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Message from the Publisher

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This issue of *Trends in Higher Education* focuses on the key role of technology in shaping the new realities in the higher education sector. New and not so new technologies such as Artificial Intelligence, Generative AI such as ChatGPT and Spatial Computing are discussed together with matters relating to the risks and security, in adopting these new AI technologies. These, as well as other issues are explored from the lens of teaching and learning and institutional operations. The bulletin also offers strategies and provides solutions on addressing some of these risks.

This Publication is now in its eighth year, and we would like to know how useful it is in informing you about the latest trends in higher education. We have prepared a short survey and encourage you to fill out the questionnaire so that we can make the publication even better and more targeted to your needs, in the future. The link to the survey is attached at the end of the bulletin.

Trends in Higher Education – Technology Issues and Practices

Introduction

In the last couple of years, the focus has been on technology centred on risks and security, AI and generative AI, spatial computing, connectivity technology, and technology innovative solutions for tackling climate change and health care. Against this background, it becomes critical for organisations to have a clear and comprehensive business strategy, a solid technology foundation, and a creative workforce to adeptly manage these technology streams. For higher education institutions (HEIs) these technology advancements and information technology risks will undoubtedly have implications for operations, teaching and learning, and research and unintended consequences for resources and infrastructure to support technical wellness. This issue of *Trends in Higher Education* touches on some of these issues to gain a better understanding of the potential impact on the higher education sector and what other HEIs are doing, to ensure that the technology is efficient, effective, safe and relevant to stakeholders.

Anticipating new technologies in the workplace

According to Rutherford (2024), recent advancements in AI technology have led to the creation of smarter, more versatile robots that can handle multiple tasks. SCUP (Fall 2024) draws attention to Samsung's Ballie personal assistant robot, which is "designed to be a companion, an entertainment device, and a roving guard dog with its front and rear cameras." By expanding the range and complexity of tasks robots can perform with minimal supervision robots would eventually become more adaptable and efficient with the potential for greater application in several industries including manufacturing and healthcare. With these general-purpose robots, institutions will

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have to rethink what new skills and knowledge might be in demand and how they can reshape their curricula to meet those needs. In addition, it will require more interdisciplinary work between academic departments, to drive and support new knowledge.

Spatial computing technologies will aid in redefining the way people and organisations learn, collaborate, create, problem-solve and engage with digital information as it seeks to bridge the physical and virtual worlds (Bharwaney and Sleeva 2024). The technology gives individuals and teams an unlimited number of virtual displays to view all their open documents side by side, to accomplish complex tasks thereby, enhancing collaboration and improving productivity (Grothaus 2024, SCUP Fall 2024). Spatial computing has enormous potential for several industries such as health care, manufacturing, architecture and construction, safety training, and entertainment. Among healthcare professionals, detailed 3D visualisations of anatomical models along with spatial mapping facilitate collaborative physician consultations and enable them to overlay data onto the patient's body during procedures with precision (Bharwaney and Sleeva 2024). Given the opening up of this computing space and its range of applications, institutions will need to determine areas best suited for applying spatial computing technologies in its operations. HEIs will have to evaluate their programmes for opportunities for using spatial computing to facilitate learning.

Applying Generative AI in universities

As universities and colleges struggle to come to terms with generative AI and its impact on teaching and learning, the University of Virginia (UVA) established a Generative AI in Teaching and Learning Task Force in Spring 2023, to examine the technology's implications for teaching and learning at the institution. Findings from their evaluation show that:

- 42% report using AI for coursework in some fashion by mid-spring 2023.

- 32% report already using AI as a study tool with 19% using AI to study regularly or all the time.
- only 4% of faculty regularly encourage students to use AI tutors however, 60-70% of faculty say that they would use AI in specific assignments and 5-10% of faculty respondents saying they use AI regularly as an instructional design aide.
- 77% state their instructors did not make their AI policies clear to them. However, only 27% of faculty respondents and 23% of student respondents believe that students who are using AI are doing so in ways that comply with the Honor code.

Although there are challenges relating to limited AI literacy or a lack of organisation to reassess teaching goals and methods, HEIs including UVA are looking to secure positive outcomes with regards to use of AI in teaching and learning. Within the higher education community, there have been four types of responses to the emergence of generative AI in education: (i) panels or conversations engaging students and faculty, (ii) websites providing guidance and resource (e.g. Berkeley, Pittsburgh, Northwestern), (iii) major investments (e.g., Emory's AI Learning Center will promote AI literacy across all schools and units), and (iv) curriculum changes (e.g., University of Florida embraced AI as a core learning competency) (UVA 2023).

Despite these positive developments among some HEIs, others still need to assess the challenges and opportunities that AI may present for them as well as get a handle on students' use of AI. Given the ubiquitous nature of the technology, there will be need to consider its impact on what and how students learn. It may even further affect the value we place on academic awards. The rapid development of technology along with its pervasiveness will require HEIs to monitor their compliance with quality frameworks and accreditation standards to ensure that its education provision is maintained and enhanced.

A recent agreement between Informa and Microsoft will allow the technology company to access content from its Taylor & Francis division, which also includes Routledge journals (Jack 2024). Moreover, “other academic publishers have raised concerns that technology companies are using their copyrighted material to train generative AI tools without permission or payment.” Access to this copious content would allow technology companies to improve their relevance and performance. However, access to the content have raised concerns over plagiarism among academics and researchers. Nevertheless, both partners have assured that detailed citations and adherence to global copyright law is fundamental to the agreement. For academics and researchers, it means that they may have to be more cognisant of the “extent of the permissions they give to publishers when they assign copyright to them” (Jack 2024).

Improving productivity via technology tools

Generative AI will likely become quite useful for the regular, non-tech person according to Heikkilä and Heaven (2024). They note that AI models (e.g. GPT-4 and Gemini) can process not only text but images and even videos. Thus, a real estate agent can upload text from previous listings, fine-tune a powerful model to generate similar text with just a click of a button, upload videos and photos of new listings, and simply ask the customised AI to generate a description of the property. With the advances of Generative AI in text-to-video generator, movie studios (Paramount and Disney) are using the tool in their production pipeline to lip-sync actors’ performances to multiple foreign-language overdubs and for special effects (Heikkilä and Heaven 2024).

Despite the opportunities for the service and creative sectors, there is scepticism about the likelihood that generative AI’s impact long-term on productivity and the economy. Citing research done at MIT, SCUP (Fall 2024) notes that within the next decade only an estimated

4.6% of tasks will be affected by AI and related technologies. Although companies have spent approximately \$1 trillion developing and supporting generative AI, there are concerns relating to potential shortages in AI chips and an aging electric infrastructure that is unlikely to provide the power that widespread use of generative AI will require.

Given the perspectives of generative AI as a disrupter and an enabler as well as being unable to fulfil the potential ascribed particularly in the medium-term, institutions will have to carefully consider the relevance of adopting generative AI tools while keeping current with the new technologies. SCUP (Fall 2024) also suggests that institutions develop a contingency plan in the event that generative AI tools do not perform as expected and impacts operations.

More tech-savvy teaching

A 2023 survey conducted by EDUCAUSE¹ show that faculty are feeling good about teaching with technology and nearly all faculty (96%) feel that they are advanced or competent in their technological skills (EDUCAUSE August 2023). Considering modality preferences and teaching experiences across modalities the findings reveal that:

- A slight majority of faculty (53%) prefer to teach courses that are completely on-site.
- A majority of respondents (65%) said that they are currently teaching in their preferred modes while 31% said they were not.
- Just over two-thirds (68%) of faculty who teach multiple courses in a semester prefer to teach all of their courses in the same modality while 25% prefer teaching using a combination of modes.
- A majority of faculty felt more connected to and able to engage their students when teaching on-site (91% and 89%, respectively) as compared to teaching online (39% and 48%) or hybrid courses (61% and 62%).
- Faculty felt that the quality of their teaching is best and that their students learn the

most when teaching on-site (83% and 70%, respectively) as compared to teaching online (43% and 27%) or hybrid courses (54% and 47%).

Respondents were asked about the top two (i.e. very important/important) supports for teaching that were provided by their institutions (see Figure 1).

Figure 1: Top two teaching supports provided by institutions

Instructional support	Instructional technologies	Networking support
92% Adequate prep time	76% Online instructional technology	71% With faculty in the same discipline at the same institution
68% Design Support	69% On-campus instructional technology	64% With faculty teaching in the same modality at the same institution

Source: EDUCAUSE, August 2023.

Despite acknowledging that support for instruction is important, the survey found that faculty do not have time to use it. While a majority of faculty often use supports for technologies and tools (59%), only 15% use instructional support and 17% use opportunities for networking. The most common reason for not accessing these supports was a lack of time (69%).

Both EDUCAUSE (August 2023) and SCUP (Fall 2024) offer some suggestions to better support faculty teaching such as:

- (i) providing more time for teaching responsibilities.
- (ii) offering more training, professional development opportunities, and opportunities for discussion and collaboration.
- (iii) collecting exemplars of effective teaching and course design across modalities and share these in a centralised place.

- (iv) improving the quality of technology support.
- (v) offering faculty more choice in teaching modalities.
- (vi) supporting adjuncts at the same level as other faculty members.
- (vii) assessing faculty's competency in using specific technology tools.

Boosting cloud safety

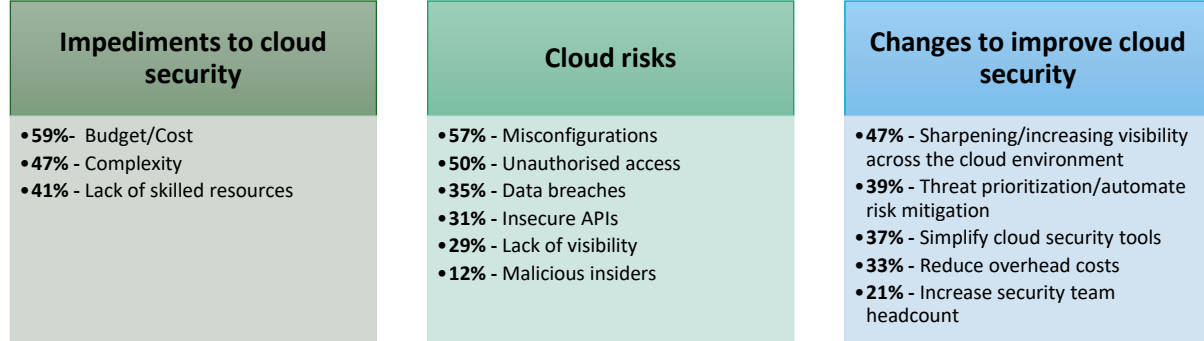
Cloud computing has provided users with the capability to store and access data and programmes over the internet instead of a hard drive, but it has also increased risks to individuals and organisations. In a survey administered in late 2023² the authors found that 77% of IT and security professionals feel unprepared to deal with security threats in the cloud computing environment (SCUP Fall 2024). The findings from another survey administered in 2023/2024 to senior executives³ reveal that 28% of respondents identify improving infrastructure as a top cloud security objective, followed by increasing efficiency (25%), maintaining compliance (25%), scaling the security team (13%), and securing supply chains (6%). In addition, the report drew attention to factors that affect cloud security and impediments to improving cloud security (see Figure 2).

These findings demonstrate the challenges and the opportunities for an organisation. CSA (2024) suggests that organisations need to emphasise better visibility for their code-to-cloud environment, accelerate security remediation, strengthen organisational collaboration, and streamline processes to counter risks effectively. SCUP (Fall 2024) adds that universities should do a risk assessment for a cyberattack on cloud environments and develop a contingency plan for service disruption. Further, institutions should develop a policy or review their policy governing the adoption and secure use of cloud services.

Data privacy and higher education

Privacy is increasingly becoming important within specific workforce domains

Figure 2: Factors affecting cloud security



Source: Stansfield, 2024.

(cybersecurity and privacy, teaching and learning, and IT leadership) in higher education especially, with the emergence of generative AI technologies. EDUCAUSE (2024) notes that the “increasing need for data security and protection against threats to personal privacy” was identified as the number one trend impacting their institution’s technology strategy, policies, and/or practices in 2024.

A 2023 survey by EDUCAUSE⁴ found that only 40% of respondents indicated that their institutions had a role dedicated to privacy, and that those institutions that do have privacy staff have an average of only two privacy staff compared with an average of five cybersecurity staff. Moreover, greater attention is given to cybersecurity as demonstrated in staffing - 29% said that new cybersecurity positions were created in the past 12 months versus 3% who said new privacy positions were created. Cybersecurity saw the most services outsourced: 36% of respondents said that their institution has outsourced cybersecurity services in the past 12 months, while only 6% said privacy services had been outsourced. In addition, only 35% of respondents indicated that “institutional privacy policies” are a part of their current security training.

As institutions adopt more technologies and increase the use of data, security and privacy threats and risks will only continue to grow and

institutions will have to strategically plan for allocating more resources to this function.

Improving browser security

Campuses have become one of the top targets for cyberattacks. Web browsers, according to SCUP (Fall 2024), are the most used web application but is also very vulnerable to attacks. Ramos (2023) draws attention to the cross-site leak attacks that can potentially occur against web-browsers that allows attackers access to sensitive information from other websites visited by users. In addition, web browsers are susceptible to zero-day vulnerabilities (i.e. previously unknown security holes discovered by hackers before developers have had a chance to fix them). For instance, Google Chrome experienced at least three zero-day vulnerabilities in 2023, posing risks for organisations relying on the browser application.

The 2024 LayerX report noted that 62% of the workforce is using unmanaged devices to access corporate data and 45% of all browsers within corporate devices use personal profiles. In addition, 33% of all extensions within an organisation pose a high risk, with 1% of installed extensions known to be malicious. Almost 8% of employees risk data exposure by pasting or typing sensitive information into Generative AI tools like ChatGPT.

To mitigate these threats, it is suggested that organisations introduce various security controls

to reduce potential data leaks and unauthorised access to sensitive information. This can be achieved by:

- securing browsers: develop and enforce browser policies, institute strict management of browser extensions.
- implementing strong authentication measures: use multi-factor authentication, support strong password practices, and use single sign-on cautiously.
- managing unmanaged devices: introduce conditional access controls, restrict data access based on device type, continuous validation of users' devices, develop and promote BYOD policies and guidelines.
- building a culture of security awareness (zero-trust security): enhance automation and orchestration, encourage reporting of suspicious activity, monitor for threats (network detection and response as well as micro-segmentation).

In addition to the above, the importance of reviewing the potential for browser cyberattacks and developing subsequent browser security guidelines along with educating the campus community on browser security is recommended by SCUP (Fall 2024). And, as a part of a more comprehensive cybersecurity measures SCUP (Spring 2024) suggests that HEIs conduct vulnerability audits.

Student email address no longer for life

Most HEIs provide an institutional email address to students, and some do so for life (SCUP Spring 2024). In 2022 Google, which has long offered some of its services free to universities through its G Suite for Education program, placed limits on the amount of free cloud storage available to institutions at 100 terabytes across Drive, Gmail, Photos and other apps that are part of the Google Workspace for Education suite. Hickey (2024) argues that is insufficient for research-driven universities in particular. He draws attention to the data storage at the University of Hawai'i, which is currently storing almost two petabytes (2,000 TB) of data, and the effect this storage limit will have on

universities such as Iowa State University. In the latter case, the university may lapse to read-only status unless it can reduce its data storage in Drive and Photos by more than 60%. The G-suite program gave institutions adequate storage space that allowed alumni to their institutional email address post-graduation.

To adhere to the limit imposed by Google, universities and colleges will either have to restrict cloud storage, upgrade to a paid edition of Workspace for Education, or both. Many HEIs are complying with the limits set by Google and are introducing stricter storage guidelines for individual users. For example, Iowa State established a three-gigabyte quota for all individual Drive accounts and accounts exceeding that will move to read-only status until they meet the quota. Lewis & Clark College investigated the data consumed by each group of users and distributed the available 100TB accordingly.

Alumni are also affected by these developments. SCUP (Spring 2024) notes that alumni and former students at the University of Central Florida will no longer have access to email. Similarly, Emerson College will halt its existing alumni email programme in June 2025, and from 2024 (starting with class of 2024) all graduates will have access to their Emerson email for one year. As universities want to remain connected to their alumni, the University of California, Davis will offer access to alumni to their student emails for six months after graduation, but after that they will receive access to alumni-centered emails if they choose an \$850 lifetime membership to UC Davis's alumni association. Harvard University established a partnership with an international email forwarding service to roll out forwarding for graduates from the last three years and opening it to all eligible alumni in 2024 (Coffey 2023).

Students Staffing the IT Help Desk

HEIs generally have IT departments, and these departments can provide opportunities to students to gain critical workplace experience in

the field while ensuring IT service demands on campuses are met. For example, students working the ITS Service Desk at Penn State Harrisburg assist other students, faculty and staff with a number of technology issues — from downloading software to deploying, building, and testing classroom and lab computers. The service desk typically employs 18 to 20 students per academic year. Students are encouraged to take training through LinkedIn Learning, which earns them a completion certification which they can then list on their resumes. At UNC-Chapel Hill student service desk workers often assist with handling issues like Wi-Fi connection, software installation and printing. To keep its walk-in operation running efficiently the department relies on close to 30 student workers who provide that support from different disciplinary areas.

In considering this as a best practice, SCUP (Spring 2024) asks institutions to consider the kinds of IT employment opportunities offered to students and specifically, are IT service desks staffed by students. Drawing on the employment experience, SCUP (Spring 2024) questions if institutions are leveraging the insights and knowledge from student IT workers to inform IT planning and decision-making.

Conclusion

The discussion above showcases the way technology is impacting operations. It emphasises that HEIs will have to contend with issues of growing risks and security, and productivity and efficiency as it adopts technology tools. It means that HEIs will have to take stock of their IT policies and improve their IT security infrastructure to address some of these potential data breaches. Yet, technology offers opportunities to improve the core activity of teaching and learning and preparing students for the world of work. As technology expands, HEIs will have to adapt by designing new strategies and developing policies to deal with the consequences of the changes on all modes of their operations and mission.

The University Office of Planning (UOP) would like to hear your thoughts on its publication, *Trends in Higher Education*, that is distributed three times a year. You will be asked for your views on readership practices and uses, quality and value of the *Bulletin*. Your participation is important to us, and it will help improve the quality of the product. The survey should take no more than **five minutes to complete**. Please click on the survey weblink below:

<https://www.surveymonkey.com/r/5LT2SSC>

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¹ EDUCAUSE conducted a Faculty survey of 982 higher education faculty in the United States from March to May 2023. The survey looked at four areas: (i) modality preferences and the impacts of teaching in non-preferred modes, (ii) experiences teaching online and hybrid courses, (iii) technology and digital availability of course components, and (iv) types of support needed and utilised for teaching. See EDUCAUSE. *2023 Faculty and Technology Report: A First Look at Teaching Preferences since the Pandemic*. <https://www.educause.edu/ecar/research-publications/2023/faculty-and-technology-report-a-first-look-at-teaching-preferences-since-the-pandemic/introduction-and-key-findings>.

² The survey was conducted online by [Cloud Security Alliance](#) (CSA), an organisation dedicated to defining standards, certifications, and best practices to help ensure a secure cloud computing environment, in December 2023. The objectives of the survey were to gain a deeper understanding of current cloud environments and security tools, challenges in today's vulnerability assessment and mitigation practices, and opportunities to lower risk. The survey received 2,037 responses from IT and security professionals. See

"Cloud Security Alliance Survey Finds 77% of Respondents Feel Unprepared to Deal with Security Threats," *Cloud SecurityAlliance.org*, February 14, 2024, <https://cloudsecurityalliance.org/press-releases/2024/02/14/cloud-security-alliance-survey-finds-77-of-respondentsfeel-unprepared-to-deal-with-security-threats>.

³ The survey was conducted with 200 executives between January 2023 and February 2024. See Todd Stansfield, "2024 Cloud Security Strategies Report Reveals Resource Constraints and Lack of Visibility as the Biggest Challenges," *Orca.security.com*, May 28, 2024, <https://orca.security/resources/blog/cloud-security-survey-reveals-issues-and-challenges>.

⁴ The data in this report are taken from a survey of cybersecurity and privacy professionals in higher education, conducted in July 2023, representing 350 respondents from different position levels at their institution. See EDUCAUSE. *The Cybersecurity and Privacy Workforce in Higher Education, 2023*. EDUCAUSE, November 2023.