EdTech Landscapes

K-12 Trends in the U.S.

2020

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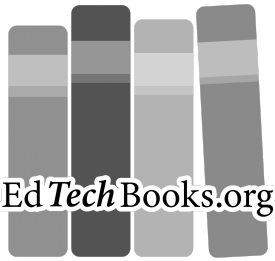

Suggested Citation

Kimmons, R. (2020). *EdTech Landscapes 2020: K-12 Trends in the U.S.* EdTechBooks. Retrieved from https://edtechbooks.org/landscapes_2020

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Introduction

This report utilizes massive datasets to summarize trends and patterns in educational technology (EdTech) communications, interest, use, research, and adoption across the U.S. Utilizing public social media posts, public school website data, and research indexing APIs, this report provides educators, principals, policymakers, and researchers with a birds eye view of what has been happening in the field of educational technology in recent years. Results for each section are provided as prose, tables, and infographics.

With the results provided in this report, it is hoped that decision-makers will be better prepared to recognize and act upon emerging trends in educational technology.

1

Research Topic Trends

What topics have researchers been studying in the field of educational technology?

Top EdTech Research Topics 2020

1st

2015 2016 2017 2018 2019

3.9% engineering

3.6% mobile

3.2% science

3.1% games

2nd

2.7% stem

2.5% internet

2.4% multimedia

2.3% augmented reality

3rd

2.2% language

1.8% virtual reality

1.1% moocs

1.1% social media

1.0% simulations

1.0% videos

Calculated from keyword instances of topics in research article and conference proceeding titles returned frrom the Scopus API (n = 26,650).

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Researchers have studied educational technologies, their uses, and their effects on learning for many decades. However, since technologies emerge and evolve so quickly, it is often difficult for researchers and practitioners to remain current on what is being studied.

To remedy this, I extracted all available research articles and conference proceedings from the Elsevier article search database, using the Scopus API, that included the term "educational technology" anywhere in the title, abstract, or keyword list. I further limited analysis of results to the five most recent years — 2015 to 2019 — to identify those topics that are most relevant to the current state of the field.

With these results, I then utilized natural language processing techniques to normalize and tokenize each word in each article's title, removing stop words (e.g., "a," "an," "the"), numbers, and punctuation. I also removed words that did not relate to the topic, such as context (e.g., "higher education"), participants (e.g., "students"), and generic field identifiers (e.g., "learning").

In total, titles of 26,650 research articles and conference proceedings were analyzed in this way, representing 5,000 to 6,000 artifacts per year. To account for fluctuating volumes of articles, trends of research emphasis were determined as percentages of overall artifacts for each year. For example, a

score of 3.1% for “games” in 2019 meant that 3.1% of all artifacts returned in the target year had a variant of the word “games” in the title.

Results indicated that the most researched topics in 2019 were “engineering,” “mobile,” “science,” and “games,” each representing between 3 and 4% of all artifacts (cf., Table 1). The topics of “stem,” “internet,” “multimedia,” and “augmented reality” were also common, each representing over 2% of all artifacts, and other common topics included “language,” “virtual reality,” “moocs,” “social media,” “simulations,” “videos,” and “open education.”

The most pronounced upticks in 2019 occurred for the topics of “science,” “stem,” and “virtual reality,” while the most notable downturns were detected for the topics of “mobile,” “games,” “internet,” and “augmented reality.”

At least two notable trends from this list merit elaboration. First, though related in some respects, “augmented reality” and “virtual reality” exhibit some noticeable differences. From the 2015 baseline, “augmented reality” was much more popular, and it has only fluctuated slightly from year to year. “Virtual reality,” on the other hand, started off much lower than its counterpart in 2015 but has steadily increased to the point that it seems poised to overtake “augmented reality” in coming years. This shift is likely connected to the

emergence of relatively low-cost virtual reality devices in the commercial market over the past few years, produced by companies such as Oculus, HTC, Valve, and Samsung.

Table 1

Most Popular Scopus-Indexed Research Topics in "Educational Technology" for 2015-2019

Topic	2015	2016	2017	2018	2019	Overall
engineering	3.9%	3.7%	4.1%	4.0%	3.9%	3.9%
mobile	4.2%	3.7%	3.5%	4.1%	3.6%	3.8%
science	4.2%	3.1%	4.0%	2.6%	3.2%	3.4%
games	3.1%	3.4%	3.3%	3.7%	3.1%	3.4%
stem	1.4%	1.8%	2.3%	2.3%	2.7%	2.1%
internet	3.1%	2.6%	2.4%	2.9%	2.5%	2.7%
multimedia	2.3%	2.3%	2.3%	2.3%	2.4%	2.3%
augmented reality	1.1%	1.0%	1.3%	1.9%	2.3%	1.5%
language	2.3%	2.4%	2.4%	2.3%	2.2%	2.3%
virtual reality	0.2%	0.4%	1.0%	1.2%	1.8%	0.9%
moocs	1.4%	1.6%	1.1%	1.4%	1.1%	1.3%
social media	1.4%	1.5%	1.3%	1.1%	1.1%	1.3%
simulations	1.6%	1.4%	1.5%	1.4%	1.0%	1.4%
videos	1.0%	0.8%	0.9%	0.8%	1.0%	0.9%
open education	0.5%	0.7%	1.0%	0.5%	0.5%	0.6%

Also of note is the finding that the subject area topics of "engineering," "science," and "stem" are

all consistently high in this list, while other subject areas (with the exception of "language") are not represented. This suggests that educational technology research continues to be closely aligned with STEM subject areas, while there seems to be relatively less research interest in using technologies to improve learning in other areas, such as the humanities and liberal arts.

2

Social Media Trends

What educational technology topics, tools, and resources have been trending on social media?

Top EdTech Twitter Hashtags 2020

2015 2016 2017 2018 2019

baseline

#ai .6%

#elearning .6%

#gsuiteedu .5%

#careerteched .4%

#stem .4%

#blockchain .2%

#science .2%

#digcit .2%

#cybersecurity .2%

#vr .1%

#google .1%

#googleedu .1%

#steam .1%

#data .1%

#socialmedia .1%

#assistivetech .1%

#math .1%

#makerspace .1%

#makered .1%

#pbl .05%

#mlearning .05%

Determined by analyzing tweets from influencer, school, and #edtech accounts (n = 6,930) that included the string "tech" in the tweet (n = 259,073).

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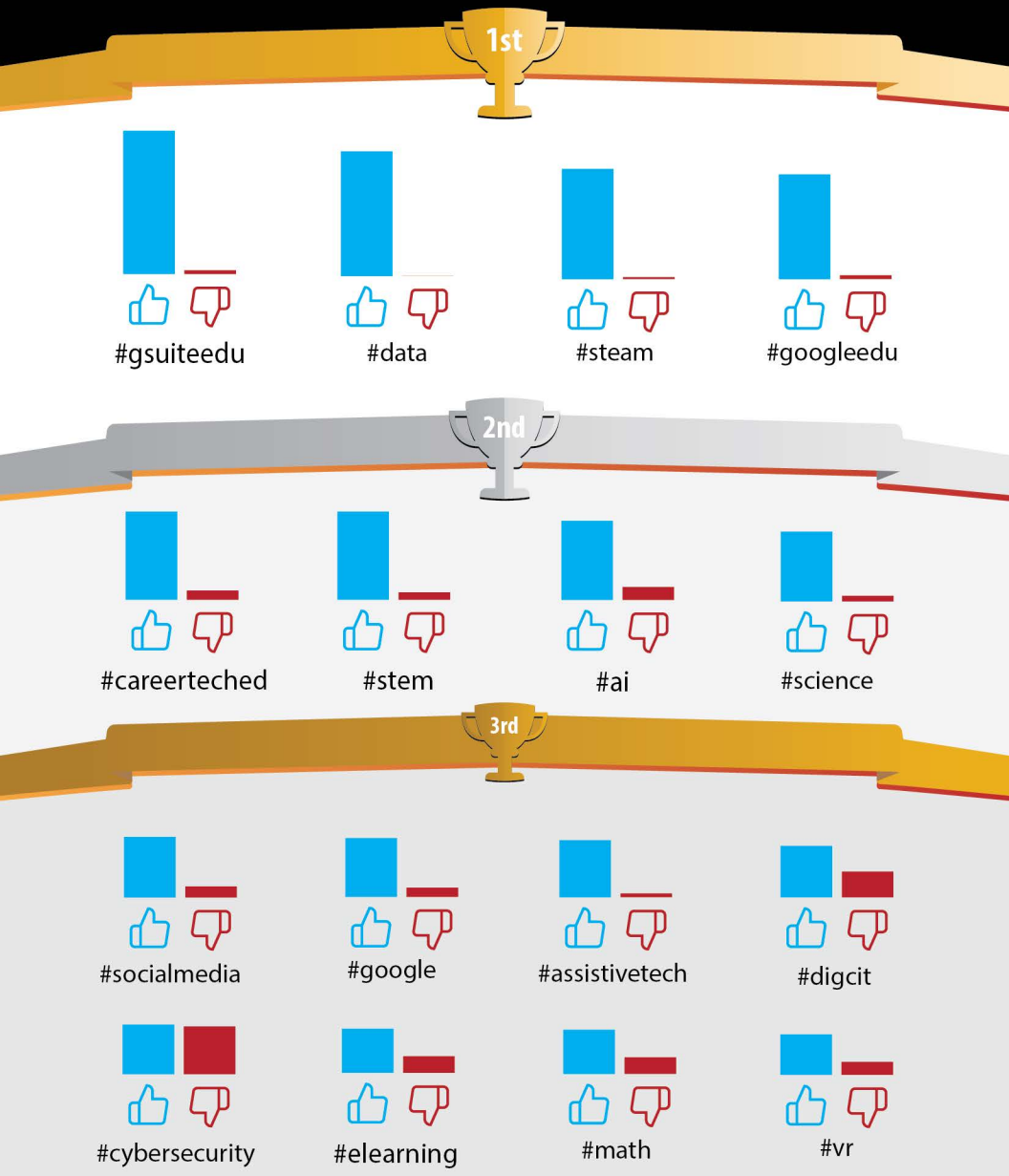
Net Sentiment of Top Twitter Hashtags 2020



Net sentiment determined by adding SentiStrength positivity and negativity results together, with scores >0 representing net positive and < 0 net negative (n = 259,073).

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Because of their immediacy and low barrier to entry, social media serve as valuable means for educators, researchers, and others to discuss emerging educational technology topics. As innovators talk about these topics, they will often utilize identifiers such as hashtags to signal the purpose or theme of their comments, and collecting and analyzing such posts (along with their hashtags) can give us valuable insight into what topics, tools, and resources are of emerging importance to innovators.

To begin to make sense of these rich data sources, I utilized the Twitter API to collect user biographical information and tweets from 6,930 users who either (1) represented official K-12 school accounts, (2) posted to the #edtech affinity space, or (3) were returned in search results for "educational technology," "edtech," "classroom technology," or "K-12 technology." I collected all available original English-language tweets for these users (n = 7.6 million, excluding retweets and non-targeted years) and then narrowed analysis to only include those tweets that mentioned the word stem "tech" (n = 259,073).

I then extracted all hashtags from these tweets, focused on those hashtags that referenced topics or tools (rather than generic or contextual terms like "#education"), and conducted sentiment analysis on hashtagged tweets (using SentiStrength) to

determine the positivity and negativity exhibited in each.

Results indicated that the most popular hashtags for 2019 included “#ai,” “#elearning,” “#gsuiteedu,” “#careerteched,” and “#stem,” followed by “#blockchain,” “#science,” “#digcit,” and “#cybersecurity” (cf., Table 2). Of these top hashtags, only “#ai” saw increased usage each year, while “#gsuiteedu,” “#stem,” “#blockchain,” “#cybersecurity,” “#data,” and “#assistivetech” saw increases for three of the four years. The hashtag “#math” was the only one to see decreased usage each year.

Net sentiment of these (and other) prominent hashtags revealed that most were sentiment neutral (e.g., sharing a resource or link without any evaluative statements), but among those that did exhibit sentiment, most were positive (cf., Table 3). Notably, the hashtags with the most positivity included Google tools like “#gsuiteedu” and “#googledu,” the subject area “#steam,” and the broad topic of “#data.” Some net positive examples included the following:

- Excellent Add-ons for Google Docs
- So thrilled one of my tips was chosen for this.
- New Google Calendar is slick! Really enjoying the new layout and customization tools!

In contrast, the hashtag “#cybersecurity” exhibited the most net negativity, revealing that many tweets using this hashtag focused on fears and frustrations, such as:

- The Horrors of Technology… AAAAAAHHH!!!
- If we know these pa$$words are terrible, why do so many people use them?
- Wow. That's, well. Uh. Scary?

However, the net positivity of these tweets overall is noteworthy given larger trends toward critiquing some of these topics, such as AI and social media, and may suggest that the educational technology community has a generally more technophilic and less critical attitude toward these emerging technologies than the population at large.

Table 2

Most Popular Twitter Hashtags Related to Educational Technology in 2015-2019

Hashtag	2015	2016	2017	2018	2019	Overall
#ai	0.03%	0.10%	0.30%	0.38%	0.59%	0.30%
#elearning	0.55%	1.58%	2.86%	1.52%	0.55%	1.49%
#gsuiteedu	0.00%	0.03%	0.56%	0.62%	0.47%	0.36%
#careerteched	0.79%	0.47%	0.23%	0.33%	0.38%	0.42%
#stem	1.13%	1.31%	1.38%	3.10%	0.38%	1.50%
#blockchain	0.00%	0.03%	0.06%	0.51%	0.20%	0.17%
#science	0.18%	0.16%	0.44%	0.36%	0.17%	0.27%
#digcit	0.15%	0.09%	0.37%	0.25%	0.16%	0.21%
#cybersecurity	0.11%	0.08%	0.14%	0.15%	0.15%	0.13%
#vr	0.05%	0.31%	0.88%	0.49%	0.13%	0.40%
#google	0.28%	0.17%	0.19%	0.13%	0.13%	0.17%
#googleedu	0.21%	0.13%	0.23%	0.10%	0.11%	0.15%
#steam	0.11%	0.14%	0.38%	0.20%	0.10%	0.19%
#data	0.05%	0.09%	0.18%	0.33%	0.09%	0.16%
#socialmedia	0.17%	0.15%	0.25%	0.13%	0.06%	0.15%
#assistivetech	0.24%	0.24%	0.29%	0.06%	0.06%	0.17%
#math	0.23%	0.19%	0.16%	0.13%	0.06%	0.15%
#makerspace	0.19%	0.19%	0.16%	0.16%	0.06%	0.15%
#makered	0.38%	0.14%	0.15%	0.10%	0.05%	0.15%
#pbl	0.12%	0.17%	0.24%	0.18%	0.05%	0.16%
#mlearning	1.99%	2.19%	0.51%	0.13%	0.05%	0.89%

Table 3

Sentiment of Most Popular Twitter Hashtags Related to Educational Technology in 2015-2019

Hashtag	Pos	Neg	Hashtag	Pos	Neg
#gsuiteedu	78%	2%	#pbl	32%	1%
#data	68%	0%	#assistivetech	31%	2%
#steam	60%	1%	#digcit	28%	14%
#googleedu	57%	2%	#cybersecurity	27%	26%
#careerteched	48%	5%	#elearning	24%	9%
#stem	48%	4%	#math	24%	9%
#ai	43%	7%	#vr	22%	7%
#science	38%	3%	#makerspace	18%	9%
#socialmedia	33%	6%	#blockchain	17%	11%
#google	32%	5%	#mlearning	15%	9%
#makered	32%	5%			

3

Website Trends

What tools and resources are schools using and directing their communities toward via their school websites?

Top K-12 Website Links 2020

1st

- 50% Facebook
- 47% Twitter
- 18% YouTube
- 17% Instagram
- 17% Google Docs
- 16% Google Sites

2nd

- 13% Google
- 13% GDrive
- 6% LinkedIn
- 6% SchoolMessenger
- 5% Google Translate

3rd

- 4% MySchoolBucks
- 4% Peach Jar
- 4% Google Maps
- 4% Google Play
- 4% iTunes
- 3% Apptegy
- 3% GMail
- 3% ISITE Lunch
- 3% Clever
- 3% Vimeo
- 3% SchoolWires
- 3% Frontline
- 3% Adobe
- 3% BoardDocs

Determined by scraping K-12 school websites (n = 65,912) and extracting domains of external URLs referenced from the home page (n = 1.9 million).

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Measuring actual adoption and use of educational technologies in K-12 is a challenging task, and for this reason it is rarely attempted, leaving decision-makers to struggle to know what technologies are actually being used. K-12 school websites are a valuable data source in this regard, because they represent many of the school-level technologies that schools expect students, teachers, and communities to utilize.

To discover what we can learn from these resources about educational technology adoption, I scraped the homepages of 51,496 K-12 school websites across the U.S. From these websites, I then extracted all external links that these sites connected to and truncated and organized these links by internet domain (e.g., “google.com”, “facebook.com”). This resulted in 1.1 million links representing 72,640 internet domains.

Results indicated that the two most-linked-to resources among school homepages were Facebook and Twitter (cf., Table 4) at a rate of almost 50%. This revealed that schools are likely using these ubiquitous social media platforms as part of their community outreach efforts, with other social media sites like Instagram, LinkedIn, and Pinterest also being highly represented.

Table 4

Most Popular Tools and Resources Linked From School Websites in 2019

Domain	Homepage Representation	Links
Facebook	49.6%	34,604
Twitter	47.1%	34,692
YouTube	18.3%	11,546
Instagram	17.5%	10,673
Google Docs	17.1%	20,272
Google Sites	15.7%	24,396
Google Search	13.3%	25,584
Google Drive	13.0%	21,997
LinkedIn	6.0%	3,381
SchoolMessenger	5.7%	2,919
Google Translate	4.9%	53,492
MySchoolBucks	4.5%	2,491
PeachJar	4.4%	2,518
Google Maps	4.0%	2,320
Google Play	3.8%	1,989
iTunes	3.6%	1,882
Apptegy	3.4%	1,731
Google Mail	3.3%	1,806
ISITE Lunch	3.2%	2,121
Clever	3.2%	1,771
Vimeo	3.1%	1,855
SchoolWires	3.1%	1,661
Frontline	3.1%	1,750

Video sharing services like YouTube and Vimeo were also highly utilized, along with a host of Google tools (like Docs, Sites, Search, Drive, and Translate) and school-directed communication and management technologies like SchoolMessenger PeachJar, and Apptegy.

Notably, none of these most prominent links are educational tools, per se, but are rather ubiquitous in nature (e.g., Facebook, Google Docs) or are focused on management aspects of schooling rather than teaching and learning.

Conclusion

This brief report provides a broad view of educational technology use and interest among K-12 schools and innovators in the U.S. Some clear takeaways from this report that may be useful for decision-makers include the following:

First, researchers and innovators both seem to be currently focused on STEM subject areas, such as science and engineering, to the relative exclusion of the arts, social sciences, and humanities (cf., relatively low and dropping rates of Twitter interest in "#steam" vs. "#stem"). This reveals a possible need for schools, educational technologists, and others to refocus efforts on non-STEM areas to consider how technologies might be leveraged to rethink and improve practices in those areas as well.

Second, educational technology involves far more than pedagogical uses of technology, as evidenced by the preponderance and variety of non-pedagogical tools that school websites are linking to (e.g., Facebook, Google Sites). This frequent and pervasive use of digital technologies for community engagement, marketing, communication, and so forth reveals that educational entities and educator training programs should recognize and value the importance of these

non-pedagogical tools and train professionals in their use to address the variety of non-pedagogical problems that educational institutions struggle with (e.g., community connectedness, parent involvement, teacher professionalism).

And third, because the community dialogue surrounding educational technologies is highly positive and technophilic, leaders in this area should consider how such positivity may be blinding them to the challenges and dilemmas that modern technologies introduce for schools, educators, and institutions. Privacy, professionalism, data ownership, information literacy, copyright, and monetization are all matters that should be of serious, emerging concern for decision-makers in this space. Yet, a recurring and persistent emphasis on only the positive elements of emerging technologies without a healthy dose of skepticism and accountability mandates means that the wellbeing of educators and students may be at perpetual risk as corporations seek to ride the recurring waves of educational technology buzz to ever-increasing profits.

Dr. Royce Kimmons is an Assistant Professor of Instructional Psychology and Technology at Brigham Young University where he studies digital participation divides specifically in the realms of social media, open education, and classroom technology use.

More information about his work may be found at http://roycekimmons.com, and you may also dialogue with him on Twitter @roycekimmons.

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