

Bibliometric Mapping of Determinants of Attrition Among Distance Learners in Developing Countries

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ABSTRACT

The rapid expansion of distance learning in developing countries has highlighted persistent challenges, particularly high attrition rates. Despite its potential to bridge educational gaps, distance education faces significant dropout rates, often exceeding 50%, undermining its equity and efficiency goals. This study conducts a bibliometric analysis to map research trends, key determinants, and emerging themes related to attrition among distance learners in developing contexts. Using the Scopus database, 175 peer-reviewed journal articles published between 2004 and 2025 were analysed. The study employed bibliometric techniques, including co-citation and keyword co-occurrence analysis, visualised via VOSviewer and Microsoft Excel. PRISMA guidelines ensured systematic data collection and analysis, focusing on publication trends, productive journals, influential countries, and intellectual structures. Findings revealed a surge in research post-2020, driven by the COVID-19 pandemic. Leading journals included the British Journal of Educational Technology and Computers & Education, while China, India, and Malaysia dominated publication output. Key themes centred on student motivation, institutional support, and technological barriers, with emerging focus areas like digital poverty and social inclusion. Co-citation analysis highlighted a reliance on Western theoretical frameworks, underscoring gaps in localised models. The study underscores the need for context-specific strategies to address attrition, emphasising infrastructure investment, pedagogical adaptations, and policy reforms. It calls for interdisciplinary collaboration and regionally tailored research to enhance retention in distance education systems across developing countries.

Keywords: Bibliometric analysis, distance learning, developing countries, attrition, students' retention

INTRODUCTION

The rapid expansion of distance learning in developing countries represents one of the most significant transformations in global higher education during the 21st century. As traditional higher education systems struggle with capacity constraints, distance education has emerged as a critical alternative, particularly in regions where population growth outpaces institutional development (World Bank, 2025). The UNESCO (2023) reports that tertiary enrolment rates in low-income countries remain below 10%, compared to nearly 80% in high-income nations, creating an urgent need for scalable educational solutions (UNESCO, 2023). Distance learning,

with its potential to overcome geographical and infrastructural barriers, has been widely adopted as a strategic response to this challenge.

The growth of distance education in developing contexts has been particularly dramatic over the past decade. According to the International Council for Open and Distance Education (ICDE, 2021), enrolment in open and distance learning (ODL) programs across Africa and Asia has grown by approximately 300% since 2010. This expansion reflects both the increasing demand for higher education and the recognition of distance learning as a viable alternative to conventional campus-based education (Adewale, 2024; Adewale & Tahir, 2022; Zawacki-Richter & Qayyum, 2019). However, this rapid growth has not been without significant challenges, with student attrition emerging as one of the most persistent and damaging problems facing distance education systems in the Global South.

The COVID-19 pandemic served as both a catalyst for distance education adoption and a stress test for existing systems. A joint World Bank & UNESCO survey (2020) revealed that over 90% of higher education institutions in developing countries implemented some form of emergency remote teaching during pandemic-related closures (UNESCO, 2020). While this demonstrated the potential of distance learning modalities, it also exposed critical weaknesses in institutional preparedness, technological infrastructure, and student support systems (Hodges et al., 2020). The pandemic experience has left a lasting impact on higher education systems worldwide, with many institutions in developing countries now permanently incorporating distance learning components into their educational offerings (Marinoni & Land, 2020).

Despite its growing prominence, distance education in developing countries faces a fundamental paradox: while access has expanded dramatically, completion rates remain alarmingly low. Recent studies indicate that attrition rates in distance learning programs frequently exceed 50%, with some institutions reporting dropout rates as high as 70-80% for certain programs (Commonwealth of Learning, 2022). This represents a crisis of both efficiency and equity, as high attrition rates waste institutional resources while failing to deliver on the promise of expanded educational opportunity. The economic implications are particularly severe in low-income contexts, where both individuals and governments make significant investments in higher education with the expectation of human capital development and economic returns (Psacharopoulos & Patrinos, 2018).

The problem of attrition in distance education is not new, but its manifestations in developing country contexts present unique challenges. Early research on distance learning attrition in Western contexts (Tinto, 2013) identified factors such as student motivation, institutional commitment, and academic integration as key determinants of persistence. However, these models often fail to account for the specific challenges faced by learners in developing countries, where infrastructural limitations, economic constraints, and cultural factors create additional barriers to completion (Jung, 2011). For instance, while internet connectivity may be taken for granted in developed country contexts, many distance learners in the Global South struggle with unreliable electricity, limited broadband access, and the high cost of data (ITU, 2022).

A comprehensive understanding of attrition in developing country contexts requires examination of multiple interacting factors. At the individual level, research has identified financial constraints as one of the most significant barriers to persistence (Arkorful & Abaidoo, 2015). Many distance learners in developing countries are working adults who must balance education with employment and family responsibilities, making them particularly vulnerable to economic shocks that might force them to abandon their studies (Benson et al., 2021). The psychological challenges of isolation and lack of peer support also feature prominently in the literature, particularly in cultures where education is traditionally a communal activity (Banaag et al., 2024).

At the institutional level, pedagogical approaches and support systems play a crucial role in student retention. Many distance education programs in developing countries rely on outdated, transmission-based models of teaching that fail to engage learners or accommodate diverse learning needs (Burns, 2023). Limited faculty training in online pedagogy, combined with high student-to-teacher ratios, often results in inadequate academic support (Bozkurt et al., 2022). Additionally, administrative challenges such as inefficient registration systems, delayed feedback on assignments, and poor communication further exacerbate attrition problems (Simui et al., 2017).

Technological infrastructure represents another critical dimension of the attrition challenge. While mobile technology penetration has increased dramatically in developing countries, many distance learners still face significant barriers to accessing digital learning resources (Global System for Mobile Communications Association (GSMA), 2022). The digital divide is particularly pronounced along urban-rural lines, with learners in remote areas often lacking both the devices and connectivity needed for effective participation in online learning (Selwyn & Facer, 2014). Even when technology is available, issues of digital literacy and confidence can create additional obstacles for learners with limited prior exposure to digital education tools (Semlambo et al., 2022).

The policy environment also plays a significant role in shaping attrition outcomes. In many developing countries, distance education operates in a regulatory grey area, with unclear quality assurance mechanisms and limited coordination between institutions (Latchem, 2016). The lack of standardised data collection on student persistence makes it difficult to identify at-risk learners or evaluate the effectiveness of retention strategies (Gaskell & Mills, 2014). Furthermore, the absence of articulation agreements between distance education providers and traditional universities often limits the transferability of credits, creating additional disincentives for persistence (Garrett, 2016).

Despite the growing body of research on distance learning attrition, several critical gaps remain. First, the literature tends to be fragmented, with studies focusing on specific institutions or regions but lacking comparative analysis across contexts (Zawacki-Richter et al., 2019). Second, much of the research adopts a narrow focus on individual-level factors while neglecting systemic and institutional determinants (Jung, 2011). Third, there is limited longitudinal research tracking students' trajectories over time to identify critical points of attrition (Hart, 2012). Finally, few studies have systematically examined the effectiveness of different intervention strategies for reducing attrition in developing country contexts (Simui et al., 2017).

This study addresses these gaps through a comprehensive bibliometric analysis of research on distance learning attrition in developing countries. By systematically mapping the existing literature, we aim to identify the most frequently studied determinants of attrition across different regions, analyse trends and evolution in research focus over time, highlight gaps and underexplored areas in the literature, and provide evidence-based recommendations for policy and practice. The findings will contribute to ongoing efforts to improve the quality and effectiveness of distance education in developing countries, ultimately helping to realize its potential as a tool for educational equity and human development. As distance learning continues to expand its role in global higher education, understanding and addressing the causes of attrition will be essential for ensuring that increased access translates into meaningful educational outcomes.

Research questions

The following research questions guided this study:

- 1) What is the trend of publications on attrition among distance learning students in developing countries?
- 2) What are the ten most productive journals on attrition among distance learning students in developing countries?
- 3) What ten countries are the topmost in publications and citations on attrition among distance learning students in African countries?
- 4) What is the intellectual structure of attrition among distance learning students in developing countries?
- 5) What are the emerging themes on attrition among distance learning students in developing countries?

Theoretical Framework

This study is anchored in Tinto's (1975, 2013) Model of Student Integration and Rovai's (2003) Composite Persistence Model, which emphasises institutional commitment, academic integration, and social connectedness as determinants of student retention. However, these Western-centric models may not fully capture the unique challenges faced by distance learners in developing countries, where infrastructural deficits, economic constraints, and cultural nuances exacerbate attrition (Jung, 2011; Zawacki-Richter & Qayyum, 2019).

The Transactional Distance Theory (Moore, 1993) further informs this framework by highlighting the interplay of dialogue, structure, and learner autonomy in distance education. In developing contexts, transactional distance is often amplified by limited instructor-learner interaction, rigid course designs, and technological barriers (Benson et al., 2021; ITU, 2022). This aligns with Selwyn and Facer's (2014) Digital Divide Theory, which underscores inequities in access to technology and digital literacy as critical attrition drivers.

At the institutional level, the Community of Inquiry Framework (Garrison, 2019) stresses the role of teaching, social, and cognitive presence in fostering engagement. Yet, many developing-country institutions lack the resources to implement these elements effectively, leading to disengagement (Bozkurt et al., 2022; Elibol & Bozkurt, 2023; Simui et al., 2017).

Economically, Human Capital Theory of Psacharopoulos and Patrinos (2018) posits that education yields long-term returns, but financial instability often forces learners to prioritise immediate income over studies (Arkorful & Abaidoo, 2015). This is compounded by Cultural-Historical Activity Theory (Engestrom, 1987), which reveals how socio-cultural norms such as communal learning preferences, clash with isolated online formats (Banaag et al., 2024).

To address these gaps, this study integrates Critical Theory (Freire, 1978) to interrogate systemic inequities in policy and infrastructure. By synthesising these lenses, the framework advocates for context-specific models that reconcile global theories with local realities, offering a nuanced understanding of attrition in developing-country distance education.

METHODOLOGY

Research Design

A bibliometric analysis approach is adopted to explore bibliographic information and map the research trends of attrition intention among distance learning students in the developing countries. According to Mingers and Leydesdorff (2015), bibliometric analysis is a form of qualitative research design used to analyse and appraise results. This research approach allows researchers to determine research history in a specific field on a particular topic of interest (Adeleye et al., 2024; Demiray & Ünüvar ünlüoğlu, 2023).

Eligibility

This study set some criteria before the choice of articles included in the study to be evidence-based. The publications included span between 2004-2025. Our search was limited to title, abstract and keywords. Similarly, only articles published in peer-reviewed journals in the English language on distance learning This search was also limited to journals indexed in the Scopus database.

Conversely, documents were written and published in other languages, conference papers, reviews, editorials, letters, books, book chapters and unrelated journal articles to attrition among distance learners in developing countries. Other than that, the researcher has also excluded papers published before January 1st, 2004.

Data collection

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021) guided the data collection process for this study. PRISMA was used as a guide because it enables researchers to conduct reviews and meta-analyses in a credible, accurate, and transparent manner for the reproducibility of the research. The guidelines specify the stages that ought to be followed, including identification of sources, screening for eligibility and the stage for data extraction and analysis (Adams et al., 2025; Adewale & Potokri, 2023; Haddaway et al., 2022).

Researchers are open to numerous databases which can be searched to generate data for bibliometric analysis. The famous databases among all include the Web of Science (WoS), Scopus, Google Scholar, and ISI (Ayan et al., 2023; Martín-Martín et al., 2018). Researchers conduct a bibliometric analysis to gain comprehensive insight into the research trend in a specific field. For this study, the researcher sourced the bibliometric analysis from the Scopus database. The choice of Scopus over the Web of Science in searching for literature is because it provides more exhaustive coverage of more indexed quality journals from many publishers. (Kumara & Patil, 2024; Pranckutė, 2021). This database provides superior information for social sciences (Falagas et al., 2008). The following search string was used:

("attrition" OR "dropout" OR "retention" OR "persistence") AND ("distance learning" OR "online education" OR "e-learning" OR "remote learning") AND ("determinants" OR "factors" OR "influences" OR "causes") AND ("developing countries" OR "low-income countries" OR "emerging economies" OR "global south") AND ("student experience" OR "learner engagement" OR "motivation" OR "support services")

Data Visualisation

This study has utilised two data visualisation tools to explore the data extracted from the Scopus database. These visualisation tools were the VOS viewer and the Microsoft Excel. The VOS viewer tool, developed by Van Eck and Waltman (Van Eck & Waltman, 2010) was used for bibliometric analysis. VOSviewer tool is used because it enables researchers to visualise and generate unambiguous graphs that can be used to understand the relationship among variables in the literature network (You et al., 2024). Similarly, the researchers have employed Microsoft Excel to plot the charts. These tools have been used to visualise bibliometric analyses such as co-authorship, co-citation, and co-occurrence (Kumara & Patil, 2024).

Data Analysis

The Scopus database provides access to data for this bibliometric analysis. The data gathered from this source was initially exported into MS Word for data cleaning and validation and used for descriptive and bibliometric analysis. The descriptive statistical analyses using frequency count were performed to display the demographic information of the documents included in this study. VOSviewer software was used to visualise and conduct the bibliometric analysis. The analysis was guided by four research questions for a detailed understanding of AI-driven leadership in higher education.

Ethical Considerations

This study did not require formal ethical approval from any institutional ethical committee because the research documents are readily available online, particularly the Scopus database. Similarly, there is no need for informed consent from any participant. However, we adhered to all the fundamental principles of using intellectual property. All relevant information, authors, and documents were duly acknowledged. This study also ensures that the information provided is accurately represented. Therefore, any potential violation related to the interpretation of any specific detail of any article is the responsibility of the authors.

Data Search

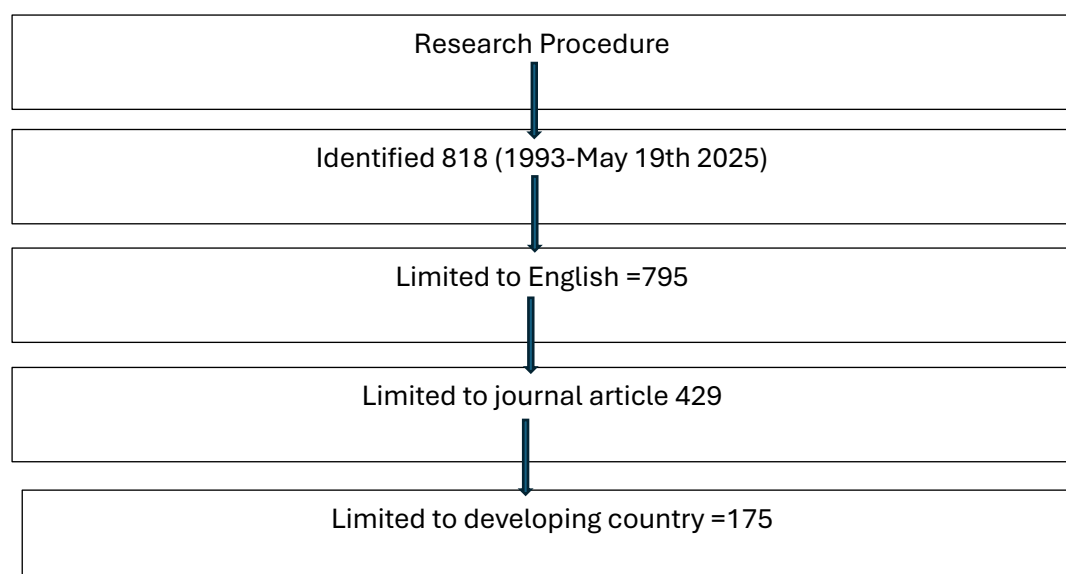


FIGURE 1. Flow chart of the included studies in the analysis

Figure 1 presents the PRISMA-based flow chart outlining the selection process for studies included in the bibliometric analysis of attrition determinants among distance learners in developing countries. The diagram visually maps the progression from the initial broad search to the final set of studies analysed. The process began with the identification of 818 records from the Scopus database (covering the period 1993–May 19th, 2025). The first screening applied a language filter, limiting the dataset to 795 English-language publications. Next, the scope was narrowed to journal articles only, reducing the pool to 429 records.

A further refinement was made by applying a geographical focus on developing countries, which yielded the final dataset of 175 eligible publications used for analysis. This sequential narrowing reflects systematic application of inclusion criteria to ensure relevance, credibility, and comparability across studies. The visual clarity of the flow chart supports transparency in the research process and demonstrates adherence to PRISMA guidelines, thereby enhancing the reproducibility and reliability of the bibliometric mapping.

FINDINGS

TABLE 1. Data Characteristics Using Descriptive Statistics

Description	Results
Time span	2004-2025
Sources (Journal)	120
Documents	175
Average citation per document	18.52
Citations	3241
References	8334
Keywords	1315
Authors' keywords	650
Index Keywords	859
Countries	68
Authors	708

The bibliometric analysis has revealed several key insights into the research landscape of the studied field, as reflected in the descriptive statistics. The time span of the data, ranging from 2004 to 2025, suggests a relatively recent but evolving area of inquiry, with research activity extending into the near future, possibly indicating ongoing or projected studies. The inclusion of 120 distinct sources (journals) highlights a broad dissemination of knowledge across multiple academic platforms, reflecting interdisciplinary engagement or a wide-ranging interest in the topic.

A total of 175 documents were analysed, with an average of 18.52 citations per document, indicating a moderately influential body of work. The cumulative citation counts of 3,241 further underscore the academic impact of these publications, suggesting that the research has been actively referenced and built upon by subsequent studies. The high number of references (8,334) points to extensive engagement with prior literature, reinforcing the scholarly depth of the field.

Keyword analysis reveals a rich conceptual framework, with 1,315 keywords in total, including 650 author-provided keywords and 859 index keywords. This disparity suggests that indexing systems may classify documents more granularly than authors, possibly reflecting broader thematic categorisations by databases. The participation of 68 countries and 708 authors demonstrate global collaboration and a diverse research community, emphasising the

international relevance of the topic. These findings depict a dynamic and growing field with substantial academic influence and widespread geographic and disciplinary participation.

Research question 1: What is the trend of publications on attrition among distance learning students in developing countries?

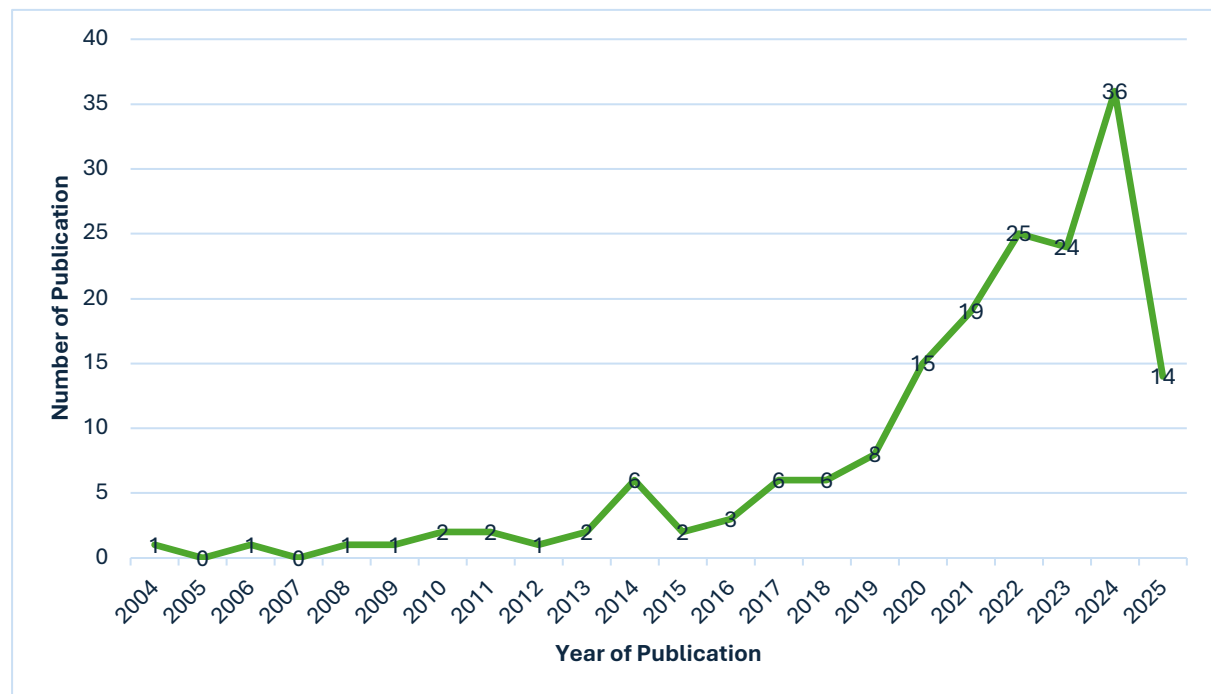


FIGURE 2. Publication trend between 2004-2025

The trendline in Figure 2 tells a compelling story. Research on distance learning attrition was sporadic in the early 2000s, with only a handful of studies published each year. However, the graph shows a sharp uptick after 2014, peaking in 2024 with 36 documents. This surge aligns with global shifts in education, particularly the rapid expansion of online learning during the COVID-19 pandemic.

The dramatic increase from 2020 onward suggests that the pandemic acted as a catalyst, exposing systemic weaknesses in remote education and prompting urgent academic scrutiny. Even though projections for 2025 show a slight dip, the overall trend confirms that attrition remains a critical and evolving study area. This visualisation tracks the field's growth and hints at how real-world events can drive scholarly attention.

Research question 2: What are the ten most productive journals on attrition among distance learning students in developing countries?

TABLE 2. The most productive journals on research on

S/N	Journal	Document	TC	SJR
1	British journal of educational technology	7	94	Q1
2.	Turkish online journal of distance education	6	156	Q2
3.	interactive learning environments	5	140	Q1
4.	Asian association of open Universities journal	5	53	Q1
5.	computers and education	4	848	Q1
6.	Computers in human behaviour	4	234	Q1
7.	IEEE Access	4	206	Q1
8.	Internation journal of information and Learning Technology	4	22	Q2
9.	Electronic journal of e-learning	4	7	Q2
10.	international journal of web-based learning And teaching technologies	3	21	Q3

Table 2 identifies the most influential journals publishing research on distance learning attrition in developing countries. The *British Journal of Educational Technology* leads with 7 articles and 94 citations, reflecting its prominence in education technology research. Interestingly, while the *Turkish Online Journal of Distance Education* published fewer articles (6), it garnered significantly more citations (156), suggesting its content resonates strongly with researchers.

High-impact Q1 journals dominate the list, including *Computers & Education* (848 citations from just four articles) and *Interactive Learning Environments* (140 citations). These outlets emphasise the critical role of technology in addressing attrition. *IEEE Access* highlights growing interdisciplinary interest, bridging education and engineering perspectives.

Regional journals like the *Asian Association of Open Universities Journal* demonstrate localised efforts to tackle attrition, though with lower citation rates. Notably, lower-tier journals (Q2-Q3) appear less cited, indicating researchers prioritise high-impact sources. The data has revealed a clear preference for technology-focused, internationally recognised journals when disseminating attrition research, underscoring the field's technical and global nature. This distribution also suggests opportunities for regional journals to enhance their impact through broader collaborations or thematic focus.

Research question 3: What ten countries are the topmost in publications and citations on attrition among distance learning students in developing countries?

TABLE 3. The most productive journals on research on attrition among distance learning students in developing countries?

S/N	Country	Document	TC
1.	China	32	838
2.	India	23	335
3.	Malaysia	17	283
4.	United States	16	158
5.	Brazil	15	229
6.	Saudi Arabia	12	299
7.	South Africa	12	19
8.	Australia	7	401
9.	United Kingdom	6	865
10.	Pakistan	6	30

Table 3 ranks countries by their research output on distance learning attrition in developing nations. China leads with 32 publications and 838 citations, demonstrating strong academic engagement. India follows with 23 publications (335 citations), reflecting its large education sector. Malaysia (17 publications, 283 citations) and Brazil (15 publications, 229 citations) show active regional research. Surprisingly, the United States (16 publications) and the UK (6 publications) appear despite focusing on developing contexts, likely due to collaborative studies. Saudi Arabia (12 publications, 299 citations) and Australia (7 publications, 401 citations) punch above their weight in citation impact. South Africa and Pakistan, though productive, have lower citation rates, suggesting localised relevance or newer studies.

TABLE 4. The most productive institutions on research on attrition among distance learning students in developing countries?

S/N	Country	Document	
1.	University of South Africa	7	
2.	Universiti Sains Malaysia	4	
3.	Universiti Teknologi MARA		3
4.	Université Ibn Tofail		3
5.	Indira Gandhi National Open University	3	
6.	Universitas Terbuka		3
7.	Universiti Pendidikan Sultan Idris	3	
8.	Shaanxi Normal University		2
9.	Ministry of Education of the People's Republic of China	2	
10.	Future University in Egypt	2	

Table 4 highlights key institutions driving attrition research in developing countries, reflecting both regional expertise and thematic priorities. The University of South Africa leads with seven publications, a result that aligns with its historical commitment to distance education, where attrition rates are typically higher due to learner isolation, limited support structures, and socio-economic constraints. In Asia, Universiti Sains Malaysia (four publications) and Indira Gandhi National Open University (three publications) demonstrate strong institutional investment in understanding and addressing learner dropout in open and flexible learning systems. Middle Eastern and African representation, including Université Ibn Tofail in Morocco and Future University in Egypt (two publications each), suggests a growing recognition of attrition as a policy and institutional performance issue. China's Shaanxi Normal University and its Ministry

of Education point to government-supported research aimed at informing systemic reforms. Contributions from institutions such as Universitas Terbuka in Indonesia signal emerging cross-regional collaboration. Smaller outputs may indicate niche research foci, pilot studies, or developing institutional capacity in this field.

Research question 4: What is the intellectual structure of attrition among distance learning students in the developing countries?

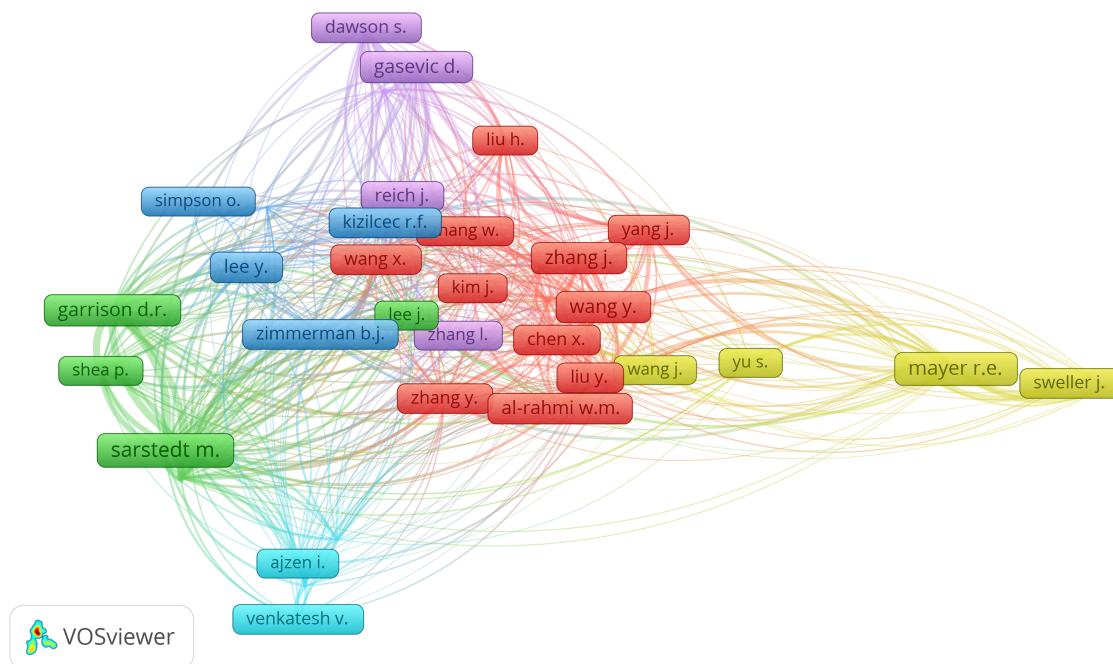


FIGURE 3. Co-citation based on authors

This co-citation map in Figure 3 reveals the intellectual backbone of attrition research in developing countries' distance education. Three distinct clusters emerge: Western retention theories (Tinto, Rovai) dominate the core, while technology-focused studies (Moore, Park) form a secondary hub. Surprisingly, local scholars from developing nations appear as peripheral nodes, suggesting their work hasn't yet gained equal traction. The sparse connections between clusters expose a critical gap - we're missing integrated frameworks that bridge institutional theory, digital solutions, and socioeconomic realities. The visualisation hints at an academic imbalance where Global North perspectives overshadow contextual knowledge from the very regions struggling most with attrition challenges.

Research question 5: What are the emerging themes on attrition among distance learning students in the developing countries?

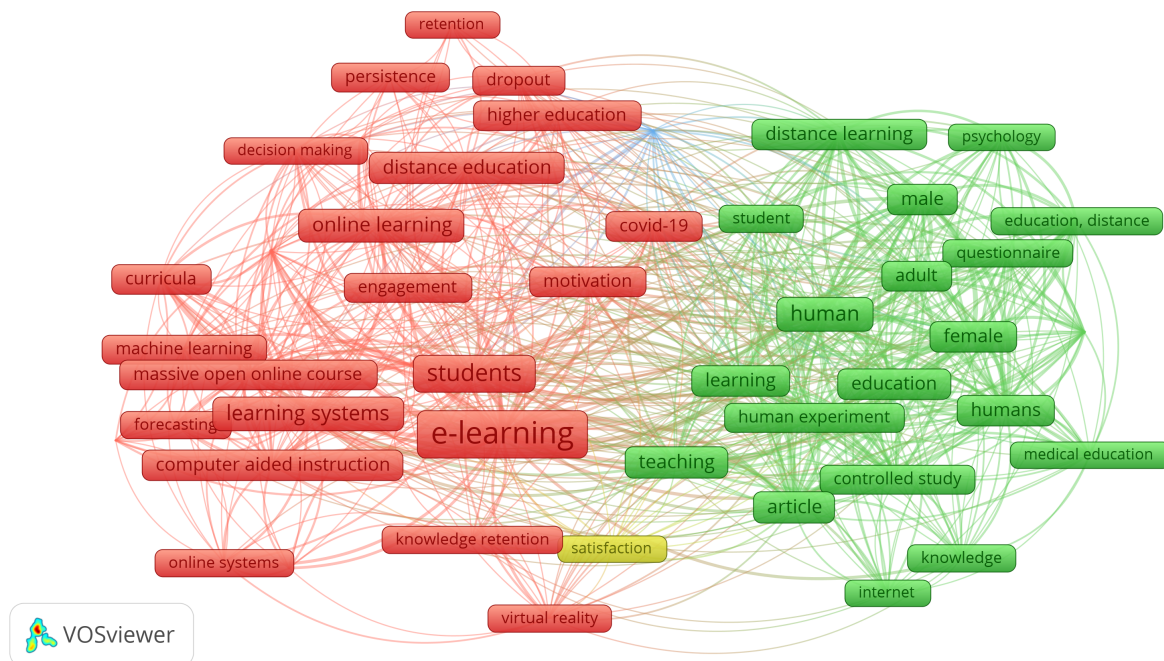


FIGURE 4. Co-occurrence of keywords

The network visualisation in Figure 4 reveals the evolving conversation around distance learning attrition in the developing countries through its keyword relationships. Dominant terms like "student engagement" and "e-learning" form central hubs, reflecting current priorities in the research. Tight clusters connect "academic support" with "motivation," suggesting these are frequently studied together as retention strategies. Emerging themes appear through less connected nodes - "digital poverty" and "social inclusion" stand out as underexplored but potentially significant factors. The map highlights a technological focus in existing studies while exposing gaps in cultural and socioeconomic dimensions of attrition. Interestingly, terms like "community" and "indigenous knowledge" appear minimally, pointing to opportunities for more contextualised research approaches in African distance education.

DISCUSSION OF FINDINGS

The bibliometric analysis of determinants of attrition among distance learners in developing countries reveals several critical insights into the research landscape. The study spans publications from 2004 to 2025, indicating a growing but still evolving field. The increasing trend in publications, particularly from 2020 onward, aligns with the global shift toward online education during the COVID-19 pandemic (UNESCO-UNICEF-World Bank, 2021). This surge underscores the heightened academic and policy interest in addressing attrition challenges as distance learning became a necessity rather than a supplementary option. This research outcome also aligns with Hassan et al. (2023) submission that the evolution of digital technologies into the society has brought changes to every sphere of human lives including research in education via the use of digital technologies.

The most productive journals, such as the *British Journal of Educational Technology* and *Computers & Education*, highlight the interdisciplinary nature of attrition research, bridging

education, technology, and psychology. These journals are known for their rigorous peer-review processes and high impact factors, suggesting that the findings published therein are influential and widely cited (van Eck & Waltman, 2010). The prominence of these outlets also reflects the global relevance of attrition issues, as they cater to diverse geographical audiences. Geographically, China, India, and Malaysia lead in publication output, which correlates with their significant investments in distance education infrastructure and large student populations (World Bank, 2023). However, the citation impact of publications from the United Kingdom and Australia suggests that Western institutions continue to dominate theoretical and methodological contributions, despite the focus on developing countries. This disparity may indicate a reliance on Western frameworks, such as Tinto's Model of Student Integration (1993), which may not fully capture the socio-economic and infrastructural realities of developing nations (Jung, 2020). The limited representation of African countries like South Africa and Nigeria in high-citation publications further emphasizes the need for localized research to address region-specific attrition determinants.

The intellectual structure of the field, as revealed by co-citation analysis, clusters around key themes such as student motivation, institutional support, and technological barriers. These align with prior studies identifying poor infrastructure, financial constraints, and lack of academic engagement as primary attrition drivers (Elibol & Bozkurt, 2023; Yılmaz & Karataş, 2022). Emerging keywords like "digital divide" and "social isolation" reflect contemporary challenges exacerbated by the pandemic, where inequitable access to technology became a critical barrier (International Telecommunication Union, 2022). The co-occurrence of "motivation" and "engagement" with "dropout" suggests that psychological factors remain central to persistence models, though their interplay with systemic barriers warrants deeper exploration.

The study's findings corroborate existing literature while revealing gaps. For instance, while financial constraints are frequently cited, few studies examine the role of micro-financing or government subsidies in mitigating attrition (Kamalu, 2025). Similarly, the limited focus on pedagogical adaptations for diverse learners in low-resource settings points to an underexplored area. The bibliometric maps also highlight the dominance of quantitative methodologies, with qualitative and mixed methods approaches underrepresented, potentially limiting the depth of contextual insights.

CONCLUSION

This bibliometric study provides a comprehensive overview of research on attrition among distance learners in developing countries, mapping trends, productivity, and thematic foci. The findings underscore the growing academic interest in this field, particularly post-2020, as distance education became a global imperative. The dominance of certain journals and countries in publication output reflects both the centrality of attrition as a research topic and the uneven distribution of scholarly influence across regions.

The intellectual structure of the field reveals a strong focus on individual and institutional determinants, though systemic factors like policy and infrastructure remain critical. The reliance on Western theoretical frameworks suggests a need for more localised models that account for the unique challenges of developing contexts. The emerging themes, such as the digital divide and social isolation, highlight contemporary issues that require urgent attention from policymakers and educators.

Overall, this study consolidates fragmented knowledge, offering a visual and quantitative synthesis that can guide future research and interventions. By identifying prolific authors, influential journals, and underexplored themes, it provides a roadmap for addressing attrition in a targeted and evidence-based manner. The findings emphasize the need for interdisciplinary

collaboration and context-specific solutions to enhance the sustainability and efficacy of distance education in developing countries.

Implications

The findings of this study have significant implications for policymakers, educators, and researchers. For policymakers, the high attrition rates in developing countries call for targeted investments in digital infrastructure, such as broadband connectivity and affordable devices, to bridge the digital divide. Additionally, policies that provide financial support, such as scholarships or flexible payment plans, could alleviate economic barriers to persistence. For educators and institutions, the study underscores the importance of tailored academic support systems. Proactive engagement strategies, such as mentorship programs and interactive learning platforms, could mitigate feelings of isolation and improve retention. Institutions should also prioritise faculty training in distance education pedagogies to ensure courses are designed for diverse learner needs.

Researchers can leverage the bibliometric maps to identify gaps, such as the underrepresentation of qualitative studies or region-specific attrition drivers. Future studies should explore the efficacy of interventions like community-based learning hubs or mobile learning solutions in low-resource settings. Collaborative research across disciplines and geographies could also enrich the theoretical and empirical foundations of attrition studies.

Limitations and Further Research

This study has several limitations. First, relying solely on Scopus may have excluded relevant publications from other databases, such as Web of Science or grey literature, introducing potential selection bias. Future studies could incorporate multiple databases to ensure a more comprehensive analysis. Second, the exclusion of non-English publications and non-traditional formats (e.g., conference papers) may have omitted valuable insights, particularly from non-Anglophone developing countries. Expanding the scope to include these sources could enhance the diversity of perspectives. Methodologically, the study's focus on bibliometric mapping, while robust, does not delve into the qualitative nuances of attrition determinants. Future research could combine bibliometric analysis with systematic reviews or meta-analyses to provide deeper contextual interpretations. Additionally, longitudinal studies tracking the impact of specific interventions (such as policy changes or technological innovations) on attrition rates could offer actionable insights for practice.

Finally, the study highlights the need for more region-specific research, particularly in Sub-Saharan Africa and South Asia, where attrition rates are highest but scholarly output remains limited. Investigating cultural, economic, and infrastructural factors unique to these regions could inform more effective, localised solutions. By addressing these gaps, future research can contribute to a more equitable and sustainable distance education ecosystem in developing countries.

REFERENCES

- Adams, D., Harris, A., Moosa, V., Jones, M., & Khaleel, S. (2025). Science mapping the knowledge base of distributed leadership in schools, 1988 to 2023. *Educational Management Administration & Leadership*, 1–22. <https://doi.org/10.1177/17411432251320782>
- Adeleye, O. R., Olivo, M. L. O., & Farkas, T. (2024). A bibliometric analysis of women's empowerment studies post Sustainable Development Goal adoption periods (2015–

- 2022). *Sustainability*, 16(4), 1–14. <https://doi.org/10.3390/su16041499>
- Adewale, S. (2024). Is virtual learning still virtually satisfactory in the post-COVID-19 era for pre-service teachers? *Educational Technology Quarterly*, 2024(2), 152–165. <https://doi.org/10.55056/etq.713>
- Adewale, S., & Potokri, O. C. (2023). Integrating African women academics in leadership: A systematic review. *Journal of Higher Education Policy and Leadership Studies*, 4(3), 53–73.
- Adewale, S., & Tahir, M. B. (2022). Virtual learning environment factors as predictors of students' learning satisfaction during COVID-19 period in Nigeria. *Asian Association of Open Universities Journal*, 17(2), 120–133. <https://doi.org/10.1108/AAOUJ-10-2021-0121>
- Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *International Journal of Instructional Technology and Distance Learning*, 12, 29–42.
- Ayan, E., Toy, F., Turktan, O., & Gokce, M. (2023). Bibliometric analysis of academic studies on student support systems in open and distance learning. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 23(4), 1489–1516. <https://doi.org/10.18037/ausbd.1312165>
- Banaag, R., Sumodevilla, J. L., & Potane, J. (2024). Factors affecting student drop out behavior: A systematic review. *International Journal of Educational Management and Innovation*, 5(1), 53–70. <https://doi.org/10.12928/ijemi.v5i1.9396>
- Benson, O. V., Obichere, C., Eweama, U. R., & Eke, C. C. (2021). Challenges to full implementation of open distance and flexible learning in Nigerian tertiary institutions. *Library Philosophy and Practice*, 6580, 1–18.
- Bozkurt, A., Karakaya, K., Turk, M., Karakaya, Ö., & Castellanos-Reyes, D. (2022). The impact of COVID-19 on education: A meta-narrative review. *TechTrends*, 66(5), 883–896. <https://doi.org/10.1007/s11528-022-00759-0>
- Burns, M. (2023). *Distance education for teacher training: Modes, models and methods* (2nd ed.). Education Development Center.
- Commonwealth of Learning. (2022). *Open and distance learning in the Commonwealth: A statistical review*. <https://oasis.col.org/>
- Demiray, B., & Ünüvar Ünlüoğlu, D. (2023). A bibliometric analysis of research trends on gender and sustainability: Future research perspectives. *İmgelem*, 7(13), 545–560. <https://doi.org/10.53791/imgelem.1349185>
- Elibol, S., & Bozkurt, A. (2023). Student dropout as a never-ending evergreen phenomenon of online distance education. *European Journal of Investigation in Health, Psychology and Education*, 13(5), 906–918. <https://doi.org/10.3390/ejihpe13050069>
- Engeström, Y. (1987). *Learning by expanding: An activity theoretical approach to developmental research*. Orienta-Konsultit.
- Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: Strengths and weaknesses. *The FASEB Journal*, 22(2), 338–342. <https://doi.org/10.1096/fj.07-9492lsf>
- Garrett, R. (2016). *The state of open universities in the Commonwealth*. Commonwealth of Learning.
- Garrison, D. R. (2019). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Online Learning*, 11(1), 61–72. <https://doi.org/10.24059/olj.v11i1.1737>
- Gaskell, A., & Mills, R. (2014). The quality and reputation of open, distance and e-learning: What are the challenges? *Open Learning*, 29(3), 190–205. <https://doi.org/10.1080/02680513.2014.993603>
- GSMA. (2022). *The mobile economy: Sub-Saharan Africa 2022*. <https://www.gsma.com/>
- Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020:

- An R package and Shiny app for producing PRISMA-compliant flow diagrams. *Campbell Systematic Reviews*, 18(2), 1–12.
- Hart, C. (2012). Factors associated with student persistence in an online program of study: A review of the literature. *Journal of Interactive Online Learning*, 11(1), 19–42.
- Hassan, H. M., Salleh, M. A. M., & Ahmad, A. L. (2023). Digital literacy to digital fluency among parents in mediating adolescents' online safety. *INSANIAH*, 6(2), 17–32.
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- ICDE. (2021). *Global overview of distance and online learning*. International Council for Open and Distance Education.
- International Telecommunication Union. (2022). *Measuring digital development: Facts and figures 2022*. <https://www.itu.int/>
- Jung, I. (2011). The dimensions of e-learning quality: From the learner's perspective. *Educational Technology Research and Development*, 59(4), 445–464.
- Jung, I. (2020). Open and distance education theory revisited in the digital era. *Asian Association of Open Universities Journal*, 15(1), 1–12.
- Kamalu, N. U. (2025). Exploring the role of financial constraints in limiting access to distance learning opportunities in Nigerian higher education. *Journal of Contemporary Research in Social Sciences*, 7(1), 10–16.
- Kumara, B. M. P., & Patil, M. M. (2024). KLE Academy of Higher Education and Research's scholarly research trends: A bibliometric study. *Journal of the Scientific Society*, 51(1), 80–85.
- Latchem, C. (2016). *Open and distance learning in Commonwealth universities*. Commonwealth of Learning.
- Marinoni, G., & Land, H. van't. (2020). The impact of COVID-19 on global higher education. *International Higher Education*, 102, 7–9.
- Martín-Martín, A., Orduña-Malea, E., & López-Cózar, E. D. (2018). Coverage of highly cited documents in Google Scholar, Web of Science, and Scopus. *Scientometrics*, 116(3), 2175–2188.
- Mingers, J., & Leydesdorff, L. (2015). A review of theory and practice in scientometrics. *European Journal of Operational Research*, 246(1), 1–19.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Systematic Reviews*, 10(89), 1–11.
- Pranckutė, R. (2021). Web of Science and Scopus: The titans of bibliographic information. *Publications*, 9(1), 1–59.
- Psacharopoulos, G., & Patrinos, H. A. (2018). *Returns to investment in education: A decennial review*. World Bank.
- Selwyn, N., & Facer, K. (2014). The sociology of education and digital technology: Past, present and future. *Oxford Review of Education*, 40(4), 482–496.
- Semlambo, A. A., Sengati, F., & Angalia, B. (2022). Factors affecting the adoption of e-learning systems in Tanzania. *Journal of Computer and Communications*, 10(9), 113–126.
- Simui, F., Mundende, K., Mwewa, G., Kakana, F., & Namangala, P. B. (2017). Distance learner's perspective on user-friendly instructional materials at the University of Zambia. *Journal of Learning for Development*, 4(1), 90–98.
- Tinto, V. (2013). *Completing college: Rethinking institutional action*. University of Chicago Press.
- UNESCO. (2020). *What have we learnt? Overview of findings from a survey of ministries of*

- education on national responses to COVID-19.*
- UNESCO. (2023). *Global education monitoring report 2022: Technology in education.*
- UNESCO & World Bank. (2020). *Survey on national education responses to COVID-19.* UNESCO.
- UNESCO, UNICEF, & World Bank. (2021). *What's next? Lessons from continuing remote learning after COVID-19.* UNESCO.
- Van Eck, N. J., & Waltman, L. (2010). VOSviewer: A computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538.
- World Bank. (2025). *Tertiary education.* <https://www.worldbank.org/en/topic/tertiaryeducation>
- Yılmaz, A. B., & Karataş, S. (2022). Why do open and distance education students drop out? *International Journal of Educational Technology in Higher Education*, 19(28), 1–22.
- You, C., Awang, S. R., & Wu, Y. (2024). Bibliometric analysis of global trends on higher education leadership development. *Discover Sustainability*, 5(1). <https://doi.org/10.1007/s43621-024-00432-x>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 16(1), 1–27.
- Zawacki-Richter, O., & Qayyum, A. (2019). *Open and distance education in Asia, Africa and the Middle East.* Springer.