



INNOVATIONS, TECHNOLOGIES AND CHALLENGES ASSOCIATED WITH TRANSNATIONAL EDUCATION

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ABSTRACT

Purpose: This study delves into Transnational education, focusing on challenges, technologies, and innovative practices that significantly shaped its landscape from 2014 to June 2024.

Design/Methodology/Approach: The study applied the PRISMA framework and bibliographic analysis to synthesise information from 77 articles emphasising the best practices, innovations, technology, and challenges associated with TNE.

Findings: The study highlights notable technological tools such as virtual learning environments (VLEs), artificial intelligence (AI), telepresence robots, and other innovations that have transformed how TNE programmes operate effectively. However, the research highlights challenges such as differences in culture and language, quality assurance issues, and the need for more representation from areas in discussions about TNE.

Research Limitation: A primary drawback of this review is its temporal scope, as it encompasses only works published from 2014 to mid-2024. Although the study deployed well-defined search methodologies, excluding non-peer-reviewed publications and grey literature may have eliminated significant practical insights.

Practical Implication: The results underline the importance of embracing advancements to make higher education accessible while endorsing further exploration into upcoming trends such as AI-powered personalised learning and blockchain innovations.

Social Implication: This anticipatory viewpoint is essential for maintaining TNE's relevance and adaptability to the changing requirements of the global education environment.

Originality/Value: This is the first systematic review of specific technologies and innovative practices that have been suggested.

Keywords: *Challenges. cross-border. education. innovations. transnational*



INTRODUCTION

Access to quality higher education has significantly challenged most learners in third-world countries. The influence of geopolitical policies, global pandemics and the increasing expenses associated with studying abroad have hindered students' ability to pursue higher education opportunities (Palmer & Chandir, 2024). Transnational education (TNE) is one of the essential educational approaches to curbing the internationalisation challenges that higher education has faced in the modern day. Globalisation and the desire for a highly qualified and mobile workforce have increased the number of TNE programmes and providers.

According to the UNESCO and Council of Europe, TNE refers to “all types of higher education study programmes, or sets of courses of study, or educational services (including those of distance education) in which the learners are located in a country different from the one where the awarding institution is based. TNE also provides education on a global scale or a cross-border level involving educational institutions, students, and academicians of more than one nation. It includes cross-border mobility of students, academics, programmes of study, and/or institutions (UNESCO/Council of Europe, 2001).

In Transnational education (TNE), the home campus refers to the institution's main campus where the programmes of study originate, and the host campus is the campus where the programme of study is delivered to the learners (Healey, 2018). TNE has become an ideal strategy for universities in the global north to help learners in third-world countries access quality higher education. Over the past decade, there has been an increase in TNE host institutions and students undertaking various courses from universities in the more developed countries, mainly the United Kingdom and the United States of America. In Africa, Nigeria, Egypt, Mauritius, and Ghana are countries with more institutions involved in TNE (Owusu Agyemang & Amoakohene, 2020). Since the emergence of the Internet and technology-driven learning platforms in the 1990s, there has been a transition in how courses are delivered, moving away from traditional textbook-based correspondence courses to online learning methods (Healey, 2018; Prosina et al., 2024). Over the past few years, the use of learning management systems (LMS) and virtual learning environments (VLE) has enabled different learning programs to be offered without geographical barriers (El-Ansari, 2017; Crist, 2017).

However, in the past few years, research on the feasibility of TNE and its challenges, particularly technology challenges that are critical in finding new ways to utilise TNE, needs to be more robust.



Against this backdrop, the present study aims to conduct an SLR to identify the challenges, technologies, innovations, or best practices associated with TNE. The findings of this research are intended to guide policymakers and institutions considering ventures into TNE, enabling them to manage TNE resources effectively. Existing literature suggests that TNE is viable for students and delivering institutions.

THEORIES UNDERPINNING STUDY

Transnational education

Demand for knowledge exchanges pushes students and educational programmes to relocate between countries, globalising education. Students might study abroad or enrol in international programmes in their own countries to expand their expertise. Rapid development and free tertiary education policies adopted by most developing countries make higher education systems struggle to accommodate student numbers because these nations are financially strapped. Transnational education from rich nations can solve this issue (Alam et al., 2013).

EU countries host the most significant proportion (35%) of international students, along with the US, UK, Australia, Canada, Japan, and Russia (OECD, 2016, p. 168). Developed countries like the UK, the US, and Australia increasingly export education to developing countries to increase their economic and cultural impact (Altbach, 2015). These options change the “education market” to create “education systems must produce human resources destined to upgrade developing economies and to ensure the growth of the advanced economies” (Moutsios, 2009, p. 475). These options also led to the phrase “transnational education”. McBurnie and Ziguras (2006) named TNE “offshore” education because it “efficiently allocates educational resources across borders”.

UNESCO calls TNE “cross-border” education (OECD, 2016: x). UNESCO defines trans-border (higher) education as when a teacher, student, programme, institution/provider, or course materials cross national jurisdictional lines. Cross-border higher education may be provided by public/private and non-profit/profit providers (OECD, 2016). TNE is a form of globalisation in education that exchanges knowledge between countries based on participant needs. TNE involves rich countries selling and developing countries buying.

Models of TNE

This section describes some of the most common types of TNE models used today.

Franchises are a popular form of TNE where one institution exports its academic programme to another HEI in a different country, establishing a permanent base (O’Sullivan & British Council, 2012). This model benefits institutions and students through resource exchange, such



as increased student numbers, international profile, income for the institution, and access to increased academic expertise for students (Pon & Ritchie, 2022). International branch campuses (IBCs) are another common form of TNE, operating using the name of an established institution or in partnership with a local institution (Rottleb et al., 2024; Hickey & Davies, 2024).

International branch campuses (IBCs) require a physical presence in the host country and thrive on the popularity of the home institution's name and programmes (Hill et al., 2021). There are almost 250 IBCs worldwide, serving nearly 200,000 students, with China hosting the most IBCs (El-Ansari, 2017; Crist, 2017). IBCs benefit local students by driving tuition prices down and offering more choices. Another model that is becoming popular these days is "Twinning partnerships" or "twinned programmes," which were established due to the commercial presence of IBCs.

In this model, students can transfer pre-approved credits to their home institution towards degree completion, with only one qualification awarded from the home institution. Twinning programmes fall into different categories depending on the duration of the programme, with common examples being the 3+0, 3+1, 2+1, or 2+2 models. The 3+0 model is the most fiscally beneficial for students as they can earn a degree from an overseas university without leaving their home country.

The joint degree is another form of TNE, where two institutions collaborate to offer a singular programme, and the degree is awarded by both institutions (Knight & Liu, 2016). Joint PhD programmes are the most common of this model and can broaden education and research capacities internationally, benefiting those studying topics requiring collaboration and networking (Simpson, 2021).

In the "double" or "dual" degree model, students receive two degrees from partnering institutions. This model prepares a globalised workforce through cross-cultural immersion but is limited as over 90% of programmes are taught in English, and less than 15% of host countries offer English training (Davi, 2020). Undergraduate students can earn dual degrees in two major fields, such as Zhejiang University's engineering programme with the University of Illinois at Urbana-Champaign (Zhu et al., 2018). Students apply to both institutions but pay tuition to their home institution.



Related Work

TNE is a rapidly growing field in higher education, with numerous studies and reviews published to synthesise the available knowledge. This section aims to critically review six (6) systematic literature reviews on TNE, assess the extent to which they include innovative practices and challenges in the field, and discuss them.

In the work by Carvalho et al. (2023), 68 articles were examined to conduct a systematic literature review concerning TNE and its quality assurance. It provides an extensive overview of the difficulties and possible solutions for quality assurance in the TNE programmes, including institutional accreditation, the application of information technology and the acquisition of cultural and language skills.

Nevertheless, the review needs a more critical engagement with examples of the new practices in the area. The article's authors mention how technology and online learning were employed in the TNE, but what exactly is done through these instruments to improve and make TNE programmes more accessible is not addressed. Furthermore, the review needs to consider the possibilities offered by new models of TNE in solving some of the problems faced by traditional TNE programmes such as micro-credentials coupled with stackable degrees.

A recent review by Fehrenbach & Huisman (2024) focused mainly on TNE partnerships and alliances between higher education institutions. The authors used 43 studies in their analysis. They came up with some gaps in the strategy of such partnerships, including the cultural and linguistic insensitivity of some partnering institutions and the focus on quick returns rather than long-term growth strategies. The review mentions some creative approaches adopted towards TNE partnerships, such as virtual exchange and collaborative online international learning (COIL), to enhance cross-cultural interaction and create new, context-specific, joint educational offerings with partner institutions. Nevertheless, the debate about these practices needs to be more superficial and capture the prevailing trends of creativity and innovations in TNE partnerships.

Also, examining the issue of the internationalisation of higher education in Southeast Asia, a region which is fast becoming a centre for TNE, was conducted by Alex (2021). The author included in the analysis 50 studies and distinguished several important tendencies and obstacles in the internationalisation of higher education in the given region's context, which includes the expansion of TNE Programmes and their partnership, state in regional cooperation and integration, and equity and accessibility issues. The same review mentions some of the best practices on how to internationalise higher education by countries in Southeast Asia, for



instance, the use of blended and e-learning to promote accessibility, establishment of problem and project-based programmes to counter local and international problems, and inclusion of indigenous and local knowledge to the curriculum. The discussion of such practices needs to reflect the extent of innovation practices for TNE in the region.

METHODOLOGY

A systematic literature review and bibliographic analysis were performed to avoid bias. A detailed and comprehensive review methodology was created. The study utilised the PRISMA (the Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology (Page et al., 2021), which helps to carry out the systematic review, starting from relevant data identification to selection of eligible studies, risk of bias assessment, data extraction and synthesis of study findings and bibliography. The study underwent four steps (Figure 2) of quality assurance measures before obtaining 77 primary studies (PS) for the review. First, a query search string was designed to identify relevant literature on the topic based on the abstract, title, and keywords of records in the online databases. The literature sample was restricted to peer-reviewed journal articles published in English between January 2014 and June 30, 2024.

Second, the research papers that popped up after applying the search string were subjected to a screening process that emphasised peer-reviewed research articles and the removal of duplicate papers as the primary means of inclusion and exclusion. Third, eligibility criteria were applied, and papers whose abstracts addressed our research questions were selected. Finally, papers from open-access websites were downloaded and used for the study.

Query string

The Scopus database and Educational Resource Information Center (ERIC) were used to identify and extract eligible papers. ERIC was used because it is a trusted source of peer-reviewed research papers for researchers in the field of education (Chistyakov et al., 2023) and the Scopus database has been established as one of the largest and most credible databases of scholarly articles (Medias et al., 2024). Forty-one papers were identified and added to the results obtained from Scopus for screening and final selection. The query string used on ERIC was “Innovative and challenges in transnational education”. Zotero was used to organise the results from each search into a Zotero library to eliminate duplicates, and some duplicates were automatically detected and removed. Several duplicates were also manually detected after scrutiny.



Table 1: The Scopus search query

TITLE-ABS-KEY (((innovat* OR "innovative practices" OR technolog*) OR (challenges OR problem OR barriers)) AND ("branch campus" OR "transnational education" OR "cross-border" OR "cross border" OR "International Higher education" OR "TNE")) AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English"))

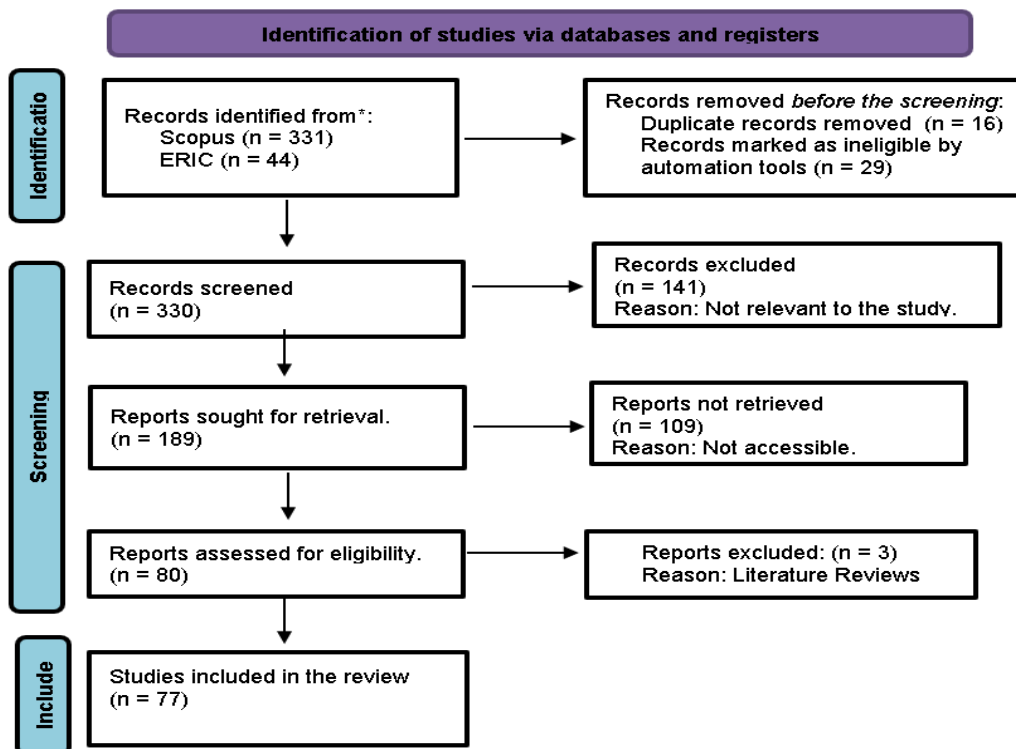


Figure 1: PRISMA flow diagram.

Review questions were constructed during the design stage to elicit the study aims, forming the inquiry's foundation. As indicated in Table 2, questions about the review process and the logic or motivation for doing so were raised and answered.



Table 2: Research objectives, motivation and techniques.

S/N	Research Question	Inspiration	Technique
RQ1	What are the recent publication trends in the role or use of technology in enhancing TNE?	To categorise studies and assess their foci, primary venues, and contributions. Trends can be evaluated based on the number of studies conducted. This data will provide the scientific community with information about the areas in the domain that need to be added or completed.	Quantitative
RQ2	What are the common technological tools used in TNE programmes?	To identify the most common technology tools used in TNE programmes, their effectiveness, and their impact on educational results. It will also explain why it is the most preferred choice. Researchers and policymakers will be able to see the possibilities in various technologies for TNE.	Qualitative
RQ3	What are the challenges associated with TNE?	To identify the challenges associated with TNE projects, academics and policymakers will share insights into potential solutions and best practices for overcoming these obstacles.	Qualitative
RQ4	What are the best practices and innovative approaches in TNE?	Policymakers will now have the opportunity to adopt the best practices and innovations of others when developing best practices.	Qualitative
RQ5	What should the research focus be in the future?	This topic proposes future goals for researchers and policymakers regarding technologies in TNE and supplies academics with information about the current topic of interest.	Qualitative

RESULTS AND DISCUSSION

This section presents and analyses findings on TNE innovations, technologies, and challenges.

Publication trends.

This section examined research trends through three lenses: publication year, dataset origin, and publication outlets.

Publication year

As illustrated in Figure 3, between 2014 and 2016, two (2.6%) papers were published. From 2016 onwards, the line graph exhibits an ascending trend, signifying a steady increase in relevant studies up to 2020, where 12 (15.58%) articles were published. However, from 2020 to 2022, there was a notable decrease from 12 to 9 articles, followed by a surge to the highest number of articles, 22 (28.57%) published in 2023. In the subsequent year, a moderate decline occurred, with 6 (7.79%) articles published as of June 30, 2024. The number of publications is anticipated to rise by the end of 2024.

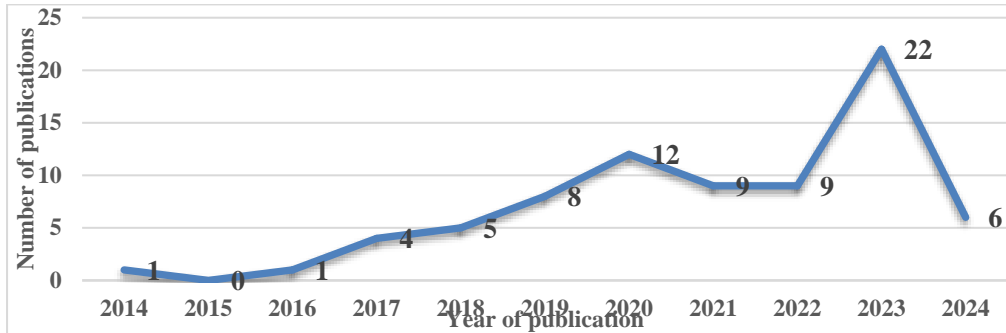


Figure 3: Publication years of primary studies from 2014 to June 2024.

Publication outlets from the primary papers

As depicted in Figure 4, the primary studies (77 papers) were biased towards certain publishing firms/outlets. Routledge Publishing Limited published the highest number of papers, with 13 (16.88%). Following this, SAGE Publications Ltd and SAGE Publications Inc. published 7 (9.09%) and 6 (7.79%) papers, respectively. Brill Academic Publishers and MDPI each published 4 papers. John Wiley and Sons Inc., Emerald Group Holdings Ltd, and Emerald Group Publishing Ltd each published 3 papers (3.90%). Blackwell Publishing Ltd., Springer, MDPI AG, De Gruyter Mouton, and Athens Institute for Education and Research each published 2 papers. The remaining publishing outlets each published a single paper.

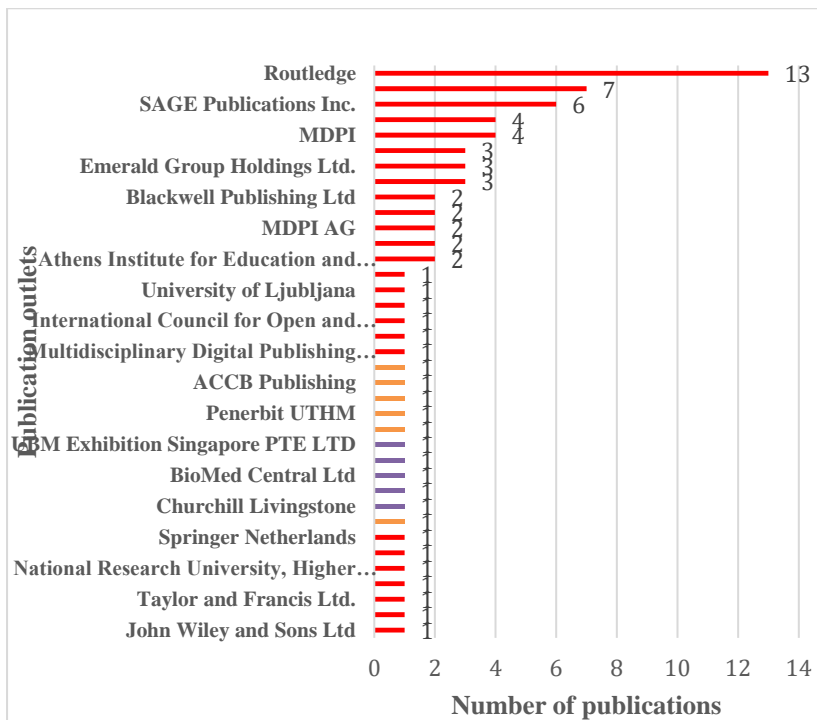


Figure 4: Publication outlets from the primary studies.



Distribution by country, based on the origin of the corresponding author

This systematic review identified a geographical bias among the primary studies (77 papers). Figure 5 summarises the geographical Distribution of publications. The UK had the highest number of corresponding authors, with 23 (29.87%), followed by China with 12 (15.58%), Australia with 8 (10.39%), and the USA and the UAE with 5 and 4 authors, respectively. The Netherlands and Germany each had 3 authors, while Canada, New Zealand, South Africa, Thailand, Fiji, and Denmark each had two authors. Each of the remaining 7 countries had only one author.

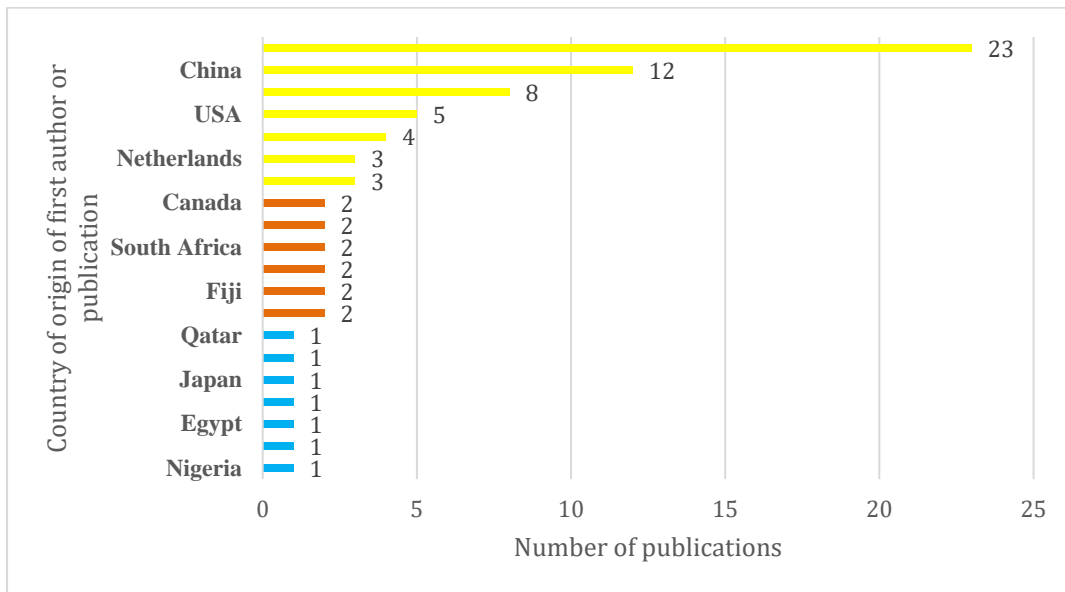


Figure 5: Distribution by country based on the origin of the corresponding author

Dataset's continent of origin.

Figure 6 illustrates the continental Distribution of all 77 papers. The highest number of articles, 32, comes from Europe. During the period under review, twenty-one articles came from Asia, 12 from Oceania, 7 from America, and 5 from Africa.

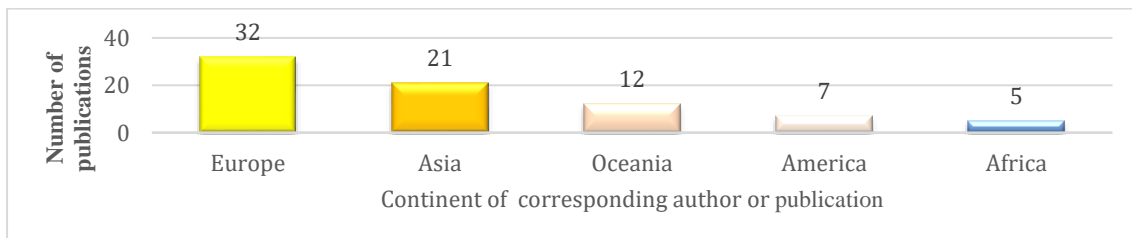


Figure 6: Distribution by continent based on the origin of the corresponding author.



Common technological tools used in TNE programmes.

Figure 7 summarises the technological tools employed in Transnational Education (TNE). Virtual Learning Environments (VLEs) emerged as the most widely used technology, followed by Artificial Intelligence (AI) and Automation.

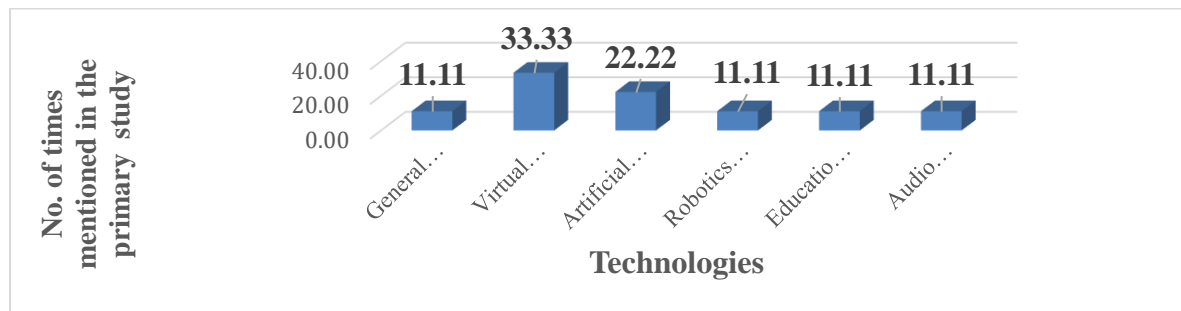


Figure 7: Technological tools in TNE

Description of technological tools used in TNE programmes.

This section further explains Figure 7, as identified in the primary studies.

General ICTs

Information and communication technologies (ICTs) are crucial for effective collaboration in TNE, particularly in developing countries where sophisticated technologies are not the norm [PS2]. PS2 specifically explores the general use of ICTs by Obafemi Awolowo University (OAU) to enhance TNE and distance learning initiatives. Facing challenges such as limited access to quality higher education, OAU adopted a range of ICTs. These include an Integrated Learning Management System (ILMS) for online learning and collaboration, VSAT and optic fibre networks for high-speed internet connectivity, and digital radio and television stations for broader educational content delivery.

Virtual Learning Environments (VLEs)

Virtual Learning Environments (VLEs) are essential platforms, especially during disruptions like the COVID-19 pandemic, enabling online learning, communication, and collaboration for students and faculty in different countries [PS49, PS64, PS65]. Chinese TNE programmes, for instance, heavily relied on VLEs to continue operations during the pandemic [PS49].

Artificial Intelligence and Automation

Though not extensively discussed in the primary studies, AI and automation have transformative potential for TNE [PS7, PS48]. PS7 asserts that the use of translation tools such



as Google Translate or Microsoft Translator has reduced the communication problem encountered by most TNE campuses, which occasionally interact directly with foreign partners.

Robotics and Telepresence

Telepresence robots have redefined the virtual TNE by providing a more engaging and interactive learning experience, especially in complex learning scenarios [PS30]. These machines make it easier for people far away to interact with each other.

Educational Software and Platforms

Specifically designed educational devices are essential in the TNE framework, especially in medical education programmes implemented in more than one geographical area [PS16]. This type of software allows academic consortia to devise curricula, assess learners, and communicate with partner institutions without risking differences in quality. Among such systems are language-tutoring systems like Duolingo, medical simulation systems for performing surgery, computer programming platforms, and assessment systems like Khan Academy, Quizlet, Kahoot!, and MedEdPORTAL [PS16].

Audio and Video Technologies

Video conferencing tools enable teachers and students to interact within a community and engage them in the process [PS24]. Recorded lectures and other learning materials offer flexible access to course content. Platforms like Zoom and Microsoft Teams are widely used for virtual interviews, lectures, and collaborative research [PS2, PS10]. Local preferences, such as Tencent Meeting in China, also play a role [PS12].

The challenges associated with TNE

Figure 8 summarises the challenges associated with TNE. Cultural differences emerged as the most encountered challenge, followed by language and communication.

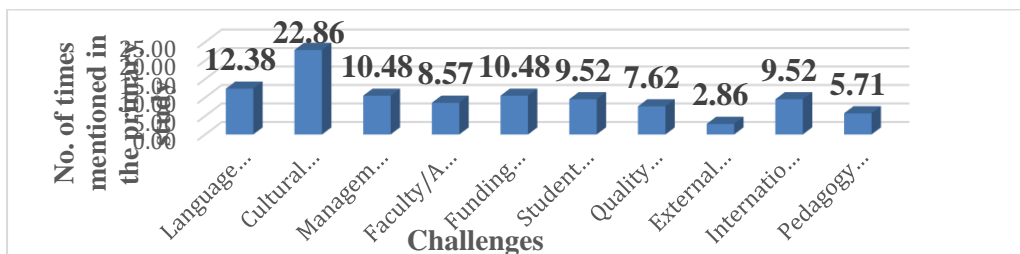


Figure 8: Challenges associated with TNE



Detailed explanation of challenges associated with TNE.

This section provides a detailed explanation of Figure 8, as identified in the primary studies.

Language and Communication

One of the primary challenges in implementing TNE is the varying proficiencies in the language of instruction among students and staff, which can significantly impact teaching and learning effectiveness [PS1, PS14, PS31]. The sources also emphasise the significant challenge of linguistic diversity in TNE programmes [PS1, PS2, PS69, PS74]. Students and staff often come from diverse linguistic backgrounds, potentially hindering communication and understanding in academic settings [PS30, PS31, PS32, PS33, PS70, PS71, PS74, PS75].

Cultural Differences

Students from diverse cultural backgrounds may have different learning styles, expectations, and approaches to education, leading to challenges in engagement, participation, and academic performance [PS6, PS8, PS12, PS13, PS15, PS28, PS33, PS36, PS42, PS43, PS46, PS47, PS49, PS50, PS54, PS57, PS61, PS62, PS66, PS70, PS71, PS72, PS77].

Management and Leadership

TNE programmes involve managing relationships and expectations of multiple stakeholders, including home and host institutions, government agencies, accrediting bodies, students, faculty, and staff [PS9, PS12, PS21, PS59, PS60]. Integrating TNE into an institution's strategic vision and operational framework is crucial. It requires strong leadership to navigate the complexities of international partnerships, manage risks, and ensure alignment with the institution's mission and goals [PS21, PS22, PS39, PS51, PS60]. Establishing a financially viable and sustainable model for TNE involves securing adequate funding, managing costs effectively, and ensuring a return on Investment [PS12, PS18, PS20, PS28, PS36, PS47].

Faculty/Academics Challenges

Instructors operating within a TNE framework require intercultural competence to appreciate different cultural perspectives, communication styles, and teaching expectations. It is essential to deliver such training with other development opportunities that develop intercultural competencies [PS3, PS6, PS56, PS73]. Academics teaching in a TNE context need to modify their teaching, assessment, and interaction with students to conform to the needs of a heterogeneous learner group. Institutions of Higher Learning need to achieve this goal by providing appropriate integration and training for the faculty [PS33, PS37, PS39].



Funding and Resource Constraints

Some researchers emphasise the amount of money spent and the hardship on the part of students to get TNE, especially where there is a need for expeditions [PS36, PS53]. The other area of concern regarding TNE is the financial sustainability of the initiatives, which at all times depend on factors which can hardly be controlled, for instance, being in different countries with varying cost structures or operating within budgets with little to no financial resources, student enrolments or funding from the government [PS12, PS18, PS20, PS28, PS33, PS36, PS37, PS44, PS47, PS53].

Student Support

Studying through TNE in a foreign country poses several adapting issues for the students, for instance, culture, language, or society [PS1, PS10, PS14, PS29, PS34, PS43, PS52]. The transition of such students can be made easier with certain aids, such as participation in orientation programmes, facilities for learning the language, counselling, and peer mentoring [PS10, PS17, PS38, PS40, PS54, PS64, PS67].

Quality Assurance

One of the most constraining factors in TNE is harmonising quality standards and legal obligations across jurisdictions [PS18, PS20, PS23, PS42, PS53, PS59, PS61, PS63]. Academics have to put in place procedures that ensure that TNE delivery sites maintain quality standards of scholarship commensurate with the institutions they represent, often including cooperation with foreign accrediting bodies and quality assessment agencies.

External Factors

Geopolitical and economic conditions in host states may impose serious hindrances in operation levels, including student recruitment, programme implementation, and financial health, in that preparation and contingency planning are needed [PS2, PS35, PS72].

Policy and Regulation

Programmes and institutions that provide TNE face additional complexity regarding the policies and regulations in both the country of origin and the destination countries [PS10, PS35, PS37, PS38, PS68, PS75]. Barriers such as programme accreditation requirements, quality assurance regulations, visa regimes, and rights to intellectual property might be more challenging for them to navigate.

Pedagogy and Curriculum

Culturally contextualising the curriculum development process for the host country is essential for the success of TNE, which also entails importing some-level aspects of indigenous cultures, perspectives and case examples for teaching materials and adapting ways of delivering the content according to the culture and orientation of the students [PS32, PS41, PS45, PS47, PS61, PS68].



The best practices and innovative approaches in TNE

Figure 9 summarises the innovations and best practices in TNE. Innovation in management and organisation emerged as the most prominent practice, followed by innovative teaching and learning methods.

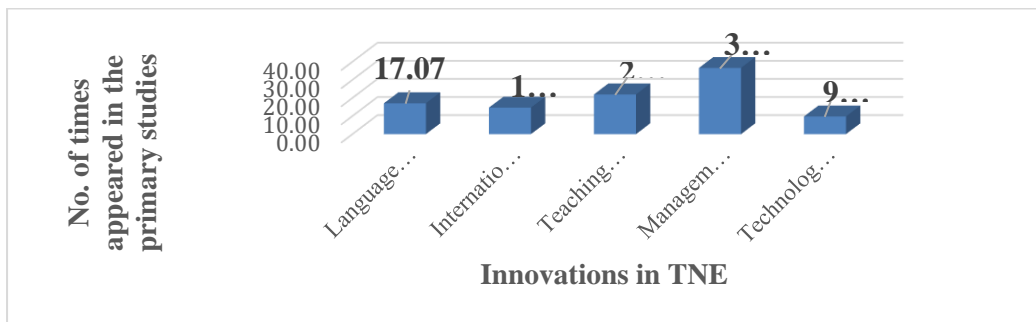


Figure 9: Innovations in TNE

Detailed explanation of best practices and innovative approaches in TNE.

This section provides a detailed explanation of Figure 9, as identified in the primary studies.

Language and Cultural Perspectives

PS10 encourages incorporating cultural sensitivity in health promotion pedagogy. Initiatives like the Transnational Education and Community Health Collaborative (TEaCH CoLab) connect classrooms and communities across continents to enrich health promotion education. PS24 proposes incorporating collaborative autoethnography, where instructors reflect on their experiences and emotions related to teaching in a TNE context, providing valuable insights into language teaching practices. PS29 suggests critical collaboration in transnational literacy autobiographies to improve TNE. PS43 emphasises the need to analyse student transition experiences through a cultural lens.

Internationalisation Strategies

Some universities running TNE programmes have studied the issues connected with internationalisation and language policies to determine their feasibility and difficulties for language centres. This improved the TNE language assistance available to students and staff members [PS14]. There is a need to balance the concepts of TNE, especially international branch campuses, in pursuit of global and local responsiveness. This informs the programme about the compromise that will ensure that the interests of the home institution and the host country are satisfied, making it possible to have productive and effective relationships [PS22].



Teaching and Learning Methods

PS7 asserts that TNE programmes have the potential to utilise technology to develop skills and effective strategies based on the concept of suitable learning for the learner. There is scope for enhancing TNE takers' effectiveness and accessibility by applying Education 4.0 Principles. PS32 believes that interactions between nursing professionals from different nations are essential in creating a transnational curriculum that deals with the world's health problems. PS33 puts forward the attention that should be placed on investigating the students' experience to improve the programme quality. PS41 recommends that in transnational partnerships, a response-able pedagogy should be adopted to promote accountability, responsibility, and carefulness in transnational activities.

Policy and Management Strategies

TNE programmes involve policy-making to ensure the smooth functioning of the programme and to manage unexpected challenges like the COVID-19 pandemic [PS9]. This raises an increasing concern about the promise of innovation to provide comparability across distributed campuses as countries move towards the use of THE, as highlighted by PS16. PS21 emphasises understanding the experiences and challenges encountered by leaders of international branch campuses, which is crucial for successful TNE management. According to PS26 and PS3, there is a need for TNE programmes in engineering to carry out a systematic review of project allocation methods to address fairness, equity, and even learning opportunities for students.

Technology Integration

PS30 proposes using telepresence robots to improve virtual transnational education. These robots can complement a virtual learning environment owing to students' active involvement. Examining the challenges and opportunities presented by this shift, including the need for robust technological infrastructure, digital literacy training, and innovative pedagogical approaches, has informed the development of sustainable and resilient TNE programmes in the post-pandemic era [PS61].

Future Research Focus

Despite an increase in TNE-related research publications in 2016, the majority should have highlighted the breakthroughs and technological advancements that have since gained prominence. While TNE has undeniably increased access to quality education, future research should look into the impact of AI, VR, AR, and blockchain on transnational education, focusing on personalised learning and credential verification to fully realise TNE's potential in this technological era. Furthermore, based on our primary research findings, future studies should



examine the changing patterns of student and faculty mobility, such as the rise of online exchange programmes, the need for faculty training in TNE environments, and the factors that contribute to the sustainability and scalability of technologically enhanced TNE initiatives. Addressing these gaps can lead to a more thorough knowledge of the innovations and problems of using technology to improve global education and practical insights for educators, policymakers, and institutions.

Analysis of Graphic Maps

This section uses VOSviewer software (van Eck & Waltman, 2019) to analyse bibliographical graphical representations. The main mapping methods used in this work are co-citation and bibliographic coupling. Co-citation coupling compares two texts concerning a third text that cites both and establishes whether the two texts have similar themes. For instance, suppose articles A and B have been cited by paper C; a relationship can be drawn between articles A and B even though the two have not quoted each other directly. The link strength of this relationship is positively correlated with the number of papers that co-cite A and B.

Co-citation of Authors

The author co-citation analysis aims to reveal the structure and relationships among authors most frequently cited together. Figure 7 presents a co-citation network comprising two distinct clusters (red and green colours) formed by co-citation links among nine authors. The threshold for inclusion was set at a minimum of 20 citations, with nine authors meeting this criterion out of a total of 4,385 authors cited in the primary study papers. Jane Knight (knight j.) emerges as the most cited author in the domain of TNE, with 72 citations and a total link strength of 300, as indicated by the prominent node in the second cluster (green). In Cluster 1 (red), Stephen Wilkins (wilkins s.) is cited 55 times with a total link strength of 273, followed by Philip G. Altbach (altbach p.g.) in Cluster 2 with 34 citations and a total link strength of 260.

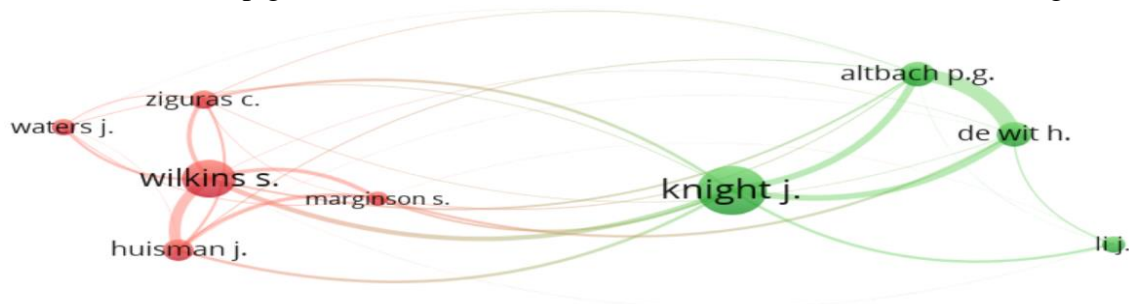


Figure 7: Co-citation of authors. The colours represent clusters



Co-Citation of Cited References

Figure 8 displays a co-citation network with two distinct clusters (red and green) formed by co-citation links among eleven references. The inclusion threshold was set at a minimum of four citations, resulting in eleven references meeting this criterion out of 3,367 cited references in the primary study papers. This analysis yielded 37 links with a cumulative link strength of 72. Notably, Smith's (2010) paper, "Assuring Quality in Transnational Education: A Matter of Collaboration or Control?" published in *Studies in Higher Education*, is the most frequently cited article in the field of TNE, with five citations and a total link strength of 20, as represented by the prominent node in Cluster 1. In Cluster 2, Pyvis's (2011) paper, "The Need for Context-Sensitive Measures of Educational Quality in Transnational Education," published in *Teaching in Higher Education*, is the second most cited work, with four citations and a total link strength of 19.



Figure 8: Co-citation of Cited References

Bibliographic Coupling of Countries

Figure 9 illustrates the bibliographic connections among significant countries, organised into six distinct clusters, each denoted by a different colour. These clusters are formed based on interconnections among sixteen countries. The inclusion threshold was set at a maximum of twenty documents and a minimum of two documents per country, resulting in sixteen countries meeting this criterion out of the 27 countries represented by corresponding authors in the references of the primary study papers. This analysis yielded 55 links with a total link strength of 1,263. Notably, the United Kingdom stands out with 29 documents and 506 citations, achieving a total link strength of 709. China follows with 15 documents and 115 citations, total link strength of 508. The map reveals intricate bibliographic interconnections among these 16 countries, notably showing that China, Australia, the United States, the Netherlands, Germany,



and the United Arab Emirates, among others, are bibliographically linked to the United Kingdom in the context of Transnational Education (TNE).

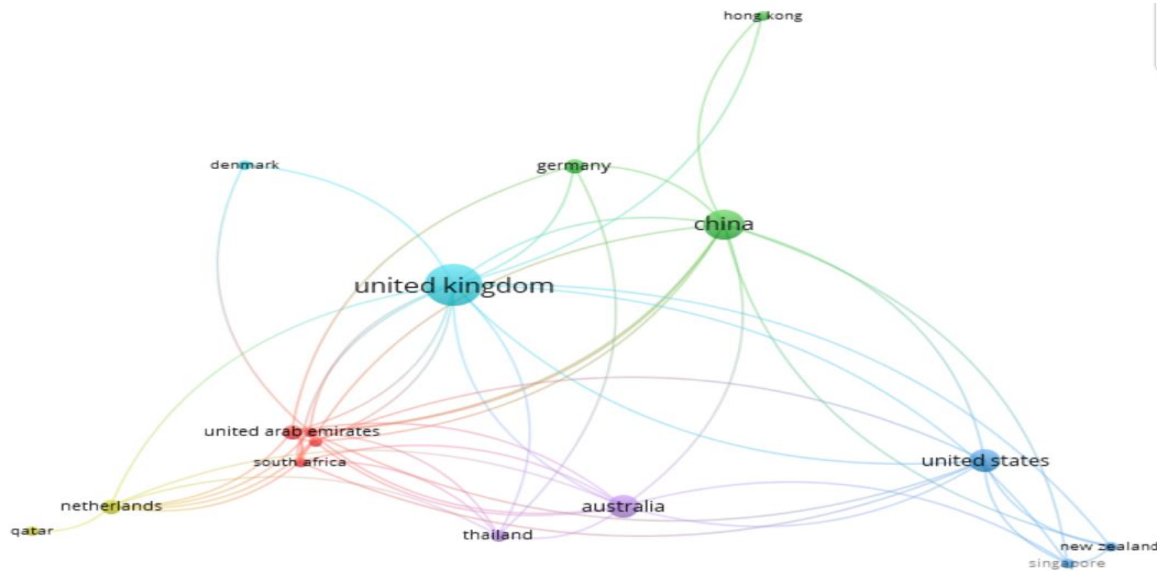


Figure 9: Bibliographic coupling by countries.

Co-occurrence of Author Keywords

Figure 10 presents a co-occurrence network of authors' keywords, organised into six distinct clusters represented by different colours. The inclusion threshold was set at a minimum of two occurrences, resulting in twenty-eight keywords meeting this criterion out of 308 from the primary study papers. This analysis yielded 70 links with a cumulative link strength of 84. The term "transnational education" has the most significant node, indicating its frequent use as a keyword. The size of each node corresponds to the frequency of the keyword's usage. These keywords can also be utilised to determine the types of papers included in the review.

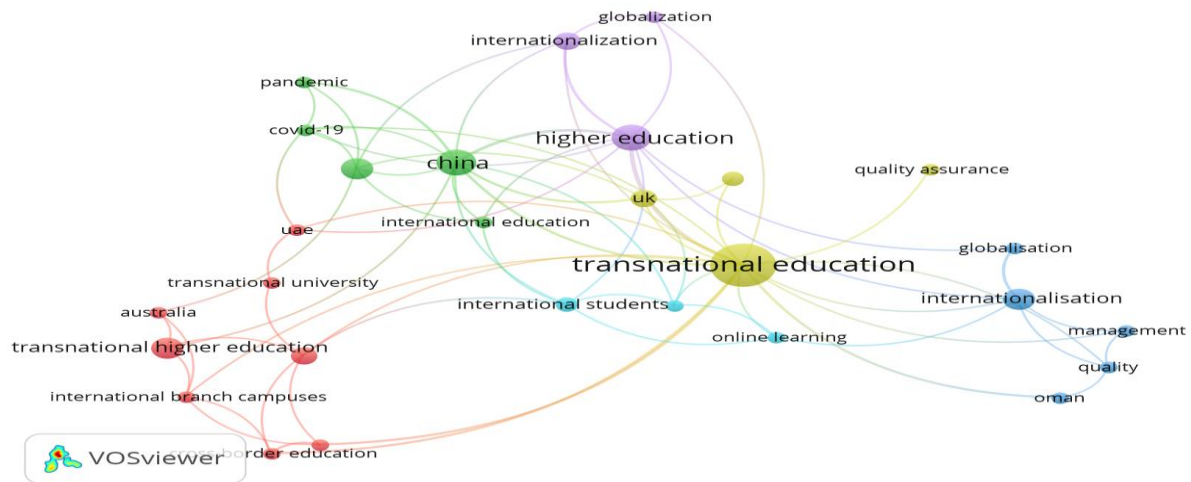


Figure 10: Co-occurrence of authors keywords

CONCLUSION

This study adhered to a meticulous and transparent methodology to validate its conclusions. A clearly defined search method, detailed in Table 1, was utilised to find relevant papers within the Scopus database. The utilisation of bibliometric tools, specifically VOSviewer, for the analysis of co-citation and bibliographic coupling maps further substantiates the academic relationships and patterns discovered in the study.

Nonetheless, despite these endeavours, research legitimacy is predicated on the idea that the data presented in peer-reviewed journals adequately reflects the whole range of advancements in TNE. The dependence on English-language publications may restrict the incorporation of ideas from non-English speaking regions, thereby underrepresenting findings from nations experiencing significant TNE expansion.

A primary drawback of this review is its temporal scope, as it encompasses only works published from 2014 to mid-2024. This indicates that advances or challenges in TNE arising after this period may not have been documented. Furthermore, although the study deployed well-defined search methodologies, excluding non-peer-reviewed publications and grey literature may have eliminated significant practical insights.

This SLR extensively analyses the popular technological instruments, challenges, and best practices in TNE over the past decade. The results highlight VLEs, AI, and robots' critical



importance in improving TNE while revealing ongoing issues associated with cultural disparities, communication obstacles, and quality assurance. The review identifies best practices, including telepresence technologies and creative teaching methodologies, which provide solutions for addressing these difficulties and fostering future growth in TNE. The data indicate a notable increase in TNE research, especially post-2016, reflecting an escalating interest in this domain. The assessment also revealed a concentration of research in particular geographic regions, primarily the UK, China, and Australia. This geographic bias indicates a necessity for more research representation from other regions involved in TNE.

The study underscores the essential function of technology in enabling and improving TNE programmes. Virtual Learning Environments (VLEs) have become the predominant technology, succeeded by AI and automation tools, indicating a growing dependence on digital platforms for educational provision and assistance. This technology integration provides significant prospects for enhancing access and flexibility in TNE but also introduces distinct problems.

A significant challenge identified is the necessity to reconcile cultural and linguistic disparities between source and host institutions, which can profoundly affect programme efficacy. The report also emphasises a potential discrepancy in management practices between the source and host universities engaged in TNE relationships. This disparity highlights the necessity of clear communication, mutual understanding, and collaborative strategies to manage TNE programmes effectively.

The research emphasises the necessity of ongoing innovation for the future of TNE. Although TNE has significantly expanded access to quality education, further investigation is required to ascertain how upcoming technologies such as AI, VR, AR, and blockchain might be utilised to optimise TNE's potential. This anticipatory viewpoint is essential for maintaining TNE's relevance and adaptability to the changing requirements of the global education environment. Future studies should concentrate on enhancing the comprehension of future technologies, like blockchain for credential verification and the extensive application of artificial intelligence to tailor learning in TNE environments. Moreover, examining international education from the viewpoints of underrepresented regions and institutions is essential, guaranteeing that varied experiences and innovations are integrated into the broader dialogue.



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Appendix A. List of Primary Studies (PS) in this Literature

- PS1:** Adriansen, H. K., Juul-Wiese, T., Madsen, L. M., Saarinen, T., Spangler, V., & Waters, J. L. (2023). Emplacing English as lingua franca in international higher education: A spatial perspective on linguistic diversity. *Population, Space and Place*, 29(2). <https://doi.org/10.1002/psp.2619>
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- PS3:** Alemu - 2020 - *Transnational Mobility of Academics Some Academic*. (n.d.).
- PS4:** Altin, M. E. (2019). Internationalisation of the German Higher Education System New Player in the Market. *Athens Journal of Education*, 6(3), 237–256. <https://doi.org/10.30958/aje.6-3-5>
- PS5:** Balan - 2017 - *Meeting the challenges of globalisation in legal e*. (n.d.).
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- PS8:** Bordogna, C. M. (n.d.). *Are Degree-awarding Institutions doing enough to Support the Implementation of Quality Assurance in Transnational Higher Education Partnerships?*
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- PS11:** Che, A. M. (2023). Benefits and Challenges of Transnational Education: Reflections From a Sino-British Joint Venture University. *International Journal of Chinese Education*, 12(1). <https://doi.org/10.1177/2212585X221144903>
- PS12:** Clerkin, C., Hatahet, T., Malekigorji, M., & Andrews, G. P. (2022). Chinese Students' Perception and Expectation of Online and Post-Pandemic Teaching and Learning Approaches in a UK Transnational Programme. *Education Sciences*, 12(11). <https://doi.org/10.3390/educsci12110761>
- PS13:** Cranwell, P. B., Li, D., Page, E. M., Whiteside, K. L., & Woodcock, A. E. W. (2021). Understanding the barriers faced by TNE students when completing advanced-level laboratory-based practical classes. *International Journal of Chinese Education*, 10(3). <https://doi.org/10.1177/22125868211046033>
- PS14:** Critchley, M., & Wyburd, J. (2021). Evolution of university internationalisation strategies and language policies: Challenges and opportunities for language centres. *Language Learning in Higher Education*, 11(1), 3–13. <https://doi.org/10.1515/cercles-2021-0001>
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- PS20:** Harris, R. O. (2020). Transnational Education in Sub Sahara Africa Strategic Partnerships. *Journal of Higher Education Theory and Practice*, 20(2), 111–121.
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- PS41:** Mortimer, C., & Escalante, M. A. L. (2022). Response-able pedagogy: teaching through Shakespeare in a Higher Education (HE) transnational partnership. *Culture and Organization*, 28(3–4), 345–361. <https://doi.org/10.1080/14759551.2022.2031198>
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- PS55:** Rottleb, T., & Kleibert, J. M. (2022). Circulation and containment in the knowledge-based economy: Transnational education zones in Dubai and Qatar. *Environment and Planning A*, 54(5), 930–948. <https://doi.org/10.1177/0308518X221077105>
- PS56:** *Rowley and Skipper - 2021 - Student and staff expectations and experiences of .* (n.d.).
- PS57:** Saito, E., Ab Kadir, M. A., & Grove, C. (2023). The opportunities afforded by offshore teaching to faculty members: Strengthening confidence in core qualities. *Reflective Practice*, 24(2), 251–263. <https://doi.org/10.1080/14623943.2023.2170341>
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- PS59:** Shams, S. M. R. (2017). Transnational education and total quality management: a stakeholder-centred model. *Journal of Management Development*, 36(3), 376–389. <https://doi.org/10.1108/JMD-10-2015-0147>
- PS60:** Stafford, S., & Taylor, J. (n.d.). *Transnational education as an internationalisation strategy: Meeting the institutional management challenges.*
- PS61:** Sun, Y., Li, N., Hao, J. L., Sarno, L. Di, & Wang, L. (2022). Post-COVID-19 Development of Transnational Education in China: Challenges and Opportunities. *Education Sciences*, 12(6). <https://doi.org/10.3390/educsci12060416>
- PS62:** Tight, M. (2022). Internationalisation of higher education beyond the West: challenges and opportunities—the research evidence. *Educational Research and Evaluation*, 27(3–4), 239–259. <https://doi.org/10.1080/13803611.2022.2041853>
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