TechTrends
https://doi.org/10.1007/s11528-024-00950-5

COLUMN: EDITORIAL

# Trends and Topics in Educational Technology, 2024 Edition

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## Introduction

This editorial continues to landscape the trends and popular educational technology topics for 2023. We used the public internet data mining approach from previous years (Allman et al., 2023b; Kimmons, 2020; Kimmons & Rosenberg, 2022; Kimmons et al., 2021). This year, we extracted and analyzed data from the Scopus research article database, K-12 school and district Facebook pages, and the open publishing platform EdTech Books. We also looked closer at two key terms—"artificial intelligence" and "OER"—using Google Custom Search API to examine patterns in the higher education context and the description of resources from the Teachers Pay Teachers (TPT) website for insights in the K-12 context. This year, we no longer utilized the X (formerly Twitter) #EdTech affinity group as a data source because of the changes to the platform/accessibility of the data. Our analysis represents snapshots of 2023 trends in educational technology from these dataset angles, furthering our understanding of current EdTech community's attitudes, behaviors, and leanings and underpinning a predictive vision of future trends in the field.

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## What Were Trends in EdTech Journals in 2023?

For insight into which research topics were trending in the field in 2023, we analyzed article titles published in the top educational technology journals during the year. We utilized a similar methodology as in previous years (Kimmons et al., 2021; Kimmons & Rosenberg, 2022; Allman et al., 2023b) and compiled a list of 3,355 articles published in 2023 from the top educational technology journals (n = 18) as identified by Google Scholar and retrieved via the Scopus API. See Table 1 for the list of journals included in the analysis. Following this, we looked at the frequencies of each keyword and n-gram (multi-word phrase) appearing in the titles to identify potential trends.

We then manually categorized top keywords and n-grams into three information types suggested by the data: "Contexts," "Methods," and a broader category of "Topics, Tools, and Modalities" (see Table 2). Contexts included terms related to the research settings, such as "high school" or "university." Methods included descriptors of the research methods, such as "systematic review" or "case study." Topics, Tools, and Modalities included a more comprehensive array of terms, such as "online," "learning analytics," and "virtual reality." Notably, in previous years, we had separated modalities into their own section, but this separation seemed to become increasingly arbitrary and unnecessary (e.g., is VR a topic or a modality?). So, we combined modalities and topics into a common category. We included all relevant n-grams above 0.5% and their comparatively ranked keywords in the table.

Table 2 suggests several noteworthy findings. Regarding contexts, higher education was far more common as a setting for educational technology studies than K-12, and secondary schools were more represented than elementary schools. This suggests an inverted pyramid representation of EdTech research being done at different educational levels, a trend that we saw in previous analyses (Allman et al., 2023b). Referenced physical locations also focused on school settings, suggesting an emphasis on formal (rather than informal or

Published online: 21 March 2024

**Table 1** List of Educational Technology Journals Used in the SCOPUS Analysis (alphabetically)

| |
|---|
| Australasian Journal of Educational Technology |
| British Journal of Educational Technology |
| Computer Assisted Language Learning |
| Computers & Education |
| Education and Information Technologies |
| Educational Technology & Society |
| Educational Technology Research and Development |
| IEEE Transactions on Learning Technologies |
| Interactive Learning Environments |
| International Journal of Artificial Intelligence in Education |
| Internet and Higher Education |
| Journal of Computer Assisted Learning |
| Journal of Educational Computing Research |
| Language Learning & Technology |
| Learning, Media and Technology |
| Tech Trends |
| The International Review of Research in Open and Distributed Learning |
| The Turkish Online Journal of Educational Technology |

non-formal) learning. As expected, references to COVID-19 declined from the previous year (3.6% to 2.4%). Relatively high on the list were also references to language learning. Specifically, search terms "language" (n = 169, 5.0%) and "EFL" (n = 95; 2.8%) and related n-grams "language learning" (n = 54; 1.6%), "EFL learner" (n = 37; 1.1%), and "foreign language" (n = 28, 0.8%). Additionally, references to "support" (n = 124, 3.7%), "professional," and "preservice" (both n = 64; 1.9%) and n-grams "preservice teacher" (n = 49, 1.9%) and "professional development" (n = 22, 0.7%) might be worth noticing as important context keywords for studies carried out in 2023.

The most commonly referenced n-grams related to research methods mentioned in 2023 titles were secondary data analysis methods, specifically "systematic OR scoping OR literature reviews" (n = 194, 5.8%) and "meta-analyses" (n = 49, 1.9%). The most common primary data analysis method n-grams included "machine learning" (n = 43, 1.3%), "case study" (n = 43, 1.3%), "network analysis" (n = 23, 0.7%), and "mixed methods" (n = 24, 0.7%). Additionally, several keywords related to measuring educational success in the titles of 2023 journal articles are noteworthy. Specifically, search terms "effect" (n = 202, 6.0%), "performance" (n = 193, 5.8%), "impact" (n = 148, 4.4%), "evaluation" (n = 82, 2.4%), "effectiveness" and "achievement" (both n = 77, 2.3%), and "outcome" (n = 68, 2.0%).

Regarding modality, the dominant term continues to be "online" (n = 469, 14%) and the n-gram "online teaching OR online learning" (n = 150, 4.5%), outnumbering the next-highest n-gram, "blended learning" (n = 31, 0.9%), at a rate of 5-to-1. Although, from closer investigation of the titles, it appears that "online," "distance," "blended," "remote," and a variety of other terms are sometimes used interchangeably to describe a broad spectrum of internet-mediated synchronous or asynchronous learning situations. Immersive environments, in the form of "virtual," "augmented," and "mixed reality," in that order, were also of interest. Specifically, the search term "virtual" appeared 188 times (5.6%), and n-grams "virtual reality" were seen 110 times (3.3%), "augmented reality" 63 times (1.9%), and "immersive virtual" 22 times (0.7%). Notably, references to "artificial intelligence" more than doubled from the previous year (n = 91, increase from 1.4% to 2.7%), and "learning analytics" also saw increased attention (n = 72, 1.6% to 2.1%).

## What Was Trending among School and School District Facebook Groups in 2023?

The comprehensive analysis of hyperlinks shared on school and district Facebook pages revealed significant trends in technology adoption and usage within K-12 educational settings. Table 3 showcases the top fifteen domains by their prevalence and highlights the evolving landscape of digital tools in education from 2021 to 2023.

To identify the technologies shared on school and district Facebook pages, we scrutinized the domain names of all hyperlinks posted across 16,309 publicly accessible pages, totaling 10,597,076 posts. Executing this analysis involved exploring the homepages of all schools and school districts in the U.S. for links to Facebook pages. Subsequently, we uploaded the identified links to Facebook pages onto the CrowdTangle platform to access publicly available posts for the years 2021–2023 and identified the domains of websites linked within schools' and districts' posts. Additional details on the data collection approach can be found in Rosenberg et al. (2022). The top fifteen most-shared domains, delineated by year (2021, 2022, and 2023), are presented in Table 3. The following explanation may help the reader interpret the table. For instance, in 2023, 7049, or 43% of schools or districts with publicly accessible Facebook pages, shared one or more links to docs.google.com, and the domain was shared on average 5.3 times.

Upon reviewing the years 2021 to 2023, we observed the continued dominance of Google services, with Google Docs maintaining its position as the most shared domain for three consecutive years, as highlighted in prior research (Allman et al., 2023b). YouTube follows closely behind, indicating the sustained prevalence of Google services in the mainstream usage of schools and school districts, underscoring the stability of these technologies within educational institutions. Simultaneously, we noted a significant decline in the

**Table 2** EdTech Journal Article Titles: Keywords and N-Grams for Contexts, Methods, and Topics, Tools, and Modalities

| Keywords | *n* | % | N-Grams | *n* | % |
|---|---|---|---|---|---|
| Contexts | | | | | |
| school | 201 | 6.0% | higher education | 144 | 4.3% |
| higher (education) | 144 | 4.3% | school student | 64 | 1.9% |
| classroom | 142 | 4.2% | university student | 60 | 1.8% |
| university | 134 | 4.0% | preservice teacher | 49 | 1.5% |
| academic | 126 | 3.8% | COVID-19 pandemic | 44 | 1.3% |
| covid19 | 80 | 2.4% | primary school | 38 | 1.1% |
| secondary | 58 | 1.7% | EFL learner | 37 | 1.1% |
| K-12 | 45 | 1.3% | secondary school | 36 | 1.1% |
| high (school) | 36 | 1.1% | high school | 36 | 1.1% |
| elementary | 31 | 0.9% | K-12 (education or school) | 16 | 0.5% |
| Research Methods | | | | | |
| review | 255 | 7.6% | (systematic / scoping / literature) review | 194 | 5.8% |
| analysis | 206 | 6.1% | meta-analysis | 49 | 1.5% |
| development | 178 | 5.3% | machine learning | 43 | 1.3% |
| systematic | 172 | 5.1% | case study | 43 | 1.3% |
| impact | 148 | 4.4% | network analysis | 23 | 0.7% |
| exploring | 108 | 3.2% | mixed method | 24 | 0.7% |
| evaluation | 82 | 2.4% | factors influencing | 21 | 0.6% |
| Topics, Tools, and Modalities | | | | | |
| learn | 1,555 | 46.3% | online teach/learning | 150 | 4.5% |
| student | 809 | 24.1% | learning environment | 114 | 3.4% |
| education | 608 | 18.1% | virtual reality | 110 | 3.3% |
| online | 469 | 14.0% | computational thinking | 103 | 3.1% |
| teacher | 368 | 11.0% | artificial intelligence | 91 | 2.7% |
| technology | 340 | 10.1% | student learning | 82 | 2.4% |
| digital | 319 | 9.5% | learning analytics | 72 | 2.1% |
| teach | 254 | 7.6% | augmented reality | 63 | 1.9% |
| model | 228 | 6.8% | language learning | 54 | 1.6% |
| design | 220 | 6.6% | learning performance | 47 | 1.4% |
| performance | 193 | 5.8% | learning outcome | 47 | 1.4% |
| reality | 193 | 5.8% | game-based learning | 43 | 1.3% |
| environment | 191 | 5.7% | social media | 42 | 1.3% |
| virtual | 188 | 5.6% | flipped classroom | 40 | 1.2% |
| educational | 179 | 5.3% | self-regulated learning | 40 | 1.2% |
| language | 169 | 5.0% | educational technology | 34 | 1.0% |
| thinking | 162 | 4.8% | teaching and learning | 32 | 1.0% |
| social | 160 | 4.8% | student engagement | 32 | 1.0% |
| skill | 145 | 4.3% | collaborative learning | 31 | 0.9% |
| knowledge | 130 | 3.9% | blended teach/learning | 31 | 0.9% |
| role | 125 | 3.7% | student perception | 26 | 0.8% |
| engagement | 122 | 3.6% | online course | 25 | 0.8% |
| assessment | 117 | 3.5% | distance teach/learning | 21 | 0.7% |
| experience | 116 | 3.5% | digital learning | 23 | 0.7% |
| game | 115 | 3.4% | immersive virtual | 22 | 0.7% |
| computational | 114 | 3.4% | mobile learning | 20 | 0.6% |
| perspective | 112 | 3.3% | open online | 18 | 0.5% |

**Table 3** Domains for Hyperlinks Shared on School and School District Facebook Pages

| 2021 | | | | 2022 | | | | 2023 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Domain | *n* | % | M | Domain | *n* | % | M | Domain | *n* | % | M |
| docs.google.com | 7278 | 44.6% | 6.8 | docs.google.com | 7174 | 44.0% | 5.6 | docs.google.com | 7049 | 43.2% | 5.3 |
| youtube.com | 7225 | 44.3% | 8.0 | youtube.com | 6715 | 41.2% | 6.8 | youtube.com | 5422 | 33.2% | 5.9 |
| google.com | 4253 | 26.1% | 3.8 | drive.google.com | 2781 | 17.1% | 5.1 | drive.google.com | 2509 | 15.4% | 4.6 |
| drive.google.com | 3423 | 21.0% | 5.8 | accounts.google.com | 1909 | 11.7% | 2.5 | signupgenius.com | 1917 | 11.8% | 4.5 |
| zoom.us | 3387 | 20.8% | 3.5 | zoom.us | 1798 | 11.0% | 3.2 | accounts.google.com | 1871 | 11.5% | 2.6 |
| accounts.google.com | 2416 | 14.8% | 2.5 | signupgenius.com | 1693 | 10.4% | 3.2 | bookfairs.scholastic.com | 1474 | 9.0% | 2.0 |
| sites.google.com | 1862 | 11.4% | 2.9 | smore.com | 1538 | 9.4% | 7.6 | gofan.co | 1424 | 8.7% | 4.1 |
| bookfairs.scholastic.com | 1498 | 9.2% | 2.3 | bookfairs.scholastic.com | 1411 | 8.7% | 1.9 | smore.com | 1383 | 8.5% | 7.2 |
| signupgenius.com | 1449 | 8.9% | 2.9 | gofan.co | 1356 | 8.3% | 3.9 | sites.google.com | 1162 | 7.1% | 3.6 |
| smore.com | 1436 | 8.8% | 8.4 | sites.google.com | 1351 | 8.3% | 3.1 | zoom.us | 1147 | 7.0% | 3.3 |
| nfhsnetwork.com | 1378 | 8.4% | 4.3 | eventbrite.com | 1060 | 6.5% | 2.9 | eventbrite.com | 1068 | 6.5% | 2.9 |
| surveymonkey.com | 1236 | 7.6% | 2.3 | nfhsnetwork.com | 1031 | 6.3% | 3.6 | applitrack.com | 971 | 6.0% | 6.2 |
| gofan.co | 1045 | 6.4% | 4.1 | applitrack.com | 1012 | 6.2% | 5.7 | surveymonkey.com | 838 | 5.1% | 2.4 |
| eventbrite.com | 1029 | 6.3% | 2.9 | surveymonkey.com | 1001 | 6.1% | 2.2 | forms.office.com | 821 | 5.0% | 3.3 |
| vimeo.com | 1008 | 6.20% | 2.8 | s3.amazonaws.com | 867 | 5.30% | 9.2 | nfhsnetwork.com | 754 | 4.60% | 3.6 |

*n* the number of schools/districts sharing one or more links to the domain; % the proportion of pages sharing one or more links in that year; *M* the mean number of times a domain is shared by a district when it is shared at least once

percentage of YouTube links from 44% in 2021 and 41% in 2022 to 33% in 2023. This shift might reflect a broader trend towards prioritizing the digital privacy and security of students within the educational community, influencing how schools and districts curate and share content on social media platforms. The trend in Zoom links continues to decline, with the proportion of districts sharing Zoom links decreasing from 21% in 2021 to 11% in 2022 and further dropping to 7% in 2023. This decline aligns with the reduced engagement in remote activities across various schools and school districts. Additionally, tools facilitating event sign-ups, exemplified by SignUpGenius and gofan.co, experienced steady increases, indicating a surge in posts promoting event registrations post-COVID-19 pandemic. Other domains, such as bookfairs.scholastic.com, smore.com, eventbrite.com, and surveymonkey.com, have consistently maintained their presence in the top ten over the past three years. Their similar frequency suggests the sustained importance of tools for school-parent communication, book sales, event management, and survey services within K-12 schools and districts.

## What Were Trends in EdTech Open Educational Resources (OER) in 2023?

In addition to Scopus and social media trends, we also examined an EdTech-focused Open Educational Resource (OER) platform EdTech Books (https://edtechbooks.org). OER are "teaching, learning, and research materials that reside in the public domain or have been released under an open license that permits their free use and re-purposing by others" (Creative Commons, 2020). OER can take various forms and sizes, including textbooks, lessons, courses, learning activities, assessments, technologies, syllabi, images, presentations, videos, and graphics. Being 'open' means that OER is freely accessible to anyone with internet access and can be retained, reused, redistributed, revised, and remixed as needed (Wiley, n.d.), providing significant opportunities for improving "the quality and affordability of education for learners everywhere" (Wiley & Hilton, 2018, p. 144). Research has repeatedly shown that OER quality is comparable to commercial resources (Clinton & Khan, 2019; Kimmons, 2015), and their adoption does not negatively impact student learning (Hilton, 2016, 2019) while saving students money (Clinton, 2018; Hilton, 2016; Ikahihifo et al., 2017) and providing a variety of other benefits (Kimmons, 2016). In 2023, almost two-thirds (64%) of U.S. higher education faculty are aware of OER, and 29% of faculty require OER in their courses (Seaman & Seaman, 2023b).

For this year's OER analysis, we again selected EdTech Books as the authors are most familiar with this platform and have ready access to data. In 2023, ETB provided free OER to more than 1.5 million users worldwide. We believe that as an EdTech-focused platform, EdTech Books analytics may provide valuable insights into user behavior and how OER are developed, adopted, and used in our field.

A perusal of the most popular books (Table 4) and chapters (Table 5) revealed that readers seemed to be drawn to these resources when they were seeking information on

**Table 4** Top 20 Most-Accessed Books Related to Educational Technology on EdTech Books in 2023

| Title | Author(s) | Chapter Views | PDF Downloads | URL |
|---|---|---|---|---|
| Online Tools for Teaching and Learning | Trust, T | 88,911 | 4,641 | https://edtechbooks.org/onlinetools |
| Foundations of Learning and Instructional Design Technology | West, R | 59,267 | 13,669 | https://edtechbooks.org/lidtfoundations |
| Design for Learning | McDonald, J., & West, R | 53,870 | 10,582 | https://edtechbooks.org/id |
| Critical Media Literacy and Civic Learning | Maloy, R. W., et al | 44,578 | 12,911 | https://edtechbooks.org/mediaandciviclearning |
| Project Management for Instructional Designers | Wiley, D., et al | 42,562 | 8,626 | https://edtechbooks.org/pm4id |
| Education Research | Kimmons, R | 42,419 | 6,871 | https://edtechbooks.org/education_research |
| EdTech in the Wild | Kimmons, R | 34,180 | 10,762 | https://edtechbooks.org/wild |
| The Students' Guide to Learning Design and Research | Kimmons, R., & Caskurlu, S | 32,841 | 7,238 | https://edtechbooks.org/studentguide |
| An Open Education Reader | Wiley, D | 31,744 | 9,847 | https://edtechbooks.org/openedreader |
| The K-12 Educational Technology Handbook | Ottenbreit-Leftwich, A., & Kimmons, R | 29,320 | 4,954 | https://edtechbooks.org/k12handbook |
| An Introduction to Open Education | Arts, Y., et al | 27,371 | 8,107 | https://edtechbooks.org/open_education |
| Designing Engaging and Interactive Synchronous Online Class Sessions | Marquart, M., et al | 22,272 | 7,001 | https://edtechbooks.org/designing_engaging_interactive_synchronous_online_classes |
| Hybrid-Flexible Course Design | Beatty, B | 19,389 | 5,138 | https://edtechbooks.org/hyflex |
| EdTechnica | Kimmons, R., et al | 14,601 | 3,908 | https://edtechbooks.org/encyclopedia |
| Visuals in Learning Design | Kimmons, R | 13,935 | 3,148 | https://edtechbooks.org/design |
| Learner and User Experience Research | Schmidt, M., et al | 13,389 | 4,007 | https://edtechbooks.org/ux |
| (Open) Educational Resources around the World | Peters, L. N., et al | 12,962 | 3,100 | https://edtechbooks.org/oer_around_the_world |
| K-12 Blended Teaching | Graham, C. R., et al | 11,670 | 1,709 | https://edtechbooks.org/k12blended |
| A Practitioner's Guide to Instructional Design in Higher Education | Conklin, S., et al | 9,762 | 2,659 | https://edtechbooks.org/id_highered |
| Becoming an Open Scholar | Kimmons, R | 8,270 | 2,442 | https://edtechbooks.org/open_scholar |

broad theoretical aspects of educational technology (e.g., behaviorism, constructivism, socioculturalism), technology-specific guidance (e.g., how to use a specific tool), or research and evaluation guidelines (e.g., mixed methods or sampling procedures). This is consistent with our findings from last year (Allman et al., 2023b).

A closer analysis of the most popular books and chapters suggested that the top trending chapters are most influenced by organic traffic via search engines rather than direct links (such as from a course). This underscores the importance of indexing and optimizing OER resources to increase exposure and impact. On the other hand, EdTech books that were most accessed may have been influenced by OER adoption behaviors and instructors' pedagogical decisions as part of formal access to instructional resources. For example, students might have been instructed to read carefully, which could mean accessing longer chapters several times or downloading them as PDF for annotation or later retrieval. Another instructor may encourage the use of social annotation tools, such as Hypothesis, to complete collaborative classroom assignments, encouraging students to return to a chapter several times and thus increasing overall book views. Additionally, ease of access or anticipation of fees to access may also explain why some books have higher PDF downloads than expected. For example, West's *Foundations of Learning and Instructional Design Technology* (highest PDF downloads) is often sought out with search terms like

**Table 5** Top 20 Most-Accessed Chapters Related to Educational Technology on EdTech Books in 2023

| Title | Author(s) | Chapter Views | PDF Downloads | URL |
|---|---|---|---|---|
| Behaviorism | Brau, B., et al | 7,777 | 242 | https://edtechbooks.org/education_research/behaviorismt |
| Constructivism | Brau, B | 6,752 | 1,115 | https://edtechbooks.org/studentguide/constructivism |
| Socioculturalism | Allman, B | 4,513 | 502 | https://edtechbooks.org/studentguide/socioculturalism |
| Technology Integration | Kimmons, R | 4,067 | 381 | https://edtechbooks.org/k12handbook/technology_integration |
| Edgar Dale and the Cone of Experience | Lee, S. J., & Reeves, T. C | 3,697 | 258 | https://edtechbooks.org/lidtfoundations/edgar_dale |
| Curriculum Design Processes | Dodd, B. J | 3,079 | 365 | https://edtechbooks.org/id/curriculum_design_process |
| Community-building in Adobe Connect: Using Layouts and Different Pods to Facilitate Games and Icebreaker Activities | Stayer, M., & Chung, R. Y | 3,067 | 101 | https://edtechbooks.org/designing_engaging_interactive_synchronous_online_classes/games |
| Mixed Methods | Kimmons, R | 2,997 | 242 | https://edtechbooks.org/education_research/mixed_methods |
| Inferential Statistics | Pfleger, P. I | 2,788 | 185 | https://edtechbooks.org/education_research/inferential_statistics |
| Conducting a Learner Analysis | Fulgencio, J., & Asino, T. I | 2,646 | 377 | https://edtechbooks.org/id/learner_analysis |
| Instructional Design Evaluation | Calhoun, C., et al | 2,486 | 586 | https://edtechbooks.org/id/instructional_design_evaluation |
| Cognitivism | Michela, E | 2,481 | 302 | https://edtechbooks.org/studentguide/cognitivism |
| Sampling | Kimmons, R | 2,287 | 215 | https://edtechbooks.org/education_research/sampling |
| Socratic Seminar | Castellanos-Reyes, D | 2,197 | 294 | https://edtechbooks.org/studentguide/socratic_seminar |
| Behaviorism, Cognitivism, Constructivism | Ertmer, P. A., & Newby, T | 2,196 | 405 | https://edtechbooks.org/lidtfoundations/behaviorism_cognitivism_constructivism |
| China's Approach to Digital Transformation of Higher Education | Xiao, J., & Shang, J | 2,099 | 136 | https://edtechbooks.org/oer_around_the_world/chinas_approach_to_d |
| Robert Gagné and the Systematic Design of Instruction | Curry, J. H., et al | 2,034 | 443 | https://edtechbooks.org/id/robert_gagn_and_systematic_design |
| Motivation Theories on Learning | Seifert, K., & Sutton, R | 1,818 | 233 | https://edtechbooks.org/lidtfoundations/motivation_theories_on_learning |
| Role-Play | Bawa, A | 1,780 | 466 | https://edtechbooks.org/studentguide/roleplay |
| Computational Thinking | Hunsaker, E | 1,718 | 293 | https://edtechbooks.org/k12handbook/computational_thinking |

"instructional design pdf," which suggests that learners are intentionally seeking local copies of these particular resources.

We found that the United States (29.7%), the Philippines (14.1%), and India (6.2%) were again the heaviest users of the platform, with overall use of the platform becoming less centralized to the U.S. We also found an increase in overall mobile device access to the platform, with 39.7% of users accessing on a phone as opposed to 59% on a desktop or laptop. This reveals an increasing trend of globalization of educational-technology-related OER and the need to be attentive to their accessibility with various device configurations and bandwidth limitations.

## References to Artificial Intelligence and OER on University Websites and Teachers Pay Teachers

Further exploring how large public data sources might help us identify patterns in the field, we used the Google Custom Search API to scrape data from university websites (cf., such as Kimmons & Veletsianos, 2021 and Veletsianos et al., 2023) and descriptions of resources uploaded to the popular curricular sharing site Teachers Pay Teachers (TPT) to understand the frequencies and nature of references to two key terms of particular interest to the authors: "artificial intelligence" and "OER".

In considering Google indexing results of university websites, it is necessary to limit analyses to a few sets of interesting a priori terms. So, for this analysis, we limited our considerations to AI, given its current interest in the larger social context, and OER, given its attention in educational technology and the topic's relationship to university missions as public caretakers of knowledge. Results showed that 66.4% of universities mentioned "generative artificial intelligence," "generative AI," or "ChatGPT," and 47.7% referenced "open educational resource" or "open textbook," with references to generative AI outnumbering references to OER at a rate of nearly 5-to-1 (see Table 6). In both cases, politically blue states (Democratic according to the most recent U.S. presidential election) were more likely to reference these technologies than were politically red (Republican) states. However, urban states were more likely to reference "AI," and rural states were more likely to reference "OER." Rhode Island, Utah, and Idaho were among the most likely to mention both, and Wyoming was the least likely to mention either. Interestingly, Hawaii was the most likely to mention artificial intelligence but was among the least likely to mention OER. This pattern suggests sociopolitical and economic differences in how educators pay attention to these technologies. Also, it suggests that universities may be more actively playing into the hype of new technologies (e.g., "AI") in their communication efforts than serving as public distributors of valuable knowledge to their communities (e.g., "OER").

In a similar vein, data extracted from the TPT website spanning from 2021 to 2023, encompassing 3,936,779 entries, were explored. Specific details regarding the data collection method can be found in (Shelton et al., 2022). The analysis revealed a total of 3,303 instances referencing AI-related keywords, including "generative artificial intelligence," "generative AI," "artificial intelligence," "DALL-E," and "ChatGPT." In contrast, mentions of "open educational resource" or "open textbook" numbered 4,285 (see Table 7 for details).

The analysis of the data suggested a growing trend of references to AI-related educational resources on the TPT platform from 2021 to 2023. Notably, despite the proportion of AI-related resources being low before 2023, there has been a remarkable uptick in interest. The number of AI-related resources in 2021 and 2022 were less than 0.05%. Specifically, in 2021, only 521 out of 1,060,241 or 0.049% of total resources and 528 out of 1,268,771 (0.042%) resources in 2022 were related to AI. In 2023, the mentions of AI surged to 2,254 out of 1,607,767 or 0.14% resources, representing almost a threefold increase from the 2022 figures, indicating a burgeoning interest in AI within K-12 educational resources. This surge aligns with the rising interest and integration of AI in educational settings, particularly following the release of generative artificial intelligence tools like ChatGPT in November 2022, reflecting educators' growing curiosity and the pressing need to incorporate AI into their teaching resources.

**Table 7** References to AI and OER on Teachers Pay Teachers Website

| Year | Resources | AI | OER |
|---|---|---|---|
| 2021 | 1,060,241 | 521 | 1,543 |
| 2022 | 1,268,771 | 528 | 1,276 |
| 2023 | 1,607,767 | 2,254 | 1,466 |
| Total | 3,936,779 | 3,303 | 4,285 |

**Table 6** References to AI and OER on University Websites

| | AI | OER |
|---|---|---|
| Total Results | 283,416 | 47,780 |
| Mentioned on Website | 66.4% | 47.7% |
| Results per Site when Mentioned | 248 | 56 |
| Most Likely to Mention | HI, RI, UT, NV, ID | UT, RI, AZ, DC, ID |
| Least Likely to Mention | WV, AR, NM, NC, WY | WY, MS, VT, HI, GA |
| Red State Weighted Likelihood | 63.7% | 47.4% |
| Blue State Weighted Likelihood | 69.8% | 51.4% |
| Rural State Weighted Likelihood | 64.8% | 53.9% |
| Urban State Weighted Likelihood | 70.3% | 45.4% |

Compared to the mentions of Open Educational Resources (OER), AI references are fewer in number. However, the ratio of nearly 1-to-1.3 (AI to OER) suggests that AI is also becoming a topic of significant interest within educational resources in the K-12 setting. This is particularly noteworthy given that OERs have been a mainstay in educational discussions for a longer period, emphasizing the rapid ascension of AI as a key area of focus. The increasing mention of specific AI tools like "DALL-E" and "ChatGPT" possibly indicates a shift in the educational resource landscape, where innovative AI tools are starting to play a central role in creating and disseminating educational content. This shift could be attributed to the capabilities of generative AI, offering novel approaches to personalized learning, automated content generation, and interactive learning experiences. The disparity between the growth of AI vs. OER references could also reflect the evolving nature of educational technology, where there is a move from traditional open resources to more dynamic, adaptive, and personalized learning experiences AI offers. Integrating AI in educational resources can represent a transformative step in educational technology, potentially reshaping how educational content is created, distributed, and consumed. However, as AI online educational resources rapidly expand, concerns like academic fraud, information bias, and ethical dilemmas arise and deserve closer attention. Recommendations from educational technology experts are especially relevant and needed since markets often lack the motivation to regulate content under platform capitalism (Rodríguez et al., 2020).

## Discussion and Conclusion

The analyses of the data from Scopus, Facebook, and EdTech Books, as well as the examination of AI and OER-related terms using Google Custom Search API and Teachers Pay Teachers, represent snapshots from different angles and offer valuable insights into the current state of the educational technology field. Moreover, by comparing some of the 2023 results to previous years, we observed several developmental directions and trends that may guide educational researchers and practitioners for future work.

The Scopus data suggested that studies published in the top EdTech journals in 2023 were predominantly conducted in higher education contexts, and among K-12 studies, secondary contexts were more common than elementary. Not surprisingly, references to COVID-19 declined from previous years. Interestingly, although COVID-19 was less referenced, the terms “online teaching” and “online learning” were frequently mentioned, remaining a dominant learning modality. Secondary data analysis methods, such as literature reviews and meta-analyses, were the most common research methods. However, it is important to mention that this year’s analysis included only titles, not abstracts, as was done in previous years, which may typically include fewer references to primary research methods. Keywords related to emerging technologies, including virtual reality, augmented reality, artificial intelligence, and learning analytics, were also frequently mentioned in the titles.

Through analyzing the hyperlinks on school and school district Facebook pages, we observed that Google-provided services, such as Google Docs, YouTube, and Google search engine, were the most included external links, which seems to be consistent with our findings from previous years (Allman et al., 2023b; Kimmons et al., 2021; Kimmons & Rosenberg, 2022). A trend worth mentioning is the consistent decline of Zoom links and increased links to school event planning and registration sites between 2021 and 2023. This suggests a return to in-person learning and an increased school social event activity post-COVID-19.

The analysis of EdTechBooks data as a proxy for OER behavior in the field of educational technology revealed that, similar to last year’s findings, readers continue seeking resources related to theory, educational technology topics, and research and evaluation methods. Closer analysis suggested that chapter access might be more influenced by the organic traffic from search engines. In contrast, book access may be more tied to OER adoption and formal educational setting behaviors, such as course instructional material choices and instructor pedagogical decisions. The increase in global and mobile OER access further emphasizes the importance of technical and design decisions related to accessibility, flexibility, and social justice issues during OER design and development (Allman et al., 2023a).

Finally, the results of further examining AI and OER-related terms on university websites and Teachers Pay Teachers were intriguing. One interesting finding was that universities in politically blue states were more likely to refer to both technologies than universities in politically red states. Additionally, universities in urban states typically referenced AI more often, while rural state universities more likely referenced OER. This suggests that EdTech attention may be associated with social, political, and economic factors, such as available capital and resources. The analysis of resources on the Teachers Pay Teachers platform emphasized a rising interest in AI in K-12 educational resources while the interest in OER resources remained steady. Among the AI tools, references to generative AI tools such as ChatGPT increased the most, suggesting interest in applying these tools in education and educational content creation.

This year’s analyses indicated that the field of educational technology continues to be influenced by the past pandemic as well as emerging technologies. Even though COVID-19 has gradually faded out in people’s lives, online learning has become a widely accepted way of learning, and technology-mediated instruction has become a norm in all educational

settings. Digital educational resources replaced, for the most part, traditional print materials both in higher education and K-12 settings (Seaman & Seaman, 2023a, 2023b). Mobile and digital learning platforms make learning more accessible and facilitate collaboration through cloud-based services across modalities. OER remain an interest in K-12 and higher ed, particularly in rural states. Immersive technologies continue transforming the EdTech landscape, integrating VR, AR, and gamification elements into learning environments for more engaging experiences. We found that AI and generative AI, in particular, are topics that are notably raising interest in the educational technology field. Utilizing generative AI to produce content and instructional resources, provide adaptive and personalized learning experiences, and automate assessment and evaluation are only a few potential applications that could transform the field of educational technology in the near future. Although the inclusion of AI is relevant at the university and K-12 level, social, political, and economic influences and implications need to be considered. Recognizing that many across educational sectors feel unprepared for AI-related changes (Cengage, 2023), we should embrace these new technologies with optimistic caution, carefully considering potentials balanced against security, privacy, and other concerns.

**Data Availability** Data is available upon request.

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