab', with students and academics favouring Arab universities due to the lower cost of partnerships and exchange programmes. Evidence from the Curriculum Design theme highlight the importance of adapting pedagogy to meet diverse expectations. Meanwhile, Local Context acts as a connecting thread, linking resource availability and cultural difference. All the themes are interconnected with the desire to protect the culture, explaining, or informing the teaching style. The figure illustrates the close interconnection among three subthemes, 'protect culture', reluctance to learn language' and 'protect culture'. These connections emerged from participants' narratives, indicating that cultural preservation and language attitudes are intertwined influences shaping collaboration experiences. Conversely, the lack of inter-theme connections between Resources, and Curriculum design is noteworthy.

4. Discussion

4.1 Profile of participants

Section 3.1 demonstrates that the participants have the right level of skills, experiences, and backgrounds to provide valuable insight to the study. The inclusion of early-career professionals and academics, alongside the established ones, including CEOs ensures that perspectives on barriers are not skewed by any level of experience. The same applies to gender, discipline, and levels of international and local exposure. For example, experienced participants are likely to be more resistant to bureaucratic delays and better equipped with the skills to address them. Hence, they may not identify such delays as barriers. This is complemented by the views of the less experienced ones, who are likely to report such issues due limited capacity to navigate them. This diverse mix of backgrounds, experience levels, and international exposure ensures a rich and balanced variety of perspectives on the barriers to transnational teaching and research collaboration.

4.2 Barriers to teaching and research collaboration in occupational safety, health and wellbeing in engineering

The findings of the study highlight the complex nature of the barriers and their interplay, underscoring the implications for practice, research, and society. This interplay is particularly evident the close causal inferences among 'protect culture', reluctance to learn language' and 'protect culture', indicating areas where policy interventions could be targeted. The participants emphasised that cultural differences, including language differences and a reluctance to learn and integrate into a different culture, hinder collaboration. These challenges are compounded by academics' preference for research and teaching collaboration with universities in other Arab countries such as Qatar. This reflects broader challenges in cross-cultural engagement, where collaboration requires not only technical alignment but also cultural sensitivity and mutual respect. Studies such as Brooks and Brooks (2015) have similarly identified barriers to cross-cultural engagement barriers in transnational research and teaching collaborations.

Another critical theme of barriers is curriculum design. The findings emphasise that the absence of occupational safety, health, and well-being in the curriculum concerning; where such content is present, the critical topics such as DfS and MHW are often missing. This does not mean that MHW is entirely excluded from the curriculum; rather, it reflects the absence in terms of content. Nevertheless, the absence means that pivotal aspects of OSHW, which are critical for improved productivity in engineering, are missing (Umeokafor et al. 2024b). For example, DfS stems from eliminating or substituting risks/hazards by designing them out before the construction stage (Umeokafor et al. 2023). This proactive and strategic OSHW improvement is more efficient than reactive approaches, hence has positive implications for productivity (Umeokafor et al. 2023, 2024b). Design for Safety training increases workers skills and knowledge in various areas including accident causation and hazard and risk management (Behm et al. 2014). The lack of OSHW content and the lack of innovative teaching methods in OSHW areas, for example DfS is also reported in studies such as Umeokafor et al. (2024b). Other key barriers in this theme include the lack of contextualised OSHW content and the presence of teaching method (in particular lectures) that students view does not support a better understanding of engineering and OSHW. Rather, they advocate for more practical sessions to enhance comprehension. Umeokafor (2019) offers a treatise on contextualized strategies, content, practices and laws in OSHW without the issues in the discipline will remain unaddressed. Collaborative efforts across borders enable the joint

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creation of educational content that blends internationally recognised approaches with locally grounded insights, making the curriculum more applicable and impactful

Equally important in the time-and cost-related resource barriers, which are also cited in many studies in the context of research (Brooks and Brooks 2015). This issue predominates in teaching-focused universities where there are limited resources for research, disproportionately affecting universities from low-resource settings and exacerbating global inequality in research and teaching. Further, transnational academic collaboration in teaching and research is dependent on the attitudes of academics and students toward the programmes. These attitudes play a crucial role in shaping how educators and researchers approach joint work, whether positively or negatively. While there is interest in teaching partnership, the lack of agreement on the type of teaching partnership highlights the need to develop models with varied options to meet students needs. Importantly, there is a difference between partnership and collaboration, for example, in terms formality, duration, structure and level of risk.

4.3 Causal inference or interaction of the barriers to teaching and research collaboration in engineering in Egypt

Each theme is linked to subthemes and evidence drawn from participants' accounts, demonstrating how these factors interact rather than operate in isolation. The intra-theme connections in the subtheme cultural difference among specific barriers 'protect culture', 'attraction to Arab' and 'reluctance to learn language' which feed into the theme of Attitude, suggest that language resistance reflects deeper identity concerns. Resource-related barriers extend beyond funding to include time constraints, highlighting the need for strategies that address both financial and scheduling pressures. Curriculum Design emerges through subthemes like teaching styles and course content. The role of the theme 'Local Context' as a connecting thread reinforces the need for collaboration strategies that align with local realities. Rather than presenting these relationships as statistical associations, the figure conveys interpretive connections grounded in participants' narratives, emphasising the interdependent nature of these barriers and the need for integrated solutions.

5. Conclusions

Using document analysis and group panel discussions with industry practitioner, academics and students in Egypt, the reported study explored the barriers to transnational research and teaching collaboration in OSHW within engineering. Successful transnational collaborations in OSHW in engineering between Egypt universities and those in the UK is contingent upon addressing the complex interplay among culture, curriculum, resources and attitudinal factors. The findings reflect broader challenges in cross-cultural engagement, where collaboration requires not only technical alignment but also cultural sensitivity and mutual respect. This also determines the ability of such collaboration to adequately address the local challenges, ensuring that the research and teaching collaborations are fit for purpose, contributing to Egypt meeting the sustainable development goals. While a positive attitude toward collaboration is also contingent on cultural factors, it is essential in addressing the cultural and structural barriers. Time-and cost-related barriers are also identified and are likely to affect low resources and teaching-focused universities more than the research-intensive ones. Additionally, gaps in engineering curriculum where OSHW is absent or, when present lacks the critical content for improving productivity is noted. The teaching style remains passive, overlooking innovative approaches of learning.

The lack of consensus on the type of teaching partnership highlights the need to develop models with multiple options to meet student needs. Hence, teaching partnerships should support varied delivery method (such as online distance learning and flying faculty) or internationalisation strategies such as student exchange or mobility but grounded in innovative learning approaches. It is also recommended to focus on shared areas of interest and national priorities of the international partner. The teaching and research partnership must be culturally sensitive and incorporate sustainable measures to address resource-related challenges, such as finance and time. For example, staff training on securing research funding from local and international organisations can be beneficial. These initiatives should also build on the positive attitude toward collaboration identified in the study. A future study could focus on developing and piloting strategies for establishing culturally sensitive and sustainable transnational research and teaching collaborations in OsSHW within engineering disciplines. However, all the recommendations in this paper are subject to empirical investigation. The current research is limited to academics and students in one region of Egypt, although it included industry professional from other regions. Further research that will expand the geographic scope of is recommended. As global collaboration evolves and policies change, the findings may represent only a snapshot of the current situation**.** Hence, longitudinal research is also recommended.

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6. Acknowledgement

This research was supported by the British Council through the Going Global Partnerships programme. The authors gratefully acknowledge the Council's contribution to fostering international collaboration and capacity building, which was instrumental in the successful completion of this study. The views expressed in this publication are those of the authors and do not necessarily reflect those of the British Council.

References

Alharbi, A., Nurfianti, A., Mullen, R. F., McClure, J. D., & Miller, W. H. (2024). *The effectiveness of simulation-based learning (SBL) on students' knowledge and skills in nursing programs: a systematic review*. BMC Medical Education, 24, Article 1099. https://doi.org/10.1186/s12909-024-05911-3

Bégin-Caouette, O., Aarrevaara, T., Rose, A.-L., & Arimoto, A. (2023). International research collaboration practices and outcomes: A comparative analysis of academics' international research activities. In *Internationalization and the Academic Profession* (pp. 191–215). Springer. https://doi.org/10.1007/978-3-031-26995-0_9

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3(2), 77–101, https://doi.org/10.1191/1478088706qp063oa.

Behm, M., Culvenor, J., & Dixon, G. (2014). Development of safe design thinking among engineering students. *Safety Science*, *63*, 1–7. https://doi.org/10.1016/j.ssci.2013.10.018

Brooks, M. C., & Brooks, J. S. (2015). Exploring opportunities and challenges of cross-cultural and international teaching, research, and service for higher education faculty members. In N. D. Erbe & A. H. Normore (Eds.), *Cross-Cultural Collaboration and Leadership in Modern Organizations* (pp. 35–48). Business Science Reference. https://doi.org/10.4018/978-1-4666-8376-1.ch003

Dhillon, N., and Yousef, T. (2009). *Youth Employment in the Middle East and North Africa: Revisiting and Reframing the Challenge*. Brookings Institution. Available at: https://www.brookings.edu/articles/youth-employment-in-the-middle-east-and-north-africa-revisiting-and-reframing-the-challenge/

Dusdal, J., & Powell, J. J. W. (2021). Benefits, motivations, and challenges of international collaborative research: A sociology of science case study. *Science and Public Policy*, 48(2), 235–245. https://doi.org/10.1093/scipol/scab010

Erikkson, P. & Kovalainen, A. (2008). *Qualitative research in business research*. Thousand Oaks, CA. Sage

Ferreira Nunes, A. K., Barroso, R. C. A., & Santos, J. F. (2019). *The use of triangulation as a tool for validation of data in qualitative research in education*. Paper presented at the World Conference on Qualitative Research. Retrieved from https://wcqr.ludomedia.org/wp-content/uploads/2019/08/Panel2_Final_WCQR2019_Use_of_triangulation_as_tool_for_validation_GPETE

Krcal, A., Allinson, R., Sutinen, L., Javorka, Z., Ryd, J., Hucks, L., Cimatti, R., Kassimatis, S., & Burrows, H. (2021). *Role of international higher education partnerships in contributing to the Sustainable Development Goals*. British Council & Association of Commonwealth Universities. https://www.britishcouncil.org/sites/default/files/role_of_international_higher_education_partnerships_in_contributing_to_the_sustainable_development_goals.pdf

Leahey, E., Beckman, C. M., & Stanko, T. L. (2017). Prominent but less productive: The impact of interdisciplinarity on Scientists' research. *Administrative Science Quarterly*, 62, 105–139. https://doi.org/10.1177/0001839216665364

Lucas, R. C., Govel, J. C., Nasta, G. N., Brooks, M., Clark, T., Johnston, Y. A., Lussier, M. E., McCall, K. L., Rouhana, N., Rola, A., Seward, S., & McGinley, J. (2025). *Utilizing panel discussions to facilitate interprofessional learning: Lessons from the rural and underserved service track*. Advances in Clinical Pharmacy Education & Training. https://doi.org/10.1002/jac5.70074

Morgan, H. (2022). *Conducting a qualitative document analysis*. The Qualitative Report, 27(1), 64–77. https://doi.org/10.46743/2160-3715/2022.5044

Podgorska, M., & Zdonek, I. (2023). Interdisciplinary collaboration in higher education towards sustainable development. *Sustainable Development*. https://doi.org/10.1002/sd.2765

Sillitoe, P. (2004). Interdisciplinary experiences: Working with indigenous knowledge in development. *Interdisciplinary Science Reviews*, 29, 6–23. https://doi.org/10.1179/030801804225012428

Umeokafor, N. I. (2015). *A discussion of obser-view as a method of generating data in the construction industry*. Civil Engineering Dimension (Dimensi Teknik Sipil), 17(1), 54–58. Available at: https://nnedinmaumeokafor.com/published-articles-in-journals/

2.

Umeokafor, N. (2019). Why copied or transposed safety, health and well-being legislation and standards are impracticable and irrelevant in developing economies. *Policy and Practice in Health and Safety*, *18*(1), 41–54. https://doi.org/10.1080/14773996.2019.1667095

Umeokafor, N., Okoro, C., Diugwu, I., & Umar, T. (2023). Design for safety in construction in Nigeria: A qualitative inquiry of the critical opportunities. *International Journal of Building Pathology and Adaptation*, *41*(2), 476–494. https://doi.org/10.1108/IJBPA-05-2021-0066

Umeokafor, N., Emuze, F., Sunindijo, R.Y., Umar, T., Windapo, A., Che Ibrahim, C.K.I. and Teizer, J., (2024a). Health, safety, and wellbeing in every brick: Scaffolding success. In: N. Umeokafor, F. Emuze, C.K.I. Che Ibrahim, R.Y. Sunindijo, T. Umar, A. Windapo and J. Teizer, eds. *Handbook of Drivers of Continuous Improvement in Construction Health, Safety, and Wellbeing*. 1st ed. London: Routledge, pp.1–14. https://doi.org/10.1201/9781032614069-1

Umeokafor, N., Windapo, A., Umar, T., & Che Ibrahim, C. K. I. (2024b). Navigating design for safety education: A framework of diffusion and implementation barriers. In N. Umeokafor, F. Emuze, R. Y. Sunindijo, T. Umar, A. Windapo, & C. K. I. Che Ibrahim (Eds.), *Handbook of Drivers of Continuous Improvement in Construction Health, Safety, and Wellbeing* (1st ed., Chapter 18). Routledge. https://doi.org/10.1201/9781032614069-18

Vines, A. (2024) Africa in 2025: Economic growth despite persist problems. Retrieved from Africa in 2025: Economic growth despite persistent problems | Chatham House – International Affairs Think Tank on 19th Sept 2025

Walsh, J. P., & Lee, Y.-N. (2015). The bureaucratization of science. *Research Policy*, 44, 1584–1600. https://doi.org/10.1016/j.respol.2015.04.010

World Bank. (2024). *Unemployment, total (% of total labor force) – Egypt*. World Development Indicators. Retrieved from https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=EG