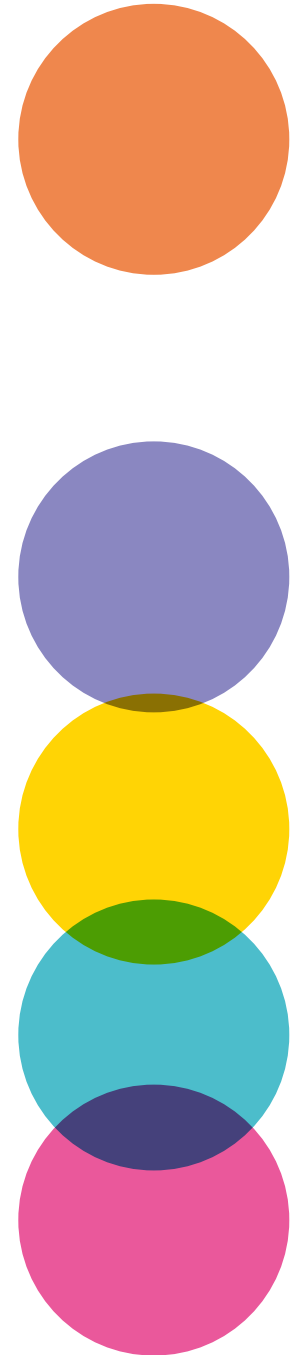


Is research output fit for the future?

● closing
● the
● impact
● gap



introduction

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Digital innovation and improved connectivity are changing the way many of us access information, communicate, and learn.

In academia, advances in the digital space make it easier for researchers to collaborate and share findings. However, despite these opportunities, published research is often cited as inaccessible, or difficult to use in practice.

Our commitment to help researchers drive change in society, along with supporting quality education for all, has prompted us to seek answers to questions on how research is currently used and shared both within and outside of academia. We also look at how research outputs might be developed in the future to advance accessibility, learning, and real-world impact.

We gathered global perspectives on the future trends in learning and research presentation, comparing the views of students, early career stage researchers and the established research community.



Background

The way we learn, research and share information has changed dramatically over the last couple of decades. However, is academic research, and the institutions and funding bodies that support it, keeping up with these advances or are the structures that dictate research communication still stuck in the past?

The COVID-19 crisis has undoubtedly fast-tracked digital transformation as many parts of the world shifted to remote working and learning. Academics and students were forced to swap their lecture halls for online platforms and rapidly adapt to remote learning, meeting and research.

There has been an accelerated move to make science more open. Academics, funders, and publishers across the world have come together to advance research on both COVID-19 and related work. Publishers have taken down paywalls to make COVID-19 research and related work freely available to all, while researchers have raced to share their insights and findings via pre-print servers (platforms that publish research papers before peer review) and other digital platforms.

Many of the changes in education and research were already afoot, but COVID-19 has offered an opportunity for thought and experimentation. As we emerge from the pandemic, many higher education institutions are under pressure to rethink their approaches to education.

Academics are debating how research should be communicated in the future so it can inform decision makers and influencers outside of academia and to what extent the move to open and rapid publication remains the new normal.

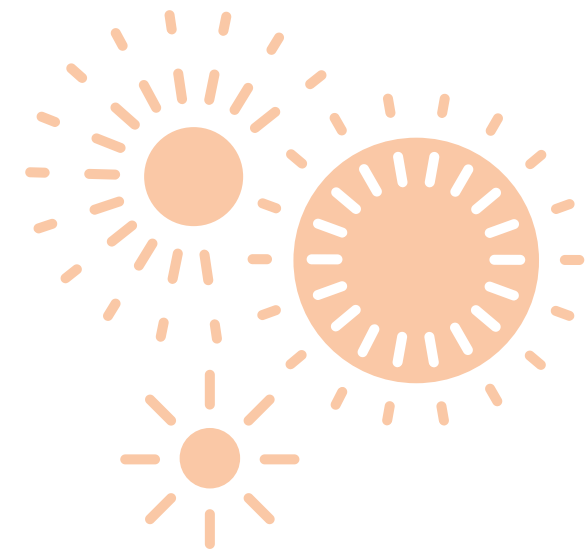
Taking this opportunity to reassess the future shape of how information is presented both for learning and for academic research to be impactful in driving change is a significant moment in our history and essential for our societies to meet the growing demands of the 21st century.

Academics, non academics, and the research paper

When we examine current research outputs, the academic paper leads the pack and has done for over 350 years. Though it has been digitised and can be accessed online, it still follows the same structure of text, figures, methodology and findings that it always has; not much has evolved in the way we present academic papers, despite changes in learning styles.

Journal articles dominate academic communication, but they tell only one part of the research story. More and more academics are turning to other formats to share their work and research experiences. Released from the rigid structure of the journal article, academics have the freedom to discuss their research in more accessible and engaging ways, using avenues such as social media, videos and games to reach new audiences, which broadens reach and usability to others who process information differently.

With such a variety of options, for how long will traditional academic outputs remain the primary way to communicate research?



The power of academic culture

A departure from the academic paper would mean a shakeup of the research ecosystem. Academic culture is wedded to the research paper to such an extent that decisions on hiring, promotion, reward, recognition, and funding often rest on the success of a researcher's publishing career.

The impact agenda

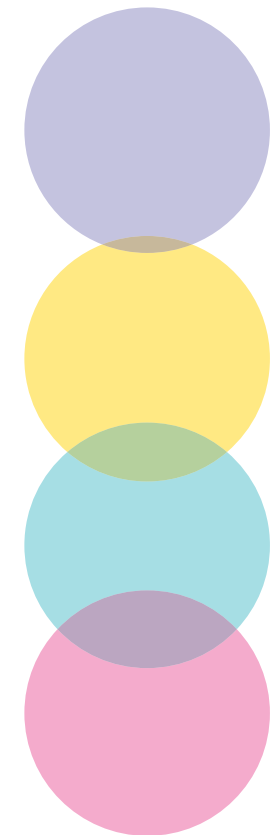
For most researchers, the real point of their work is to make a tangible difference to society. They want accessible research outputs to influence thinking, inform 'real world' decisions and for impact to be demonstrated broader than the citation metrics.

To this end, funders and national research assessments such as the UK Research Excellence Framework and the Excellence in Research for Australia require institutions to demonstrate the impact of their research beyond academia. There are also grassroots initiatives including the Declaration on Research Assessment (DORA), which urges funders, academic institutions and publishers to move away from citations and evaluate the impact of all research outputs.

Supporting the path to real-world impact

We know that part of the journey to real-world impact relies on making research accessible and engaging for policy makers, communities, and end-users. To help us and others in the research ecosystem understand how best to support real-world decision making, along with learning at university, we turned to academics, undergraduates and postgraduates for their views on these issues. We also wanted them to answer the question that if academia solely presents research in traditional formats, that only it can understand, will it ever make the kind of real world impact most researchers want?

We probed into the current ways academics, undergraduates and postgraduates learn and consume information, the challenges with current academic formats, and the best ways to use and present research outside of university. Finally, we asked about their aspirations for research presentation, and the tools that could help improve learning and research outcomes in the future.



Methodology and demographics

Learning is an important step to making a change. So if we're interested in how research drives real-world change, we need to understand how those instrumental in making the change will learn from the research that's been done.

Closing the Impact Gap report is based on two surveys that took place in November and December 2020 and January 2021. The first, carried out on our behalf by OnePoll, targeted 1,000 undergraduates and postgraduates in 10 different countries. The second was a study of 1,500 academic researchers from Emerald's Literati database, with respondents from over 100 countries worldwide.

Within the academic survey, where there were fewer than 100 people (Australasia, India, and Latin America) findings should only be used as an indicative view. Within the student survey, France, Germany, and UK were combined to group as Europe. Meanwhile, China and Japan have been reported separately (instead of grouped) to emphasise their different views. Within the academic survey, North America includes Canada, whereas the student survey was just USA.

[See a full breakdown of participants in this report](#)

Key findings

Four areas of interest emerged from our research

Is academia stuck in a rut?

We found 92% of academics present their research as journal articles, but also identified a strong need for more varied formats that appeal to different learning styles, and that are more in line with the way the world has moved on in terms of how information is consumed.

Are research papers fit for purpose?



3 in 5 academics believe it is difficult for research to be used outside of academia



45% of academics and 43% of students agree there is too much to read/papers are too long to digest



Only 30% of students generally read the full article and 57% tend to check the abstract first, and if relevant, go on to read the full article

Barriers to innovation



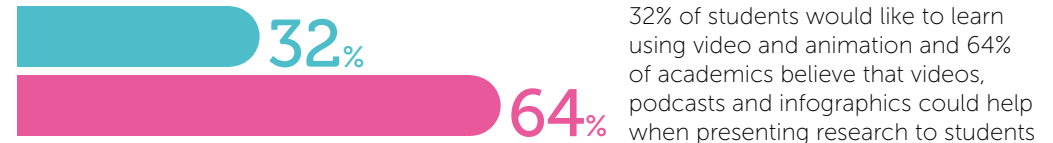
47% of academics and 29% of students see budget constraints as the major barrier to change within research outputs



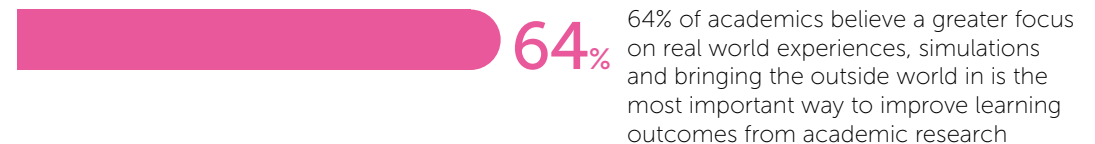
1 in 4 students believe academics are more concerned about career progression than making learning easy for non-academics or students

■ Academics
■ Students (includes under and postgraduates)

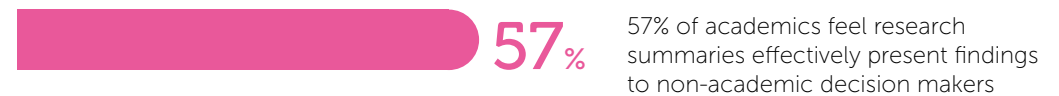
The future of learning and research outputs



32% of students would like to learn using video and animation and 64% of academics believe that videos, podcasts and infographics could help when presenting research to students



64% of academics believe a greater focus on real world experiences, simulations and bringing the outside world in is the most important way to improve learning outcomes from academic research

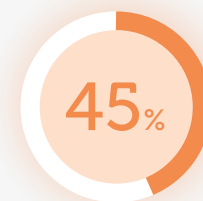


57% of academics feel research summaries effectively present findings to non-academic decision makers

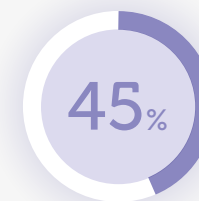


45% recognise the need for faster research dissemination in a post-COVID world, another 45% place responsibility on publishers to reduce Article Processing Charges for underfunded research areas

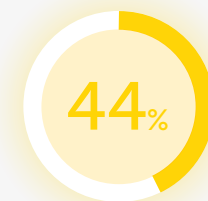
Top changes academics believe will help research lead to greater impact include:



quick dissemination



reduced Article Processing Charges for those in underfunded areas



more focus on interdisciplinary research

the analysis

Is academia stuck in a rut?

There is a gap between the needs of academics and those of the next generation of learners. Alongside teaching, academics are under pressure to secure funding, carry out research and publish, often, in high impact factor journals. Meanwhile, students attend university to gain qualifications, skills and experiences that will set them up for the future.

There have been calls for innovation within teaching, but the traditional lecture has largely dominated the scene. Teaching approaches have been forced to change during COVID-19, with academics adapting lectures for remote students, and providing digital and interactive content.

We are yet to learn the changes within higher education that will remain post-pandemic, but it is clear from our research that students are hungry for a more varied learning experience.



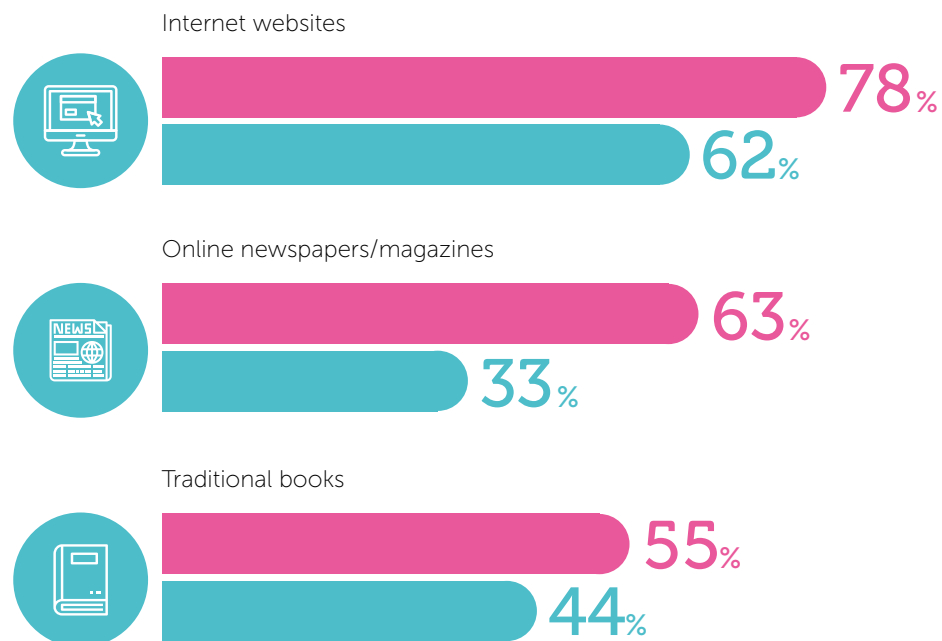
"The needs of researchers are very different from the needs of students. Innovations that help teaching are often counterproductive for research."

Academic in the UK

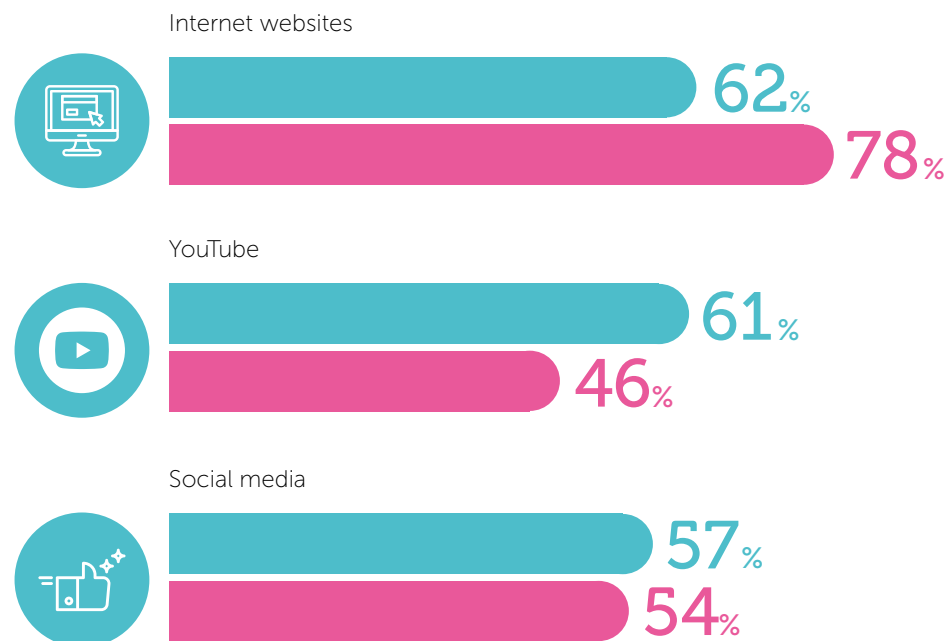
Information and learning preferences outside of academia

The top 3 most popular ways that academics/students consume information outside of academia:

Top three: Academics



Top three: Students



■ Academics ■ Students (includes under and postgraduates)

[See a regional breakdown of the results](#)

While online channels, social media and YouTube are significant for both groups, students are more drawn to digital content than academics who prefer traditional media such as books and newspapers.

In China, where they have their own social media platforms, most students (78%) and academics (59%) favour social media learning. Meanwhile, traditional books are particularly popular for academics in Australasia (70%) and Europe (66%), as well as for students in Brazil (72%) and India (49%).



Research and learning at university

In the context of higher education, students and academics gravitate to similar content types but to varying degrees. Academics are far more likely to choose journal articles over other formats. Students are principally drawn to traditional books, but open to a wide range of content forms for learning and research.

When we drill into less traditional content forms, preferences start to widen. Students have a high appetite for video and animation (29% students vs. 8% academics), quizzes (23% students vs. 5% academics), book apps (19% of students vs. 4% academics) and audio & podcasts (17% students vs 4% academics).

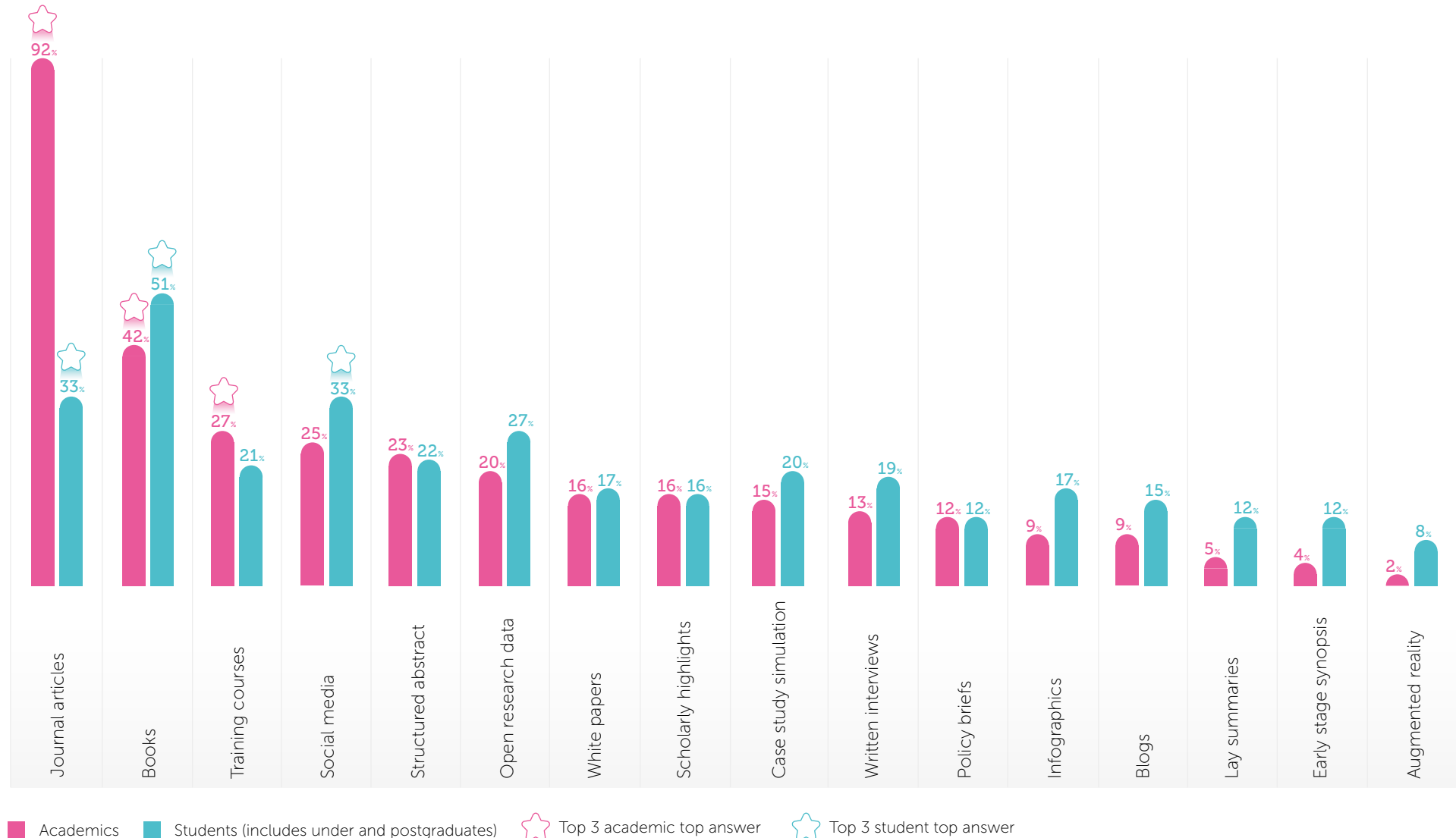
In their quest to learn, students are more likely than academics to simplify content using annotated articles (21% of students vs. 10% of academics) and infographics (17% of students vs. 9% of academics). Students also prefer content that is made more interesting and digestible through games (12% of students vs. 3% of academics), de-jargonising software (10% of students vs. 1% of academics) or cartoons (10% students vs. 1% of academics).

Expert view

"We know a big issue with impact is that research can often be inaccessible. Not only because of the academic language used, but also because research is often situated behind a paywall. But there are other reasons too. Many potential research users are also time poor and can lack the confidence and skills needed to really interrogate research findings. So, what we need to do is help potential research users understand 'what does this mean for me?' Alternative forms of media and social media can certainly help with these issues: especially if they help us engage reflectively with new knowledge and ideas."

Professor
Chris Brown, Professor
in Education and Deputy
Executive Dean (Research),
Faculty of Social Sciences
and Health, Durham
University.

Top current ways that academics present, and students consume information within university.



- Q. Which of the following content forms do you currently use to present your research? (academics)
- Q. Which of the following content forms do you currently use to help you with your learning and/or research at University? (students)

Are research papers fit for purpose?

A pressing need for evolution

Except for being digitised, research papers haven't changed much since they began over 350 years ago. That's not to say there haven't been calls for change. Scholars and others continue to debate the function and future of the scientific paper, exploring how open access and potential changes to incentive structures might influence the way research outputs evolve in the future, and the age-old question of: who pays?

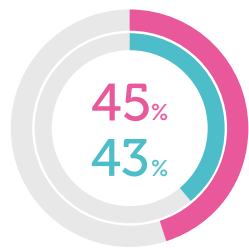
Some scholars are right to argue that research communication is already in transition. We see more and more academics experimenting with different research outputs,

sharing research via blogs, social media, and using repositories and preprint servers. While many non-traditional activities can be tracked by altmetrics providers, traditional journal impact measures are likely to dominate for as long as they remain tied to incentive structures.

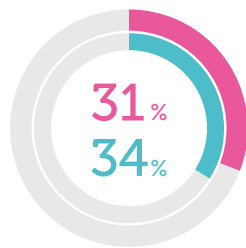
Our research points to several reasons why the traditional scientific paper might not be fit for the future, supporting the drive for a range of research outputs.

Long, text heavy, and full of jargon

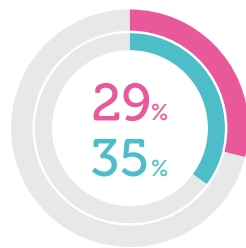
Q. Which of the following do you consider are challenges with academic research papers? (Please select all that apply.)



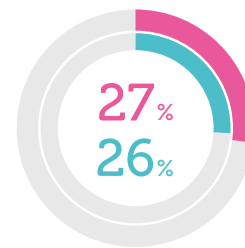
Too much to read / papers too long to digest



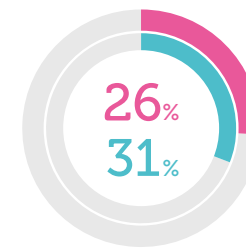
Text heavy rather than visual



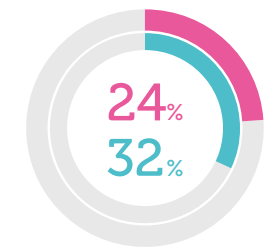
Too much use of jargon rather than plain English



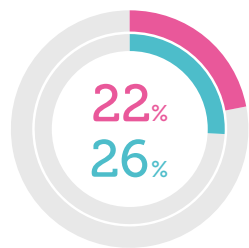
Lack of remote access when off campus



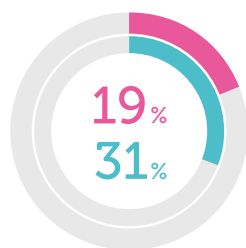
Confidence the source is trustworthy



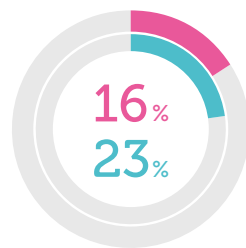
Knowing where to find content in the first place



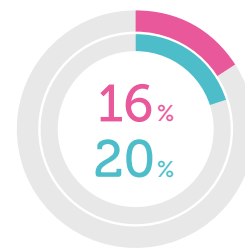
Poor search functionality



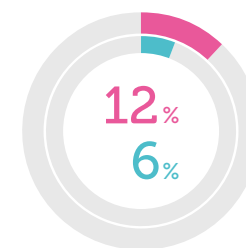
Lack of summaries



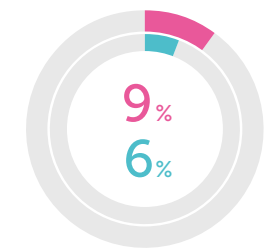
Lack of multiple language content



Lack of accessibility for e.g. visually impaired / hearing loss



I don't think there are any challenges with academic research papers



Other

■ Academics ■ Students (includes under and postgraduates)

See regional breakdowns of participants in this report for [academics](#) and for [students](#).

"Many articles and journals are so technical with jargon that many people soon switch off. It would be much easier if these were written in plain everyday language that the average person can digest and retain"

Undergraduate student in Australia

"Sometimes a simple jargon buster is needed, a lot of complicated words have a very simple secondary word which would have been used instead"

Undergraduate student in UK

"Overuse of mathematical equations and calculations resulting in unintelligible outputs"

Academic in Australia

"Sometimes it would be nice to see shorter articles. The requirement for extensive literature reviews and showing that you know what you're talking about is tedious, and sometimes unnecessary (just seems to serve previous authors). Say what you have found and get on with it"

Academic in USA

"We have to come up with a better way to present and digest article information. Most of us don't have 20 hours a week to read articles – how we can access the information, identify top articles (and best articles that have not been out long enough for citations to indicate) to help us sift through the irrelevant or poor academic articles"

Academic in USA

"I dislike the pressure from publishers to transfer devices appropriate to teaching (quizzes, boxes, graphics, etc.) to research articles and monographs, where they are not helpful"

Academic in UK

Nearly half of students and academics say that research papers are too long and too text heavy. Another top concern is the use of jargon rather than plain language, particularly for academics in Australasia (38%), India (32%) and North America (49%), and students in China (49%) and the USA (56%).

Other challenges for students include lack of summaries (31% students vs. 19% academics), knowing where to find content in the first place (32% students vs. 24% academics). 23% students see the lack of multiple language research content as a challenge, particularly in China (40%), India (28%) and USA (39%). 16% of academics find a lack of multiple language content a problem, apart from those in Latin America where it's an issue for 41%.

Having confidence that research is from a trustworthy source is important to both students and academics. 1 in 4 academics (26%) cited trust as a major challenge, with Australasian academics (34%) the most concerned, compared to other regions of the world. For students, trust is a major worry to those in Brazil (43%), China (42%) and Egypt (34%).

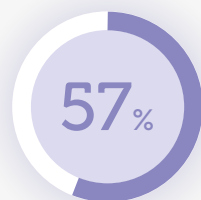
A small minority of academics (12%) and students (6%) don't see any challenges with research papers.

How students engage with academic content

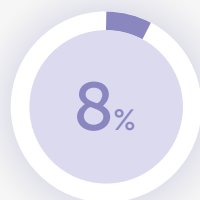
Q. Which of the following best describes your habits when reading academic content?



I generally read the full article



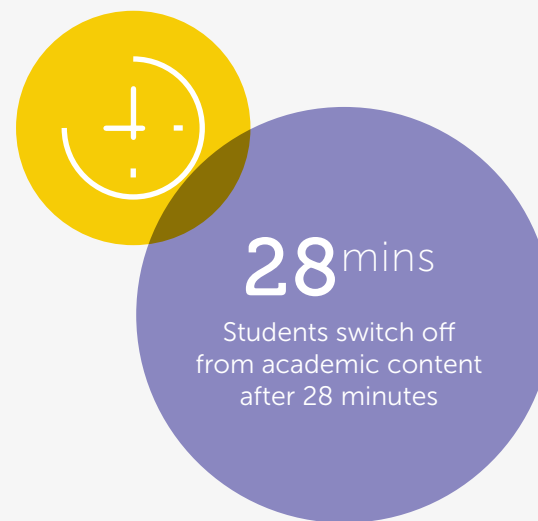
I generally check the abstract first and if it is relevant, I will read the full article



I generally only read the abstract



I do not typically read academic content



Despite its challenges, most students will read a research paper if relevant. Students generally check an abstract first and, if useful, go on to read the full article. However, nearly one third of students will read the full article – and this rises to more than half in India and the USA, but only 10% in Japan.

On average students engage with academic content for 28 minutes before they 'switch off'. Over a quarter of students in China say they never switch off and students in the USA are more likely to switch off than any other country.

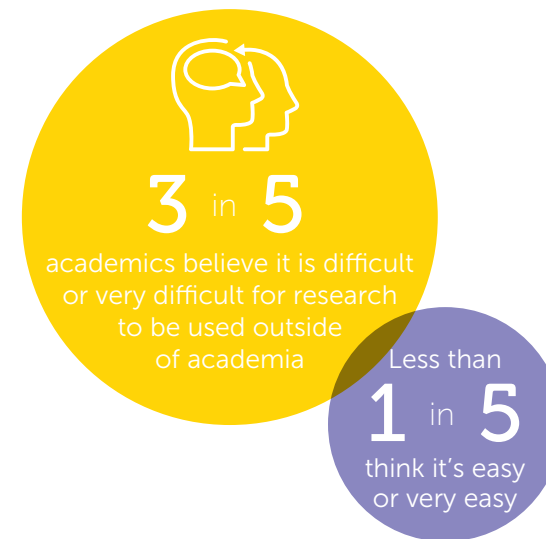
How well do current research outputs translate outside of academia?

Most academics (60%) agree that the way research is currently presented makes it difficult or very difficult for research to be used outside of academia. 32% of academics in China, East Asia and Northern Africa believe that it is easy or very easy for research to be used outside of academia, while only 6% of academics in Australasia and 7% in North America believe the same.

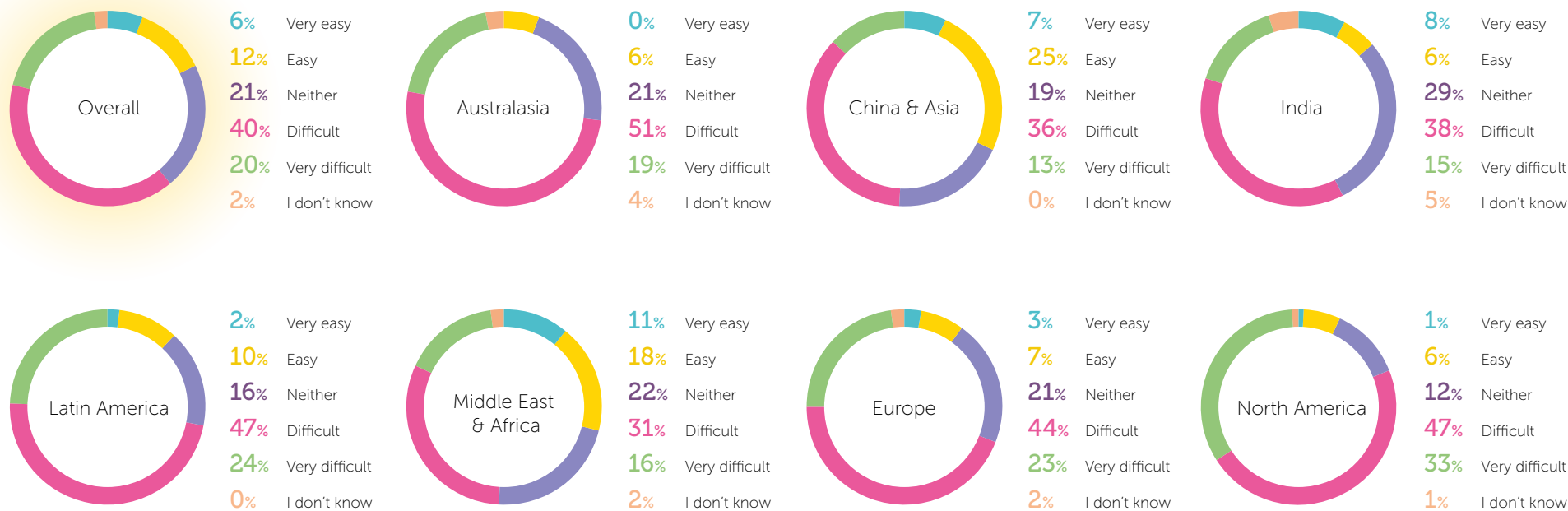
70% of academics in Australasia and 80% in North America agree that it is difficult or very difficult to use research

outside of academia, while in China and Asia and Northern Africa just under half agree the same.

The difficulty of using research outside of academia is a challenge that has been discussed in previous Emerald reports. In our [Global Inclusivity Report 2020](#), academics agreed then that the single biggest way research can become more impactful is through greater knowledge exchange with those outside academia.



Q. Do you think the way research is currently presented, makes it easy or difficult to use outside of academia?



Figures may not add up to 100% due to rounding.

Most wanted content types – students

Top 3 content types students want to see used more at university



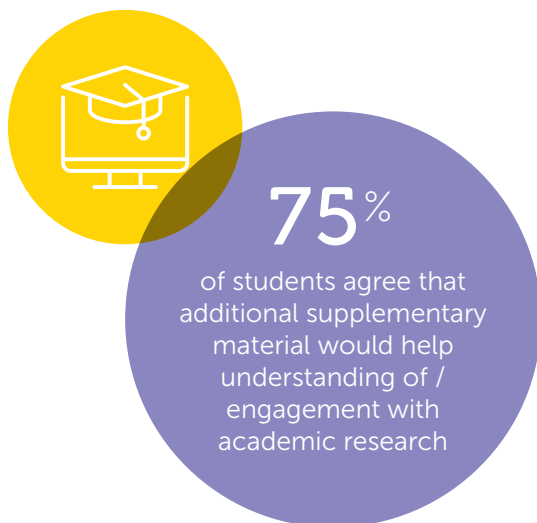
Students believe a combination of traditional methods along with technology would aid their learning at university. 26% of students favour the use of open research data (rising to 47% in China) and 25% prefer video articles/interview.

They also think learning could be enhanced through training courses and quizzes (24%), case studies (23%), podcasts (23%), journal articles (23%), infographics (22%), annotated articles (21%), structured abstracts (21%) and games (21%).

Quizzes to test knowledge proved popular in Australia (43%), China (39%), USA (30%) and Europe (23%).

Most students agree that supplementary material alongside a journal article or book chapter would aid their learning. Students in China are most in favour, with 97% choosing this option.

[See a regional breakdown of the results](#)



Most wanted content types – academics

The content types academics would prefer for research presentation (aside from traditional formats)



Academics would like to see research presented via traditional and new content types. However, they still prefer journal articles over all other formats, with 59% of academics (rising to 64% in India) rating them as 'very attractive'.

Traditional books continue to appeal to academics, with 34% choosing this option, rising to 43% in Europe. Academics are least keen on early stage synopses (9%) and de-jargoning software (8%). Open research data ranks highly for 31% of academic respondents, as well as 26% of undergraduate/postgraduates.

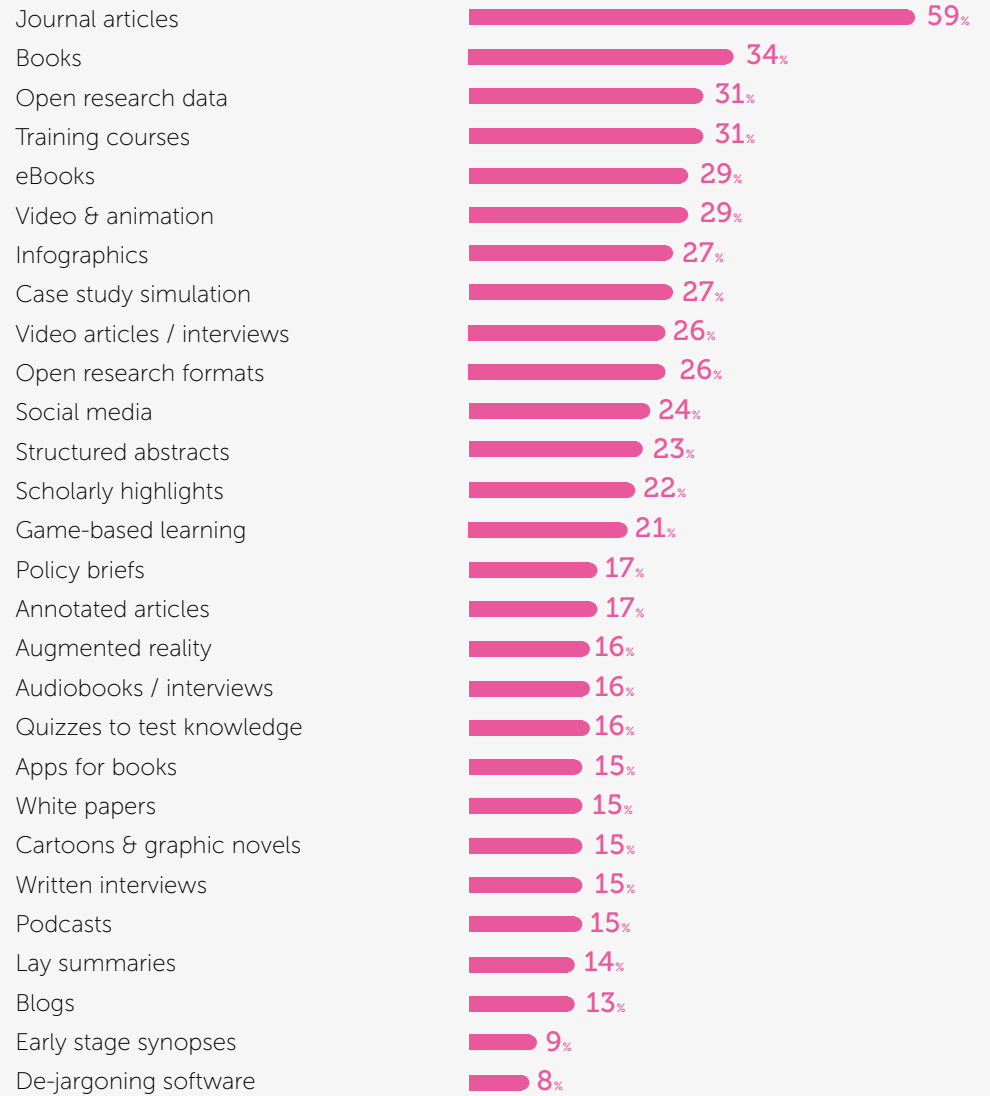
The tables on the next page show a fuller breakdown for both types of user, and regional breakdowns are also available for students and for academics.

Q. Which of the following content forms would you like to see used more in the future to help you with your learning and make research papers more useful at university?



■ Students (includes under and postgraduates) ■ Academics

Q. Using the scale of '1. Not at all attractive' to '5. Very attractive', how attractive are the following formats below, as a way to present academic research beyond traditional formats?



See regional breakdowns of participants in this report for [academics](#) and for [students](#).



YouTube

71%

YouTube is by far the most popular social media channel in helping students learn, with 71% overall using this platform.

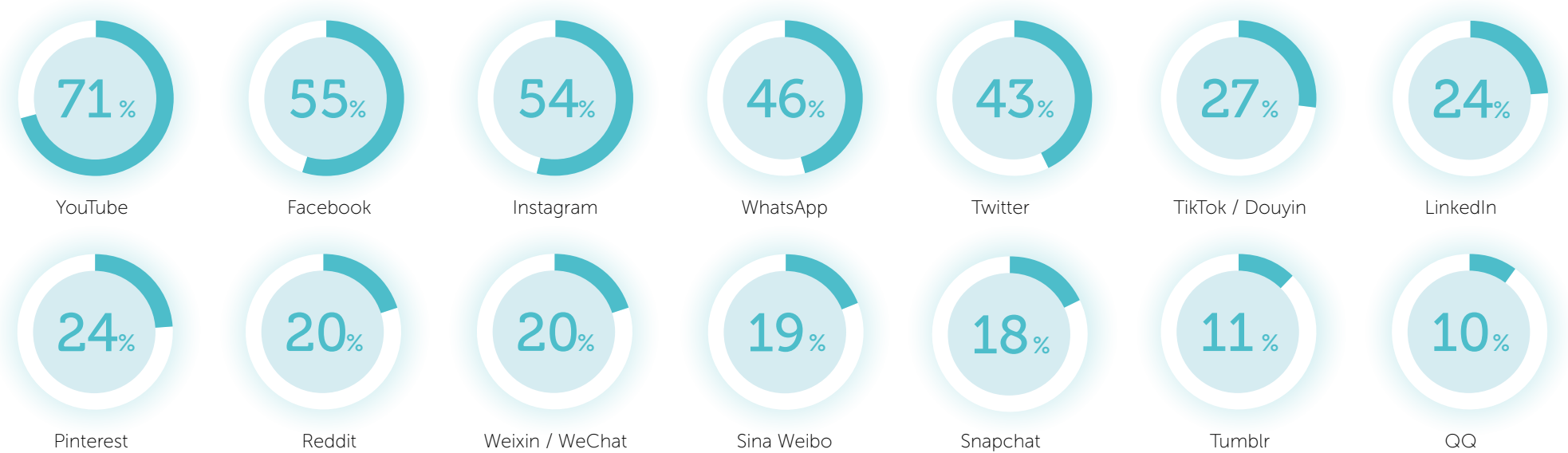
China and the USA are the only countries without YouTube in their top 3

Top social media channels

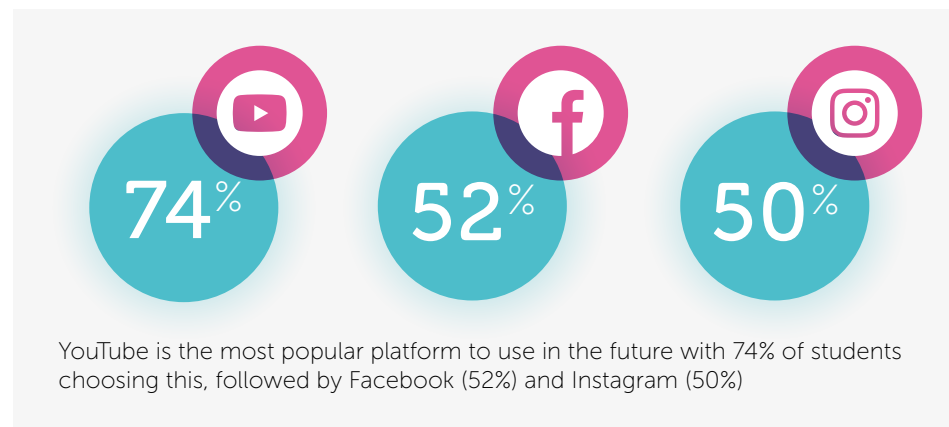
YouTube as a learning tool is most popular among students in Egypt (92%), India (92%) and Brazil (90%), but least in China (37%), where the country has its own social media platforms. Facebook is the second most popular social media sites for learning and/or research at university, used by 55% of students overall, rising to 82% in Egypt. However, only 11% of students in Japan use Facebook for study.

Instagram is the third most favoured social media channel for learning, with 54% of students using it overall, rising to 78% in Japan, but falling to 26% in China. Sina Weibo (micro blogging), Weixin (messaging) and Douyin (TikTok) are China's most popular social media platforms, with 80%, 91% and 85% of students using them respectively.

STUDENTS Q. Which social media sites do you currently use to help with your learning and/or research at university?



Future trends in social media

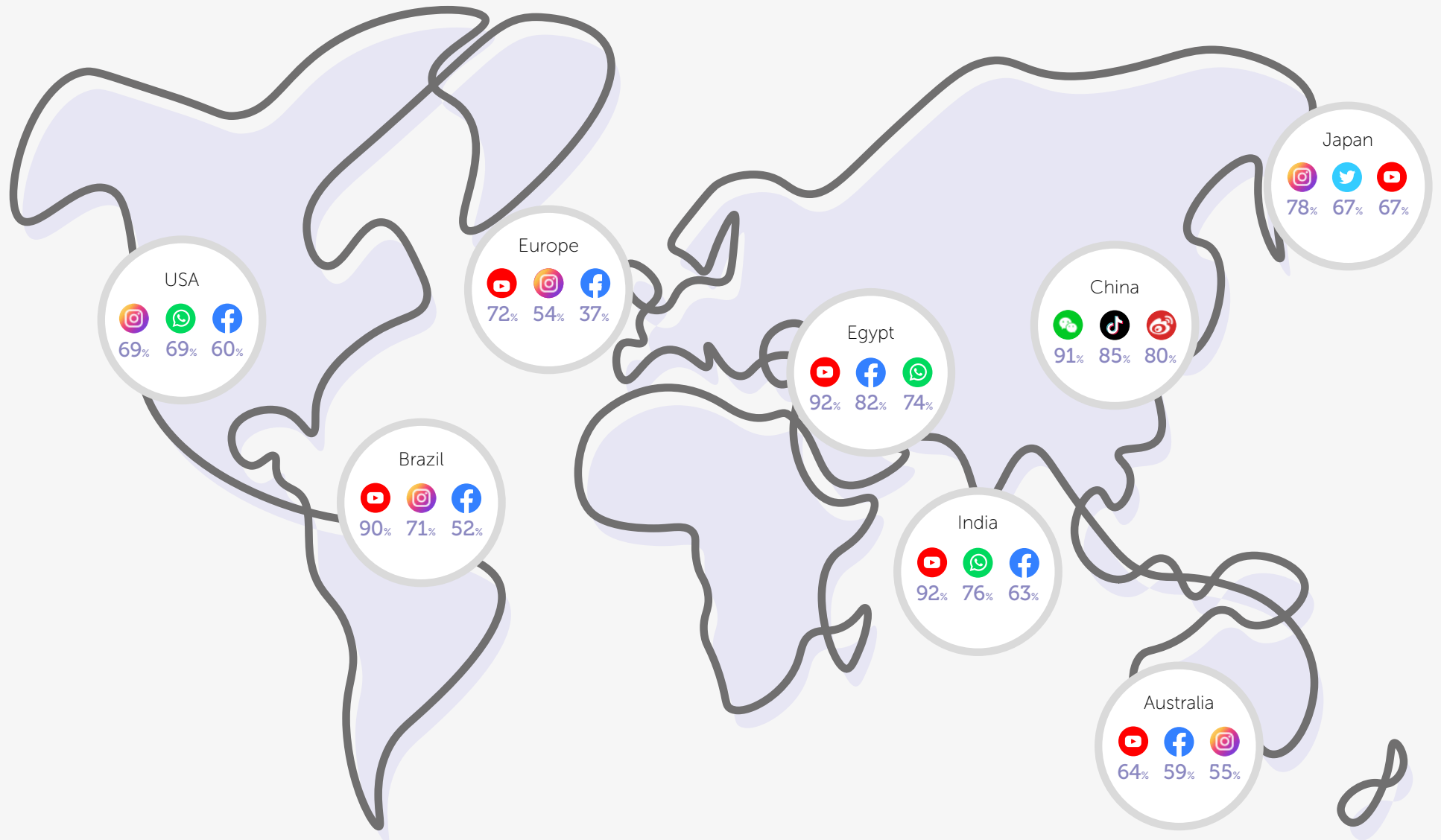


Students generally believe that the current social media sites they use to learn and/or research at university will continue to be relevant in the future. Most are open to a range of social media sites, except for students in Japan who prefer YouTube (69%), Twitter (56%) and Instagram (50%).

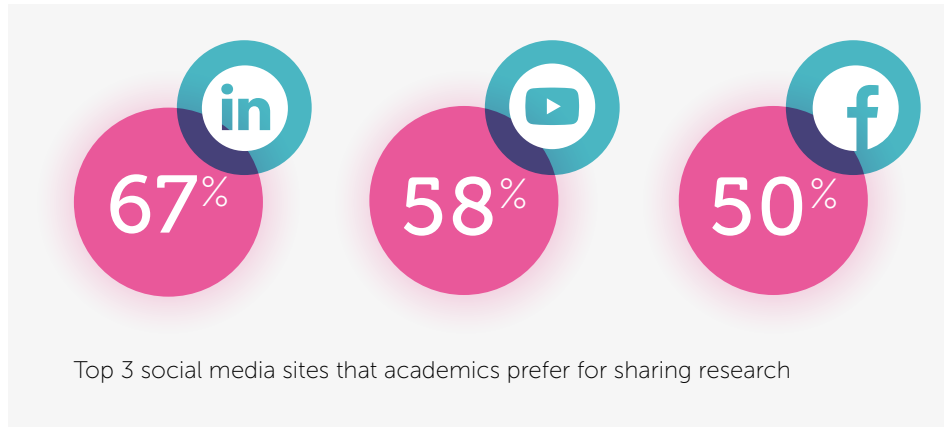
YouTube is again the most popular platform overall, but is particularly important to students in Brazil, Europe, and India. Students in China are the least likely to use YouTube for learning and are more supportive of their own platforms.

LinkedIn didn't appear within the top results, as students may not be focusing on their career at this point. However, LinkedIn, along with WhatsApp, may become important for certain regions in the future. USA was the only country to have LinkedIn in their top three, with 66% of students choosing this to help them learn in the future. WhatsApp is popular among 48% of students overall, and although not widely used by organisations to support learning, it could be a worthwhile option to explore.

STUDENTS Q. Which social media sites do you currently use to help with your learning and/or research at university?



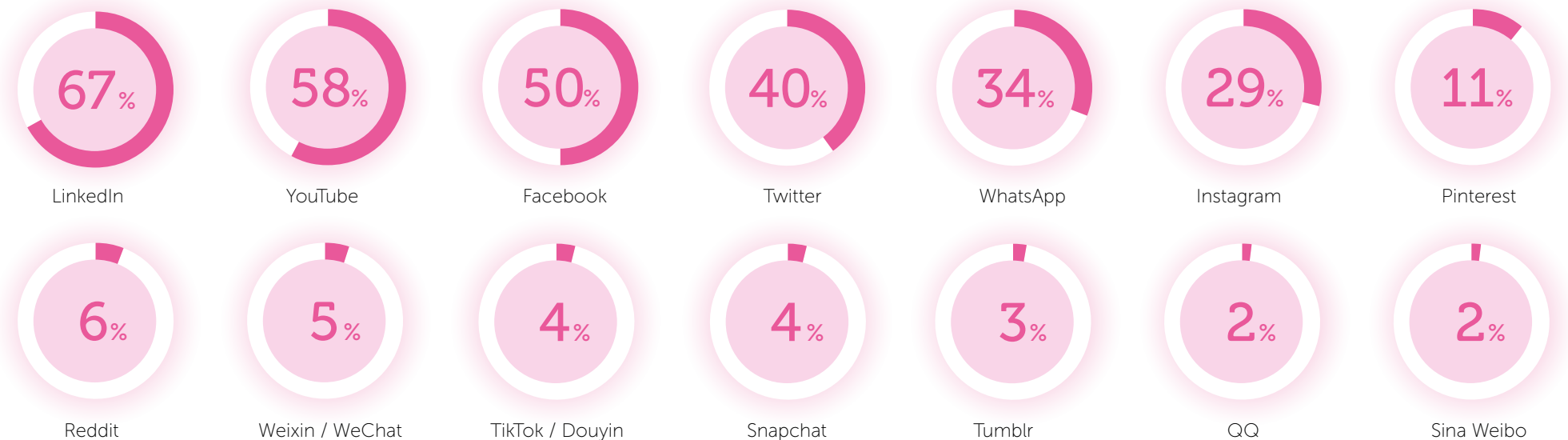
Top social media channels for sharing research



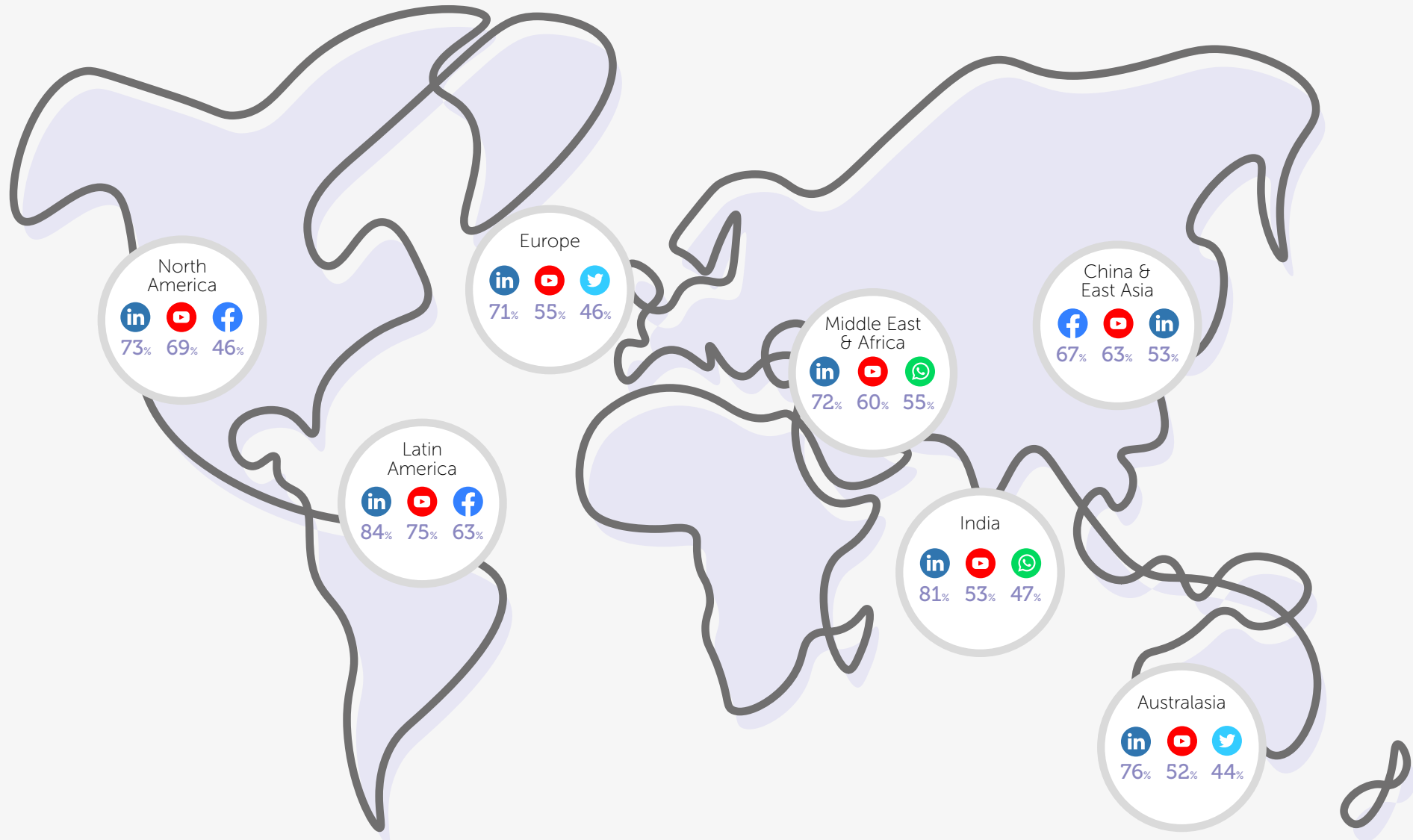
67% of academics would like research shared via LinkedIn rather than other social media sites. Those in Latin America and India were the biggest fans of LinkedIn where it was selected by 84% and 81% of academics respectively. YouTube is a top 3 platform for all regions, averaging 58% but rising to 75% in Latin America.

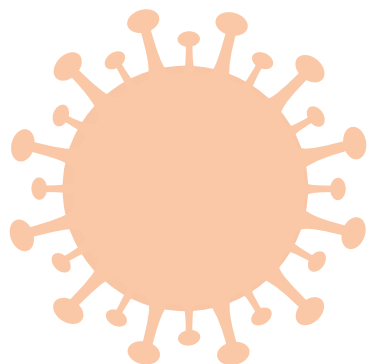
Twitter and WhatsApp may be important for some regions, with 40% and 34% of academics respectively choosing these options. Instagram and Pinterest fair less well as potential channels for sharing research but may be relevant for some, with 29% and 11% of academics opting for these sites respectively.

ACADEMICS Q. Which social media sites would you like to see as a way to share research?



ACADEMICS Q. Which social media sites would you like to see as a way to share research?



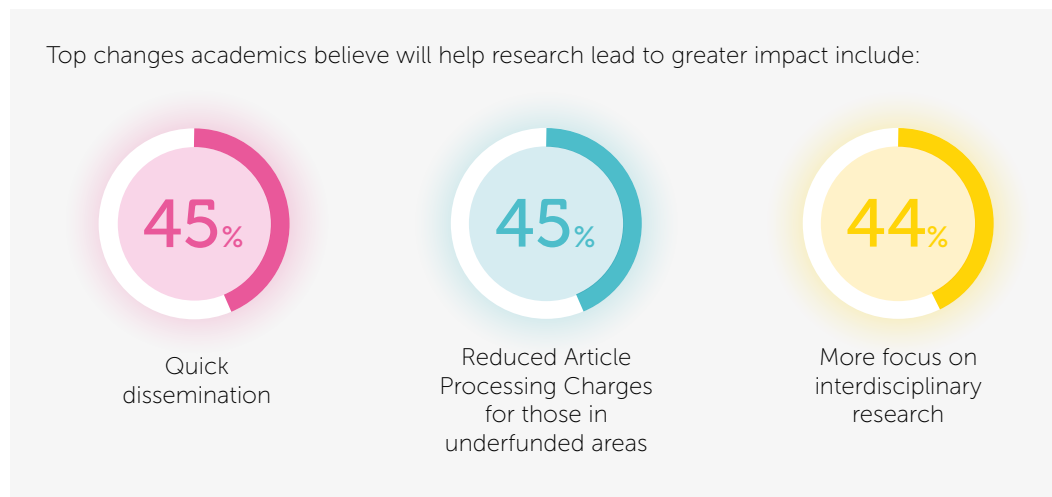
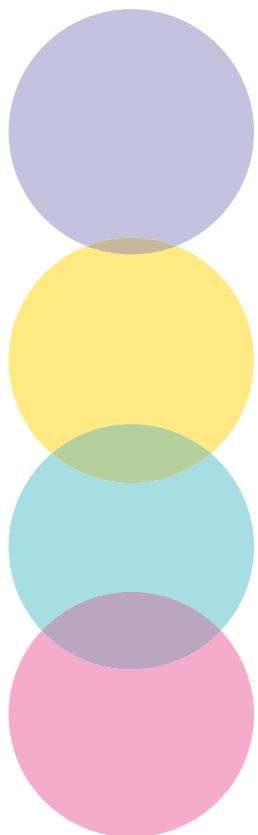


Impact of COVID-19 on research

The global research community's response to the COVID-19 pandemic has been phenomenal. Researchers have collaborated across disciplines and regions, shared research outputs rapidly through preprint servers and open platforms, and fast-tracked peer reviews. Meanwhile, publishers have supported this drive by offering free access to content and reducing time to publication.

Open and rapid sharing of research outputs have undoubtedly helped in the fight against COVID-19. The recent changes to research practice have set a precedent and paved the way to how research might be conducted and published in the future.

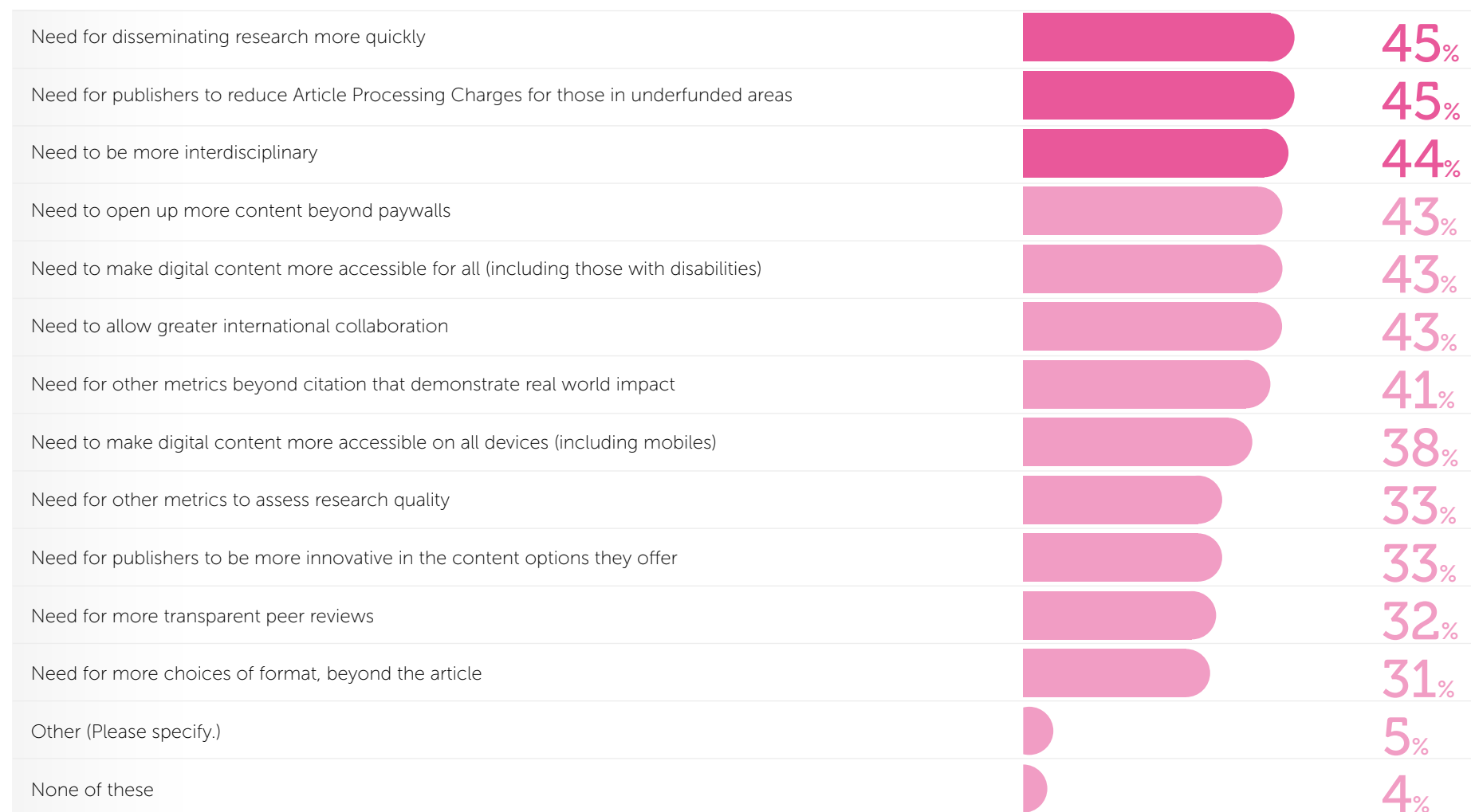
We asked academics how information and research need to be presented to further real-world impact. We found that most academics want change within research culture and publishing practices, and have strong ideas over how to progress the sector.



In addition, academics want more open content (43%), greater accessibility to content (43%), and metrics that help to demonstrate real-world impact (41%).

33% of academics want publishers to be more innovative in the content options they offer, 32% want more transparent peer reviews, and almost 1 in 3 (31%) want more choices of research content, beyond the journal article.

ACADEMICS Q. How do you think the COVID-19 pandemic has affected the way information and research needs to be presented to make it impactful? (pick all that apply)



[See a regional breakdown of participants in this report](#)

Barriers to innovation & participation

Why budgets and career priorities are hindering progress

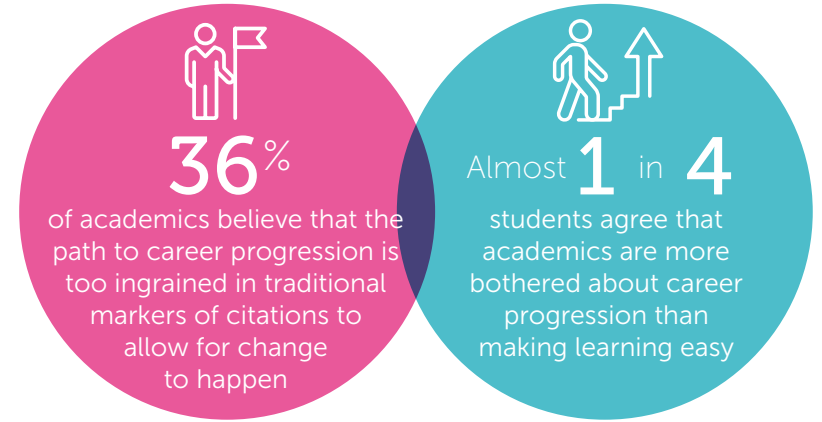
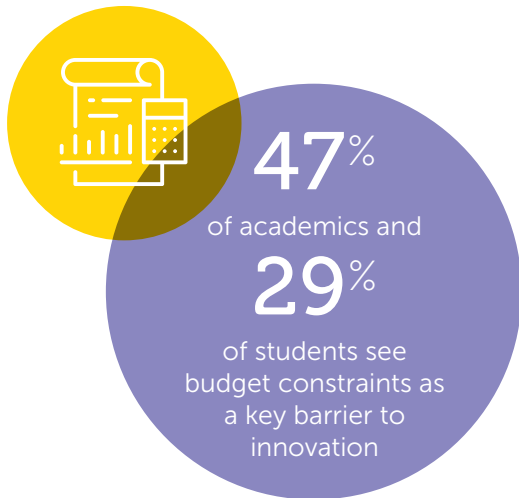
Many of the barriers that prevent innovation within research presentation and teaching are linked to academic culture. Academics are constantly managing multiple responsibilities; they must apply for and win grants, research, write papers, publish (preferably in high-impact journals), and teach. To increase their chances of progression, they need to find time to network, collaborate, present at conferences, as well as engage the public and reach out to policy makers.

Alongside their responsibilities, academics often face uncertain futures. In the UK, with higher education under pressure to reduce costs there is a tendency to employ academics on a casual basis. 34% of academics were hired on fixed-term contracts in 2018-19, according to the most recent data from Higher Education Statistics Agency (HESA). Casualisation within the sector could increase in the future, as universities face even greater financial uncertainty due to the COVID-19 crisis.

Academics across the world face similar employment insecurities as more universities embrace the trend to casualise staff. In Australia, some of the country's best universities have the majority of their academics on fixed or casual contracts, and younger academics tend to be most affected. In some universities more than 80% of staff below the age of 30 are on insecure contracts.

Money worries

Limited university budgets are a major barrier to innovation for academics. While funding is more of a concern for academics (47%), 29% of students (rising to 42% of students in Brazil) also recognise that budget constraints hinder change.



Academics in India are particularly worried about budget constraints in universities, with 69% selecting it as an extreme barrier to innovation.

In China, 11% of students chose budget constraints as an extreme barrier, but this rose to 45% of academics in China and East Asia.

37% of academics believe publishers charge universities too much and 36% (rising to 58% in Australasia) share concerns around how research funding is awarded.

Who pays for innovation?

60% of academics think the cost of new content forms should be covered by Article Processing Charges. However, 14% of academics are prepared to pay more if new content forms are likely to improve the impact of their research, and 11% agree to pay more if additional costs are under 10%.

Is progress limited by academic culture?

Over a third (36%) of academics feel that the traditional path to career progression hinders progress on how research is presented. Academics in Australasia and North America are most inclined to agree that the academic incentive system is an obstacle to innovation. What is most striking here is that researchers place the responsibility for lack of innovation on the system, whereas almost a quarter of students believe the responsibility for inaction lies with academics themselves.

Both groups to some extent believe there is a resistance to change within academic culture. 31% of academics and 23% of students agree that academic culture is very traditional and isn't keen on change and/or that academics have an old-fashioned mindset and don't like change. This barrier was felt most strongly by 47% of academics in North America and 45% of students in the USA.

Are academic traditions holding back Early Career Researchers (ECRs)?

“They ECRs need to be disruptors and innovators since the beginning. This means that, sadly, we must accept that shining future minds will be more practical, less theoretical, more prompted but less accurate”.

Academic in South & Eastern Europe

*“1. They don’t have the resources needed to break into the system.
2. They are judged by traditional peers (tenure and promotion).
3. Research funding goes to traditional researchers with reputations for success using traditional methods.”*

Academic in North America

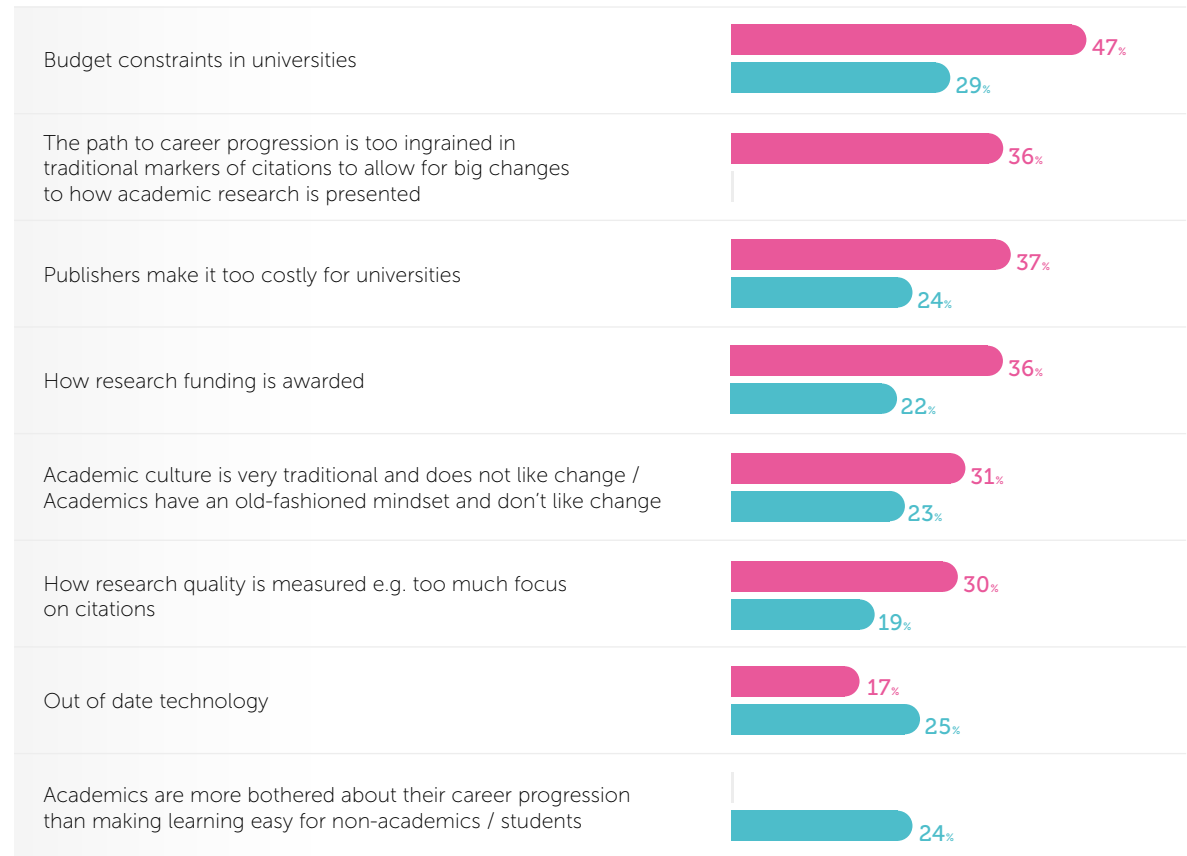
“The reward structure for tenure in higher education is biased toward traditional measures which seem to be increasingly ‘traditional’ in their nature. For example, many institutions want to require an impact index for research, which is a flawed process of counting peer citations”.

Academic in North America

Lack of investment in technology

1 in 4 students believe that out of date technology hinders progress in innovation, compared to just 17% of academics. Out-of-date technology, is a barrier most felt by students in Brazil (38%), India (36%) and the USA (33%), whereas, students in Japan (6%) and China (9%) see it as less of an obstacle. Academics in the Middle East and Africa (29%) most strongly see outdated technology as an extreme barrier, followed by 24% in India.

Q. Thinking about innovation in the way that academic research is presented to new generations of learners, please state how much of a barrier you think each of the following are in achieving this innovation.



■ Academics ■ Students (includes under and postgraduates)

See regional breakdowns of participants in this report for [academics](#) and for [students](#).

Expert view

How can research be more valuable to wider society?

We need to ask, as any business would, what is our product and how is this valuable to wider society? The nature of published content undoubtedly needs to be broader in format to meet the differing demands of audiences. The one-size-fits-all research article is not a sustainable model. This is evident in the results of this survey. Articles are important as a way of mobilising knowledge in academia, but academia is not the only 'user' of research. Instead, articles are one part of what should be a wide portfolio of content and services that meets the different needs and purposes of our societies. For example, sharing of proven teaching/training methods sits alongside consultancy services for SMEs.

This is a long-term change, but is supported by the drive for greater societal impact, and will demand some uncomfortable transitions. Our use of metrics will change dramatically over the next 10 years, as we move away from assessment of quality through numbers towards assessments that are more qualitative in nature. Increasingly, research is being measured in terms of impactful outcomes, rather than impactful outputs.

We will need to develop a non-limiting framework for impact that allows its value to be understood by stakeholders. Career pathways will do much to drive these changes and to bring diversity to the way in which academic work is conducted and delivered, with impact on our 'product'. More fundamentally, embracing representatives of broader society as co-creators in the research process will completely change the conversation. With this, the outputs and outcomes will no longer be delivered to 'users' but co-created with society. The result will be 'fit for purpose'.



"We no longer operate in a world where the one-size-fits-all research article is a sustainable model. This is evident in the results of this survey. Articles are important as a way of mobilising knowledge in academia, but academia is not the only 'user' of research. Instead, articles are one part of what should be a wide portfolio of content and services that meets the different needs and purposes of our societies."

Professor Debbie
Isobel Keeling, Associate
Dean of Engagement,
University of Sussex
Business School

The future of learning and research outputs

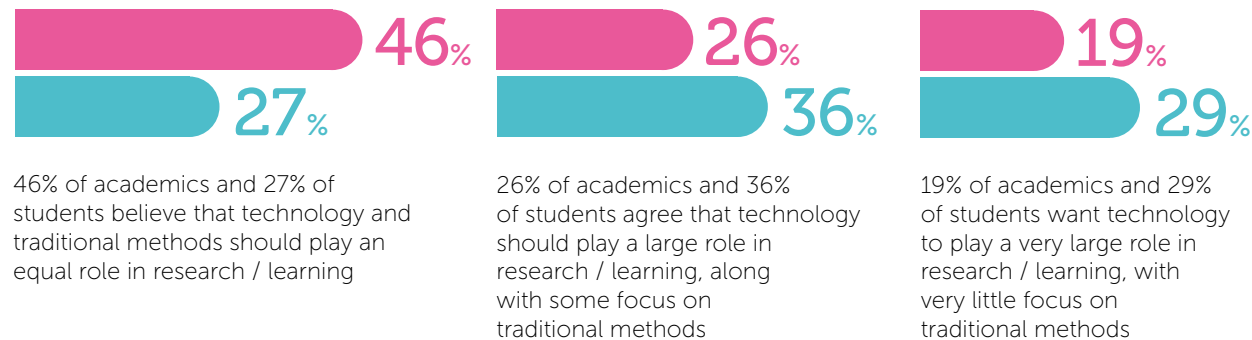
The role of technology

Universities around the world are using technology to enhance their learning environments. Technology Enhanced Learning (TEL), usually delivered via an online platform, is increasingly used in higher education, and has become central to the delivery of remote learning during the COVID-19 pandemic.

TEL can improve engagement and accessibility and it helps students to pace their learning and understand complex information. Research has shown that universities can increase the benefits of TEL by using it more frequently to build connections between lecturers, fellow students and external groups.

How might technology improve research accessibility?

Considering the benefits of TEL, we asked students and academics for their thoughts on using technology to improve the usefulness of research in general, as well as enhance learning within higher education.



46% of academics and 27% of students believe that technology and traditional methods should play an equal role in research / learning

26% of academics and 36% of students agree that technology should play a large role in research / learning, along with some focus on traditional methods

19% of academics and 29% of students want technology to play a very large role in research / learning, with very little focus on traditional methods

Both academics and students are keen for technology to play a role in improving both research accessibility and learning. However, there are mixed views over how much technology should be used versus traditional methods. Students generally feel more strongly than academics about technology playing a large or a very large role in research / learning.

■ Academics ■ Students (includes under and postgraduates)

Regional views about the role of technology

There are mixed opinions on the role of technology at the regional level. In all but one region (Middle East and Africa), academics agree that both technology and traditional methods should play an equal role in research – around 50%. However, students are more disparate and equally spread, with most agreeing that technology should play a large role in learning, along with some focus on traditional methods, rising to 47% of students in China.

Academics most in favour of change are those in the Middle East and Africa (32%) and India (26%), who want to move away from traditional methods and for technology to play a very large role in research. This was echoed most strongly by students in Egypt (46%) and the USA (53%) who want the same for learning. Meanwhile, academics in North America (7%) and Latin America (8%) are least in favour of technology playing a very large role in research.

Technology versus tradition

In their verbatim responses, students repeatedly call for a break with traditional learning approaches and for technology to play a greater role. One student in Egypt urges universities to “stay away from the old ways and methods” and make “more use of modern technology to keep pace with the times”.

Another student in the UK sees traditional teaching approaches as merely a tick box exercise he must endure to earn a degree: “[...] traditional teaching facilities have just stuck to the norm and ignored the fact that a majority don’t get on well with the traditional and are just putting up with it to get a piece of paper [...] University is not a space to learn, it is a place for lecturers to ‘teach you how to learn’ which is the biggest cop out.”

Most students want academics to use technology and new content forms such as videos to support learning at university.

“Improve media communication abstract themes. Each YouTuber can do something like this nowadays better than professors whose task it should be”

Postgraduate student in Germany

“They can provide us animated notes and give us some creativity assignments that are fun, and we gain knowledge from it at the same time too”

Undergraduate student in India

“Make study tip videos and helpful articles and content”

Undergraduate student in UK

Academics generally agree that videos and other tools can help make learning more engaging and digestible.



“5-minute video summary. It can be made for students, juniors and seniors or one for all”

Academic in Egypt

“Learning should be fun, and interactive. There should be a degree of freedom. If students choose not to do exams, that should be fine”

Academic in Malaysia

“Learning Bytes – 1/2-minute videos, 5-minute videos depending on the content”

Academic in India

“Flexibility is key, accessibility of course. Variety of information formats – text, but also visual audio and AV”

Academic in Australia

A minority of students and academics are less confident about the role of technology in opening learning opportunities. One UK academic raises concerns over the idea that technology automatically offers quality learning opportunities. "Learning is fundamentally a social process," explains the academic. "Relationships mediated by technology are not ideal though they might be the best available in certain, limited circumstances (e.g. COVID). The evidence is that social media often does not support connection and mental health."

Likewise, a UK student kicks back at the notion of technology leading to quality learning experience, describing first-hand how remote learning has muted opportunities. "In the current term learning is extremely poor, online lectures just do not have the same captivating power as in person lectures," they note.



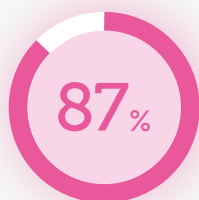
4 in 5

academics believe the use of technology could make learning more accessible

4 groups of learners who could benefit from technology

Most academics agree that technology could help the following groups of people gain access to learning opportunities:

Remote learners



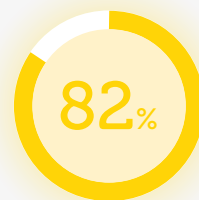
of academics believe technology could benefit those wanting to study remotely from any location

Professionals / Carers



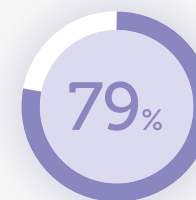
of academics think technology could help those with work or caring responsibilities

Returners to study / School leavers



of academics see technology being useful for people returning to study later in their careers as well as students starting straight from school

Career changers



see technology helping professionals retrain when switching careers



REAL WORLD: virtual experiences, simulations, other teachers/experts, real-world problems, and workplaces will bring the outside world into learning.



PROJECT-BASED LEARNING: students work on challenges and problems. Learning usually goes beyond traditional subjects.



LECTURERS' ROLE: lecturers bring their knowledge and experience to the learning environment.



COLLABORATIVE LEARNING: less working alone and more time spent on group work.



VISUALISATION: visual devices bring content to life.



PERSONAL LEARNING ENVIRONMENT: the online learning environment you engage with is tailored to your personal needs, learning style and personal interests.



PERSONALISATION: learning that's more personalised, driven by rich data and guided by learning analytics and advise which are the most efficient for which students.



MOBILE LEARNING: we get access to knowledge through smartphones and tablets, sometimes using virtual learning environments. It is learning anytime, anywhere.



FLIPPED CLASSROOM: students master basic concepts of topics at home. Time spent in classroom is used to reflect, discuss, and develop topics.



SOCIAL MEDIA: learners share ideas and feelings.

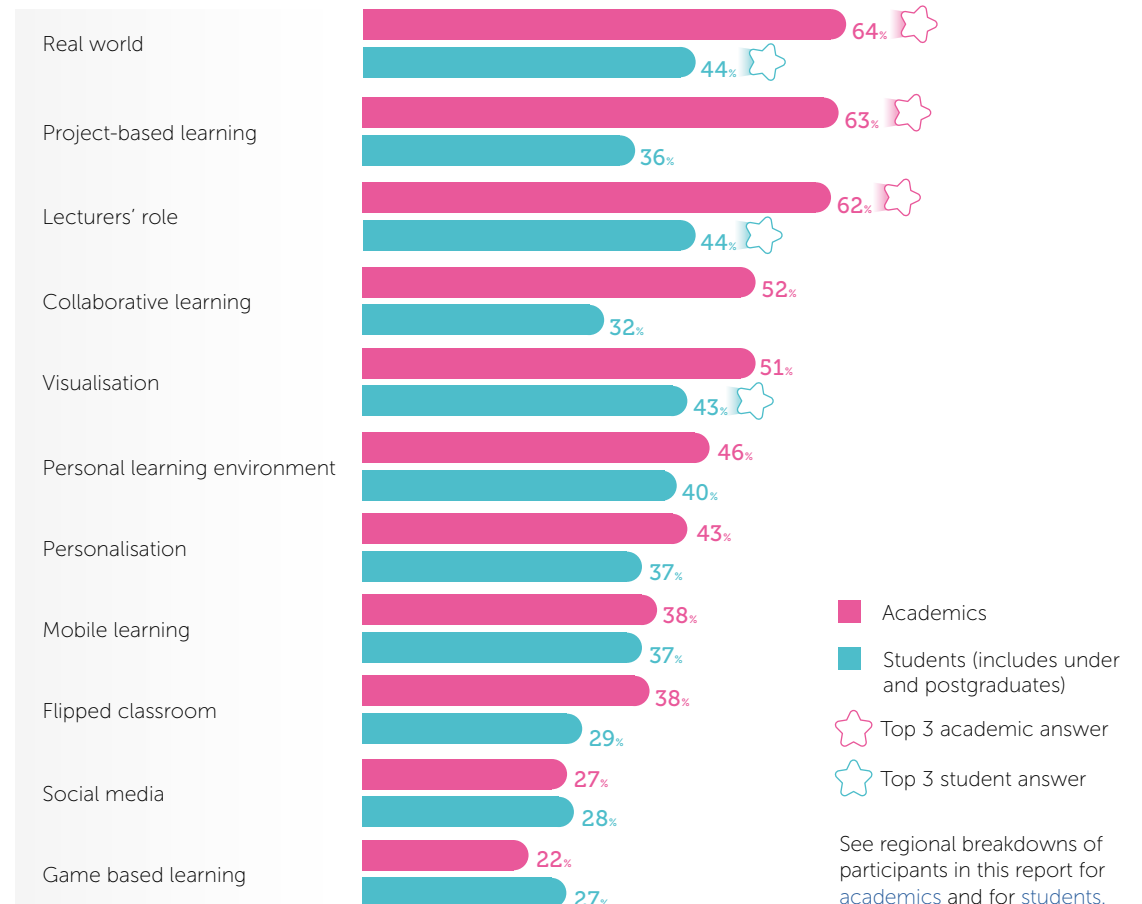


GAME BASED LEARNING: learning is mixed with games or with game mechanisms.

Future trends to make research more effective for learning outcomes

Academics and students agree that a greater focus on the real world will make the biggest improvement in learning outcomes from academic research, through virtual experiences, simulations, solving real world problems and bringing the outside world into learning. Although, for students, the lecturers' role is equally important in making research more effective for learners. Project-based learning is the next popular trend for academics, while for students it is visualisation.

Q. How important do you think the following trends are in improving learning outcomes from academic research?



Both academics and students want learning to focus more on the real world, bringing the outside world into the classroom through virtual experiences, simulations, other teachers/experts, real-world problems, and workplaces. Real world is a trend most favoured by academics in Latin American (71%) and Middle East and Africa (69%), as well as students in India (58%). However, it is least popular among students in Japan (16%). Although, students in Japan rated all the trends well below average.

Project-based learning, where students work on challenges and problems (often on non-traditional subjects), is the second most favourable trend for academics (63%), rising to 82% for those in India. This trend is closely followed by the lecturers' role, a choice for 62% of academics overall, rising to 72% for those in India and 71% in the Middle East and Africa. The lecturers' role is the second most popular choice among students, with 44% choosing this option.

Visualisation, where visual devices bring content to life in far more interesting and dynamic ways, is the third most significant trend for students, with 43% rating it very important, rising to 56% for students in Egypt. While, the average score was higher for academics, with 51% making this choice, other trends seem more important for this group.

Both groups place less value on game-based learning, with 27% of students and 22% of academics selecting this trend. Game-based learning is least popular among students in Japan (12%) and academics in Australasia (11%).

Making research more usable for the next generation

We know that students want academics to use more videos and animations to help with their learning and academics are supportive of this move, with 64% of them choosing videos, podcasts and infographics as the number one way they could more effectively present research to students. Academics are keen that measures to improve research accessibility for students go further by providing article summaries (59%), making research open access (59%), and presenting research in more accessible language (45%). Academics are least keen on sharing policy makers' perspectives at 21%.



64%

of academics believe that content forms such as videos, podcasts and infographics could help when presenting research to students

32%

of students would like to see video and animation used for learning



How best to present research to decision makers

"Paywalls are a massive issue. There are concerns about readability and digestibility – but these all pale compared to access. People can't read papers, because they're priced at horrific costs of which little to none goes back to the actual author/s"

Undergraduate student in Australia

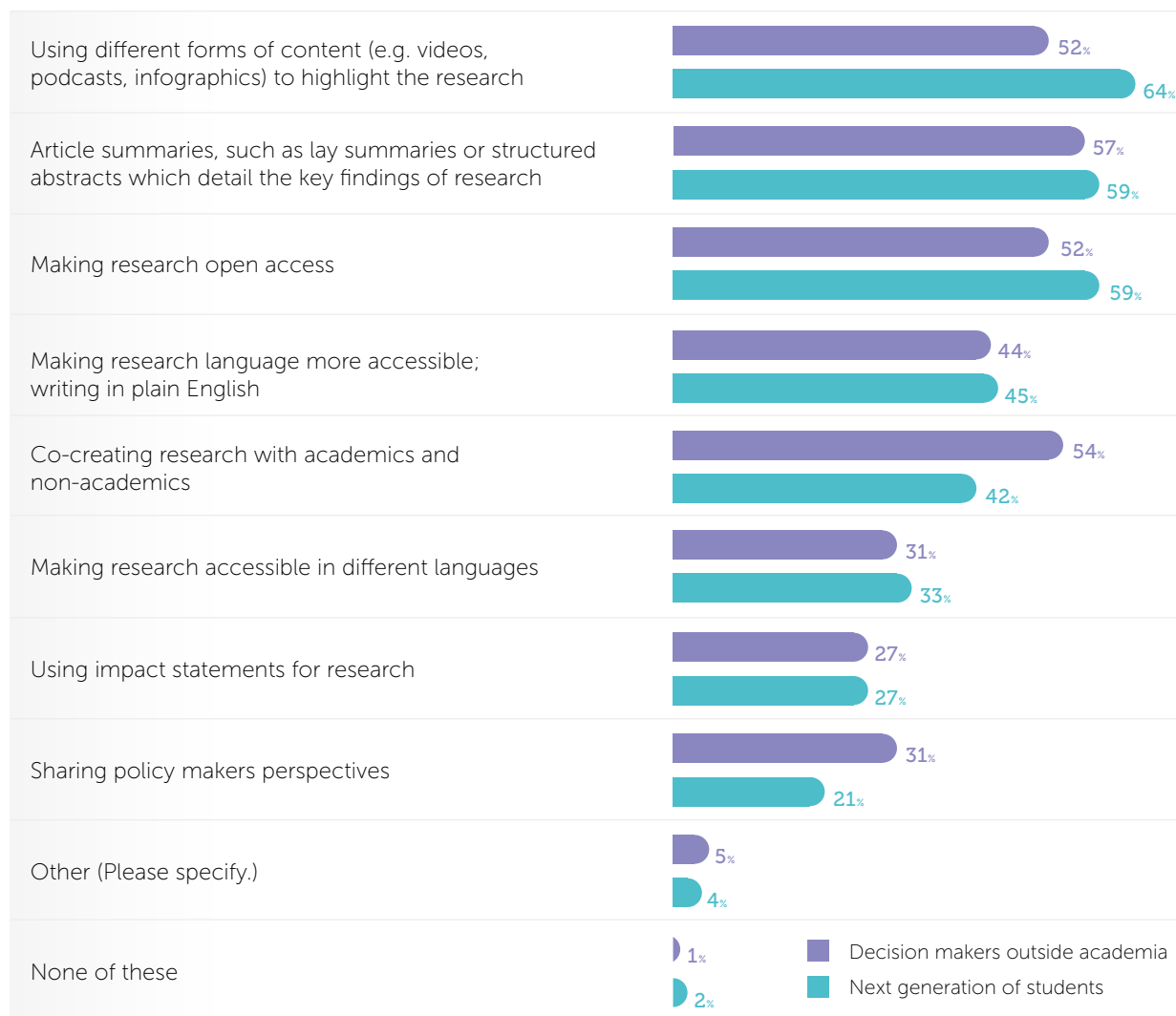
"I often use more easily digestible videos – with interesting graphics and narrators for teaching – especially at the undergrad level"

Academic in the USA

"I would select game-based learning, videos and other edtechs, as they would allow students to learn in a more attractive way and, at the same time, make learning accessible to students in remote places. However, this will only be possible if internet is available to everyone"

Academic in Brazil

- Q. How do you think research could be more effectively presented to decision makers outside academia?
- Q. How do you think research could be more effectively presented to the next generation of students?





57%

of academics feel research summaries could help to effectively present findings to decision makers, outside of academia

Academics believe that article summaries such as lay summaries or structured abstracts are the best way to improve how research information is presented to decision makers outside of academia, with 57% choosing this option. Article summaries are also within the top 3 answers for all regions, with 77% of academics in North America and 75% in Australasia choosing this option.

In addition to the lay summary, most academics agree they could more effectively present research to non-academics through co-creation between academics and practitioners (54%), open research (52%) and using different forms of content such as videos, podcasts and infographics (52%).

Impact statements are the least popular option for academics looking to improve the way research is presented to non-academic decision makers, with 27% selecting this option.

"If a more layman's report was made, the general public could have a better understanding of important issues like climate change, mental health, suicide rates, impact from COVID"

Undergraduate student in Australia

"Journals could provide an 'alternative' abstract that sums up the paper in very simple / non-scientific terms (if possible) so that the message that the article is trying to put across is clear even for someone not working in that field"

Postgraduate student in UK

"Animation and animated CAD tools are the most effective tool to connect research work to decision makers outside academia"

Academic in Egypt

"Publishing summaries in newsletter style/in relevant magazines [...] Or making sure there is a regular summary of research in industry magazines"

Academic in United Arab Emirates

Expert view

Future trends

It is important that scholars, researchers, and practitioners stay current with developments in their fields, especially in this era of accelerating technological development and social change. A key problem is that although the flow of information is increasing, our abilities to review and process research in our minds is not. It is simply getting harder and harder to keep up and make the best use of what we have learned to solve new problems.

The findings of the 'Is research output fit for the future' survey serve as a wake-up call. If fewer than one-in-five respondents believe it is easy to make use of research outside of academia, this implies large gains in effectiveness in the transfer and application of knowledge may be gained by increasing accessibility.

At the same time, these findings are not surprising. Promotion and tenure schemes, and academic culture in general, are more concerned about adding lines on curricula vitae and publishing in journals perceived of being 'higher impact' than the true impact of whether research produced can be made useful beyond the walls of the Ivory Tower.

Refocusing the presentation of research on becoming relevant in the 'real world' will probably not require any one solution, but many. The survey reflects a hunger for new modalities for sharing what we learn in clear language and through expanded forms of digital media.

As a journal editor, the required response, at first, seems obvious: improve accessibility. And there are limited steps we can take, such as opening discussions on social media, working to ensure article abstracts are written in plain language, and serving as an ambassador for the articles (and the authors) with practitioners.

The academic publishing industry, as a whole, faces a deeper crisis. Its structure serves the needs of academics to publish, but readers who desire to learn are left behind. As a result, articles are still hidden behind paywalls only well-endowed libraries can afford and publishing standards support the status quo. Opening accessibility will require incredible determination and innovation from publishers as they are not only tasked with changing their own business models but also challenging academic culture.

I applaud Emerald for taking the lead on this conversation in the industry. Such commitments to social responsibility will undoubtedly contribute toward positive education futures.

"Refocusing the presentation of research on becoming relevant in the 'real world' will probably not require any one solution, but many."



Dr John W Moravec,
Founder and
Principal Member,
Education Futures LLC

Expert view

What's the publisher's role in content innovation?

While other content formats – videos, animations, podcasts, lay summaries, and even 3D modelling, etc. – are not new and have been used by researchers to complement the journal article or book chapter, it is still not as common in the less well-funded Social Sciences. The view of academics in the survey is that the single biggest way their research can become more impactful is through greater knowledge exchange with those outside academia. However, the majority of published research articles clearly don't support this owing to an overreliance of jargon, lack of plain English, being too long and dense text formats that don't readily engage a lay or even academic audience. Students also believe that more novel content formats that move research outputs beyond the traditional article will create deeper engagement and deliver a richer learning experience.

The pandemic has accelerated the desire for research that can make a difference and solve big, real-world problems and has highlighted once again that academia's culture and incentive structures need reimaging. As publishers, we have a clear role to play working with other scholarly stakeholders, including funders, member organisations and higher education institutions, to stop propping up academia's current incentive structures that value the publication of the traditional research article in impact factor journals over the research output and content formats that move us beyond the article.

Our intent is to move from a publisher of articles to a facilitator of research. We do this by building deep relationships, leveraging our well-established connections to a global community of social scientists, practitioners and policy makers, to allow us through co-creation to facilitate the process of turning research outputs into policy and practice. We will explore new commercial models, partners and sponsors to remove existing barriers to open publication internationally, and to contribute to the development of an open and inclusive research culture that supports a wider range of research outputs.

We will also work with researchers to help them make their work more discoverable and to enable research outputs and contributions to be recognised in different ways. We offer practical guides and advice as well as workshops and webinars for those looking to get published and, once published, how to create a platform to extend the reach and generate attention and ultimately impact for their work.

"Our intent is to move from a publisher of articles to a facilitator of research. We do this by building deep relationships, leveraging our well-established connections to a global community of social scientists, practitioners and policy makers, to allow us through co-creation to facilitate the process of turning research outputs into policy and practice."



Sally Wilson,
Head of Publishing,
Emerald

conclusions



There is a general desire for innovation within teaching and research output, but how does this match action? What are the consequences?

Our findings suggest that current research outputs such as the journal article are too long and difficult for students to use effectively for learning and that publishing and funding pressures are thought to be stalling innovation. Undergraduates, postgraduates and academics generally want change within higher education and believe that research could be made more accessible through greater use of technologies such as videos and animations and being more relevant to the real world.

Policy makers, funders, universities, academics, and publishers share responsibility for making research outputs fit for the future and it's time for all of us involved in the higher education landscape to consider what we can do to create change.

The danger of doing nothing is something we all need to respond to, especially at a time when the societal impacts of the pandemic are challenging the lives and futures of many. What is clear from the report findings is that we all need to work together to ensure the structures and incentives that currently dictate the research ecosystem do not hinder future academics from doing things differently in the future.



The report poses four key questions for the stakeholders of research:

- **What are the most effective resources we can provide for teaching and learning that address both students' and academics' preferences and needs?**
- **How do we respond to the limits of the research article?**
- **How do we reduce the barriers to innovation?**
- **What does the future of research output look like?**

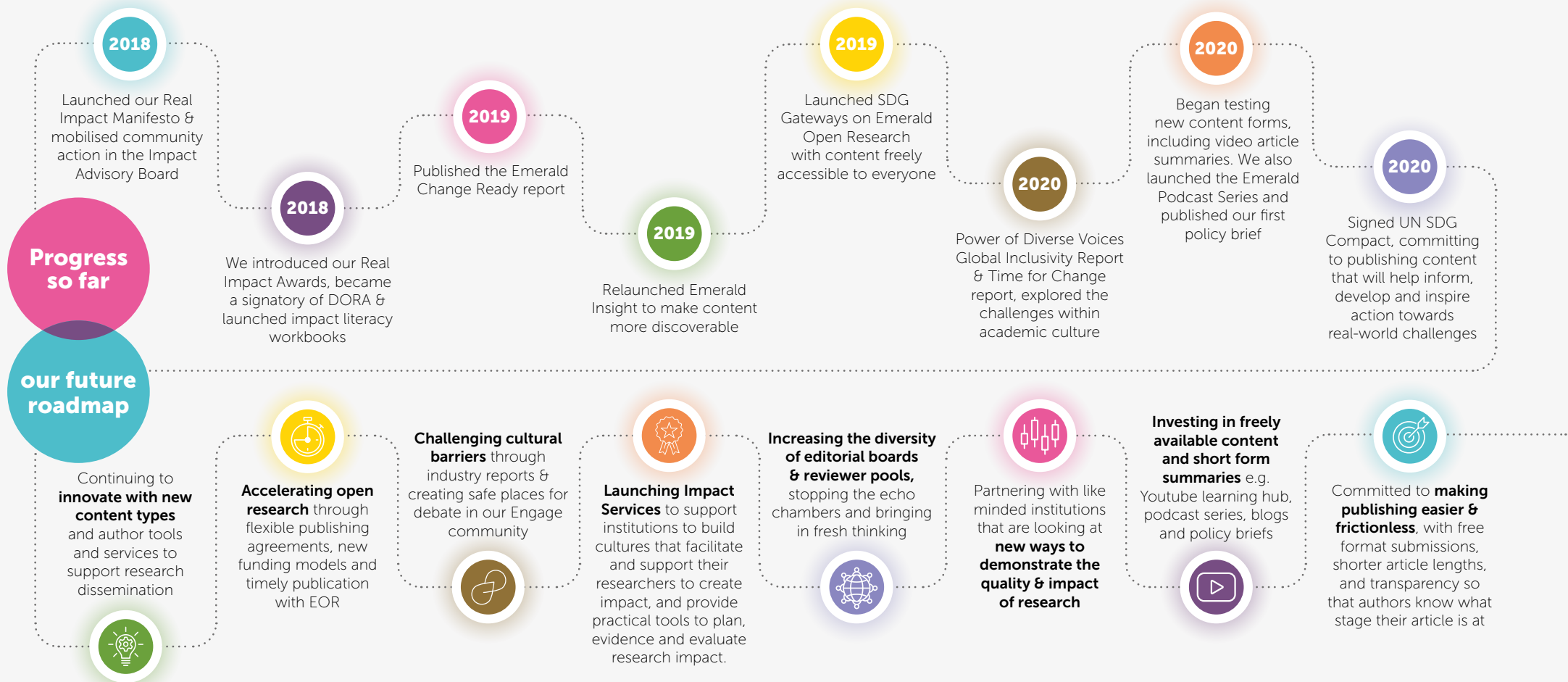
In response, we suggest consideration is given to the points below:

- Many universities may be in precarious financial positions due to the COVID-19 crisis, however, where possible, they should create initiatives to help academics provide more varied teaching approaches, as well as craft more accessible and engaging research outputs.
- Academics are aware that current research outputs, particularly the traditional research paper, are difficult to understand and could be made more accessible to learners and presented more effectively to decision makers. They are however in a tough spot for initiating change (e.g. lack of budget, time, support). More research is needed into what specific support would help them alter their learning approaches and widen their research outputs.
- Universities and funders have a role to play in supporting new ways to communicate research and use broader measures to assess individual research contributions. They should move away from a focus on impact factors and citations as the key measures of success and the basis for incentives such as promotion, recognition and funding.
- Publishers need to lead from the front and recognise the role they must play in making research more accessible to the outside world. Signing up to DORA and promoting a broader range of impact metrics, moving away from journal impact factors and towards article-level metrics, will help drive change in academic culture.
- Publishers should explore how they can support change within research culture and publishing practices to help drive impact, looking at areas such as rapid and open dissemination, support to underfunded areas and greater focus on interdisciplinary research.
- For research to lead to impact it must be accessible to end users. Publishers can make research easier for students and non-academics to understand by providing supplementary content options such as videos, graphics, and images. They should look to provide support tools to help promote healthy research practice and support the exchange of knowledge with those outside academia, in forms that aid decision making and promote real world action.

Roadmap to impact

All stakeholders have a responsibility to look at the ways we can contribute to make research more accessible and learning fit for the next generation of students.

At Emerald, we have made a commitment to drive research impact and are making progress, but there is still work ahead. Our impact roadmap below shows how far we have travelled on this journey and our intentions to support change.



About the report

The report was commissioned and produced by Emerald Publishing.



Authors: Rebecca Torr (Content Editor), Alison Kildunne (Head of Brand), Tamsyn Johnston-Hughes (PR and Social Media Manager), Mathew Sutcliffe (Customer Insights Manager), and Laura Etchells (Commissioning Editor).

Designers: Paul Martin (Head of Design) and Amanda Benson (Studio Manager).

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