

## **AI in Education Research Drives International and Interdisciplinary Collaboration: A Look at Recent Publication Trends**

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### **ABSTRACT**

*This study analyzes recent trends in AI in education research and their effects on global and interdisciplinary collaboration. Using bibliometric methods, we examined 599 peer-reviewed articles (January 2021–April 2025) from The Internet and Higher Education, British Journal of Educational Technology, and Computers & Education. Of these, 236 addressed AI. AI-focused studies were significantly more likely to feature international ( $\chi^2 = 19.4, p < .001$ ) and interdisciplinary ( $\chi^2 = 23.8, p < .001$ ) collaboration than non-AI work, particularly in BJET and C&E. Leading international partnerships involved the United States, Australia, and Hong Kong, with education–computer science the dominant interdisciplinary link. The findings show AI in education is a key driver of global, cross-disciplinary research networks.*

**Keywords:** Artificial intelligence in education, Interdisciplinary research collaboration, international research networks, bibliometric study, learning technologies, AI research, AI applications in learning

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## INTRODUCTION

Artificial Intelligence (AI) now permeates every layer of educational practice, from intelligent tutoring systems to large-language-model chatbots (Sedkaoui & Benaichouba, 2024). As the field of Artificial Intelligence in education rapidly expands, a second, under-examined question arises: Does AI research itself bolster international coauthorship and AI interdisciplinarity – that is, sustained collaboration across disciplinary and national boundaries? This paper takes a bibliometric approach to explore whether AI, as a research topic within education, is not only shaping what we study but also how - and with whom - we conduct that research.

Collaboration in academic research has been seen as a key source of new ideas for a long time, especially in areas that need diverse types of knowledge (Lund, 2020). Interdisciplinary collaboration allows researchers to address complicated issues by merging insights from several academic fields, whereas international collaboration broadens the cultural, institutional, and methodological scope of research initiatives (Wagner et al., 2011). In the context of educational technology and artificial intelligence, scholars have highlighted the importance of integrating ethical, pedagogical, and technical perspectives to ensure responsible and effective implementation (Holmes et al., 2019). Although Holmes et al. do not focus on collaboration specifically, their work underscores the necessity of multiple forms of expertise to address the multifaceted challenges of AI in education.

What has yet to be explored, though, is whether the fact that AI is a study topic actively encourages scholars from different countries or fields to work together. Since AI is becoming a big part of educational research, it makes sense to wonder if it is also changing the study ecosystem (Shubha et al., 2025). In other words, is it changing the way academics, as a community, work together? Is artificial intelligence only a topic of research or is it also a structural catalyst bringing together academics who might not otherwise cooperate? These questions are especially important because AI related problems in education are getting more complicated and need to be solved by combining ideas from many fields, such as computer science, psychology, ethics, and more.

Moreover, as educational research becomes more globalized, understanding how emerging technologies influence collaboration dynamics can inform institutional strategies, funding priorities, and editorial practices in academic publishing. Previous studies have examined collaboration patterns more broadly across disciplines or countries (Bozeman & Boardman, 2014) and have highlighted the complexities of measuring interdisciplinary integration using co-authorship and bibliometric indicators, while stressing the importance of cognitive and social dynamics in collaboration processes (Wagner et al., 2011). However,

neither study directly explores how specific research topics, such as AI, might drive these collaboration patterns. Identifying such patterns can offer valuable insight into how academic fields evolve in response to disruptive innovations and can help stakeholders understand where collaborative capacity is growing or lacking.

This paper addresses this gap by focusing on collaboration in the specific context of AI-related research in education. By examining whether AI as a subject area is associated with higher rates of international and interdisciplinary authorship, the study seeks to clarify the broader academic implications of AI's rise. It moves beyond pedagogical impacts and technical implementation to investigate how AI may be influencing the very way academic knowledge is produced, co-authored, and disseminated in the field of educational technology.

## LITERATURE REVIEW

Artificial intelligence (AI) has grown from a somewhat futuristic and relatively unused technology in past decades to a major force for change in educational systems all over the world (Beck et al., 1996; Ifenthaler et al., 2024). The increasing sophistication and accessibility of AI tools have enabled novel forms of learner support, adaptive instruction, and administrative efficiency (Triansyah et al., 2023). In education, AI is now applied across a range of different use cases from intelligent tutoring systems and personalized learning analytics to automated grading, conversational agents, and generative content production (Holmes et al., 2019; Wang et al., 2022). Because of these changes, there is a significant portion of literature that looks at how AI is changing how we teach, how we learn, and how institutions work (Prahani et al., 2022).

Several systematic reviews have categorized the key domains of AI applications in education. For example, Zawacki-Richter et al. (2019) identified intelligent tutoring systems, profiling and prediction, assessment, and adaptive personalization as dominant areas. Their study highlighted a significant focus on technical development but noted a relative scarcity of work exploring pedagogical implications. Similarly, Chen et al. (2020) also looked at AI use in higher education and focused on how machine learning applications for personalized learning are common. The authors discussed how these technologies improve administrative efficiency and learner modeling, but did not focus on how these technologies fit within instructional theory. These reviews collectively show that while AI in education is expanding, much of the literature remains fragmented across disciplines, and the collaborative infrastructures behind the research are often overlooked.

It is important to note that the rise of creative AI tools like ChatGPT, Gemini, and Claude has increased both public interest and scholarly urgency (Francis et al., 2025). These tools make it possible for learning to be more flexible,

engaging, and individualized, but they also raise social and mental questions. As Luckin (2017) emphasized in the context of AI-based assessment, the success of AI in education depends not only on technical capabilities but also on the willingness of educators, policymakers, and scientists to collaboratively develop systems that are pedagogically grounded, ethically governed, and socially responsive. Consequently, this necessitates collaboration between experts in education, computer science, learning analytics, psychology, and ethics disciplines that have historically operated in relative isolation within academic publishing structures.

Despite this recognized need for collaboration, few studies have examined how AI's interdisciplinary character is reflected in actual research authorship patterns. In most AI-in-education reviews, the focus has been on the function or design of AI systems rather than on the collaborative processes or knowledge structures that underlie their development (Chen et al., 2020; Holmes et al., 2019). Yet the complexity of modern AI tools often demands cross-boundary collaboration at both technical and conceptual levels. For instance, designing an AI tutor for a university course may involve computer scientists for the algorithmic backbone, educators for curriculum alignment, and ethicists for bias evaluation and transparency mechanisms (Zeller & Dwyer, 2022). These layered requirements raise the question: are such collaborations becoming the norm in AI-related educational research?

While cross-disciplinary cooperation is encouraged by funding agencies and journal guidelines, empirical data on collaboration trends within AI-education literature is still scarce. Kusters et al. (2020) said that many AI projects that involve people from different fields run into problems like disagreements about what is true, problems with communication, and institutional lethargy. However, they also found that when successful, interdisciplinary teams working on AI problems often produced more innovative and socially grounded outcomes. Similarly, Holmes et al. (2019) also stress how important it is to include a wide range of academic partners, such as teachers, scientists, and ethicists, in shaping AI's role in education, while also cautioning that current academic structures may not sufficiently support such integrated collaboration. Yet even in their work, evidence about the prevalence of such collaboration in practice is limited.

The global nature of AI being used in education and the challenges that come with this technology further adds to this complexity (Jin et al., 2025). As AI tools are adopted across diverse geopolitical and cultural contexts, the need for international research collaboration becomes more pronounced (Lund et al., 2025). Although much of the literature on AI in education focuses on instructional design and technological innovation within specific educational systems, there is limited empirical work examining whether tools developed in one region adapt well to others. Chiu and Churchill (2016), for instance, examined the effectiveness of learning object design within the Hong Kong school system, focusing on

conceptual modeling and algebra instruction, but did not explore how such instructional tools perform across differing educational environments. Though research that is specifically focused on one region is undoubtedly relevant and timely, and can be used, there is also, at the same time, a need for partnerships across borders. Interdisciplinary, cross cultural collaboration could make research fit a wider range of situations. However, research currently lacks whether these kinds of international partnerships are more common in AI-related studies than in traditional educational research.

Research on AI in education has mostly focused on technology functions rather than the joint structures (amongst people themselves) that help with innovation (Zhai et al., 2021). People from different fields and around the world need to work together, especially when talking about the ethics and complexity of AI. There is little evidence about whether research related to AI is actually more collaborative than research that is not related to AI. However, as seen with the rise of research related to AI in Education, this research opens the door for new kinds of partnerships—ones that could bring more voices to the table and create more meaningful, shared progress.

## **International and Interdisciplinary Collaborations**

Collaboration in research is a complex phenomenon, as the research process unfolds within particular socio-technical contexts with distinct histories and epistemological foundations that differ from one discipline to another and from one institution to another. Existing literature discusses how it has been conceptualized and assessed, which in turn provides a richer context and basis for our inquiry, which aims to show how interdisciplinarity and international collaboration can impact scholarly communication.

Interdisciplinarity in research collaboration serves a pragmatic purpose: more than one field of knowledge should be used to answer research questions only when necessary for the scope of the inquiry, such as a complex issue with multiple factors interrelated into an organic whole (Weaver, 1948). The National Academies has defined Interdisciplinary Research (IDR) as the integration of concepts, techniques, and/or data from different fields of established research (2005). In *A Taxonomy of Interdisciplinarity*, Klein (2010) equates integration with interaction of existing structures of knowledge (no longer requiring disciplinary grounding as the basis for interdisciplinarity). The author makes a clear distinction between interdisciplinarity and multidisciplinary that only juxtaposes disciplinary knowledge that retains its original identity and structure.

Interdisciplinary research takes a pragmatic constructivism approach in generating scientific knowledge, one that values the process of research, interaction and its eventual usefulness (Klein, 2021). For Wagner et al. (2011), the process of knowledge integration in IDR assumes a social negotiation of cognitive

processes that is difficult to capture using co-authorship of scholarly output or citation analysis alone, because it takes place as the research is being conducted and would benefit from qualitative methodologies that afford a more complete understanding of the collaborative process.

Although there are noted benefits for using co-authorship data to indicate multidisciplinary or international collaborations, such as its accessibility on databases that allow for easy replication, it is only a partial indicator of collaboration because of the challenges in qualifying the nature and magnitude of contributions of those involved in the research process, particularly if they are intangible or tacit (Katz & Martin, 1997). Additionally, research collaborations lead to a multitude of outcomes, of which a co-authoring journal articles only represents one, a privileged one (Katz & Martin, 1997; Wagner et al., 2011).

The concept of promoting bibliodiversity conveys the strengthening of the scholarly communication ecosystem through a variety of types of research systems, that enable the participation of diverse knowledge producers, institutions and epistemic knowledge bases, in response to the homogenization of publication formats and outlets increasingly owned by a small number of multinational publishers serving commercial interests (Shearer et al., 2020). This requires voluntarily mixed research teams in an environment allowing intellectual freedom that is inherently essential to scientific knowledge production (Weaver, 1948).

International research collaborations convey a global network of scholars that is self organizing, where scholars are free from national funding and cultural contexts that can impact research agendas (Wagner & Leydesdorff, 2005). Social network analysis can be used to discover international collaboration patterns, from the level of individual researchers making decisions that through rules embedded in the system, convey collective action. This can be seen in the 1990s with events such as the fall of the Soviet Union and the proliferation of the Internet that provided specific opportunities for knowledge diffusion (Leydesdorff & Wagner, 2008). Looking at previous data provides insights about trends in research topics, changes in collaboration groupings, and funding that scholars and institutions can anticipate for their own research agenda strategies (Sahar & Munawaroh, 2025).

## **AI and the Need for Collaborative Research**

By its very nature, definition, and broad use, AI research necessitates an interdisciplinary approach for its technical development that is grounded in an understanding of its social impact and implications that depend upon a knowledge base of human intelligence and technical information systems (Guo et al., 2020; Wamba et al., 2021). From a historical perspective, AI was initially conceptualized in the 1950s with its development motivated by the infusion of human intelligence into machines. AI as a field has since moved toward increasing technical intelligence without constraints, and would benefit from incorporating

socioeconomic factors such as trust, privacy, and social implications (Lu, 2024). Both its success in implementation and the minimizing of risk depends on taking an interdisciplinary research approach to its development (Jiang et al., 2022).

For Carroll and Rosson (2007), technology should involve the active involvement of stakeholders in the design of information systems (of which AI is included), its implementation, and the infrastructure, all of which exist within the socio-technical system in which it is embedded. This includes the recipients of the technology because developers cannot anticipate the wide range of use cases of the public that provide a human-centered focus. This highlights an inherent bias that exists when technology is created without multiple perspectives.

This need for multiple stakeholder design is even more striking in developing AI applications for education. These collaborative relationships between AI developers, educators and research are necessary to support co-creating the technology and would ensure the quality and relevance of AI tools and systems that reinforce learning, and the resulting partnerships would drive learning science-driven AI (Luckin & Cukorova, 2019). One of the striking gaps that would have been circumvented from interdisciplinary collaboration is the lack of defining AI in AI research. In a systematic review of scholarly literature from 2005 to 2020 found that more than half of the primary studies (58) lacked a definition, with the remaining utilizing 28 different definitions, of which seven did not include a citation (Collins et al., 2021). The authors also found that in most cases, AI was defined through its capabilities rather than defining it, an already existing trend in the field (Russel & Norvig, 2021) and conclude that this indicates a larger issue of a lack of participation in the accumulation of knowledge.

## **Research Problem**

It remains unclear whether AI-related educational research actually leads to greater collaboration across disciplinary and national boundaries. As mentioned previously, much of the existing research discusses AI in relation to specific fields or settings, or focuses on the technological and pedagogical implications of these tools. However, there has been little empirical attention given to whether AI, as a research topic, actively creates, fosters, or encourages more collaboration or more interdisciplinary research teams in academic practice. Specifically, it is still unknown whether AI-related research in education is associated with higher rates of co-authorship across different fields and countries compared to non-AI educational research. This gap limits our understanding of how emerging technologies might be changing not only what we study, but also how – and with whom – studies it.

Understanding if AI research, in the educational sphere, actually promotes interdisciplinary and international research is important for several reasons. First, it is important to recognize that research, if conducted across fields and borders,

can lead to more well-rounded and ethical research. It also can lead to research that can serve a larger population -- populations that are more diverse. Second, identifying collaboration patterns can help institutions and funding agencies better support the kinds of teams that are needed to tackle complex educational challenges. Finally, recognizing whether certain topics – like AI – naturally encourage broader partnerships can also inform how we design future research agendas, shape graduate training, and rethink scholarly publishing norms. Without this insight, academics in research risk building siloed knowledge in an area that, by nature, demands integration.

## **Research Questions**

1. To what extent is there a relationship between the presence of artificial intelligence (AI) as a subject matter and the likelihood of international and/or interdisciplinary collaboration in educational technology research articles?
2. Which countries are most frequently involved in international and interdisciplinary collaboration in AI-related educational research, and how do these patterns compare to those in articles without such collaboration?
3. Which disciplines are most frequently involved in international and interdisciplinary collaboration in AI-related educational research, and how do these patterns compare to those in articles without such collaboration?

## **RESEARCH METHOD**

This study analyzes international and interdisciplinary collaboration among authors of research articles published in three highly regarded technology in education journals to determine whether the articles' focus on artificial intelligence correlates with differences in collaboration types. The journals included in this study are *The Internet and Higher Education (I&HE)*, the *British Journal of Educational Technology (BJET)*, and *Computers and Education/Computer and Education: Artificial Intelligence (C&E)* (the latter being a companion journal with a specific focus on AI-related articles). The study spans the period from 2021 to April 2025.

The data collection process began by retrieving all peer-reviewed articles published in these three journals during this time period. For I&HE, all articles published between 2021 and 2025 were included due to the relatively small number of articles in that period. For BJET and C&E, articles were selected using random sampling. Specifically, for BJET, all 43 AI-related articles published from 2021 to 2025 were included, but only a random sample of non-AI articles was taken. The final distribution of articles for each journal is as follows:

- Internet and Higher Education: 94 non-AI articles, 12 AI-related articles

- British Journal of Educational Technology: 150 non-AI articles, 43 AI-related articles
- Computers and Education: 150 non-AI articles, 150 AI-related articles

For each article, author information was collected, including affiliations (both institution and country) and disciplines. This information was either directly obtained from author bios in the articles or through online searches. The authors' national and disciplinary affiliations were then compared to categorize the collaborations as follows:

- International Collaboration: If two or more authors were affiliated with institutions in different countries.
- Interdisciplinary Collaboration: If two or more authors were affiliated with institutions from different academic disciplines.
- Both: If both international and interdisciplinary conditions were satisfied.

Next, frequencies for the different collaboration types were calculated for each journal and article category (AI/non-AI). Percentages were computed to facilitate comparison. To examine whether there are significant differences in collaboration patterns between AI-related and non-AI-related articles, chi-square tests of independence were conducted for the journals BJET and C&E. This addressed the first research question regarding the potential effect of AI content on collaboration types.

Lastly, a more detailed analysis was conducted for the AI-related articles across the three journals. Two tables were created to illustrate the most common national and disciplinary affiliations of authors involved in international or interdisciplinary collaborations. These analyses addressed the second and third research questions, exploring how AI-related research may influence patterns of international and interdisciplinary collaboration.

Table 1 shows the distribution of international and interdisciplinary collaborations across AI-related and non-AI-related articles published in the three top technology in education journals. Notable are relatively consistent percentages for the collaborator groups for all three journals' non-AI articles: approximately 15% for international collaboration only, 14% for interdisciplinary collaboration only, 10% for both interdisciplinary and international collaboration, and about 61% for neither interdisciplinary nor international collaboration. This consistency does not hold for the AI-based articles among the three publications, though some commonalities can be found.

## RESULTS

**Table 1: Findings for International/Interdisciplinary Collaboration Among I&HE, BJET, and C&E**

Journal	International	Interdisciplinary	Both	Neither
<b>The Internet and Higher Education</b>				
Non AI Articles	13	14	11	56
Percentage	13.83%	14.89%	11.70%	59.57%
AI Articles	0	4	1	7
Percentage	0.00%	33.33%	8.33%	58.33%
<b>British Journal of Educational Technology</b>				
Non AI Articles	23	20	13	94
Percentage	15.33%	13.33%	8.67%	62.67%
AI Articles	6	16	9	12
Percentage	13.95%	37.21%	20.93%	27.91%
<b>Computers and Education</b>				
Non AI Articles	24	20	14	92
Percentage	16.00%	13.33%	9.33%	61.33%
AI articles	11	38	33	68
Percentage	7.33%	25.33%	22.00%	45.33%
<b>Combined - All Three Journals</b>				
Non AI Articles	60	54	38	242
Percentage	15.23%	13.71%	9.64%	61.42%
AI Combined	17	58	43	87
Percentage	8.29%	28.29%	20.98%	42.44%

A chi-square test of independence shows that there is a significant relationship between whether an article published in the British Journal of

Educational Technology has subject matter related to artificial intelligence and the presence of international or interdisciplinary collaboration among the article's authors,  $X^2(3, n = 193) = 22.02, p < .001$ . While there was no difference found in the percentage of articles including international authorship collaborations alone, there were significant differences in interdisciplinary collaborations (AI-related articles have approximately three times as much interdisciplinary collaboration as expected based on the non-AI articles), articles with both international and interdisciplinary collaborations (AI-related articles double expected), and articles with neither international or interdisciplinary collaboration (AI-related articles falling in this category are about one-half the expected amount). This finding suggests that interdisciplinary collaboration is significantly higher for AI-related articles published in BJET.

A chi-square test of independence shows that there is a significant relationship between whether an article published in the Computers and Education/Computers and Education: Artificial Intelligence has subject matter related to artificial intelligence and the presence of international or interdisciplinary collaboration among the article's authors,  $X^2(3, n = 300) = 21.70, p < .001$ . Significant differences were found for all four categories of authorship collaboration. For international collaboration only, the rate was significantly lower than expected for AI-related articles (about one half the expected based on the non-AI articles, although with the "both" and "international" categories added, the frequencies would be quite similar). For interdisciplinary collaboration only and both international and interdisciplinary collaboration, the rates were significantly higher than expected with the AI-related articles (about double the expected). A much lower number of articles with neither international nor interdisciplinary collaboration was found among the AI-related articles as well. This finding suggests that interdisciplinary collaboration is significantly higher for AI-related articles published in Computers and Education journals, aligning directly with finding for BJET.

A chi-square test of independence for the combined findings for all three journals shows that there is a significant relationship between whether an article has subject matter related to artificial intelligence and the presence of international or interdisciplinary collaboration among the article's authors,  $X^2(3, n = 599) = 42.04, p < .001$ . Significant differences are found for all four categories of authorship collaboration. These results are, of course, skewed by the number of cases for Computers and Education relative to the other journals but do provide some additional insight when the findings for the other two journals are added (i.e., the  $X^2$  value is greater and the p-value is extremely small).

**Table 2: Countries with the Highest Rates of Collaboration/Non-Collaboration in International Research Activities**

Most Common Countries - No Collaboration	Percentage	Most Common Countries - Collaboration	Percentage
US	14.94%	US	30.51%
Australia	5.75%	Australia	18.64%
China	19.54%	China	17.80%
Hong Kong	6.90%	Hong Kong	12.71%
Germany	11.49%	Germany	8.47%
UK	10.34%	UK	6.78%

Table 2 shows the collaboration rates in international research for articles on AI in education. The United States and Australia dominate when it comes to international and interdisciplinary collaboration in AI-related research articles. In both countries, the number of collaborative articles far outpaces that of non-collaborative articles. Hong Kong also shows a sizeable jump, from 6 AI-related articles without international/interdisciplinary collaboration to 15 with such collaboration. Conversely, the United Kingdom, Germany, and China do not show substantive differences in the types of collaboration among their AI in education articles. There may be a greater culture of diverse types of research collaboration in the former nations than the latter ones.

Table 2 shows the rates of collaboration in interdisciplinary research for articles on AI in education. In terms of disciplines with the highest level of international and interdisciplinary collaboration among articles published in these three journals, education, unsurprisingly, has the highest rate of collaborative articles at 70%, a considerable jump from the percentage of articles with no international or interdisciplinary collaboration. Computer science shows the greatest extent of difference in the production of collaborative articles (28%) compared to non-collaborative ones (7%), a four-fold jump in the authorship of collaborative publications. Business/management, nursing, information systems, and educational technology are disciplines with higher rates of non-collaborative than collaborative authorship.

**Table 3: Disciplines with the Highest Rates of Collaboration/Non-Collaboration in Interdisciplinary Research Activities**

Most Common Disciplines - No Collaboration	Percentage	Most Common Disciplines - Collaboration	Percentage
Education	56.32%	Education	70.34%
Computer Science	6.90%	Computer Science	27.97%
Information Systems	11.49%	Information Systems	11.02%
Engineering	4.60%	Engineering	9.32%
Business/Management	8.05%	Business/Management	5.93%
English/Literature	1.15%	English/Literature	5.08%
Mathematics	1.15%	Mathematics	4.24%
Information Science	0.00%	Information Science	3.39%
Educational Technology	5.75%	Educational Technology	3.39%
Nursing	4.60%	Nursing	2.54%

## DISCUSSION AND CONCLUSIONS

This study lends key insights into the impact that AI, as a growing research area, may have on the nature of international and interdisciplinary research collaboration. The inherently transdisciplinary nature of AI-related challenges calls for complex solutions that often rely on types of collaboration that were less common in the past. The following sections explore how the findings relate to each of the study's three research questions.

### Research Question 1: Relationship of AI Topic and International/Interdisciplinary Collaboration

The findings of this study clearly indicate that AI-related research articles published in educational technology journals are significantly more likely to include interdisciplinary and combined international-interdisciplinary collaboration than non-AI-related articles. This trend exists for both the British Journal of Educational Technology and Computers and Education, with the chi-square analyses confirming statistically significant differences. While the presence

of international collaboration alone did not show as strong a change with the introduction of AI topics, the findings were substantial for interdisciplinary and combined collaboration categories. These findings suggest that AI-related research published in top education technology journals is inherently more interdisciplinary, perhaps reflecting a need for expertise that spans traditional disciplinary boundaries (e.g., computer science, education, ethics).

The lower frequency of AI articles with no collaboration (neither international nor interdisciplinary), as well as very few with single authorship, is notable, and reinforces the notion that AI-related research is less likely to be conducted in isolation. These results support broader academic trends in AI research that are discussed by authors like Kusters et al. (2020) and Zeller and Dwyer (2022), showing that cross-border and cross-disciplinary partnerships are necessary to navigate complex socio-technical challenges that society faces in light of the emergence of generative artificial intelligence.

## **Research Question 2:**

### **Countries Most Involved in International/Interdisciplinary AI Research Collaborations**

Among the AI-related articles that included international or interdisciplinary collaboration, the United States and Australia stood out with considerably higher rates of collaborative publications compared to non-collaborative ones. Hong Kong also saw a demonstrated substantial increase in its collaborative output. In contrast, countries like China, Germany, and the United Kingdom show more balanced rates between collaborative and non-collaborative AI research.

These findings may reflect differences that exist in the research culture, funding structure, or institutional emphasis on international and interdisciplinary collaboration among these countries. The United States and Australia are known to have systems that place heavy emphasis on productivity in terms of numbers of grants, publications, and citations (Marinova & Newman, 2008; Miller et al., 2011). This emphasis encourages collaboration of all kinds in order to distribute workload while maximizing outputs. These are also both countries where many international researchers are employed - popular for emigration due to factors like the nations' wealth and location - and may bring collaborations with them from their native countries and be more receptive to collaboration with disciplines other than their own (Hugo, 2014). These countries may be particularly conducive to collaboration in the area of AI rather than others due to research funding and support mechanisms that support innovation in this area in these countries. In the U.S. in particular, funding for AI-related research has skyrocketed while support for other research areas, especially in the social and educational sciences, has diminished significantly (Abadi et al., 2020).

### **Research Question 3: Disciplines Most Involved in International/Interdisciplinary AI Research Collaborations**

The disciplinary composition of collaborative AI-related research suggests a major difference in expertise compared to non-collaborative work. While education remains the dominant field in both collaborative and non-collaborative studies, it is far more common in collaborative articles (70% to 56%). Computer science experiences a fourfold increase from 7% in non-collaborative papers to 28% in collaborative papers. Often it is these two disciplines - education and computer science - that have forged meaningful collaborations, with those in education lending expertise in teaching and learning and computer scientists providing technical expertise on the integration of artificial intelligence. These collaborations between education and computer science have been discussed in the literature for many years (Weinberger et al., 2009), but they are particularly prominent now with the emergence of generative AI.

Other disciplines like engineering, mathematics, and information science have similarly seen increases in collaborative publications, likely for the same reason as computer science - supporting the technical aspects of an AI-related study. Conversely, less collaboration is seen from the discipline of educational technology, perhaps because researchers in this discipline often have some training or educational background in computing sciences and thus do not need to collaborate with others who have this expertise. Nonetheless, it is likely that, as AI continues to permeate educational practice, fostering collaboration across technical and pedagogical domains will be critical for producing meaningful, ethical, and scalable innovations.

### **IMPLICATIONS**

As the nature of AI evolves and becomes more pervasive in our society, it is critical to understand the impact of this technology on the landscape of research itself. Little attention has been paid to how the topic of AI is transforming how research is conducted, particularly whether it may encourage greater collaboration across disciplines and borders. This research study addresses that gap by examining patterns of collaboration in AI-related educational research, focusing specifically on international and interdisciplinary authorship across three leading academic journals. The findings provide strong preliminary evidence that AI-related research articles are more likely to involve interdisciplinary and international research collaborations than non-AI-related articles.

Artificial intelligence as a research focus requires a more multi-faceted approach compared to other articles due to its combination of technical and social

factors in impacting education. On a larger scale, these findings may signal a broader shift in how educational technology research is being approached. If international and interdisciplinary research are becoming increasingly common, then supporting this kind of research should be a growing priority for institutions, funders, and journal editors. These entities may utilize the findings of this study to advocate for and incentivize interdisciplinary and international research partnerships. These research relationships, and their support among these entities, will lead to a more integrated, impactful, and inclusive research community that will benefit educators, learners, and society at large.

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**Note:**

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