

REVIEW ARTICLE

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The *International Journal of Educational Technology in Higher Education*: content and authorship analysis 2010–2024

Melissa Bond^{1,2,3*}

*Correspondence:
melissa.bond@ucl.ac.uk

¹ EPPi Centre, University College
London, London, UK

² Knowledge Center
for Education, University
of Stavanger, Stavanger, Norway

³ National Institute of Teaching,
London, UK

Abstract

In celebrating the 20th anniversary of the *International Journal of Educational Technology in Higher Education (IJETHE)*, previously known as the *Revista de Universidad y Sociedad del Conocimiento (RUSC)*, it is timely to reflect upon the shape and depth of educational technology research as it has appeared within the journal, in order to understand how *IJETHE* has contributed to furthering scholarship, and to provide future directions to the field. It is particularly important to understand authorship patterns in terms of equity and diversity, especially in regard to ensuring wide-ranging geographical and gender representation in academic publishing. To this end, a content and authorship analysis was conducted of 631 articles, published in *RUSC* and *IJETHE* from 2010 to June 2024. Furthermore, in order to contribute to ongoing efforts to raise methodological standards of secondary research being conducted within the field, an analysis of the quality of evidence syntheses published in *IJETHE* from 2018 to June 2024 was conducted. Common themes in *IJETHE* have been students' experience and engagement in online learning, the role of assessment and feedback, teachers' digital competencies, and the development and quality of open educational practices and resources. The authorship analysis revealed gender parity and an increasingly international identity, although contributions from the Middle East, South America and Africa remain underrepresented. The findings revealed a critical need for enhanced efforts to raise the methodological rigour of EdTech evidence syntheses, and suggestions are provided for how *IJETHE* can help move the field forwards. Key future research areas include educator professional development, the impact of digital tools on learning outcomes and engagement, the influence of social and contextual factors, the application of AI tools to support learning, and the use of multimodal data to analyse student learning across diverse contexts.

Keywords: Co-authorship analysis, International research collaboration, Academic publishing, Evidence synthesis quality, Bibliometric review, Gender representation, Artificial intelligence

Introduction

The *International Journal of Educational Technology in Higher Education (IJETHE)*, originally published as the *Revista de Universidad y Sociedad del Conocimiento (RUSC)*, has become known as one of the most prestigious in the field of educational technology

(EdTech), with its reputation having grown rapidly throughout its now 20-year history. Having reached an Impact Factor of 8.6 in 2023, *IJETHE* is now ranked as the fourth most impactful journal in the SSCI Education & Educational Research index. Celebrating their 20th anniversary, the Editor-in-Chief (Coordinator) Josep Duart (2024) wrote:

“Now, we must look to the future. Once again, with the support of all of us who make this journal possible, we must analyse the significant educational challenges we currently face and formulate proposals, analyses, and research to help us continue improving educational technology in Higher Education. And also, due to our long experience and growth, we can significantly contribute to academic publishing.”

Answering this call to arms, this article seeks to investigate how EdTech research has transformed across time in *IJETHE*, and how the journal has contributed to the field through an analysis of its editorial curation and academic stewardship, focusing on topics, authorship patterns, and methodological rigor. It then seeks to provide concrete guidance for the field, in order to help facilitate its continued growth.

A brief history of RUSC and IJETHE

The *RUSC* journal was first published in 2004 by the Open University of Catalonia in Spain. Its remit was to capture and promote research exploring the relationship between education and digital learning, as well as the digitalisation of higher education, and to make this research openly accessible to all (Duart, 2013). Until 2010, articles were only published in Spanish, but from 2010 both Spanish and English language articles were accepted, with the caveat that any Spanish articles be translated and made available in English as well. In 2010, the journal changed its name to *RUSC. Universities and Knowledge Society Journal*, and in 2013, a partnership was established with the University of New England in Australia, in order to increase its international scope (Duart & James, 2016). 12 volumes and 25 issues were published during this time, including two special issues and multiple special sections (see Table 1), before the journal changed its name in 2016 to the *International Journal of Educational Technology in Higher Education (IJETHE)*. *IJETHE* is currently associated with four institutions: Universitat Oberta de Catalunya, Dublin City University, Pontificia Universidad Católica de Valparaíso and Guangzhou University, and there have since been at least two special issues (now called ‘thematic issues’) per year, with the exception of 2021.

IJETHE in previous studies

RUSC and *IJETHE* have been the focus of three previous studies; a bibliometric analysis of 216 articles published in *RUSC* between 2004 and 2013 (Ramiro Sánchez et al., 2014), a thematic analysis of 355 articles from both *RUSC* and *IJETHE* from 2004 to 2017 (Marín et al., 2018), and as part of a social network analysis exploring the Spanish and English EdTech research communities (Marín & Zawacki-Richter, 2019). Ramiro Sánchez et al. (2014) found that 56% of articles published 2004–2013 were theoretical, with 10.2% of empirical studies focused on university faculty, 16.2% on university students, and 8.8% on both faculty and students. ‘Educational models and technology use in higher education’ was the largest topic (26.4%), followed by ‘technological and pedagogical models and innovations’ (18.1%), and ‘organisational and administrative perspectives

Table 1 Special sections and special issues in RUSC or IJETHE (2010–2024)

Year	Topic	Country of Editors
2010	Framing the digital divide in higher education (special section)	Spain
2010	Why offer information and digital competency training in higher education? (special section)	Spain
2011	The impact of social networks on teaching and learning (special section)	Canada, UK
2011	Globalization and internationalisation of higher education (special section)	Netherlands
2012	Mathematical e-Learning (special section)	Spain, Netherlands, Australia
2012	Innovation and good practices in university government and management (special section)	Spain
2013	New informal ways of learning: Or are we formalising the informal? (special issue)	Spain, UK
2013	Education and technology in Mexico and Latin America: Outlook and challenges (special section)	Mexico, Spain
2014	What is the future of mobile learning in education? (special section)	Canada, Spain
2014	E-learning in the disciplines of Economics and Business Studies	Australia, Spain, USA
2014	Conversations from south of the equator: Challenges and opportunities in OER across broader Oceania (special section)	Australia
2015	The future of MOOCs: Adaptive learning or business model? (special section)	USA, Spain
2015	New learning scenarios from a transformative perspective	Spain
2015	Learning analytics (special section)	Spain, Australia
2016	Using e-Assessment to enhance student learning and evidence learning outcomes	Australia, Canada
2016	The internet and online pedagogy	Canada, Spain
2017	Games and simulation in higher education	Australia, Greece, Spain
2017	Learning design for in situ continuous professional development	Israel, Netherlands, Spain
2018	Blended learning in higher education: Research findings	USA
2018	More than tools? Critical perspectives and alternative visions of technology in higher education	Spain, Australia
2018	The universities of the future: Educational and organisational challenges	Spain, Canada, Denmark
2019	Technology enhanced learning or learning driven by technology	Spain, UK, Luxembourg, Turkey
2019	Food, nutrition and the online: Opportunities and challenges for higher education and lifelong learning	Spain, Portugal, Ireland, México
2019	Can artificial intelligence transform higher education?	Canada, USA, Colombia, UK
2020	Towards a critical perspective on data literacy in higher education. Emerging practices and challenges	Spain, Italy, Canada, South Africa
2020	The future learning environment, pedagogical and technological perspectives	Hong Kong, Thailand, USA
2022	Technology-mediated educational innovations in Latin American higher education institutions	Colombia, Mexico, USA, Peru
2022	Digitally competent future teachers	Lithuania, Finland, Spain
2022	Micro-credentials and the next new normal in digitally enhanced higher education ecosystems	Ireland, Australia
2023	In person, hybrid and online higher education: Supporting students' complex trajectories	Spain, UK, France
2023	New advances in artificial intelligence applications in higher education	Germany, UK, South Africa, USA
2024	Higher education futures at the intersection of justice, hope, and educational technology	USA, Canada, UK, Australia
2024	Technological innovations for facilitation of peer learning processes and outcomes	The Netherlands, USA

on ICT use in higher education institutions' (11.6%), although it was the area 'open access systems for use of learning materials; systems for development and use of open educational resources' that received the most citations. In regard to authorship, they found 64.3% were from Spain, followed by Argentina (4.8%), Mexico (4.8%) and Colombia (4.8%), with 52.8% of articles published in Spanish, and 38.9% in both Spanish and English.

Marín et al. (2018) used Leximancer to produce concept maps for three time periods; 2004–2009 ($n=134$), 2010–2015 ($n=157$), and 2016–2017 ($n=64$). The 2004–2009 period focused on technology-mediated higher education, in particular ICT tools for teacher professional development, the impact of ICT and e-Learning on society, including the use of OER, as well as students' experiences of using digital tools. In the 2010–2015 period, research focused on the quality of online learning, including educational resources and practices, such as the use of social media, and teacher and student digital competencies also became an important topic. Learning design and the social impact of educational technology were prominent in 2016–2017, along with social media and assessment. Following this study, Marín and Zawacki-Richter (2019) then included 257 articles from *RUSC* in a social network analysis with seven other EdTech journals, in order to understand whether Spanish and English EdTech research communities cited each other. They found that the Spanish community was more tightly connected than the English community, and that English language articles rarely cite publications written in another language.

Equity, diversity and inclusion in academic publishing

There is a long history of conscious and unconscious biases in academic research publishing, captured and perpetuated through a variety of metrics (Fortin et al., 2021; Meibauer et al., 2024), that has led to unequal authorship and editorial patterns. Editorial boards, for example, have been found to be dominated by researchers from the US and UK in fields such as sociology (Brown et al., 2024) and environmental science and public health (Dada et al., 2022), as well as education, with the editorial boards of the top five journals in each quartile of the Education & Educational Research Journal Citation Reports dominated by the US (54%), the UK (11.54%) and Australia (7.42%; Xue & Xu, 2024). In the field of ecology and evolution, over half of top researchers with a h -index above 30 at the end of 2021 came from the US (35%), the UK and Australia, with 83% coming from 12 higher-income countries from Europe, North America or Australia (Hughes et al., 2023), and in an analysis of 316,390 peer-reviewed journal articles published between 2000 and 2021 in the field of land use science (Kamau et al., 2022), ethnicity was found to be biased towards White researchers (62%), followed by Asian (30%), Hispanic (6%) and Black (2%) researchers.

Issues of EDI in academic publishing also extend to gender representation, which has been identified in a range of fields. In an analysis of 31 biodiversity journals indexed in the Web of Science, only 28.7% of editors were women (Liévano-Latorre et al., 2020), and from 60 peer-reviewed land science journals, only 25.47% of editorial board members were female (Mohammadi Hamidi et al., 2022). An analysis of 143 journals in veterinary science (Wang et al., 2022) found only 32.2% of managing editors and 34.5% of editors were female, with heavily skewed male editorship in Asia (approx. 90% male),

Africa (76%) and South/Central America (72%), although in ecology, Latin America had a higher representation of female top researchers than other regions (Hughes et al., 2023). Furthermore, of 591 environmental and public health journals, 32.9% of editors were women, with only 13.2% of journals ($n=78$) demonstrating gender parity in their editorial boards (Dada et al., 2022).

The field of Education and EdTech specifically are no exception (Bardakci et al., 2021; Chen et al., 2023). Although a recent analysis of the top five journals in each quartile of the Journal Citation Reports 2021 in Education & Educational Research revealed a reasonable editorial board gender division (Xue & Xu, 2024), the most prominent EdTech journal represented did not, with a total 36.84% female representation in *Computers & Education (CAE)*. Given that an analysis of the gender composition of the top five economics journals found evidence to suggest that low representation of women on editorial boards reduces the number of articles that are (co-)authored by women, whereas high levels of representation increase the quantity of female authorship (Bransch & Kvasnicka, 2022), it is important to explore what has been discovered on gender distribution in the wider field of EdTech, as well as in *IJETHE* specifically.

Previous authorship and bibliometric studies of EdTech journals and research

Many authorship and bibliometric analyses of EdTech journals have been undertaken in the past decade (see Appendix A), reflecting the increasing interest in evidence synthesis methods to understand the current state of a field (Bond et al., 2024). Irrespective of whether studies have focused on authorship patterns within individual journals (e.g., Akturk, 2022; Goksu et al., 2022; Ozyurt & Ayaz, 2022; Voce et al., 2024), across a range of journals (e.g., Bardakci et al., 2022) or across conferences (e.g., Chen et al., 2023), they have all come to the same finding; EdTech research is heavily dominated by researchers in the US, UK, China, Taiwan, Australia, and to a lesser extent, Canada, the Netherlands, Turkey and Spain. Supporting this finding, Mertala et al. (2024) analysed 200 highly cited articles according to their h5-index score, published between 2015 and 2019 in 10 EdTech journals, and found that 76.5% of articles were written by first authors from Western contexts (Europe, North America, and Australia), and multiple analyses have reported far less research published by authors from the Middle East, Africa and South America (e.g., Bond, 2018; Bond et al., 2019).

Fewer studies have explored co-authorship and international collaboration between authors, although co-authorship in EdTech research has been found to relate to an increase in citations (Bodily et al., 2019). Solo authorship was reported at 20% in the *Australasian Journal of Educational Technology* (Bond & Buntins, 2018), 35.8% in the *British Journal of Educational Technology (BJET)* (Bond et al., 2019), and 36.3% in the *Turkish Online Journal of Educational Technology* (Bozkaya et al., 2012), although analyses across multiple journals have reported it as far lower (14.4%, Bardakci et al., 2022; 21%; Scharber et al., 2019), with authors from three or more different institutions representing 70.49% of all papers. Chen et al. (2019) reported that authors from Taiwan were particularly collaborative, and the analysis of EdTech conferences found that authors in Canada and the US, and the US and UK, collaborated the most with each other (Chen et al., 2023). This was also supported by an analysis of German, Spanish and UK authorship within 29 EdTech journals (Marín et al., 2023), which found that authors from

the UK were most likely to collaborate with authors from other countries, particularly China, Australia and the US.

However, despite the number of studies that have explored authorship patterns in EdTech research, gender representation has been far less explored. Zawacki-Richter et al. (2017) conducted an analysis of authorship in the *International Review of Research in Open & Distributed Learning* from 2000 to 2015 and discovered reasonable gender distribution (55.9% male and 44.1% female). Scharber et al. (2019) conducted an analysis of six leading EdTech journals across a similar time period (2004–2015), including *BJET* and *CAE*, exploring the extent of male and female single-authorship and male and female first-authorship in collaborative articles. They found that female authors published fewer single and first-author articles, with 46% of all articles written by women, although rates have been increasing over time. Given that gender representation in *IJETHE* has not yet been explored, and there have been calls for exploration into EdTech gender balance (Bond et al., 2019), it is timely and important to do so.

Methodological rigour of EdTech evidence synthesis

Although review articles made up 34% of the 50 most-cited EdTech papers between 2015 and 2019 (Mertala et al., 2024), concerns have been raised about the quality of evidence syntheses both within and beyond the field (Chong et al., 2024; Kitchenham et al., 2010; Pussegoda et al., 2017). Evidence syntheses should be conducted using rigorous methods that are transparently reported, to enable replicability and trustworthiness (Gough et al., 2017; Zawacki-Richter et al., 2020), however in an analysis of 73 EdTech reviews, Lai and Bower (2020) found an average total quality score of 2.7 out of 4, with only six reviews (8.2%) explicitly defining quality assessment criteria. In larger and more recent analyses of EdTech reviews, Buntins et al. (2023) found that only 16 out of 361 reviews were fully replicable, and Zawacki-Richter et al. (2024) found that 8.1% of 576 reviews achieved a quality score above 90/100. Explorations of single topic reviews have also raised similar concerns; an analysis of 66 AI in higher education reviews (Bond et al., 2024) and a meta scoping review of programming and robotics in primary and secondary schooling (Forsström et al., 2024) both revealed an average medium quality across included studies, but with many crucial elements lacking, such as information about inclusion/exclusion criteria, the full search string used to locate studies, inter-rater reliability between reviewers, and how the quality of primary research was assessed. These analyses indicate a need to explore the methodological rigour of evidence syntheses being published in *IJETHE*, in order to inform the development of guidance for authors, peer reviewers, and editors, and continue enhancing the quality of research being published.

Research questions

Therefore, against this background and “to help us continue improving educational technology in Higher Education. And... significantly contribute to academic publishing” (Duart, 2024), this study seeks to answer the following research questions:

1. What research trends and issues were published in *RUSC* and *IJETHE* from 2010 to 2024 and how have these evolved?

2. How has *IJETHE* contributed to furthering scholarship in the field of educational technology?
3. To what extent has authorship of *IJETHE* become more international from 2010 to 2024?
4. How have authorship/co-authorship patterns changed over time?
5. What is the reporting quality of evidence syntheses published in *IJETHE* from 2018 to 2024?
6. What research topics and issues have been identified by researchers as important for future research, and published in *IJETHE* from 2018 to 2024?

Method

In order to explore *IJETHE*'s contributions to the field of educational technology, a computer-assisted content and authorship analysis was undertaken, following an adapted method from both Bond (2018) and Bond et al. (2019). The reporting quality has been checked against the QuEST appraisal tool (Bond et al., 2024) and the report is provided in Appendix B.

Sample: articles published in *RUSC* and *IJETHE* 2010–2024

All articles published in *RUSC* and *IJETHE* between 2010 and June 2024 were obtained from the editorial team, but also cross-referenced with the Web of Science and then manually checked against the article listings on both the *RUSC*¹ and *IJETHE*² websites, as there were discrepancies. As a result, 1,391 items were imported into evidence synthesis software EPPi Reviewer (Thomas et al., 2023), where 754 duplicates were automatically removed, and six article correction notes deleted, leaving 631 items (see Appendix C). Items were coded based on their publication type (see Fig. 1), including forms of evidence synthesis, such as systematic reviews and meta-analyses (Sutton et al., 2019).

Computer-assisted content analysis

In order to answer research question one (What research trends and issues were published in *RUSC* and *IJETHE* from 2010 to 2024 and how have these evolved?), text-mining software Leximancer was used. Computer-assisted content analysis has been used in a wide range of disciplines to map out research domains (e.g., mining, Rathobei et al., 2024; transportation safety, Blišťanová et al., 2023), by identifying key concepts and trends within large amounts of data, whilst also being less resource-intensive to conduct (Fisk et al., 2012; Krippendorff, 2013). After excluding 47 editorials, book reviews and article corrections, 584 titles and abstracts published between 2010 and June 2024 were converted into a.csv file in Excel and uploaded into the web version of Leximancer. The stopwords 'article', 'based', 'conducted', 'during', 'findings', 'paper', 'results', 'use', 'used', 'using', 'current', 'analysis' and 'higher' were removed, and singular and plural versions of words were merged (e.g., 'course' and 'courses').³ Leximancer then automatically

¹ <https://rusc.uoc.edu/rusc/en/index.php/rusc/index.html>.

² <https://educationaltechnologyjournal.springeropen.com/>.

³ See <https://doi.org/10.17605/OSF.IO/SVK2N> for full details of the method.

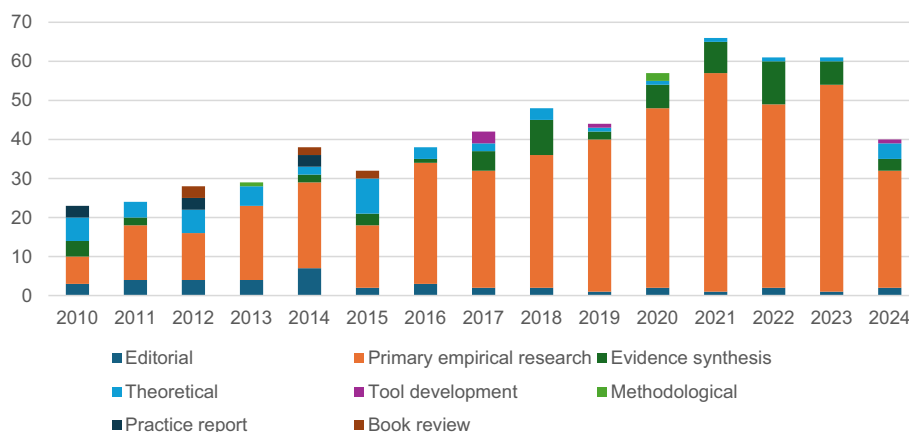


Fig. 1 Number of articles published in IJETHE by publication type

identified significant concepts and themes that occurred within two sentence blocks, and a concept map was produced with a theme size of 60%, 100% visible concepts, and 136-degree rotation, showing the frequency and connectedness of identified concepts (Smith & Humphreys, 2006). Subsets of data were also created for three time periods, to match previous journal analyses as much as possible (e.g., Bond, 2018; Bond & Buntins, 2018; Bond et al., 2019) and to allow comparisons, namely 2010–2017 ($n=218$), 2018–2020 ($n=144$), and 2021–2024 ($n=222$). Concept maps were also created for each of these time periods, which were then analysed in order to draw interpretations.

Evaluation of rigour, influence and prestige

In order to explore research question two (How has *IJETHE* contributed to furthering scholarship in the field of educational technology?), the framework of Rigour, Influence and Prestige was used (Rich & West, 2018; West & Rich, 2012).

Rigour

To establish the rigorousness of a journal, it is important to consider how high the publication standards are, and the extent to which research is critically judged on its merits prior to acceptance (West & Rich, 2012). Therefore, an analysis of *IJETHE*'s peer review policy, acceptance rate, and time to publication was undertaken.

Influence

Metrics alone do not—and should not—dictate the influence of a journal (Fortin et al., 2021; Saxena et al., 2013; Staller, 2017). Therefore, *IJETHE*'s publication rate, open access and social media policies were reviewed, alongside an analysis of citations and journal metrics. In order to triangulate citation data (Rich & West, 2018), a citation analysis comparing *IJETHE* to other leading EdTech journals was undertaken using the Clarivate Journal Citation Reports, the Google Scholar *h-index*, the software *Publish or Perish* (Harzing, 2007), the Scimago Journal & Citation Reports,⁴ and an analysis of Altmetrics using the Altmetric Explorer.

⁴ Journal Rankings on Education (scimagojr.com).

Prestige

The prestige of a journal can be assessed by exploring whether a prominent national or international professional organisation supports it, whether it is regarded as prestigious by other academics, and whether its editors and editorial board are well-known and respected in the field. Therefore, in order to evaluate the editorial team, both the *h*- and the *g*-index (Egghe, 2006) of each member was obtained from *Publish or Perish*, as per Hammerschmidt et al. (2024). The *g*-index weights highly cited articles more heavily and can provide a more accurate measure, especially for early or mid-career researchers, whereas the *h*-index favours older, more established researchers (Staller, 2017). The classification of Hirsch (2005) was used as per Bond et al. (2019); a *g*-index over 20 indicates a *successful* scientist, a score over 40 would indicate an *outstanding* scientist and a score over 60 would indicate a truly *unique* individual.

Authorship analysis

In order to answer research question three (To what extent has authorship of *IJETHE* become more international from 2010 to 2024?), all country data for every author were extracted manually from either the article or the journal website and coded within EPPI Reviewer.⁵ Each article was coded for year of publication, country of each author and continent of each author. All data is available to view publicly via EPPI Visualiser.⁶ Where the country or continent could not be determined, a code of 'unsure' was given.

In order to answer research question four (How have authorship/co-authorship patterns changed in over time?), each article was coded for the number of authors, gender of first author and type of collaboration (single authorship, domestic, international, both domestic and international). Domestic collaborations were further coded for whether they were within the same institution (intra-institutional), with other institutions (inter-institutional), or both (intra and inter-institutional).

Quality of evidence synthesis in IJETHE

In order to answer research question five (What is the reporting quality of evidence syntheses published in *IJETHE* from 2018 to 2024?), an adapted version of the Quality of Evidence Synthesis Tool (QuEST; Bond et al., 2024) was used to appraise the 43 evidence syntheses published in *IJETHE* between 2010 and 2024 that have a method section. QuEST has previously been used to appraise the quality of reviews in EdTech (Buntins et al., 2023), AI in higher education (Bond et al., 2024), programming and robotics (Forström et al., 2024), and climate and health (Bond, 2024). It usually has ten quality assessment questions, however for this review, the question 'Is Digital Evidence Synthesis Tool use or non-use reported?' was added in response to the lack of reporting of technology in evidence syntheses, not just within EdTech, but across disciplines (e.g., Bond, 2024). Each question scored 1 for yes, 0.5 for partially and 0 for no,⁷ and then rated out of 11 overall: critically low quality (0–3.5 points), low quality (4–5.5), medium quality (6–8), high quality (8.5–9.5), or excellent quality (10–11). It should be noted, however, that not

⁵ See <https://doi.org/10.17605/OSF.IO/SVK2N> for the full data extraction coding tool.

⁶ <https://doi.org/10.17605/OSF.IO/SVK2N>.

⁷ See <https://doi.org/10.17605/OSF.IO/SVK2N> for the QUEST data extraction tool.

all evidence syntheses require a quality assessment (e.g. scoping, literature and mapping reviews; see Sutton et al., 2019), so these were coded as 'Not applicable' and scored one.

Future research directions

In order to answer research question six (What research topics and issues have been identified by researchers as important for future research and published in *IJETHE* from 2018 to 2024?), the approach of Bond (2018) was used. All articles published from 2021 to 2024 ($n=228$) were manually searched for appropriate sections containing recommendations, which were often located in the discussion or conclusion sections. In some cases, this was called 'Limitations and future research directions' (e.g., Abbas et al., 2024), 'Recommendations' (e.g., AlShamsi, 2021), or within 'Conclusions, limitations and implications of the study' (e.g., Essel et al., 2022). Only those sentences discussing ideas for future research were captured, which were then exported from EPPI Reviewer into an Excel spreadsheet and saved as a.csv file.⁸ 15 articles did not provide any clear future research directions, which were subsequently coded as 'None provided', resulting in the suggestions from 207 articles being imported into Leximancer. As per the other concept maps created, stop words were removed and some words were merged (e.g., course + courses), producing a concept map with a theme size of 60%, 100% visible concepts, and 134-degree rotation.

Limitations

Every attempt was made to undertake this research as rigorously as possible, especially in regard to ensuring that all published articles were included in the analysis. Whilst it is recognised that abstracts do not necessarily capture all information about studies (Curran, 2016), particularly in regard to research design, they have been considered appropriate for gaining an understanding of a field (Cretchley et al., 2010). Furthermore, text-mining software such as Leximancer is considered superior to word frequency counts, such as word clouds, as the software accounts for linguistic and semantic complexities (Nunez-Mir et al., 2016). All authorship information was extracted manually, in order to avoid missing data that can occur when using metadata from academic databases (Bond, 2018). Although the QuEST tool is still in development, a similar approach has been used by other reviews already (e.g., Bond et al., 2024; Urdaneta-Ponte et al., 2021).

Results and discussion

Content analysis

Overall scope of the journal (2010–2024)

The key themes and research areas covered in *IJETHE* research articles ($n=584$) across 2010–2024 are depicted in Fig. 2. The thematic summary reveals that *students* has the most direct mentions within the text with 1258 (100% relative count), closely followed by *learning* (96% connectivity), *education* (57%), *university* (29%), *research* (27%) and *review* (10%). The concept map reflects the top ten most highly cited *IJETHE* articles

⁸ Available on the OSF, <https://doi.org/10.17605/OSF.IO/SVK2N>.

Table 2 Top ten highest cited articles in IJETHE, 2016–2024

Authors	Title	WoS Citations	Google Scholar	Altmetric
Zawacki-Richter et al. (2019)	Systematic review of research on AI applications in higher education—where are the educators?	665	2564	243
Dichev and Dicheva (2017)	Gamifying education: What is known, what is believed and what remains uncertain: a critical review	445	1728	151
Dziuban et al. (2018)	Blended learning: The new normal and emerging technologies	331	1745	117
Bond et al. (2020)	Mapping research in student engagement and educational technology in higher education: A systematic evidence map	287	995	65
Vlachopoulos and Makri (2017)	The effect of games and simulations on higher education: A systematic literature review	282	918	38
Kintu et al. (2017)	Blended learning effectiveness: The relationship between student characteristics, design features and outcomes	212	1121	36
Bond et al. (2018)	Digital transformation in German higher education: student and teacher perceptions and usage of digital media	197	794	40
Pham et al. (2019)	Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam	169	643	11
Alyahan and Düşteğör (2020)	Predicting academic success in higher education: Literature review and best practices	158	625	9
Geng et al. (2019)	Investigating self-directed learning and technology readiness in blending learning environment	146	634	7

self-assessment and reflection, but stressed the need for more practical and personalised professional development to be offered by institutions, with formal recognition for training completed. The establishment and use of open educational practices has also been a keen focus (see *open-educational-practices* and *open-educational-development-access-resources-context*), including the development and quality of MOOCs (see *MOOCs-research-quality-framework*, e.g., Ramirez Fernandez et al., 2014; Costello et al., 2018a).

2010–2017

The concept map for the first years of *IJETHE* publications (see Fig. 3) depicts the key research areas covered in articles ($n = 218$) published between 2010 and 2017. The thematic summary reveals that *learning* has the most direct mentions within the text with 364 (100% relative count), followed by *education* (60%), *educational* (32%) and *assessment* (16%).

This period saw a focus on how to foster online collaboration and interaction (see *interaction-online-collaborative*), particularly in regard to using social media (*interaction-online-students-study-social-networks*) such as Facebook (e.g., Román-Graván

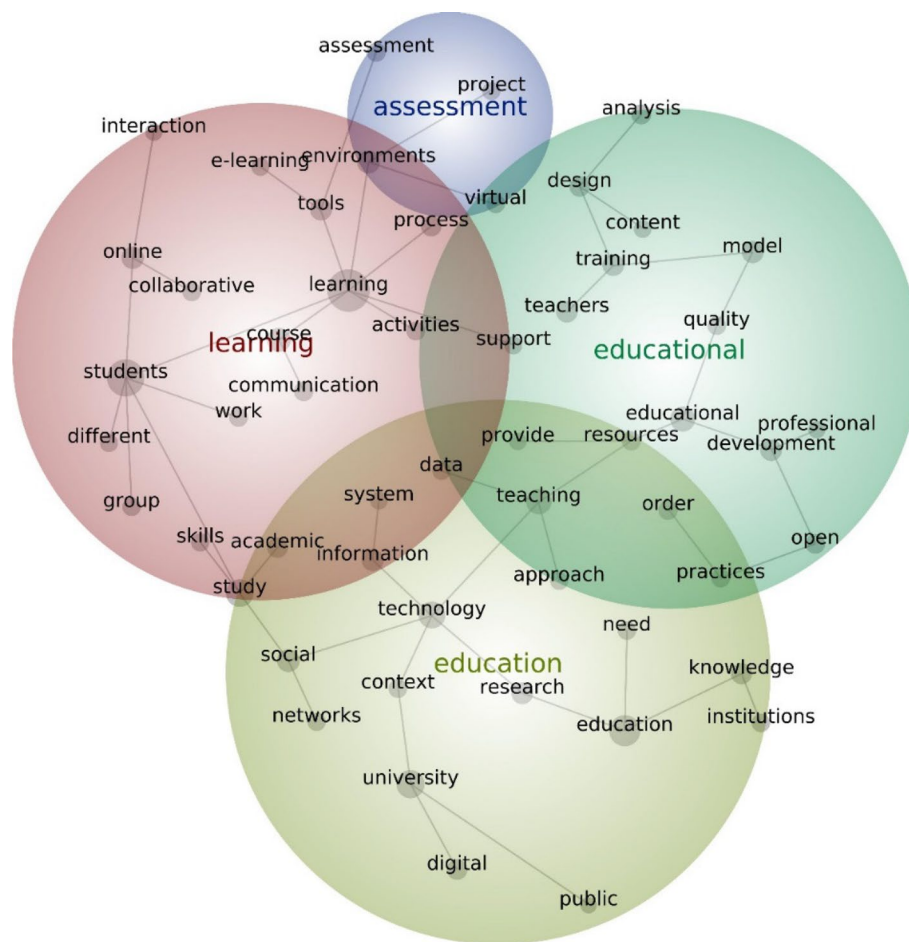


Fig. 3 Concept map for articles published 2010–2017 (n = 218)

& Martín-Gutiérrez, 2014), Ning (e.g., Panckhurst & Marsh, 2011), and Twitter (e.g., Fernández-Ferrer & Cano, 2016). In 2011, a special section called ‘The impact of social networks on teaching and learning’ was published, where the editors warned about blurred boundaries between informal online networks and formal learning spaces, and the policy ramifications of social media use by higher education institutions (Siemens & Weller, 2011). They suggested that it would be interesting to reflect on the use of social networks in 10 years’ time, wondering whether students’ ongoing learning would be realised through those networks, or whether they would purely be used for “staying in touch” (p. 168); a question we still grapple with today.

Assessment tools to support online learning was also a focus of research published in this period (see *assessment-tools-learning-activities*, *assessment-tools-learning-support* and *virtual-environments-learning-tools-assessment*), such as the use of online quizzes (e.g., Blanco Abellan & Ginovart Gisbert, 2012), and web tools developed to align learning outcomes with assessment methods (e.g., Gil-Jaurena & Kucina Softic, 2016), alongside strategies for self-assessment (e.g., Gámiz Sánchez et al., 2014) and peer assessment (e.g., Del Sánchez-Vera & Prendes-Espinosa, 2015). The quality of educational resources and higher education provision were also discussed (see *resources-educational-quality*), especially in regard to the development of MOOCs

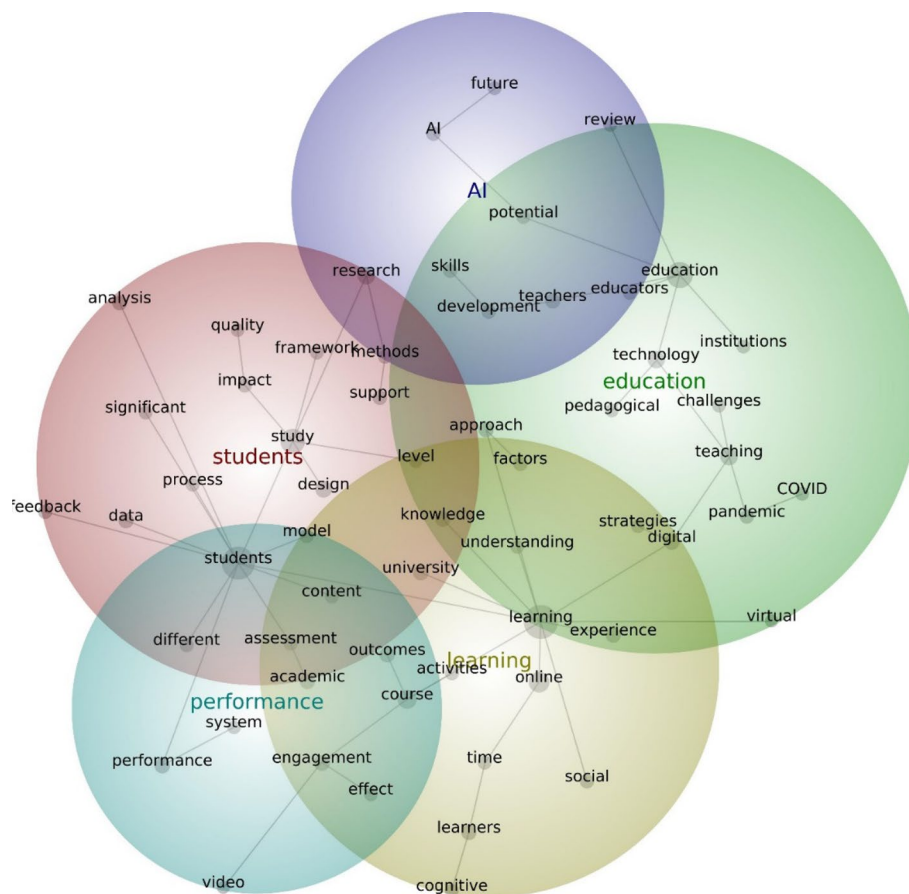


Fig. 5 Concept map for articles published 2021–2024 (n = 222)

flipped learning was heavily focused on STEM disciplines, within US contexts, and lacking theoretical foundations, echoing findings from wider EdTech research (e.g., Hew et al., 2019) and other reviews published in *IJETHE* in the same period (e.g., AI; Zawacki-Richter et al., 2019).

During this time, research also examined the digitalisation of higher education (see *teaching-technology-education-practices* and *teaching-technology-education-institutions*), including a continued exploration of the role of MOOCs (see *social-research-future-MOOCs*). Costello et al. (2018b) conducted a systematic review investigating how Twitter is used by learners and teachers in MOOCs, finding issues with a lack of theoretical underpinning and methodological reporting, including tweet metadata collection. Freitas and Paredes (2018) explored the perceptions of faculty and found that institutions must provide greater support for training, technical services, and for fostering professional learning networks among educators. The development of digital skills by both teachers (see *digital-knowledge-environment-learning-teachers*) and students (see *students-learning-environment-knowledge-skills*) was also analysed in this period, including in one of the highest cited articles (Bond et al., 2018). They found that, despite national and state digitalisation initiatives, both teachers and students at a German higher education institution used a limited number of digital tools,

mostly using them for assimilative tasks, also highlighting the need for greater institutional support.

2021–2024

The concept map for the current period (see Fig. 5) reflects a large amount of research on the impact of the COVID-19 pandemic, as well as the emergence of artificial intelligence. The thematic summary reveals that *students* has the most direct mentions within the text with 589 (100% relative count), followed very closely by *learning* (99%), *education* (70%), *performance* (17%) and *AI* (13%).

One of the largest and arguably the most important themes in this period was how to navigate the shift to emergency remote education during the COVID-19 pandemic (see *COVID-pandemic-teaching-digital-learning-experience* and *COVID-pandemic-teaching-challenges*). Studies published in *IJETHE* explored the experiences of students and faculty in Germany (Engel et al., 2023), Japan (Jung et al., 2021), the US (Ives, 2021; Zheng & Zheng, 2023), Turkey (Karadag et al., 2021), Sweden and Australia (Turner et al., 2023), and China (Yu, 2021), alongside broadband availability in Ireland (Cullinan et al., 2021) and conducting remote experiments in India (Achuthan et al., 2021). In addition to these, four systematic reviews were published, synthesising the available literature on the first six months of remote education provision (Bond et al., 2021), flipped classrooms (Divjak et al., 2022), teaching and learning strategies (Koh & Daniel, 2022), and the use of technology by academics during the pandemic (Sum & Oancea, 2022). There have also since been studies exploring the experiences of institutions and academics in the aftermath of the pandemic (e.g., Broadbent et al., 2023; Kortemeyer et al., 2023; Rienties et al., 2023). Although some voices are still missing, this depth of research indicates a robust response from *IJETHE* towards supporting the EdTech community during the COVID-19 crisis.

The other major theme in this period is the emergence of artificial intelligence, with a range of studies published from students' intention to use AI (e.g., Delcker et al., 2024) and their AI acceptance (e.g., Zhang et al., 2023), to gamified robots (e.g., Yang et al., 2023), intelligent tutoring systems (e.g., Zheng et al., 2024), and predictive learning analytics (e.g., Ouyang et al., 2023). Seven systematic reviews exploring the role of AI in higher education have been published so far in this period (e.g., Crompton & Burke, 2023; Salas-Pilco et al., 2022), which is not surprising given the findings of Bond et al.'s (2024) meta review of AI finding 66 reviews were published between 2018 and 2024 solely on higher education alone. Other evidence syntheses explored AI through design fictions (Cox, 2021), the role of chatbots (Labadze et al., 2023), adaptive feedback (Buckinham Shum et al., 2023), and how generative AI can transform assessment (Xia et al., 2024). At least eight other primary studies have been published already exploring GenAI (e.g., Walter, 2024), and no doubt this trend will continue.

Evaluation of rigour, influence and prestige

Rigour

IJETHE has a double-blind review process, with articles passing editorial office checks first, before being sent on for peer reviewing by at least two anonymous reviewers.

Table 3 Average time to first review decision and final acceptance

Journals	Time to first editorial decision (days)	Time to final acceptance (days)
CAE	10	189
BJET	26	168
IJETHE ^a	20	100
IRRODL ^a	?	180
AJET ^a	?	?
Computers & Education Open ^a	1	231

^a Open access

Table 4 Comparison of Altmetrics for selected Educational Technology journals*

Journals	Total mentions	News mentions	Blog mentions	Policy mentions	X mentions
IJETHE	18,087	219	145	13	16,744
Computers & Education	17,679	1132	263	233	15,020
BJET	10,876	325	109	90	10,058
ETRD	7025	239	50	68	5720
JCAL	4482	228	39	63	3273
IRRODL	2438	85	47	38	2078
Internet and Higher Education	2506	132	70	41	2026
International Journal of Computer-Supported Collaborative Learning	2211	28	9	5	1848
Smart Learning Environments	1298	81	10	12	994
AJET	405	20	15	8	280
Educational Technology & Society	5	0	0	0	3

*As of 20th September 2024

The Editors then reach a decision and consult members of the Editorial Board¹⁰ where necessary. The average time to first editorial decision is slightly longer than *CAE* (see Table 3), but not as long as *BJET*, with the time to final acceptance far quicker than others. However, in 2023 only 3% of articles were published, the same as *AJET* (Corrin et al., 2023), compared to 14% in *BJET* and 10% in *IRRODL*. Both *IJETHE* and *AJET* operate on an open access only, no article processing charge basis, which might therefore lead to higher numbers of submissions. The low acceptance rate still indicates a high level of rigour and careful consideration of which articles are published.

Influence

IJETHE now has rolling publication throughout the year, which means that as soon as typesetting and editorial checks have been completed, they can be uploaded onto the website and are available as open access. Any new research is then publicised via *IJETHE*'s very active social media presence, particularly on X (formerly Twitter),¹¹ as reflected by

¹⁰ <https://educationaltechnologyjournal.springeropen.com/about/editorial-board>.

¹¹ <https://twitter.com/ETHEjournal>.

Table 5 Journal impact factors for leading educational technology journals*

JIF rank	Journals	2018	2020	2023
3	Computers & Education	5.627	8.538	8.9
4	IJETHE ^a	1.922	4.944	8.6
6	BJET	2.588	4.929	6.7
7	Smart Learning Environments ^a	–	–	6.7
8	Internet and Higher Education	5.284	7.178	6.4
9	CALL	2.018	4.789	6.0
14	JCAL	2.451	3.862	5.1
16	Education & Information Technologies	–	2.917	4.8
22	ReCALL	1.361	2.917	4.6
22	Educational Technology & Society ^a	2.133	3.522	4.6
24	Journal of Computing in Higher Education	1.870	2.627	4.5
24	Journal of Research on Technology in Education	–	2.043	4.5
26	Journal of Computers in Education	–	1.08	4.3
28	IJCSSL	2.206	5.108	4.2
31	Computers & Education Open ^a	–	–	4.1
33	Journal of Educational Computing Research	1.543	3.088	4.0
33	Learning Media and Technology	2.373	4.682	4.0
45	Distance Education	1.729	2.952	3.7
45	Interactive Learning Environments	1.929	3.928	3.7
53	Interactive Technology & Smart Education	–	1.02	3.5
53	Language Learning & Technology ^a	2.571	4.313	3.5
60	Revista Iberoamericana de Educacion a Distancia ^a	–	1.69	3.4
60	Technology Pedagogy & Education	1.712	2.529	3.4
64	Educational Technology Research & Development	2.115	3.565	3.3
64	AJET ^a	1.578	3.067	3.3
64	International Journal of DE Technologies	–	–	3.3
133	IRRODL ^a	1.830	2.747	2.5

^a Open access*<https://jcr.clarivate.com/jcr/browse-journals>**Table 6** Comparison of Google Scholar h5-index for selected Educational Technology journals

Journals	h5-index 2014	h5-index 2018	h5-index 2024
Computers & Education	81	91	154
BJET	44	57	101
IJETHE ^a	–	–	77
ETRD	33	34	72
Journal of Computer Assisted Learning	38	37	63
AJET ^a	30	32	51
IRRODL ^a	34	46	49
Smart Learning Environments			46
Internet and Higher Education	35	45	45
Educational Technology & Society ^a	39	44	44
International Journal of Computer-Supported Collaborative Learning	25	26	33

^a Open access

their Altmetrics score (see Table 4). Their Altmetrics, however, also indicate that research published in *IJETHE* is not as picked up by news outlets and policy documents as other high ranking EdTech journals, which is perhaps owing to their more established history, e.g. *CAE* and *BJET* have been publishing for over 40 and 50 years respectively.

IJETHE is indexed in many international databases, including the SSCI, and as of 2023 has an impact factor of 8.6, now placing it above *BJET* (see Table 5) and ranking fourth out of 756 journals in Education & Educational Research. The Google *h*-index considers citations within publications outside of the SSCI (Hirsch, 2005) and places *IJETHE* third out of leading EdTech journals (see Table 6). It is interesting to note, however, that according to the Clarivate Journal Citation Relationships, although authors of articles in *IJETHE* heavily cite research published in *CAE* (17.87%) and *BJET* (6.43%), authors who publish in *CAE* and *BJET* do not cite *IJETHE* research as often (2.16% and 2.99% respectively). This perhaps indicates a need for a study to be undertaken, similar to Ritzhaupt et al. (2012), in order to delve deeper into why there might be a perceived imbalance of prestige by researchers between these top-ranking journals.

Prestige

IJETHE is published by SpringerOpen, with APCs covered by the journal, supported by four associated institutions: Universitat Oberta de Catalunya, Dublin City University, Pontificia Universidad Católica de Valparaíso and Guangzhou University. *IJETHE* has four Editors-in-Chief, a Deputy Editor-in-Chief and two Managing Editors, as well as a 14-member International Advisory Board and a 51-member editorial board. In order to evaluate the prestige of *IJETHE*'s overall team, the *g*-index and the *h*-index were retrieved from Google Scholar.¹² As the *h*-index favours older, more established researchers (Staller, 2017), as well as those who use more quantitative methods (Ouimet et al., 2011), the *g*-index will be used (Egghe, 2006). According to Hirsch (2005), a score over 20 indicates a *successful* researcher after 20 years, a score over 40 indicates an *outstanding* researcher, and a score over 60 indicates a truly *unique* researcher. Of the 58-member Editorial team and Editorial Board, the *g*-index for all but 11 were retrieved, with equal numbers of *successful* (22%, $n=13$), *outstanding* (22%, $n=13$) and *unique* (22%, $n=13$) researchers. Of the 14 International Advisory Board members, three are *successful* (21.4%), two are *outstanding* (14.3%) and an incredible seven are considered *unique* (50.0%).

To complement these metrics, a country and gender analysis was conducted. Both the Editorial Board (46.6% female, 51.7% male, 1.7% unknown) and the International Advisory Board (42.9% female, 57.1% male) were reasonably even in gender representation. However, the geographical analysis revealed some interesting findings (see Fig. 6). More than half of the board (51.7%, $n=30$) are located in Europe, followed by North America (20.7%, $n=12$) and South America (13.8%, $n=8$). However, there is very little representation from Asia (8.6%, $n=5$), Oceania (3.4%, $n=2$) and Africa (1.7%, $n=1$), with no researchers from the Middle East (see Appendix D). Further perpetuating the ongoing trend in EdTech research, was that the most represented

¹² Between the 20th and 22nd September 2024.

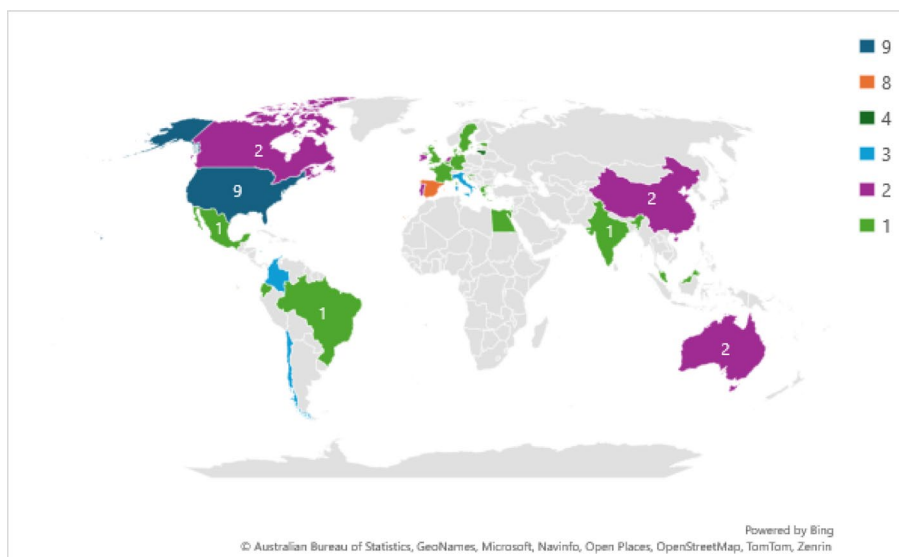


Fig. 6 Geographical representation of the Editorial Team and Board Members (n = 58)

Table 7 Evaluation of IJETHE quality

Rigour	Influence	Prestige
<ul style="list-style-type: none"> • Double-blind peer review • 20 days for initial screening of submissions • 100 days from submission to publication • 3% acceptance rate • All open access, no APC 	<ul style="list-style-type: none"> • Rolling publication throughout the year • Ranked second in the top two EdTech journals • 4/756 in Education & Educational Research • High social media presence • Still a 'new kid on the block' 	<ul style="list-style-type: none"> • Highly respected Editorial Team, Editorial Board and International Advisory Board • Reasonable gender parity • Diverse IAB • Heavy European & North American representation on the Editorial Board

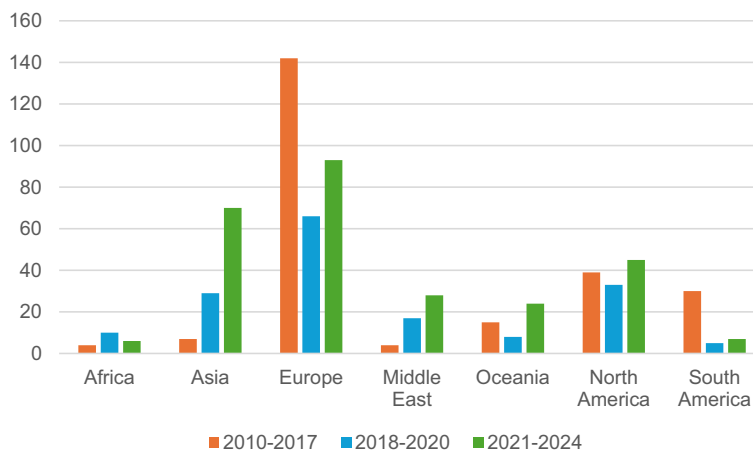


Fig. 7 Authorship by subset time period in IJETHE, 2010–2024

country on the board is the USA (15.5%, $n=9$), followed by Spain (13.8%, $n=8$) and Lithuania (6.9%, $n=3$). The International Advisory Board is slightly more even across the continents (both Africa and North America have 21.4% each), but also has

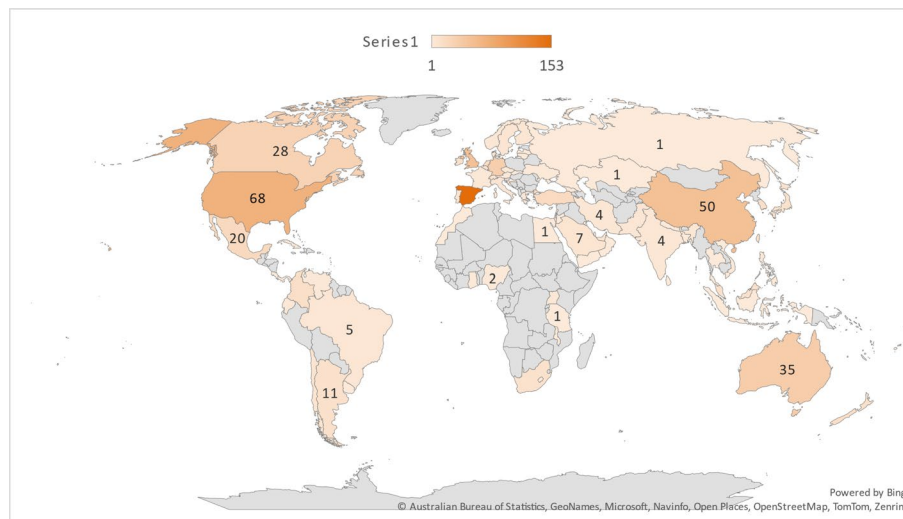


Fig. 8 Geographical authorship in IJETHE, 2010–2024

Table 8 Top ten countries, 2010–2024

Rank	Country	Continent	Number of articles	Percentage
1	Spain	Europe	153	26.2
2	USA	North America	68	11.6
3	China	Asia	50	8.6
=	UK	Europe	50	8.6
4	Australia	Oceania	35	6.0
5	Germany	Europe	33	5.7
6	Canada	North America	28	4.8
7	Mexico	North America	20	3.4
8	Turkey	Middle East	19	3.3
9	Netherlands	Europe	16	2.7
10	Colombia	South America	14	2.4

the USA as the most represented country (21.4%, $n = 3$), followed by two from Australia (14.3%) and two from South Africa (14.3%).

Overall evaluation

The evaluation of IJETHE quality as seen through the lens of rigour, influence and prestige, are shown in Table 7.

IJETHE authorship 2010–2024

Geographical analysis

The authorship within IJETHE excluding editorials up until June 2024 ($n = 584$) has heavily favoured authors from Europe (51.5%; see Appendix E), followed by North America (20.0%) and Asia (18.2%). However, when viewed across the three subset time periods (see Fig. 7), the percentage of European authorship reduced in the 2018–2020

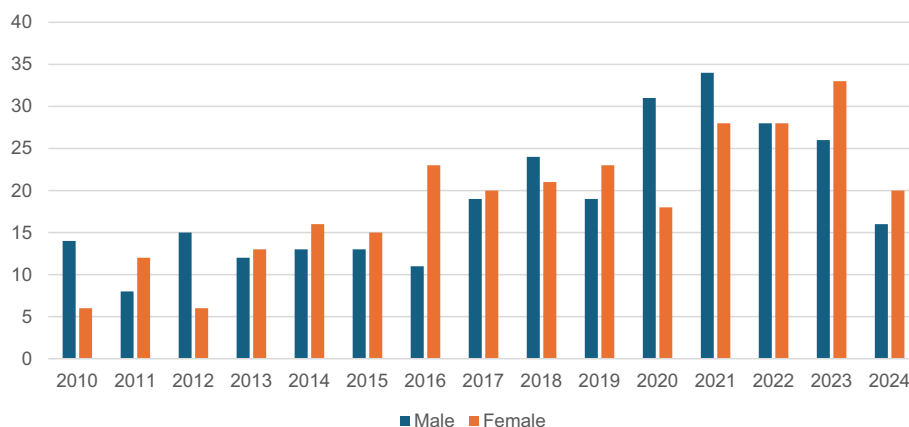


Fig. 9 Gender distribution by year in IJETHE without editorials, 2010–2024

period, and instead saw more authors from Asia, the Middle East and Africa publishing more. This trend makes sense, given the history of *IJETHE* starting out as a Spanish institutional journal, however it is important to note that the amount of South American authorship severely declined from the 2018 period. Echoing previous EdTech research (e.g., Bond et al., 2019, 2024; Mertala et al., 2024), there was far less representation from researchers in the Middle East (8.4%), South America (7.2%), and particularly Africa (3.4%).

Authorship was spread across an incredible 80 different countries (see Fig. 8), higher even than the number published in *BJET* across its 50-year history ($n=72$; Bond et al., 2019). Again, unsurprisingly, Spanish authors were the most frequently published across all years (see Table 8). However, publication by researchers in Spain was only 11.8% ($n=17$) in 2018–2020 and 10.4% ($n=23$) in 2021–2024, which in the most recent period was less than China (17.6%), USA (14.9%) and the UK (12.2%), thereby confirming the findings of previous EdTech research (e.g., Bardakci et al., 2022). It should also be noted that no authors from China, South Korea, Taiwan or Malaysia published in *IJETHE* at all in the 2010–2017 period (see Appendix E), which highlights again the strong rise in Asian authorship. Turkish and German authors have also increased their publication numbers, going from publishing two and three articles in 2010–2017, to 12 and 19 respectively in 2021–2024.

Author collaboration analysis

Research in *IJETHE* is mostly published collaboratively (82.7%, $n=483$), particularly in teams of two or three authors (see Appendix F), with 14 authors of a recent meta-analysis and research synthesis the largest in one publication (Tlili et al., 2023). South American authors have published substantially more as single authors (31%), with Middle Eastern authors the next most frequent (18%). Co-authorship in *IJETHE* is most likely to happen in domestic collaborations (62.2%), as has been found in previous EdTech research (Bond et al., 2024), with only 20.4% of publications internationally co-authored. Domestic co-authorship is particularly high for researchers from Europe (61%), with the highest rate of international research collaboration found in Africa (55%) and North America (42%).

Gender analysis of first authorship

The overall gender representation in publications without editorials ($n=584$) across 2010–2024 was almost even, with 283 male first-authored (48.5%) and 282 first-authored by females (48.3%). 19 first authors (3.3%) were not able to be coded. However, looking at the distribution of gender across the years (see Fig. 9), stark fluctuations can be noted (see Appendix F). Males dominated in 2010 (70.0%), 2012 (71.4%), 2020 (56.4%) and 2021 (52.3%), and females in 2011 (60.0%), 2016 (65.7%), 2019 (53.5%), 2023 (55.0%) and 2024 (52.6%). When viewed across the three subset periods without editorials, more females were published in 2010–2017 and 2021–2024, but more males were published in 2018–2020. When editorials are considered, males published more in the 2010–2017 and 2018–2020 periods, likely due to the number of editorials published by Editor-in-Chief Josep Duarte. The large drop in female representation in 2020 and 2021 is likely due to the COVID-19 pandemic, which placed a large burden on those with home caring responsibilities of young children and family members, especially females (Myers et al., 2020; Parlak et al., 2021).

Quality of evidence syntheses published in *IJETHE* 2018–2024

The evidence syntheses published in *IJETHE* ($n=43$) were assessed against 11 quality assessment criteria using QuEST (Bond et al., 2024; see Table 9). Almost all studies provided explicit information about their research questions, aims or objectives (93.0%) and the publication years of literature included in the review (81.4%). Only 44.2% of evidence syntheses provided the full inclusion/exclusion criteria and, although 60.5% of articles did provide the full search string used, 32.6% only provided example words used—along the lines of “search terms included words like ‘AI’ and ‘robots’”—and a further 4.7% did not report any search terms. Other concerning findings were that only 39.5% searched in a wide enough range of platforms and databases, only 25.6% reported full inter-rater reliability information between reviewers, only 14.0% of studies included the data extraction scheme used and 44.2% (17 systematic reviews) did not undertake any form of quality assessment although it is a requirement for that type of evidence synthesis (Sutton et al., 2019). There was also a literature review that was mis-named a meta-analysis, instead of a meta-synthesis (Galvis & Carvajal, 2022).

Table 9 Quality assessment of evidence syntheses ($n=43$)

Criteria	Yes	Partly	No	N/A
Are there clear research questions, aims or objectives?	93.0%	7.0%	0%	
Were inclusion/exclusion criteria provided in the method section?	44.2%	53.5%	2.3%	
Are the publication years included defined in the title, abstract or method section?	81.4%	9.3%	9.3%	
Was the search adequately conducted and likely to have covered all relevant studies?	39.5%	25.6%	34.9%	
Was the search string reported in full?	60.5%	32.6%	4.7%	2.3%
Do they report inter-rater reliability?	25.6%	11.6%	62.8%	
IS DEST use or non-use reported?	25.6%	18.6%	55.8%	
Is the data extraction coding schema provided?	14.0%	74.4%	9.3%	2.3%
Is some form of quality assessment applied?	14.0%	4.7%	44.2%	37.2%
Are sufficient details provided about the individual included studies?	34.9%	27.9%	25.6%	11.6%
Is there a reflection on review limitations?	41.9%	30.2%	27.9%	

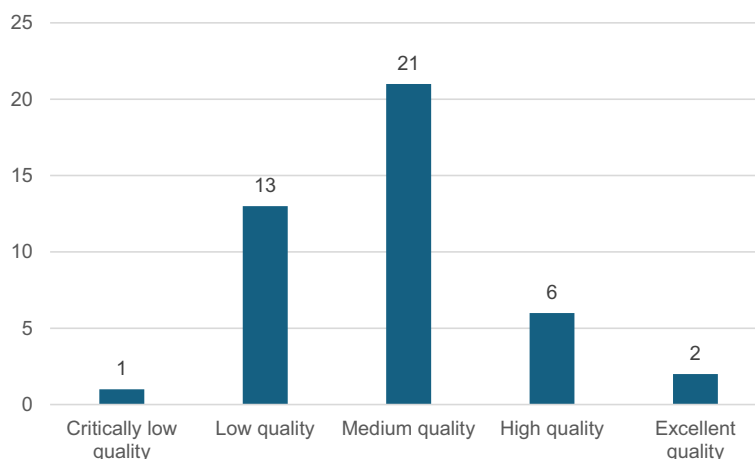


Fig. 10 Overall quality assessment of evidence syntheses (n=43)

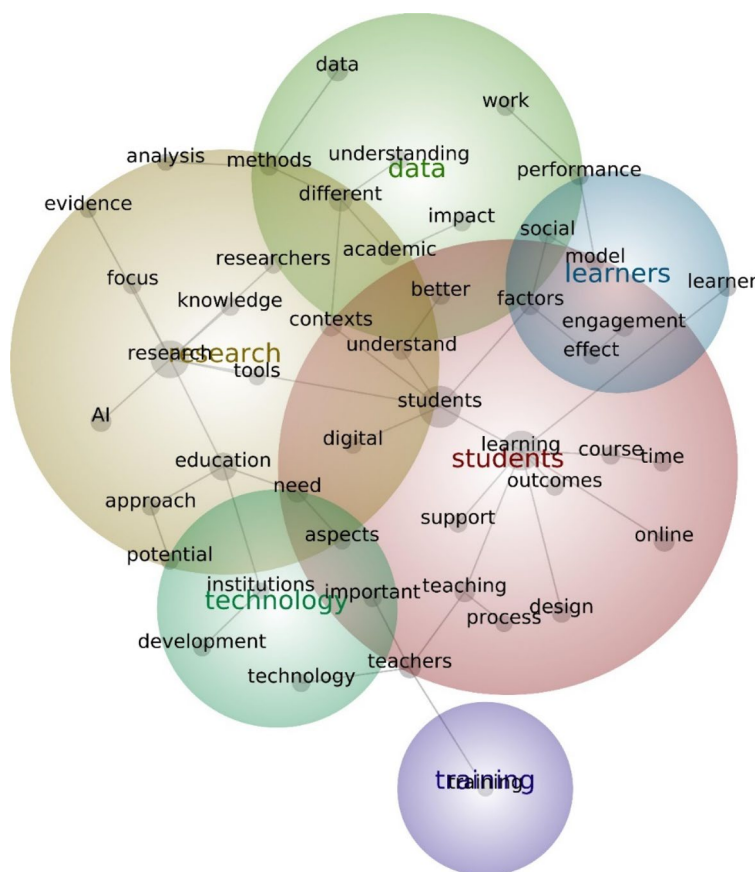


Fig. 11 Concept map for future research needs in articles published 2021–2024 (n=207)

The evidence syntheses were given an overall quality assessment score out of 11 (see Fig. 10), averaging 6.76 across the corpus. Looking at the quality over time (see Appendix G), it is encouraging that the number of ‘low quality’ reviews have been reducing since 2020, while the number of ‘high quality’ and ‘excellent quality’ reviews have been increasing. Most notable is that only three out of 23 systematic reviews are

rated 'high quality' which, given their popularity, is a major red flag and represents a key area of future development need.

Analysis of future research suggestions identified in IJETHE 2021–2024

The content analysis of future research suggestions in *IJETHE* (see Fig. 11) confirms those identified in previous EdTech research (e.g., Bond et al., 2024). The thematic summary reveals that *students* has the most direct mentions within the text with 365 mentions (100% relative count), followed by *research* (95%), *data* (28%), *learners* (14%), *technology* (14%) and *training* (7%). Five key areas were identified for future research: (1) the importance of continued professional development for educators (see *technology-teachers-training*); (2) the impact of digital tools on student learning outcomes (see *digital-students-learning-outcomes*) and engagement (see *digital-students-factors-effect-engagement*); (3) how AI can support students with their learning (see *AI-research-tools-students-learning*); (4) using a range of methods to understand how students learn online in a variety of contexts (see *online-learning-students-contexts-different-methods-data*); and (5) the impact of social and contextual factors on student engagement and outcomes (see *social-factors-effect-engagement* and *students-contexts-different-academic-impact*). The following is a list of ideas for future research, as suggested by authors published in *IJETHE* 2021–2024:

Pre-service teacher and educator professional development with technology

- Exploring effective methods for integrating AI literacy into teacher education programs and assessing the impact of AI literacy on teachers' acceptance and use of AI tools (e.g., Xia et al., 2024).
- Examining the ethical implications of using AI in teacher education, including issues related to bias, privacy, and the evolving roles of teachers in AI-powered learning environments. Longitudinal studies are particularly encouraged (e.g., Zhang et al., 2024).
- Exploring effective professional development models and strategies that support educators in developing the necessary skills, knowledge, and confidence to integrate technology effectively (e.g., Basilotta-Gómez-Pablos et al., 2022), including impacts on their wellbeing (e.g., Turner et al. (2023)).

Impact of digital tools on learning outcomes and engagement

- Cognitive and emotional aspects of learning and engagement (e.g., Abdolmaleki & Saeedi, 2024).
- Development of more comprehensive frameworks and instruments to measure and understand student engagement with digital tools, including consideration of behavioural, cognitive, emotional, and social aspects, and how these dimensions interact and influence learning outcomes (e.g., Nkomo et al., 2021).
- Involve a wider range of stakeholders, including students, teachers, administrators and policymakers in the research process (e.g., Chan & Hu, 2023; Wang et al., 2023).

AI tools to support student learning

- How generative AI affects student learning and health outcomes, as well as impacts on cognitive skills, mental health and learning experiences (e.g., Abbas et al., 2024).
- Investigation of learning gain measures, physiological measures of cognitive load as well as controlling for pre-knowledge (e.g., Koć-Januchta et al., 2022).
- How students from different disciplinary backgrounds use generative AI feedback to help revise their written work (e.g., Banihashem et al., 2024).

Using multimodal data to understand student learning in a range of contexts

- Collecting physiological data, such as heart rate variability, galvanic skin response, and eye-tracking data, alongside behavioural data from online learning platforms and video recordings, to provide insights into students' cognitive load, emotional states, and engagement levels during learning activities (e.g., Xu et al., 2023).
- Scalability in processing capabilities of live data streams originating from wearable sensors for learning analytics dashboards (e.g., Susnjak et al., 2022) and the use of customisable dashboard interfaces that allow teachers to choose visualisations (e.g., Kaliisa et al., 2023).

Impact of social and contextual factors on student engagement and learning outcomes

- Experimental designs to examine the causal relationships between independent variables (such as attitudes and motivation) and dependent variables (learning engagement and perceived learning outcomes) when using MOOCs (e.g., Wei et al., 2024).
- Examining the influence of institutional factors, such as policies, resources and support structures, have on the implementation and effectiveness of digital tools in promoting engagement and learning, particularly for underrepresented populations (e.g., Laamanen et al., 2021).
- Further exploration of loneliness in online learning, especially in regard to students with disabilities (Kotera et al., 2021).

Conclusions and recommendations

This content and authorship analysis has revealed that *IJETHE* is an impactful, highly regarded journal in educational research, with a prestigious Editorial Team and International Advisory Board. Its open access policy and quick publication time, combined with its impact factor and social media reach, have made it a popular journal for EdTech researchers. It has become substantially more international since the analysis conducted by Ramiro Sánchez et al. (2014), with researchers from 80 different countries published across 2010–2024. The US, for example, is not as dominant in *IJETHE* as in other publications (e.g., CAE; Zawacki-Richter & Latchem, 2018), and there has been a notable rise in Asian authorship, particularly from China, South Korea and Taiwan. However, research from the Global South continues to be underrepresented, and the rate of international research collaboration is low among contributing authors.

As with other disciplinary fields (e.g., ecology, Hughes et al., 2023; sociology, Brown et al., 2024), *IJETHE's* editorial board is heavily Western-focused, dominated by researchers from the US and Spain, with over half of the board based in Europe. However, unlike journals in the natural sciences (e.g., Liévano-Latorre et al., 2020), and even other journals in EdTech (e.g., CAE; Xue & Xu, 2024), *IJETHE's* editorial board has almost equal gender representation. Furthermore, although a slight gender gap has been reported in previous EdTech research (e.g., Scharber et al., 2019; Zawacki-Richter et al., 2017), research published in *IJETHE* has had equal gender representation. The dip in female representation among first authors in 2020 reflected the COVID-19 pandemic stresses particularly placed on women (Gabster et al., 2020), and it is heartening to see that the numbers of female first authors published in 2023 and 2024 are trending upwards.

The quality appraisal of evidence syntheses has confirmed concerns about the methodological rigour being applied when conducting reviews (Bond et al., 2024; Pussegoda et al., 2017). For example, only three systematic reviews out of 23 received a 'high quality' score, and only 14% of evidence syntheses conducted a quality assessment. This finding adds to a growing body of evidence that substantial work is needed to build researcher awareness of and access to high quality methodological guidance, not only within the wider field of Education, but across social science disciplines more generally (Bond, 2024).

Recommendations for the wider EdTech community

There is a pressing need for EdTech research that extends beyond short-term, one-off experiments, and addresses the diverse needs of learners worldwide. This requires incorporating multiple perspectives, disciplines, countries and cultures (Ayanwale et al., 2024; Bond et al., 2024; Crompton & Burke, 2023), while also considering the many factors that influence students' engagement with learning and digital tools (Bond & Bergdahl, 2022; Nkomo et al., 2021). Although open access journals like *IJETHE* increase opportunities for researchers from low- and middle-income countries to publish, greater efforts to build research capacity are necessary (Hughes et al., 2023). For instance, former *AJET* editors revealed that submissions from Africa or non-Westernised Asia face higher desk-rejection rates compared to those from Western contexts (Heinrich et al., 2018). Encouraging international research collaborations could help address these disparities, despite challenges in finding collaborators and trying to publish in leading journals (Matthews et al., 2020). Journals and researchers in developed, particularly English-speaking nations, could play a key role (Lund, 2022), such as recruiting more female editors to enhance female representation in publishing, potentially strengthening the visibility and publication of more women globally (Scharber et al., 2019).

Recommendations for IJETHE

The following recommendations could help strengthen *IJETHE* even further:

- Targeted recruitment of researchers from Africa and Oceania to the editorial board, as well as potentially increase numbers from Asia and South America as well, especially given the low number of authors currently being published from South America.

- Consider publishing more special issues that target particular under-represented countries and disciplinary areas outside of STEM.
- Consider establishing a Peer Mentoring Scheme and an Early Career Researcher Mentoring scheme, similar to BERA journals such as *BJET*¹³ and the *Review of Education*.¹⁴
- Set up a Q&A page on the website like IRRODL,¹⁵ including revised information on how to successfully submit an article to the system.
- Increase *IJETHE*'s social media presence beyond X, in order to improve reach, such as using LinkedIn (e.g. Open Praxis¹⁶), as this is where a lot of EdTech conversation has moved to.
- Editor and reviewer training of evidence synthesis methods, including the use of a quality appraisal tool like QuEST when considering the methodological rigour of a potential review publication.
- Provide periodic methodological guidance in editorials (e.g., Twining et al., 2017).
- Consider providing an optional template for the reporting of systematic reviews.
- Consider lengthening the word count suggestion for review articles.
- Explore why researchers who publish in top, established EdTech journals like *CAE* and *BJET* do not cite research published in *IJETHE* as often.
- Explore how research published in *IJETHE* could become more visible to news outlets and policy makers.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s41239-024-00492-z>.

Additional file 1.
Additional file 2.
Additional file 3.
Additional file 4.
Additional file 5.
Additional file 6.
Additional file 7.

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Author contributions

MB conceptualised the review, managed the software, conducted all screening and data extraction, synthesis, writing up, and revisions.

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Availability of data and materials

The datasets generated and/or analysed during the current study are available in the OSF repository, <https://doi.org/10.17605/OSF.IO/SVK2N>.

¹³ <https://www.bera.ac.uk/news/bera-launches-journal-peer-mentoring-scheme>.

¹⁴ <https://www.bera.ac.uk/opportunity/roe-behind-the-scenes-early-career-researcher-mentorship-scheme-call-for-expression-of-interest>.

¹⁵ <https://www.irrodl.org/index.php/irrodl/about>.

¹⁶ <https://www.linkedin.com/company/open-praxis/>.

Declarations

Competing interests

The author has published in *IJETH* and has work in the top ten articles list.

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