EDUCAUSE Annual Conference 2023

Visits to Oakton Community College,
Harper College,
University of Chicago,
EDUCAUSE Learning Initiative Annual Meeting 2023

French & Japanese Delegations Joint Report

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Forewords

The Annual Conference 2023 held in Chicago in October marked the 10th anniversary of the EDUCAUSE French Delegation. From the outset, this initiative has sought to provide the French Higher Education community with an international perspective on digital issues, by bringing together complementary profiles able to appreciate the major trends and prospects. However, from an initial philosophy of simple participation that prevailed in the early years, this decade saw an increasing involvement of this Delegation's members at various levels of EDUCAUSE.

We have been selected over 15 presentations on a number of topical subjects. In addition, several of our delegates are mobilized each year as proposal reviewers for the EDUCAUSE Annual Conference and ELI Annual Meeting, as well as members of the respective program committees (in 2019 and 2023). Lastly, some of us are members of expert panels for the EDUCAUSE Horizon Report and annual Top-10 issues, are active in various thematic Community Groups (XR and Learning Spaces in particular), or are involved as editors of reference articles and translators of tools[1].

Recognition of these different levels of intervention has enabled us to forge privileged connections with EDUCAUSE and in particular its executive members (President, Vice-Presidents and Directors). Our actions have also given us significant visibility within the North American academic community and beyond, leading to the establishment of formal collaborations, some of which are long-standing.

Amongst them, through long lasting exchanges and meetings during the conference, different bonds increasingly created themselves during the years between the French and the Japanese Delegations, to finally reach a formal collaboration around the EDUCAUSE Annual Conference 2022. Practically speaking, it consisted as a first step to involve a member of the Japanese Delegation in the on-site visits the French one is systematically organizing before and after the event (25 of them have been conducted since 2013), and then as a second step to extend the French Delegation Annual Report published since 10 years (19 editions in French and English, representing 1500 pages) to integrate contributions from the Japanese Delegation, and to release a first ever Japanese extended translation, which we are very happy to present you today.

These different actions all express our commitment to exchanging, raising awareness, informing, inspiring, and sharing to support the development of digital technology in our respective Higher Education communities, and beyond. We expect this report and the overall French/Japanese cooperation to contribute to the development of the digital in Higher Education and the innovation in the Teaching and Learning practices.

We wish you a pleasant and informative read.

The EDUCAUSE French Delegation Steering Committee
John Augeri, Laurent Flory, Thierry Koscielniak and Bruno Urbero

[1] Especially for the French and Japanese Translations of the EDUCAUSE Learning Space Rating System (LSRS), see https://www.educause.edu/focus-areas-and-initiatives/teaching-and-learning-program/initiatives/learning-space-rating-system

The AXIES International Collaboration Office has organized AXIES receptions and seminars at EDUCAUSE Conferences to provide opportunities for Japanese participants to exchange opinions with EDUCAUSE leaders and to interact with EDUCAUSE-like organizations in other countries. In FY2022, we started a trial delegation program for EDUCAUSE Conferences to promote the globalization of the AXIES human network by sharing knowledge through EDUCAUSE conferences and strengthening cooperation with organizations that promote the use of ICT in universities, while nurturing successors with an international mindset for the post COVID-19 era. The EDUCAUSE Conference delegation program was initiated on a trial basis. In particular, one of our goals is to strengthen cooperation with EDUCAUSE-like organizations that promote the use of ICT in universities in various countries, including EDUCAUSE, and we sought cooperation with France, which has already sent a delegation to EDUCAUSE conferences for many years.

The French delegation is supported by the French Ministry of Higher Education and Research, and its organization and quality far exceed those of the Japanese delegation. The Japanese delegation participated in the EDUCAUSE Conferences with Mr. Takanori Matsuura (Okinawa Institute of Science and Technology Graduate University), who was selected through an open call last year, Dr. Takuto Matsuhashi (University of Electro-Communications), who was selected through an open call this year, and Mr. Tatsuya Touyama (Information Division, Kyoto University), who participated with independent funding, and they joined the French delegation's site visit with us. In both years, the results were reported at the AXIES Annual Conference through a organized session, but this year, for the first time, we decided to write a report jointly with the French delegation. The French delegation's report was compiled in French and translated into English and Japanese, and the Japanese delegation added to the French report. In this sense, we would like to thank the French delegation for providing us with this opportunity. In particular, we would like to express our special thanks to Dr. John Augeri, who was in charge of liaison with the French delegation, including the compilation of this report and contribution to the organized sessions at the AXIES annual conferences.

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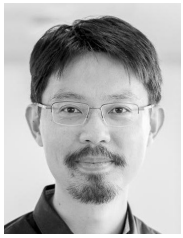

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Introduction & Trends of Higher Education in the US

Laurent Flory - French Delegation

The 2023 edition marks a return to normal for the French delegation at EDUCAUSE. The COVID-19 crisis, which brought about significant changes in society, especially in Higher Education (HE), now seems to be a thing of the past, giving way to a new normal. EDUCAUSE is a non-profit association that unites technology, academia, industry and campus players to promote higher education through the use of information technology. Among other things, it hosts an annual conference that attracts several thousand digital education professionals, researchers, decision-makers and solution providers. This year's study tour was filled with valuable interactions and exchanges with teams from the Ministry of Foreign Affairs, especially the French consular teams responsible for higher education and research. We would like to thank them for their warm welcome and the high level of discourse. We also deepened our relationship with the Japanese delegation, with whom we conducted site visits for the second year in a row. For the first time, the 2023 report of the French Delegation to EDUCAUSE (DFE) will be published in Japanese, highlighting a collaborative effort between the two delegations as co-authors.

Our site visits afforded us an in-depth insight into the ecosystem of community colleges, specifically public undergraduate institutions with a vocational emphasis. We took note of the diversity of these institutions, which are not invariably underprivileged. We also had the opportunity to re-engage with esteemed institutions such as the University of Chicago. Founded in 1890, the University of Chicago is a private research university that ranks as one of the most prestigious and influential institutions in the United States and globally. Our previous visit to this institution was in 2019, just before the emergence of the pandemic. As with each report, this introductory section presents the delegation's perception of HE in the United States. It also aims to contextualize the report within the ever-evolving North American political, economic and societal landscape. This view is by nature subjective, incomplete, and partial.

Political context

The 2023 edition took place in a period of normally calm political activity, situated between the 2022 mid-term elections and the race for the nomination, and then the elections in November 2024. Yet EDUCAUSE opened within a context of turbulence and major national and international crises.

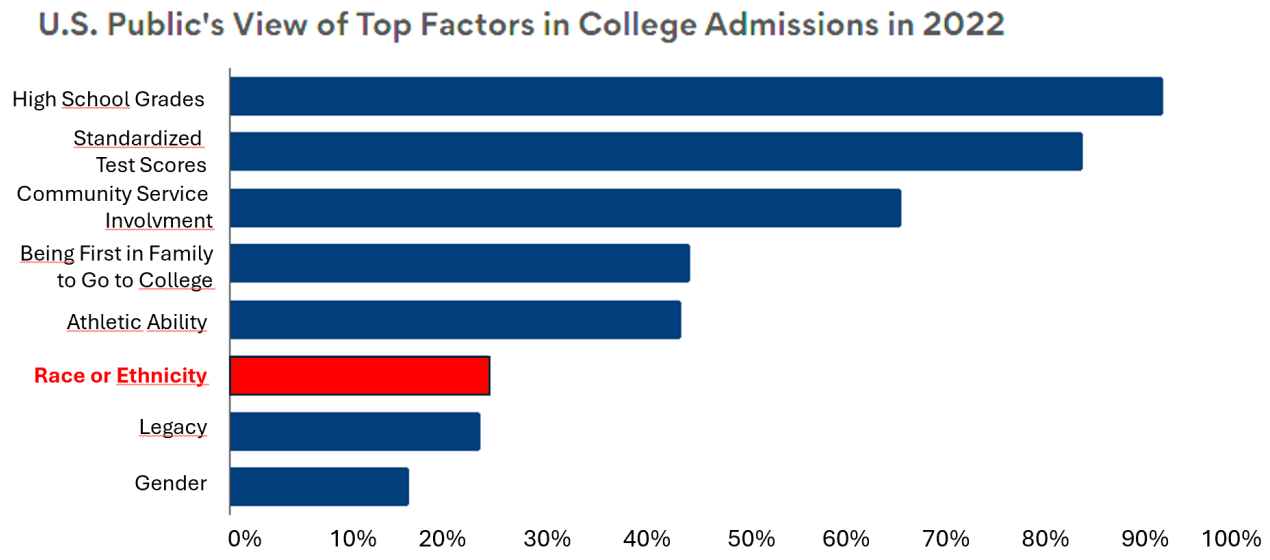
Driven by its extremes, the Republican party impeached Kevin McCarthy, Speaker of the House of Representatives, on October 3, following a motion for his ouster introduced by Florida Republican Matt Gaetz, a fervent supporter of Donald Trump. It took two weeks for Elise Stefanik (also a Trump supporter) to replace him.

The tragic events, followed by the war between Israel and Hamas, which took place during the conference triggered an explosion whose consequences are still unknown, and objectively poured oil on the fire, especially in Higher Education.

Growing divisions continues to profoundly mark American society. The post-Trump era has yet to be settled. Societal rifts between Republicans and Democrats, as well as between big cities and remote hamlets, or between coastal and inland inhabitants, but also between ethnic communities, are intensifying. Reflecting the Trump administration's alternate facts, the USA today presents a polarization of irreconcilable realities, with Americans living in distinct, politicized and diverging worlds, where conspiracy is at its height. In 2023, the Biden administration faced two major defeats in the field of higher education. In June 2023, the Supreme Court, by a vote of six to three, ruled in opposition to the affirmative action policy for admission to institutions of higher

learning. In other words, the favoring of black and Latino student applications for college admission, in place for 78 years to promote diversity without strict quotas, will no longer apply. This measure, initially introduced by President Kennedy in 1961, had spread to various sectors, including HE. This decision has cast doubt on selection procedures for entry into higher education, impacting all institutions from a technical and organizational point of view.

Eight states had already abolished affirmative action by July 23, though race or ethnicity still comprised more than 25% of college selection criteria (see the Figure below[2]).



In August 2022, the Biden administration pledged to forgive a portion of student debt under certain conditions. This measure, with an estimated cost of between $10,000 and $20,000 per person, was intended to benefit nearly forty million Americans. But it was rejected by Republicans as unfair to those who had already repaid their loans. Contested in court, it was blocked by an appeals court, pending review by the Supreme Court. Confronted with these obstacles, on the eve of the EDUCAUSE conference, the government introduced a new bill to fulfill its promise, but also to cancel the debts of students who have been victims of fraud by institutions deemed to be unscrupulous, such as the University of Phoenix[3].

Six months before the initial deadline, President Biden announced on January 12, 2024, the premature implementation of a flagship the SAVE[4] plan. , President Biden's SAFE plan is a groundbreaking initiative aimed at alleviating student debt by forgiving loan amounts under certain conditions, primarily targeting community college students who face the greatest challenges in repayment, thereby promoting a more equitable higher education landscape. Commencing in February 2024, borrowers enrolled in the SAVE plan, who have incurred less than $12,000 in loans and have been repaying for ten years, will be exempted from the remaining balance of their debt. This measure is targeted primarily at community college students, who are the least affluent and have the greatest difficulty in fulfilling their repayments.

Academic freedom[5], under siege from Republican elected officials at the end of Donald Trump's term, has become one of the campaign themes of Ron DeSantis, the staunchly conservative governor of Florida and candidate for his party's nomination. In June 2021, he enacted a law requiring students and faculty at the state's

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[2] Affirmative Action Statistics in College Admissions | BestColleges

[3] The University of Phoenix, a private, for-profit university, had advertised fake close relationships with companies, many of them fortune 500s, which were supposed to provide students with easier access to the job market. See https://www.insidehighered.com/news/2019/12/11/ftc-and-university-phoenix-settle-over-long-running-investigation-advertisements

[4] According to the White House, 6.9 million Americans have already signed up for the plan, and 3.9 million have already had their monthly repayments waived.

[5] Academic freedom is a fundamental principle that guarantees researchers and teachers the right to conduct and disseminate their work freely, without interference or censorship from political or religious authorities.

public universities to disclose their political views to the state, in the name of combating perceived socialist indoctrination. On March 28, 2022, he enforced a law prohibiting the discussion of topics related to sexual orientation or gender identity in schools. In April 2022, he backed the Stop WOKE Act, an acronym for “Stop the Wrongs to Our Kids and Employees”, which contests the view of US history through the lens of racism. Coming into effect on July 1, 2022, this law eliminates the teaching of critical race theory from the school curriculum. In counteraction to attacks on academic freedom in the United States, Harvard teacher-researchers responded by creating the Council on Academic Freedom at Harvard in May 2023. “The embattled ideal of academic freedom is not just a matter of the individual rights of professors and students. It’s baked into the mission of a university, which is to seek and share the truth—veritas, as our university, Harvard, boasts on its seal” they said[6]. In March 2023, a Florida teacher had been terminated from Palm Beach Atlantic University after a complaint from parents for addressing racial justice in his course. This case illustrates the link between the restriction of academic freedom and the threat to democracy, emphasized by many players in higher education and research.

In the United States, academic freedom is protected by the First Amendment to the Constitution, which forbids (among other things) Congress from limiting freedom of expression. It is also recognized and defended by professional associations, unions, universities and the courts. However, recent history shows that academic freedom in the United States is neither absolute nor unconditional. It is subject to legal, ethical and institutional boundaries, which aim to preserve the quality, accountability and integrity of research and teaching.

Legislative context

On the legislative front, the year 2023 was marked by numerous ongoing negotiations between the various departments of the Biden administration and higher education and research lobbying groups, including the Association of American Universities (AAU, the counterpart of « France Université », former CPU) and EDUCAUSE, which has a permanent legal officer in Washington, supported by law firms and consultants. Among the major issues at stake were compliance with the Safeguards rule[7] for the Federal Trade Commission (FTC), the federal agency responsible for consumer protection and competition, and the establishment of IT security requirements for the Internal Revenue Service (IRS). For Federal Student Aid (FSA), the federal agency in charge of scholarships, two major projects were set for completion (end 2023) around student aid. The SAIG (Student Aid Internet Gateway) project is an electronic communications system that allows higher education institutions, loan agencies, guarantee agencies, collection services and other players in federal student aid programs to transmit data to the federal agency. The launch of a new FAFSA (Free Application for Federal Student Aid) portal scheduled for late 2023 should streamline the process[8] for current and prospective students with a new online form to determine their eligibility for federal financial aid such as grants, loans or work-study programs.

The U.S. Department of Labor is contemplating changes to the overtime regime, which could have significant consequences for private educational institutions, depending on whether it provides for broad or strict exemptions. In addition, the Federal Trade Commission (FTC), the federal agency in charge of consumer protection and competition, has announced that it could advance the net neutrality issue, with a law that would uphold the principles in force in 2015. Furthermore, the Federal Communications Commission (FCC), the Electronic Communications Regulatory Authority (ECRA) and the Department of Justice (DOJ) are collaborating to adopt the new WCAG 2.1 AA accessibility standards for institutional websites and mobile applications, with potentially significant impacts in terms of compatibility for private institutions (public institutions may be exempt).

These laws or draft laws are not always mutually consistent, generating uncertainty and negotiations to modify particular texts or fields of application. Nevertheless, they all have, or will have, a major impact on the information systems of higher education and research institutions.

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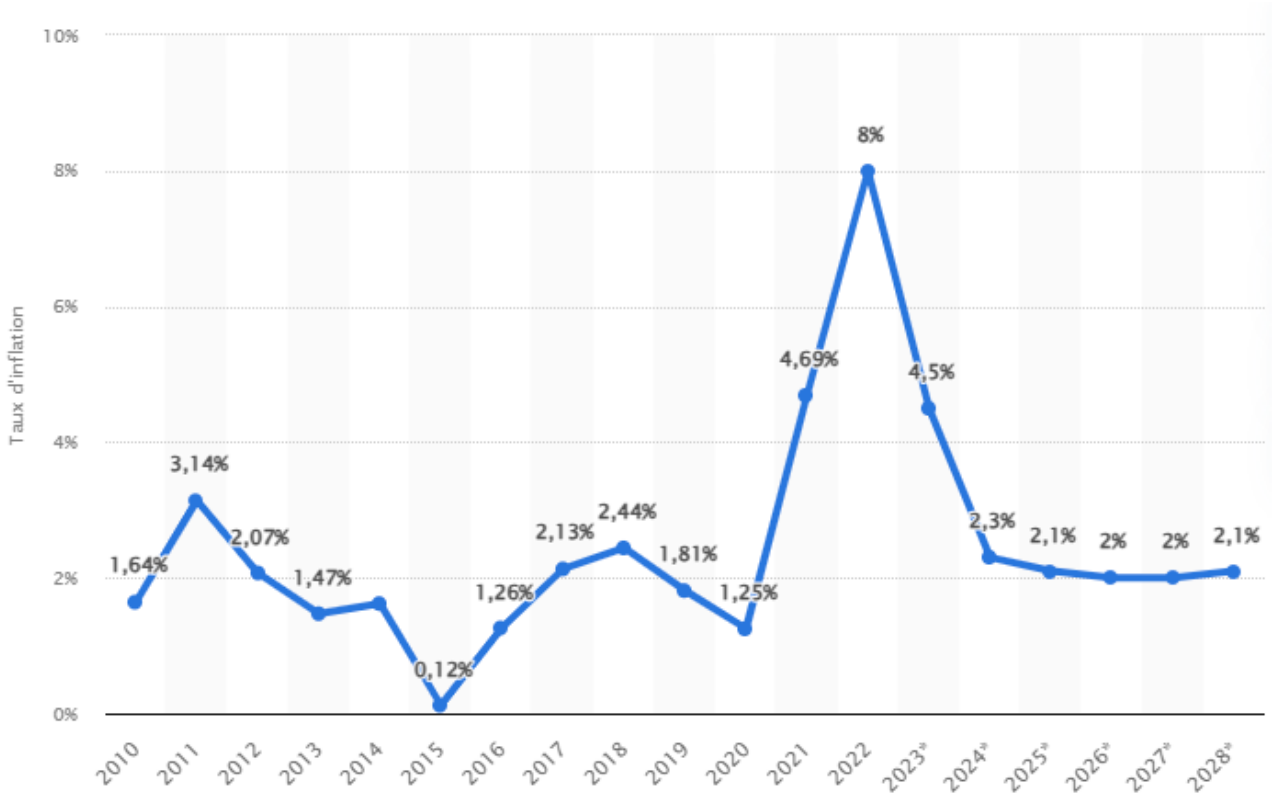
[6] https://www.insidehighered.com/news/quick-takes/2023/04/14/harvard-faculty-creates-group-academic-freedom

[7] Safeguards rule compliance" is compliance with the customer information security rule established by the U.S. Federal Trade Commission (FTC). This rule requires financial institutions to implement an information security program with appropriate measures to protect their customers' personal data.

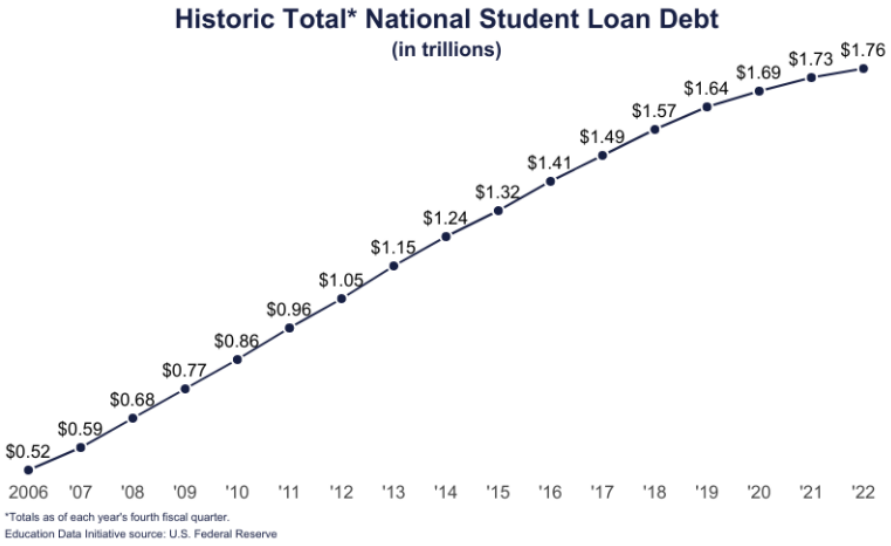
[8] The FSA is advertising a drop from a hundred questions to a few dozen for families.

Economic context

From an economic perspective, the United States has managed to control inflation, which, after the surge in 2021 and 2022, appears to be now under control (see the Figure bellow[9]).



Student debt persists in its growth. In mid-2023, it amounted to $1,766 billion[10], impacting 43.6 million people in the USA, a third of whom do not have a degree. Although it is showing signs of easing, it remains a major issue in the USA, despite not posing a threat to the banking sector, as it is mainly funded by public entities.



[9] Evolution of inflation in US in 2023 | Statista (in French)

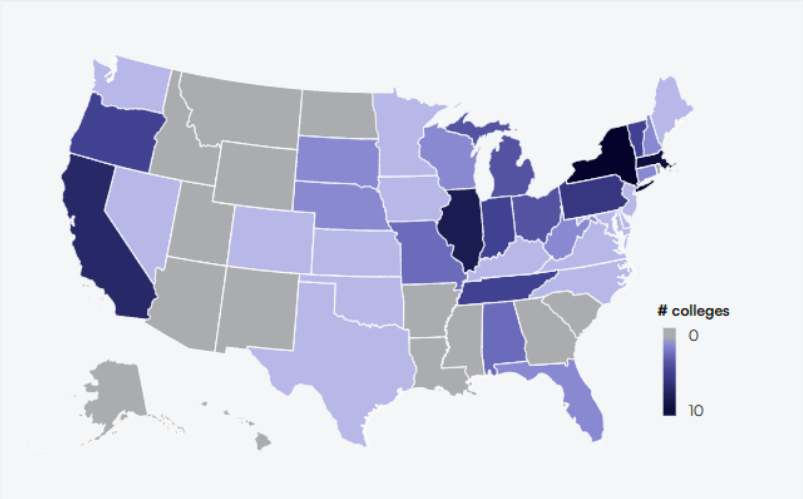
[10] https://educationdata.org/student-loan-debt-statistics

Debt issues keeps impacting former students long, long after their studies.

Age group	Average balance
24 and younger	$13,722.22
25 to 34	$32,707.48
35 to 49	$44,441.67
50 to 61	$47,660
62 and older	$49,375

Source: Direct Portfolio by Borrower Age Q1 2023

The 2.4 million former students over the age of 62 and still in debt[11][9] have an average debt of $49,000, which exceeds more than one year's median wage in the states, which is approximately $40,000[12]. Another dimension of the Higher Education industry is the increase in institution mergers, closures, or bankruptcies, which has been predicted since the turn of the decade and was thoroughly examined in last year's report. The Higher Education economy is transitioning from a period of unconstrained growth towards uncertain horizons with a multifaceted decrease in demand. When EDUCAUSE opened, over 300 colleges in the USA had openings[13]. Despite numerous federal grants, the crisis has impacted non-profit higher education institutions in the United States. By 2023, 14 of them had declared their closure[14]. These were mainly small private institutions, relying on tuition fees and limited resources. They had been experiencing declining enrolment for years and had not been able to revive their situation. A fifteenth institution, King's College, met the same fate, without officially announcing it. This institution, founded in 1938, had financial problems and lost its accreditation, forcing it to shut its doors. The "highereddive" website reports 20 closures or mergers in the USA in 2023[15] and provides a map of closures by state since 2019. And the Bestcolleges website is already forecasting[16] 9 more for 2024...



Nami Sumida/Education Dive

[11] For a total of $98 billion in outstandings

[12] Wages W-2 - Personal income in the United States - Wikipedia

[13] https://www.highereddive.com/news/almost-300-colleges-still-have-open-seats-for-fall-2023/649256/

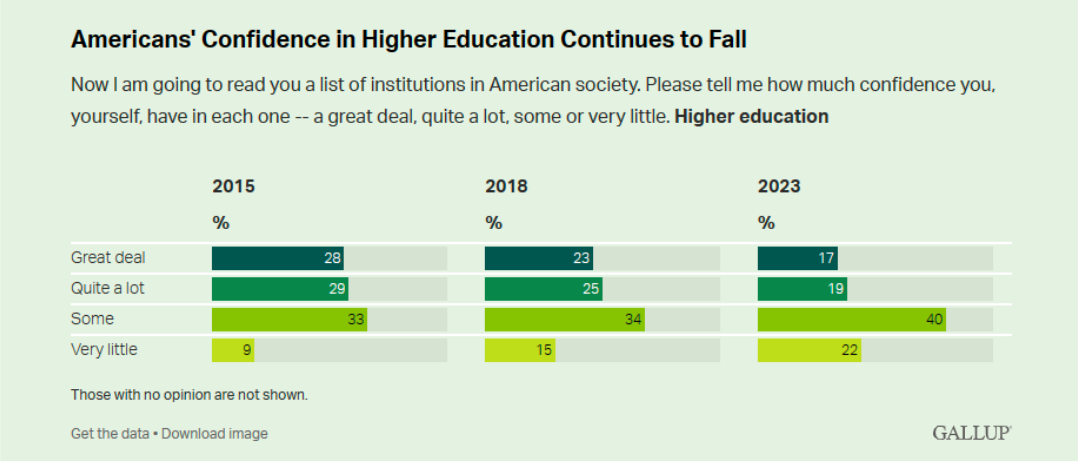
[14] https://www.insidehighered.com/news/business/financial-health/2023/12/21/look-back-college-closures-and-mergers-2023

[15] How many colleges and universities have closed since 2016? | Higher Ed Dive

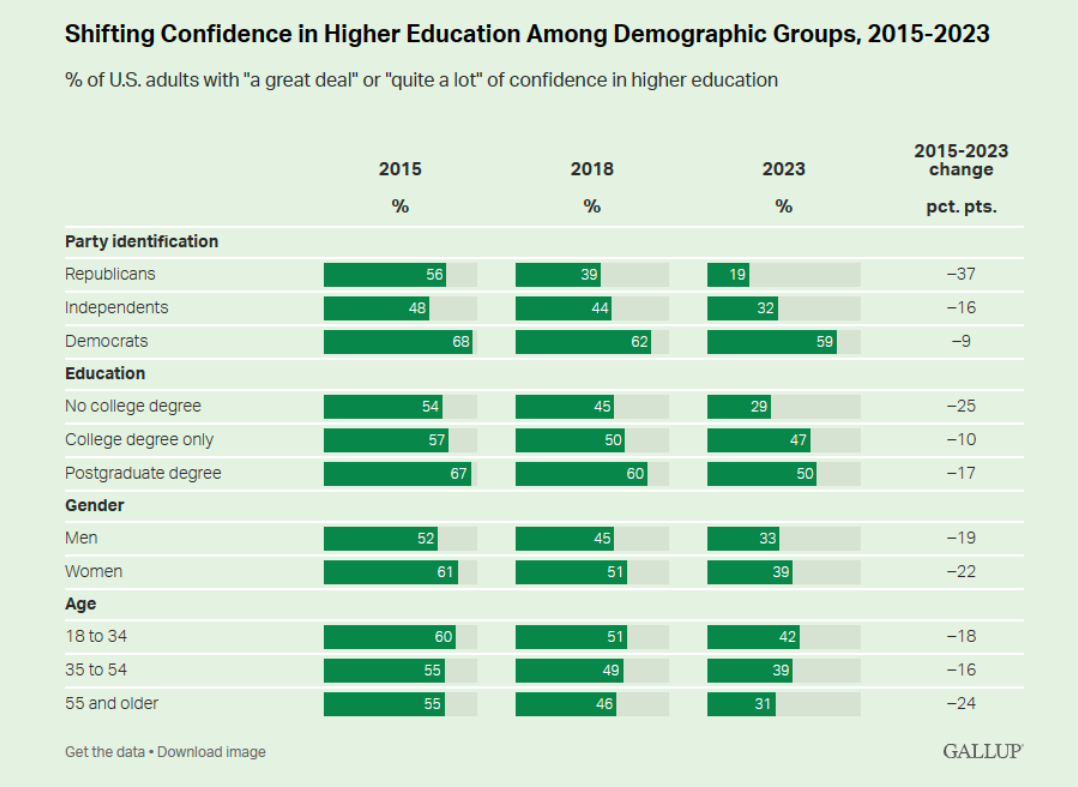
[16] Closed Colleges: List, Statistics, and Major Closures | BestColleges

Conclusions

In addition to the decreasing pool of potential students[17], and not only for demographic reasons with the "demographic cliff"[18], but American society is also questioning its higher education. It questions the added value and return on investment of higher education. The Gallup study shows that public confidence in higher education is plummeting, from a majority with 57% confidence in 2015 to a minority with just 36% in 2023 (see the Figure below[19]).



This pattern, while impacting the public as a whole, also highlights the political and social divide mentioned earlier, with a 37-point dip in confidence among Republican sympathizers and a 16-point decline among independents. Even Democrat sympathizers, who are historically and culturally more pro-ESR, experienced a decrease in confidence by 9 points.



[17] See former EDUCAUSE reports

[18] Demographic hill or the fall in the number of young people of university age as a result of the decline in the birth rate that began twenty years ago and is set to continue

[19] Americans' Confidence in Higher Education Down Sharply (gallup.com)

The COVID-19 pandemic has underscored some fragilities of North American higher education and research, but also their potential to marshal unexpected resources. In a context of social and political fractures, American society appears more divided than ever. Conflicts in Ukraine and the Middle East, the escalation of a major social network, the spread of false information (easily created by artificial intelligence), and the internal crisis of the Republican Party, split between moderates and extremists, are all factors stoking tensions and uncertainties on the eve of an election year.

"*Education is one of the major issues in the 2024 presidential election*", which officially commences in mid-January in Iowa with the first caucus. That's what Barbara Mistick, president of the National Association of Independent Colleges and Universities, predicted[20] at a meeting of leaders of private nonprofit institutions . The Republican and Democratic candidates will thus have to present their divergent visions of higher education and research to try to meet voters' expectations.

We hope this report will provide you with useful and interesting information, and perhaps motivate you to join the EDUCAUSE French and Japanese Delegations.

On behalf of our delegations, enjoy reading.

[20] https://www.highereddive.com/news/policy-developments-private-college-leaders/704132/

EDUCAUSE Top-10 Issues 2024

Laurent Flory - French Delegation

Institutional Resilience

The COVID-19 pandemic has profoundly altered our world, leaving behind more complex challenges than initially anticipated. However, the American Higher Education sector is not facing this crisis alone. Evolving issues such as lack of societal trust, the persistent student debt crisis, climate change, weather disasters, cybersecurity gaps, deep fakes, cultural and political polarization, mental health issues, declining campus demographics[21], AI mastery, hate crimes, global instability, and of course, the potential threat of the next pandemic, are also affecting the landscape.

In this context, it becomes imperative to adapt and evolve. Today's leaders must broaden their agenda beyond growth and innovation to address potential challenges and prepare for the future. In 2024, ESR leaders and their CIOs will be focusing on building institutional resilience, defined[22] as the ability to anticipate, respond and adapt quickly to changing circumstances in order to maximize opportunities and minimize unforeseen consequences.

The "2024 EDUCAUSE Top 10[23]", entitled "Institutional Resilience", drawn up by Susan Grajek and a panel of experts, highlights the 10 (+1) key contributions of digital, data and IT expertise. Each issue addressed is accompanied by a comprehensive toolbox detailing the steps and technological, political and human prerequisites needed to make optimal progress.

Credit: Zach Peil / EDUCAUSE © 2023

Mission Resilience

Institutional resilience mainly concerns training, research and user services. It aims to adapt to current needs and opportunities, while honoring historical missions. Education is at the heart of resilience, according to the TOP 10 of 2024.

The "student journey" traces the stages in the relationship between a student (customer) and the institution, beginning with recruitment, admissions and enrolment. It encompasses the multiple touchpoints, dimensions of a student's academic work and extracurricular life, and extends through the alumni's relationship with the institution. By 2024, digital managers will be collaborating with institutional stakeholders at all phases of the student journey.

Unfavorable demographic shifts, affordability and lower confidence in higher education are contributing to a higher education enrollment crisis. Managers are looking beyond traditional students to identify potential new audiences. In addition to traditional degrees and courses, they are trying to offer more diversified offerings to maintain and increase enrollments. Data is essential for making the right choices in innovation, and for understanding which options work and which ones fall by the wayside (issue #3 The enrollment crisis - Harnessing data to empower decision-makers).

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[21] See the 2023 report For a more detailed presentation, the USA refers to this as the "demographic cliff".

[22] The EDUCAUSE Institutional Resilience Working Group developed this definition of institutional resilience in higher education. The group was convened by EDUCAUSE in summer 2022 and included faculty and experts from NACUBO, CUPA- HR, and URMIA as well as EDUCAUSE.

[23] Find the entire report at this URL : 2024 EDUCAUSE Top 10: Institutional Resilience | EDUCAUSE Review

The student-institution relationship is largely mediated by technology. Today's students demand digital experiences comparable to Amazon, Spotify and Instagram, wanting flexibility in their learning and interactions with the institution. Student life leaders are working on multimodal channels for individualized services and learning experiences (issue #6 Meeting students where they are: Providing universal access to institutional services).

Students (and families) who invest in higher education expect a positive service, experience and return on investment. Analytics can guide students and institutional support teams in monitoring and adjusting their academic progress. Data and analytical tools abound, but the challenge lies in understanding and acting on these sources (issue #4 Diving deep into data: Leveraging analytics for actionable insights to improve training and student success).

Oprational Resilience

Operational resilience extends to institutional assets, human resources, planning, risk management and decision-making processes. Cybersecurity remains a major risk for institutional data and players in Higher Education and Research. It's a never-ending race in which security systems try to protect against attacks. Management must direct their investments towards the most important and most likely risks (issue #1 Cybersecurity as a core competency - Balancing cost and risk).

Governing bodies are increasingly relying on data to inform their decision-making. Today, getting fast, relevant answers from data is possible. This is crucial, because neither crises nor opportunities are willing to wait weeks for factual answers. Decision-makers need to base their decisions on facts, not anecdotes (issue #2 Driving to better decisions - Improving data quality and governance).

Relatively low salaries, poorly articulated "value packages" for existing or potential staff, combined with rigid work rules, hamper recruitment to fill vacancies. Human Resources (HR) and digital departments need to improve the value proposition for employees in order to recruit and retain the best digital and data specialists (issue #7 Hiring resilience: Recruiting and retaining IT talent under adverse circumstances).

During the pandemic, higher education overcame its reputation as a temple of resistance to change. Institutional leaders can now harness the dynamics, flexibility and widespread collaboration that characterized operations during the pandemic as a catalyst to foster sustainable institutional agility (issue #10 Adapting to the future - Cultivating institutional agility).

Financial Resilience

The foundations of college and university financing are based on long-standing habits and practices. Enrollment, grants, investments and donations on the one hand, and capital and operating costs on the other, have long influenced financial performance. Managers were familiar with the levers they could pull to adapt. Today, however, many institutions face a bleak outlook, and results are not responding to traditional levers.

Although digital development can increase costs, it can also be a driver of efficiency and added value. Combined with the decision-support possibilities offered by data, Chief Information Officers (CIOs) become essential partners in strengthening financial resilience. Technology and data transformed into information can help reduce administrative costs (issue #5 Administrative cost reduction - Streamlining processes, data and technologies) and provide estimates and projections to help executives make difficult decisions with greater certainty (issue #8 Financial keys to the future: Using technology and data to help make tough choices).

IT-related costs have risen significantly, often exceeding the rate of inflation. Digital and procurement managers are working with internal stakeholders and external partners to address this financial risk. They are also faced with the threat of having to part with technologies prematurely when they could lead to future savings or create new revenue streams (issue #9. Balancing budgets - Taking controls of IT cost and vendor management).

So the EDUCAUSE Top-10 issues 2024 are :

1. Cybersecurity as a core competency - Balancing cost and risks
2. Driving to better decisions - improving data quality and governance
3. The enrollment crisis - Harnessing data to empower decision-makers
4. Driving deep into data - Leveraging analytics for actionable insights to improve learning and student success
5. Administrative cost reduction - Streamlining processes, data, and technologies
6. Meeting students where they are - Providing universal access to institutional services
7. Hiring resilience - Recruiting and retaining IT talent under adverse circumstances
8. Financial keys to the future - Using technology and data to help make tough choices
9. Balancing budgets - Taking controls of IT cost and vendor management
10. Adapting to the future - Cultivating institutional agility

And…

Hororary issue. AI… Friend or foe - Developing and institutional approach

Issue #1 - Cybersecurity as a core competency - Balancing cost and risks

Credit: Zach Peil / EDUCAUSE © 2023

The importance of cybersecurity remains unchanged, and every year it features in EDUCAUSE's Top 10 due to the constant evolution of threats and technological advances. This dynamic requires institutions to remain proactive, agile and adaptable in their cybersecurity practices. Higher education is no exception; cybersecurity remains a constant threat to all industries.

In 2024, a number of developments will require particular attention. Institutional systems and users are handling larger volumes of data than ever before, with data flowing between solution providers and across end-user locations and devices. Three years after the start of the COVID-19 pandemic, many institutions are still struggling to adapt to the expansion of remote learning and working, as well as increased flexibility in working hours. The transformative impact of AI is beginning to be felt, with huge potential not only in operational services, training and research, but also as a potential vector for cybercriminals.

Politicians and elected representatives are concerned about cyber threats to assets and individuals, introducing regulations to address these challenges. Higher education legal officers and CISOs need to anticipate the impact of these regulations, adapt to them and bear the consequences. Regulatory frameworks relating to cybersecurity and data privacy, often intertwined and interdependent, add to the complexity of compliance. In the United States, "dual federalism" creates national laws and fifty separate, sometimes divergent state privacy laws. Despite these challenges, strategic institutions will treat cybersecurity as a core competency, basing their decisions and investments on risk management tailored to their resources and values. They will ensure that policies, training and practices evolve in response to constantly changing threats and regulations.

The perspective

Effective cybersecurity is of crucial importance, as it affects access to research funding, recruitment of foreign students and partnerships with commercial organizations. It plays an essential role in protecting student privacy and creating a safe learning environment.

Ongoing cybersecurity activities, such as audits or penetration tests, provide an opportunity to better understand the institution's assets and vulnerabilities before malicious actors exploit them. Cybersecurity practices are intrinsically linked to general digital dexterity, so investments in training can help students and staff improve their digital skills while learning how to better protect data, devices, their identity and the institution.

Making cybersecurity a core competency is not only a preventative measure, but also helps to build confidence. Students, alumni, funders, partners, staff and the communities served by the institution can have confidence in an institution that places digital security at the heart of its priorities. This strengthened trust becomes a solid foundation on which the institution's reputation and long-term success are built.

In summary

A financial tsunami threatens educational institutions, with data breaches in the "higher education and training sector" costing an average of $3.7 million in 2023. Even a medium-sized attack can generate considerable costs in data protection, disaster recovery and legal fees.

Pooling is emerging as a key solution. Institutions can collaborate, avoiding the need to manage their own security operations center (SOC). Outsourcing and shared SOCs are viable options.

Silos hinder progress. Stakeholders from IT to privacy to cybersecurity, but also procurement, legal and others, need to collaborate when drafting agreements with software and cloud providers.

Keeping cybersecurity on the agenda is imperative. Institutional leaders must maintain a constant understanding of cybersecurity risks. This task is particularly challenging - and crucial - in highly decentralized and diverse institutions.

Shadow IT is a threat. Teachers and administrators can acquire or develop solutions without involving IT teams. Open and honest dialogue between technology and cybersecurity professionals on the one hand, and teachers and staff on the other, is essential. It enables end-users to express their needs, and experts to propose solutions focused on security and privacy, thus preserving data and the institution without compromising innovation, productivity and creativity.

Understanding the trade-offs is crucial. Institutions can address this issue effectively by adopting a risk management framework, fostering informed and objective discussions. This enables executives to balance risks against opportunities and costs, ensuring a solid posture in the face of cybersecurity challenges.

Key success factors

Facilities can effectively address cybersecurity challenges by adopting a risk management framework that encourages in-depth, informed conversations. This helps executives balance risks against opportunities and costs, forming a strong defense against digital threats.

Making cybersecurity a core competency becomes an essential element in building trust with students, alumni, funders, partners, staff and the communities served by the institution. This approach allows the necessary activities and investments to be integrated into the institution's operating model and culture. Data protection and privacy are no longer seen as a one-off reaction to incidents, but as an ongoing and constantly evolving practice.

By viewing cybersecurity as a core competency, educational institutions can anticipate, prevent and proactively respond to emerging threats. Cybersecurity thus becomes a fundamental pillar of all institutional operations, helping to create a culture of vigilance and shared responsibility.

In conclusion, an integrated approach to cybersecurity is not simply a technical necessity, but an essential component in building lasting trust. It positions the institution as a responsible player, capable of ensuring data security and protection, while fostering continuous innovation and meeting ethical and regulatory expectations.

Issue #2 - Driving to better decisions - improving data quality and governance

Credit: Zach Peil / EDUCAUSE © 2023

Despite data abundance and technological advances, higher education still faces fundamental challenges in data governance and data quality. So why do we persist in struggling with these basic principles?

Institutional culture is a major obstacle. Often, the understanding of data within the institutional community does not match the stated commitment of leaders to analytics technology. Many administrative and academic players fail to grasp how to use data effectively in decision-making, ignoring the value of such data in informing choices. The issue of data ownership also creates tensions, with some departments viewing data as their property rather than an institutional resource. These attitudes hamper the crucial tasks of defining, cleansing, protecting and integrating data.

Time is another challenge. Despite the profusion of data available, teachers and managers often lack the time needed to access and use this data to address their specific concerns.

The rapid evolution of data-related technologies, risks and policies further complicates the situation. Maintaining stable institutional technological and political environments requires constant effort. Institutional managers face complex legal hurdles, with a diversity of laws governing privacy in different regions of the world, countries and US states. These legislative provisions affect the privacy rights of institutional members, and the way in which decision-makers can collect and use data.

Finally, the growing influence of artificial intelligence (AI) is adding to the complexity. AI is redefining not only how technologies collect data, but also how experts and users harness it to gain valuable insights. This evolution, while exciting, involves significant costs, adding a layer of financial complexity to the already existing challenges of harnessing data for decision-making in higher education.

The perspective

In a context of limited resources and revenues, data is emerging as an essential asset, enabling managers to overcome multiple challenges. As institutions face financial constraints and constantly evolving models, data offers valuable insights into understanding and addressing these challenges.

Currently, many institutions are implementing change initiatives and experiments aimed at transforming teaching and learning models, reaching new student populations, and adapting to remote and hybrid work environments. Data plays a crucial role in providing an in-depth understanding of institutional evolution, evaluating the success of these initiatives, and identifying the reasons for and beneficiaries of these changes.

Data also guides managers in the search for opportunities to do more with less. It allows them to discern when to take an opportunistic approach, rather than pushing exhausted staff to do more with less. Data becomes a strategic tool for making tough decisions, providing tangible evidence rather than relying on conflicting gut feelings. In this way, leaders can determine what to stop, what to celebrate, and which areas to develop to ensure the institution's longevity and effectiveness. In short, data proves to be a catalyst for innovation and a reliable compass for guiding strategic choices in a constantly changing environment.

In summary

A top-down approach is essential to changing the culture. If the facility's leadership and administrators value data, use it to inform their decisions, and ensure that their teams have the time to develop the processes, policies and subsystems needed to support a data-driven culture, the facility's culture will evolve accordingly. Otherwise, data governance will be limited to pockets of excellence within departments.

Listening to employees is crucial. Managers need to listen to and collaborate with teachers, students, administrative staff and other stakeholders to ensure that data and analysis tools are truly useful to them.

Data governance initiatives that rely on heroic individual actions to fill gaps may make initial progress, but they will struggle to scale across the institution.

It's not a question of technology. Processes, culture and results must drive these initiatives, rather than a particular technological solution.

Risk aversion is a risk in itself. Institutions too focused on risk avoidance may miss opportunities that could easily offset these risks.

Key success factors

Institutional leaders need to treat data as a true strategic asset, just as they do with their facility's equipment, buildings and installations. Both data and infrastructure require constant maintenance and attention. However, there are major differences. The revision and replacement cycles for data, technology and associated policies are much shorter.

The value proposition of a new building, with classrooms, laboratories and state-of-the-art equipment, is much better defined and easier to understand than a proposal to develop a data dictionary, ETL process or data warehouse. It is essential to recognize this complexity and allocate the necessary resources to keep data systems relevant and efficient. By investing in proactive data management, institutions can better position their strategic assets to meet evolving digital needs and maximize their long-term utility.

Issue #3 - The enrollment crisis - Harnessing data to empower decision-makers

Credit: Zach Peil / EDUCAUSE © 2023

Enrollment levels in higher education institutions have dropped considerably. The (RSE industry) markets served are changing, as are customer behaviors and needs. By 2025, the long-awaited demographic crisis will particularly affect institutions catering for traditional students, generally aged between 18 and 25 (most colleges and universities).

However, the enrollment crisis is not limited to demographic change. Attitudes towards higher education continue to deteriorate. Many students' educational experiences during the COVID-19 pandemic are influencing their interest in and expectations of higher education. Students are now savvy consumers, asking crucial questions about return on investment, such as "What benefits will I get from this degree from this institution?" and "What if I start here but don't finish here? What will these credits be worth?" Students and their families question the financial commitment required of them.

Many enrollment strategies are evolving to include a more diverse group of students, covering different age brackets, full-time and part-time statuses, nationalities and a variety of programs and degrees. However, this diversity requires equally diverse support services and learning modalities, the costs of which only become apparent after enrollment, when students' needs are better understood.

Given how institutions operate with numerous data silos, there are plenty of companies offering the next promising gadget to facilitate enrollment. For a strategic approach, institutional managers need to consider their data and tools holistically, validating data sets and looking for cause-and-effect relationships. By leveraging this information, managers can help students assess the value of an institution, degree program or credential. In this way, students can better integrate the higher education experience they expect to have into their daily lives, which have become increasingly complex in the post-pandemic world.

The perspective

The current enrollment and financial crises are jeopardizing the financial health and strategic positioning of many higher education institutions. These crises may provide the opportunity for a much-needed re-examination, motivating fundamental changes such as offering different types of degree at different prices. These changes could help to reinforce the relevance, access and affordability of institutions at a time when all three are being eroded. Higher education leaders and executives are redefining the concepts of student and student journey. Traditional models may seem less attractive, but this need not doom higher education.

Data and market research will be needed to design and evaluate different offerings, as well as the institution's future business model. Data, now more abundant and varied thanks to the many applications deployed during the pandemic, goes beyond the students' academic experience. It also enables a better understanding of the needs of current and potential students. As a result, institutions can tailor academic programs, support services (from housing and food insecurity to mental health needs) and points of contact in the enrollment process. This judicious use of data will help guide higher education institutions towards innovative solutions, strengthening their ability to respond to current and future challenges.

In summary

Highlighting your value proposition is essential. It's better to target and direct offerings to the audiences the institution is best suited to serve, rather than adopting a "growth at all costs" philosophy. Models such as competency-based education and digital degrees can help reach new markets and change perceptions of the value of higher education. Ideally, these innovations will be derived from the institution's existing strengths.

It's crucial not to rest on your laurels. The world is changing rapidly, and today's success may mean tomorrow's stagnation. Managers need to use data and foresight techniques as signals of change to anticipate emerging needs and recalibrate offerings accordingly.

The wrong seed cannot bear good fruit. The abundance of data sources requires continuous reconciliation, validation and correction before they are integrated into corporate data repositories and reporting tools. This guarantees the reliability of dashboards and analyses.

Democratizing data is crucial in enrollment models. This requires a single, shared version of reliable data from many sources. Moving data and notions of data ownership out of institutional silos and shadow IT and into an institutional data ecosystem is essential.

Cultivating external partnerships is a wise strategy. Although many institutions are individually vulnerable, collectively they can represent a strength. Partnerships between groups of facilities federating different audiences and local communities or employers can help managers simplify transitions between facilities and optimize market offerings.

Key success factors

Harnessing data to solve the enrollment crisis is part of a wider institutional transformation. This transformation is iterative and ongoing, so the use of data by stakeholders must be equally dynamic.

This requires a constant commitment to data analysis, the adaptation of strategies based on new information, and close collaboration between the various entities of the institution. Leaders need to foster a data-driven organizational culture, promoting transparency, collaboration and innovation.

The agile use of data also implies ongoing staff training to ensure a thorough understanding of analytical tools and best practices in data governance. In addition, effective communication of data findings is crucial to making strategic trade-offs and fostering informed decision-making at all levels of the institution.

In summary, solving the enrollment crisis by harnessing data requires a holistic approach to institutional transformation, where flexibility, continuous learning and collaboration are at the heart of the successful adoption of data-driven solutions.

Issue #4 - Driving deep into data - Leveraging analytics for actionable insights to improve learning and student success

Credit: Zach Peil / EDUCAUSE © 2023

The higher education landscape is changing rapidly, with teachers increasingly adopting learning tools and technologies. Teachers combine a variety of learning modalities and spaces throughout their courses. Similarly, students use a variety of tools and modalities for their learning. It's essential that teachers and students understand what works, when, for whom and why. Campus planners also need to understand what kinds of learning spaces to invest in or divest.

Student success encompasses not only academic success, but also services such as career counseling, tutoring, financial aid, behavioral health services and extracurricular activities. Students may also need a variety of services to cope with the everyday challenges that can disrupt their learning, such as transportation, housing, childcare, healthcare, and access to digital equipment and a network connection. It's crucial that counselors, students and their families understand what combination of support and services can best help each student define and achieve academic success.

While instinct, personal preference and prejudice still often influence decision-making on campus, managers now have unprecedented access to data and analysis on student learning and success. The information contained in Learning Management Systems (LMS) is no longer sufficient. Analytics and data professionals need to integrate data from many sources to provide students, teachers and advisors with actionable information.

Managers need to focus on how and where to concentrate resources, now and in the future, and how to evaluate pilot projects and initiatives. Analytics professionals need to provide flexible models and projections to guide these decisions. Technology professionals need to understand data and analytics needs across the institution, providing cost-effective, modern data services and infrastructure. Finally, technology and data managers must develop a strategy that enables the institution to leverage analytics for actionable insights.

The perspective

Ultimately, the ability to use and manage quantifiable, actionable data will help decision-makers track progress (or lack thereof), allocate resources for all items on the TOP 10 list, and react to changes in an informed manner.

When it comes to student learning and success, final results and course credits are definitive, but they often come too late in the term for students, faculty and staff to proactively intervene. Student use of digital learning environments can be a reasonable indicator of engagement and progress. The social sciences have long used survey or behavioral data as indicators of difficult-to-measure concepts such as well-being or socio-economic status. Similarly, the field of learning analytics has been exploiting "digital footprints" of student time and attention for over a decade to improve teachers' ability to deliver the right message to the right student at the right time. This data can also help to develop students' autonomy by making them aware of their habits and results on time, so that they are encouraged to seek the help that the institution is more than willing to provide.

As leaders struggle to recruit and retain student promotions beyond those the institution has traditionally served, it's particularly important to look at data to understand student needs, engagement and outcomes, and adjust - both for individual students and systemically - what's happening inside and outside the classroom. This will ensure a proactive and targeted approach to supporting every student in their academic journey and beyond.

In summary

Developing a culture of data and analysis is essential. Users and decision-makers need to adopt the habit of saying: "We have data about this" or "We know how to get data about this". They need to be skilled in using, interrogating and interpreting data to solve problems.

However, it's important not to fall into the data trap, and to avoid obsessing over perfect predictions at the expense of effective action. Those who are prepared to try, iterate, refine and repeat their attempts to help students, while rigorously collecting and evaluating outcome data, will be more successful in implementing student learning and success analytics.

Investment is essential, even though data analysis tools can often be expensive. Even free or inexpensive solutions require knowledge, staff and resources. It's necessary to see this investment as a means of improving process efficiency and maximizing the potential for student success.

Leadership with a strong vision and concrete priorities is crucial. This type of leadership will facilitate the use of data to advance priorities, and help unite the divergent voices of administration and faculty to agree on common data sources and shared dashboards.

Key success factors

Institutional leaders and their constituents who have defined clear priorities and problems to be solved, framing student learning and success from the learner and teacher through to the institution, will be best placed to take advantage.

By focusing on specific objectives, such as improving retention rates, personalizing the student experience, or strengthening teachers' pedagogical skills, these leaders can determine the crucial data to collect and analyze. This will help guide institutional efforts towards concrete solutions tailored to the real needs of the educational community.

Effective communication and close collaboration between the various players will also be key to ensuring the successful use of data. School leaders need to foster a culture of sharing and continuous learning, where teachers, students and administrative staff work together to interpret data and implement results-driven initiatives.

Ultimately, the success of data analytics in improving student learning and success relies on clarity of purpose, collaboration and ongoing stakeholder engagement. Institutions that adopt this strategic approach will be better positioned to optimize their performance and deliver an exceptional educational experience to their students.

Issue #5 - Administrative cost reduction - Streamlining processes, data, and technologies

Credit: Zach Peil / EDUCAUSE © 2023

Organizations have always sought ways to optimize operations and reduce operating costs, but today's environment and available strategies both complicate and facilitate these goals. Technological advances such as automation, AI and cloud computing, together with management styles that have evolved to make effective use of these advances, offer greater opportunities. However, data, its diversity and its data sources continue to increase rapidly and become more complex. Staff and teachers are also using more and more digital tools, many of which are unknown to digital management. Administrative processes still often conform to manual work rather than being optimized for modern digital solutions. Too often, the solution to this digital mess has been to hire more staff, bring in consultants and invest in more tools, with the resultant increase in complexity and costs.

No institution can afford to continue on this path. By 2025, the demographic cliff will hit higher education. At the same time, skepticism about higher education is growing. Only 36% of respondents to a Gallup opinion poll conducted in June 2023 expressed "great" or "fairly great" confidence in higher education, compared with 48% in 2018 and 57% in 2015[24]. Other studies suggest that this drop in confidence is associated with questions about the costs of higher education and the concrete benefits that actually flow from this investment[25]. The ability to save money and cut costs is vital for higher education institutions, and reducing operating costs is preferable to cutting programs and academic experiences.

The perspective

Streamlining processes, data and technology can bring benefits beyond cost reduction for institutions that undertake this work at a strategic level. Students are used to very quick responses and easy interfaces with large private digital players, an experience they don't often have in colleges and universities. The reorganization of student services to offer consumer-level ease and functionality represents a further opportunity for institutions.

Simplifying administrative processes and data can lead to more qualitative data, which should improve steering indicators, reduce administrative errors and provide more meaningful economic information.

A streamlined technological and data environment helps lay the foundations for institutional agility. Changes are less likely to lead to errors, and errors are easier to diagnose and correct. The very conduct of a streamlining initiative - if successful - will stimulate cultural change, since much of the institution's existing administrative complexity is based on cultural aspects that have become dysfunctional and obsolete.

This work can also facilitate innovation. A simplified administrative backbone can provide the cultural and technical flexibility needed to support the development of new business models, diversification into new areas of activity and the exploration of new ways of managing the student journey from start to finish.

Those fortunate enough to be in a financially balanced institution may be able to transfer savings on administrative costs to more student-focused services. This not only enhances student satisfaction, but also contributes to the school's financial sustainability and competitiveness in an ever-changing educational landscape.

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[24] Americans' Confidence in Higher Education Down Sharply (gallup.com)

[25] One Semester Later: How Prospective and Current College Students' Perspectives of Higher Ed Have Changed between August and December 2020 – Third Way

In summary

It's good to be small. Small and medium-sized institutions with limited resources and tight budgets have the most to gain, because even small savings have a proportionally greater impact.

It's hard to be complex. Institutions with multiple sites, autonomous curricula and many levels of decision-making will find it difficult to achieve significant cost reductions. Initial estimates of significant savings may be dashed by a multitude of exceptions on the part of stakeholders.

Say goodbye to the digital legacy. Replacing legacy systems and infrastructures with modern ERP is a strategy many institutions are pursuing to reduce administrative costs.

Compliance comes at a price. A complex regulatory environment can reduce executives' ability to find and maximize cost savings.

Culture trumps strategy. Resistance to change is likely to be the main obstacle to administrative streamlining. Institutions will need effective, committed leaders who know how to drive cultural change.

Key success factors

It's up to managers to focus these initiatives on significant cost savings, and to help stakeholders recognize the "bigger picture" benefits these savings will bring. This means clearly communicating the strategic vision behind administrative streamlining, highlighting not only the immediate cost savings, but also the long-term gains in operational efficiency, institutional agility and improved student experience.

Leaders must also be proactive in identifying and resolving potential challenges, including establishing transition plans, offering appropriate training to mitigate resistance to change, and providing feedback mechanisms to adjust initiatives as they are implemented.

By putting forward a clear vision and skilfully managing the cultural aspects of change, managers can turn administrative streamlining into an opportunity to strengthen the institution's financial sustainability while improving the quality and relevance of its services.

Issue #6 - Meeting students where they are - Providing universal access to institutional services

Credit: Zach Peil / EDUCAUSE © 2023

The COVID-19 pandemic has given us a whole new perspective on higher education. The abrupt and forced shift to all online in spring 2020 has laid the foundations for multimodal forms of learning and working. Students, teachers and staff have developed preferences for their own optimal ways of cooperating with each other and with the institution. Simultaneously, but in line with these preferences, the institution's leaders and staff are designing and building future "phygital[26]" campus

The pandemic has also helped teachers and administrators to see students more clearly, as it has opened up the partition separating learners from the wider context of their lives. No one can forget what they've been through, and the empathy generated by students' events and difficulties is helping to shape a broader approach to institutional services and strengthen commitment to helping students overcome individual barriers to academic success. Leaders initiate or develop services to address food and housing insecurity, childcare, transportation, mental health, career counseling and basic technology needs. Many teachers and educational technology professionals see this period as an opportunity to invest in universal design for learning (Universal Design for Learning[27]).

Ultimately, universal access is about providing multimodal channels to access individualized services. This work is part of a broader shake-up of the status quo underway across higher education. Everyone is asking why, when and where to teach, learn, work and interact. No one has yet found the (right) answer.

The perspective

The challenge is to offer students secure universal access to the services they need to ensure their success. Flexible, multimodal services need to be designed around students' needs and outcomes, and adapted to the institution's resources. Offering online options can be cost-effective, reaching and supporting many more students. This can enable non-selective institutions to expand their services more cost-effectively. Technology managers can help executives understand how to look at digital opportunities and benefits more broadly, while remaining realistic.

The possibility of providing universal access to institutional services may be limited in time. Teachers, students and staff still think differently because the pandemic is still fresh in their minds. Now is the time to develop a sustainable framework and digital environment.

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[26] This term has been used in healthcare to describe mixed digital and physical environments.. See, for example, Artin Entezarjou et al, Health care utilization following “digi-physical” assessment compared to physical assessment for infectious symptoms in primary care | BMC Primary Care | Full Text (biomedcentral.com) BMC Primary Care 23 (January 12th 2022).

[27] Today's learners have diverse abilities and profiles, including students with physical, sensory and learning disabilities, varied cultural and linguistic profiles, as well as diverse learning preferences and motivations. Teachers therefore have a responsibility to ensure that they offer learning opportunities that guarantee the success of all their students. Universal Design for Learning (UDL) helps to meet the challenge of diversity by providing flexible teaching materials, techniques and strategies for designing teaching and academic strategies and practices more holistically.

In summary

It's time for action. Resolute leaders who focus on action and accountability will help stakeholders move beyond analysis and debate to focus on results and continuous improvement.

Effective governance is important. Institutions with a strong system of shared governance will thrive, because they have reliable processes for getting buy-in from faculty, administration, board and students.

It will never be the same again. Institutions steeped in history and tradition, which have viewed the pandemic as a bump in the road rather than a crisis that has changed the landscape of higher education, will miss the opportunity to embrace innovation. This missed opportunity could even be the death knell for some of them.

Focus on students. Results that benefit students must guide efforts to provide universal access to institutional services. And what better way to put students at the center of these initiatives than to involve them throughout the process?

Key success factors

Institutions that are responsive and agile will progress faster. It is essential to take a proactive approach to emerging challenges, to adapt quickly to changes in the educational environment and to continually seek opportunities for improvement. This will enable institutions to keep pace with student needs and remain competitive in an ever-changing educational landscape.

Issue #7 - Hiring resilience - Recruiting and retaining IT talent under adverse circumstances

Credit: Zach Peil / EDUCAUSE © 2023

It's essential for higher education institutions to recognize that remuneration, while crucial, is only one aspect of their attractiveness and ability to retain IT talent. Flexible working hours and locations, work-life balance, and the opportunity to make a significant difference in the world are equally important in attracting and retaining skilled professionals[28].

It is also necessary to recognize that the diversity of employee needs calls for flexible policies that take this diversity into account. IT and HR managers need to work together to develop policies that promote fairness rather than equality, recognizing that different people place varying importance on work-life balance[29].

The strategy for attracting and retaining talent must go beyond compensation. Institutions can explore ways of reducing workloads by rethinking processes, automating procedural tasks and focusing on differentiating, relationship-based services. This will enable staff to focus on meaningful and collaborative tasks, strengthening their commitment to the institution.

Ultimately, digital managers need to take a holistic approach to talent management, recognizing the different needs and motivations of employees, while creating an attractive and stimulating working environment.

The perspective

Every issue in the EDUCAUSE 2024 Top 10 creates a dependency on, and significant opportunities for, the technology workforce. Institutional leaders must therefore strive to build a competent digital team to make cybersecurity a core competency, fully exploit the potential of data in decision-making, improve access to student services, and promote institutional agility.

Recruiting technological talent, retaining it, developing it on an ongoing basis and ensuring effective succession planning are essential elements in building digital teams capable of maximizing their contribution to achieving the institution's goals and mission. Managers must adopt innovative strategies to attract qualified professionals, while putting in place training and development programs to keep their skills up to date in an ever-changing technological environment. In addition, succession planning ensures the continuity and stability of teams, guaranteeing that the institution is well positioned to meet future challenges.

Ultimately, the technology workforce is the engine that propels higher education forward, leveraging innovations and advances to meet the changing needs of students and the institution as a whole.

[28] Splitters and Blenders: Two Different Relationships With Work (gallup.com)

[29] What Gen Z wants in a job - The Washington Post

In summary

Be flexible and dare to be radical. Digital and HR leaders need to work closely together and be prepared to challenge rigid hiring practices and labor policies. They must influence institutional culture by introducing innovative recruitment and HR practices, while piloting bold pilot projects to foster innovation.

Become an integrating CIO[30]. CIOs who are relationship- and people-focused, and who understand how to integrate fully with the institution's strategy and direction, will be able to exert political influence to promote fairer compensation and greater flexibility in the workplace. Their contribution to understanding and enhancing the value of technological contributions to the institution will be crucial in gaining the necessary support.

Creating a climate of belonging in the workplace. Potential candidates quickly sense the atmosphere within an organization and how employees perceive their work and colleagues. Whether work is face-to-face, hybrid or remote, all staff members need to feel welcomed and integrated into the institutional and organizational community.

Rethinking work and organization. Financial constraints and job opening opportunities can be an opportunity to restructure jobs and tasks, creating more attractive working conditions at competitive salaries. Managers need to consider flexible organizational models that promote employee efficiency and professional fulfillment, while ensuring that talent is aligned with the institution's strategic priorities.

Key success factors

The job market and issues of flexible working are constantly evolving. Recruitment and retention practices and policies will need to evolve accordingly, as the solution that works today may not be suitable tomorrow.

HR and digital managers need to stay alert to emerging labor market trends, changing candidate preferences, and new employee expectations. Organizations that take an agile approach to adjusting their recruitment, compensation, and talent management strategies will be better prepared to attract and retain qualified professionals.

Experimentation and collaboration with employees will be essential to understand what motivates and retains staff in a constantly changing work environment. Adaptability will become an essential skill for HR and IT teams, who will need to adjust quickly to the new realities of the working world to remain competitive and attractive on the job market.

In short, flexibility and the ability to innovate in HR practices will be crucial for higher education institutions to remain competitive, attract talent and meet the changing needs of their workforce.

[30] See the issue #10 The Integrative CIO, in Susan Grajek and the 2019–2020 EDUCAUSE IT Issues Panel, "Top 10 IT Issues, 2020: The Drive to Digital Transformation Begins," EDUCAUSE Review, January 27, 2020 at this URL https://er.educause.edu/articles/2020/1/top-10-it-issues-2020-the-drive-to-digital-transformation-begins or in the 2019 edition of this report.

Issue #8 - Financial keys to the future - Using technology and data to help make tough choices

Credit: Zach Peil / EDUCAUSE © 2023

The financial situation of many US higher education institutions has become precarious, with Moody's outlook for 2023 changing from stable to negative. Revenue constraints, including tuition fees and public funding, as well as inflation[31], have contributed to this trend. Although not all institutions are in difficulty, state funding for higher education has fallen in 28 states[32] compared to before 2008[33].

CIOs can play a crucial role in improving corporate finances. Firstly, they can help reduce workloads by automating and optimizing processes, consolidating redundant technologies. Secondly, they can ensure that funds allocated to corporate technologies are used efficiently, despite inflation and technology-related cost increases.

On the other hand, CIOs can lead data and analytics initiatives to make fact-based decisions, identify cost-saving opportunities and optimize resource allocation. However, the challenge often lies in the dispersal of data in SaaS solutions across campus, making it difficult to develop powerful predictive analytics models.

The rapid evolution of higher education, marked by mergers, institution closures and fundamental changes in educational models, also requires long-term financial forecasting and planning. CIOs can contribute to this transition by expanding forecasting models, integrating diverse data sources and exploring the application of AI and machine learning for more accurate forecasts over extended periods, up to ten years into the future.

The perspective

Better data and more powerful financial models are essential assets for strengthening the resilience of institutions in the face of the growing complexity of change in higher education. Dynamic models offer valuable agility in planning, enabling decision-makers to quickly adjust projections to incorporate new information.

In the current context, many institutions find themselves at a crossroads. Some are close to financial collapse, others are struggling, while some are actively trying to reinvent and reposition themselves to meet the contemporary and emerging needs of higher education. The leaders of these institutions are faced with difficult choices, and access to reliable data and dynamic financial models is becoming critical to guide them in their strategic decisions.

The challenges facing higher education, such as changing demographics, financial pressures and rapidly evolving educational models, require informed and timely decision-making. Quality financial data and models can serve as a compass, providing leaders with the clarity they need to navigate these tumultuous waters and make decisions that shape the future of their institutions.

The future of higher education depends in large part on leaders' ability to use data and financial models intelligently. By investing in in-depth analysis, consolidating relevant information and adopting dynamic models, institutions can proactively position themselves to meet the challenges ahead. In this way, the digital transformation of financial processes and the implementation of agile decision-making structures become crucial elements for effective and strategic management in an ever-changing educational landscape.

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[31] 2023 Credit and Capital Markets Outlook for Higher Education | Kaufman Hall KaufmanHall (website), January 27, 2023

[32] Out of a total of 50 states, this represents a reduction in 56% of states.

[33] State Support for Higher Ed Continues to Rise. Yet Public Colleges Still Face Headwinds. (chronicle.com) Chronicle of Higher Education, May 25, 2023

In summary

What's your superpower? Institutions facing difficult challenges or competitive situations may be more open to radical change. Large, complex institutions may have many more options and resources to devote to solving a problem. Institutional cultures that favor innovation and change may be able to reason in the broadest terms.

Data doesn't make decisions. Difficult decisions are hard to make because the solutions are not obvious and are hard to accept. Better data can provide a clear picture, particularly of the future, to help propose different paths, explore different scenarios and make informed choices. But ultimately, facility managers - informed by data and strategic thinking - need to use their judgment to make the tough decisions and choose the best paths for their facility.

Act like professionals. It's time to apply business practices to improve modeling and forecasting, for example by conducting landscape analysis, examining supply and demand, and developing sustainability forecasts.

Don't cede leadership to consultants. Consultants can help institutions improve their financial management maturity, but boards and executives must take ownership of the strategy and truly lead the engagement to ensure that the institution will benefit in the future.

Key success factors

When tough choices have to be made, there's no substitute for effective leadership. Leaders must be able to inspire the community, articulate a clear vision of the future, and understand the details, trade-offs, risks and options accurately enough to make the right choices.

An effective leader must be communicative and transparent, sharing critical information with stakeholders while actively listening to their concerns. Trust is fundamental, and leaders must strive to build and maintain this trust within the corporate community.

The ability to make tough decisions, learn from mistakes and adjust course as circumstances change is essential. The leader must be flexible while remaining anchored in the values and mission of the institution.

Leadership must also be collaborative, involving all stakeholders in the decision-making process. Leaders must recognize that the best ideas can emerge from a variety of sources within the community.

Ultimately, an effective leader is one who can inspire, guide and mobilize the community in difficult times, creating a sense of unity and trust to overcome challenges and pursue the institutional mission.

Issue #9 - Balancing budgets - Taking controls of IT cost and vendor management

Credit: Zach Peil / EDUCAUSE © 2023

Costs are rising rather than falling, but technology spending is increasing much faster than usual. Inflation, supply chain disruptions and a buoyant job market are the main causes. IT specialists are particularly in demand. The Dice Tech Salary Report for 2023 revealed that the average technology salary rose by 2.3% in 2022, but increases for the ten fastest-growing jobs ranged from 6.1% to 15.6%[34]. Inflation is slowing down, and this could continue into 2024, but weather disasters as well as global conflict and competition could continue to destabilize supply chains.

The history of exchanges and partnerships between higher education and business is a bumpy one. At the best of times, institutions and companies form lasting partnerships that benefit both parties. Companies benefit from access to students and an emerging market, strengthening their brand and enhancing their reputation by associating with a trusted industry. In some cases, this enables them to work with brilliant academics. In return, institutions can obtain even lower prices than the usual discounts granted to educational institutions or non-profit organizations, as well as direct access to senior corporate executives and experienced engineers, and even the opportunity to influence the development of products and services.

These are not the best of times. Many CIOs still enjoy trusting relationships with various companies. But many of them are also receiving invoices with staggering price increases of 10-20% or more for software licenses, cloud services and other solutions, often at relatively short notice. Having accompanied the rather difficult transition from capital to operating funding, from in-house solutions to SaaS, IaaS and other cloud solutions, CIOs and purchasing managers had, until now, managed a relatively stable renewal process.

Other industries are passing on spending increases to their customers. Not so in higher education. Students, legislators and the media are already irritated and unhappy with the cost of higher education. Now is not the time to seek to impose significant increases in the digital budget without solid guarantees of return on investment.

The perspective

Managers will have a hard time containing the costs of core technologies, but those who do won't have to cut back on services and service levels, or defer new investments. It will be easier for them to maintain staff morale, which can plummet in an atmosphere of budgetary stringency. They will be able to direct institutional leadership towards the use of technology for the benefit and transformation of the institution.

Effective management of technology costs requires a strategic approach. Leaders must understand the true value of each technology service to the institution, evaluate alternatives and implement innovative solutions to optimize costs. This can include consolidating redundant services, negotiating advantageous contracts with suppliers and exploring new technologies that offer better value for money.

Transparent communication is essential. Managers must clearly explain the reasons behind budget decisions, emphasizing the need to maintain a balance between operational efficiency and technological innovation. They should also encourage cross-departmental collaboration to identify innovative solutions that deliver savings while improving services.

Training and professional development are crucial. Investing in building the skills of technology staff can increase operational efficiency and reduce costs in the long term. Managers need to support ongoing training and encourage the acquisition of new, relevant skills to meet the changing needs of the institution.

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[34] Introduction - Tech Salary Report (dice.com)

Finally, continuous monitoring and adjustment are necessary. Executives must put in place mechanisms to track technology costs, regularly analyze results and adjust strategies in line with changing needs and market conditions. This will enable proactive management of technology spending and promote the institution's financial stability.

In summary

Identify your friends. Form partnerships with peer institutions to collectively negotiate prices and service agreements. It's a win-win situation for both parties: institutions have a larger market to offer, and company representatives have to work with a single group rather than several institutions.

Consolidate. Now is the time to eliminate redundant licenses and agreements, to consolidate technology solutions so that the institution has a single point of contact with solution providers. This will simplify management, reduce administrative costs and make it easier to negotiate advantageous contracts.

Negotiate. Work with different solution providers to eliminate waste, find creative financing options and leverage your knowledge of the market. If possible, hire or contract with a vendor management specialist who has expertise in contract negotiations.

Be smart. Calculate the return on investment and total cost of ownership of solutions. Are you really getting value for your investment? Evaluate alternatives: find other companies, work with a consortium, leverage the full value of other solutions you're using, or even create your own solution or go open source.

Key success factors

Taking the time to develop strong partnerships and relationships with solution providers outside the institution can prove beneficial for both CIOs and purchasing departments. These trusting relationships facilitate open dialogue and a mutual understanding of needs and constraints. It is crucial to communicate transparently, sharing strategic objectives and budget constraints. By anticipating long-term technology needs and establishing strategic partnerships, suppliers can better align their services with corporate objectives, offering benefits such as ongoing training or enhanced technical support.

Issue #10 - Adapting to the future - Cultivating institutional agility

Credit: Zach Peil / EDUCAUSE © 2023

Higher education has undergone major transformations over the past fifteen years, largely driven by digital technology. The COVID-19 pandemic accelerated these changes, highlighting the crucial role of campus technology organization in planning and managing institutional change.

The rapid adjustments during the pandemic demonstrated a form of agility, but it is clear that they were mainly reactive. Institutional agility goes beyond emergency reactivity. Leaders need to drive the redesign of institutional processes to make them more agile and prepared for a variety of future circumstances. This involves anticipating scenarios, assessing probabilities and developing appropriate strategies.

Executives increasingly rely on the IT organization, not only for technology services, but also for project management and change management. Technology professionals are key players in promoting institutional agility, with their experience in project management and inter-institutional collaboration.

Faced with an uncertain future, preparation for constant change becomes crucial. Leaders must recognize that change does not follow a fixed timetable, and invest in flexible organizational structures and processes to cultivate sustainable institutional agility.

The perspective

The world is evolving at a faster pace than our institutions can adapt. Cultivating agility involves efforts to anticipate change by actively seeking out the signals and drivers of change, understanding how they might influence the institution. Agile leaders will be better equipped to identify opportunities and challenges quickly, develop solutions iteratively, and act promptly to seize opportunities and meet challenges.

Agile institutions will be better able to solve the many problems facing higher education. They will have the practical ability to initiate and implement the changes needed to remain relevant in a constantly evolving environment. Thus, promoting institutional agility becomes essential to meet today's challenges and prepare higher education for future changes.

In summary

Working in cohesion is crucial. While institutional silos help optimize departmental speed and results, facility-wide agility requires fostering internal collaboration, coordinating efforts and prioritizing the success of the institution as a whole. An ancient proverb sums it up well: "If you want to go fast, go alone; if you want to go far, go together". Today, institutions must master the art of going fast and far together.

It is imperative to follow the same course. A unified vision of success is essential to avoid unnecessary debates about what success means and which directions are most crucial. Clear direction makes it easier to coordinate and align efforts.

The integration of innovation into everyday life is a necessity for agility. It requires time and resources to experiment, to learn from failure without stigma, and to stimulate creativity. It is therefore essential to create an environment that supports innovation, by developing specific processes and budgets, and by integrating innovation into job descriptions and objectives.

Stopping things in the first place is a crucial strategy for freeing up resources. Streamlining the portfolio of services by eliminating those that are duplicative, don't add enough value or aren't essential frees up time and funds for more innovative, goal-aligned initiatives.

Taking care of people is also fundamental to the quest for institutional agility. This process requires energy and optimism. Striking a balance between the urgency of change and supporting staff, ensuring that they can maintain a work-life balance, is essential to overall well-being.

Accelerating governance is a necessity. Prolonged planning and development cycles can hold institutions back in a constantly changing environment. Designing more agile governance processes and a flexible financial framework promotes agility by enabling rapid, relevant adjustments to the institution's changing needs.

Key success factors

Rather than a vast monolithic program of removal and replacement, much of this work will involve efforts based on short sprints. These successive sprints will gradually contribute to strengthening the institution's cultural and operational agility. This iterative approach will enable processes to be fine-tuned, feedback to be gathered and continuous improvements to be made, thus fostering a smoother institutional transformation that is better adapted to the specific needs of the institution. By adopting this method, the institution will not only be able to adapt more rapidly to change, but also develop a resilient and proactive culture, ready to meet future challenges with agility and efficiency.

Honorary issue[35]: AI… Friend or foe - Developing and institutional approach

Credit: Zach Peil / EDUCAUSE © 2023

OpenAI stunned the world in November 2022 with the release of ChatGPT, its web interface for the GPT-3.5 model. Suddenly, a generative AI model trained on massive amounts of content from the internet was accessible to many people and organizations around the world. Since then, we've all been experimenting with use cases and amusing (sometimes frightening) each other with stories about original query results, sinister or stupid answers, and powerful ways of using generative AI to be more productive and innovative.

Things have (already) changed since then. Generative AI is remarkably different from all status quo technologies. It's a technology that invades the mind, so to speak. It brings some of the tacit knowledge of our collective mind and makes it available to all. Although artificial neural networks, the technology that led to large language models and generative AI, are decades old, and although we've been using AI in chatbots and other products for years, ChatGPT has brought this technology within reach of the widest possible audience.

Overnight, everyone has direct access to generative AI. It is tangible and controllable by each and every one of us. We can now much more easily understand the many ways AI can and will change our lives, in transformations that will surpass the impact of other 21st century innovations, from smartphones to social media to cloud computing.

But is AI good or bad, friend or foe? The questions we should be asking are not binary. We need to question: how do we make the best use of AI to benefit the mission of higher education and its constituents? How can we transform higher education to adapt to an AI-driven future?

The perspective

AI makes knowledge and expertise available in a way that didn't exist in the past. It can help people develop rapidly, including those who traditionally have no access to adequate training provision or educational resources. In higher education, AI can potentially help reduce administrative costs if applied to administrative processes, job descriptions, project organization, meeting summaries and tracking, software development, onboarding and training. Pedagogical applications could include redesigning assessment, developing pedagogical content for (basic) courses, and tutoring. These are just the first ideas, and we're almost certain to create more powerful use cases in the months and years to come. AI may not have made the EDUCAUSE Top 10 list for 2024, but 30% of respondents to the TOP10 survey rated this priority with an importance score of 9 or 10 out of 10.

In summary

Be smart and stay smart. What you knew last month about AI is not what you'll need to know next month. Take the time to develop and maintain your understanding of AI. Create or use existing forums to share knowledge and ideas within and outside the institution.

Join management teams. Boards, presidents, faculty and others look to IT managers to advise them on institutional AI strategy. This is your chance to be that integrating CIO.

Dare to dream big. AI is more than a collection of tools for incremental improvements. Work with facility leaders and outside experts to rethink the facility and our industry.

Learn from your students. Students use AI and think about AI in ways that are more elastic, innovative and relevant to student learning and success than the rest of us. Involve them in AI strategy and experiments.

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[35] This year, Susan Grajek proposes an 11th point: AI. Although not included in the TOP10, the panel felt it necessary to include it in the 2024 study, not only in view of its growing importance, but also in view of the panelists' assessment of the importance of this trend.

Beware of hype. There's money to be made with AI, and many companies and consultants will tend to oversell their "AI-driven" products and services.

Key success factors

Institutions with "organizational capital" - those that have already invested in the cultural, human and technological capabilities essential to effective global digital transformation - will be best placed to adapt to, mitigate the risks of and benefit from AI. Some of them will have the resources to carry out these efforts. Other institutions - smaller or less well-resourced, but nonetheless agile, with digital transformation underway - can benefit from these "early adopters" and become fast followers.

By working collaboratively, institutions can share best practices, experiences and resources to maximize the benefits of AI. Strategic partnerships between institutions, industry and other stakeholders can foster successful AI adoption and enable institutions to anticipate and respond to emerging challenges.

It is essential to develop an organizational culture that encourages innovation, adaptability and collaboration. Institutions must support ongoing staff training to build the skills needed to use AI effectively and ensure a smooth transition to this new digital environment. This will help create a skilled workforce able to take advantage of the opportunities offered by AI.

In summary, the successful adoption of AI in higher education depends on preparation, collaboration and organizational culture. Institutions that invest in these aspects will be better positioned to navigate the AI era and deliver enhanced educational experiences.

Conclusion

In 2024, higher education leaders are striving to help their institutions become more resilient in order to meet the major challenges on the horizon. The EDUCAUSE Institutional Resilience Working Group defines institutional resilience in higher education as "the ability to anticipate, respond and adapt to rapidly changing circumstances in ways that maximize opportunities and minimize the consequences of unforeseen events". The working group adds: "More resilient institutions anticipate the needs of stakeholders to advance the institution's mission and purpose, foster collaboration and improve equity by involving all relevant communities and resource ecosystems".

For several years, EDUCAUSE has been talking about digital transformation (Dx) and how a series of deep, coordinated changes in culture, workforce and technology can enable new educational and operational models and transform our institutions, strategic directions and value proposition. Much of this work has focused on innovation and initiatives to attract new students or funding sources, offer new degrees, expand to new physical or digital campuses, and help more students earn degrees more affordably. The notion of improvement is implicit in all this work.

But risk is becoming a permanently more important part of life. Our world is changing rapidly and dramatically. This change fuels innovation, but also risk. Digital transformation shouldn't just be about improving business models and advancing missions; it can also be driven by risk reduction. Institutional resilience has been an element holding back digital transformation, and this needs to change. EDUCAUSE is working to integrate the concepts of institutional resilience into its digital transformation resources. This will enable higher education leaders to build on current Dx initiatives rather than trying to figure out how to take on another "big new thing" when they're already overwhelmed.

Higher education remains the driving force behind individual success. In the United States, higher education graduates experience much lower unemployment and poverty rates than their counterparts whose highest diploma is a bachelor's degree. They also earn, on average, $1.2 million more over their lifetime. But the net wealth resulting from this income premium is eroded when students are saddled with student debt. Even worse off are the millions of people who, even with student loans, were unable to earn the degrees that would have given them access to higher-paying jobs. In a recent article, Paul Tough looked at this situation from the perspective of net wealth, rather than income, and concluded that: "For most people, the new economics of higher education make enrolling in college a risky gamble[36]"

Yet Tough's article concludes with a forecast of increasing job opportunities for higher education graduates in the coming years, and a shortage of between 6.5 and 8.5 million graduates available to fill these jobs. Higher education qualifications remain essential to the health of our economy. We need to ensure that they also contribute to the economic health of individuals. But to do this, we need to change things. We need to reduce the financial burden on students and ensure that every student can graduate. For years, institutional change has focused on innovation. It's time to learn to adapt to a world where risks proliferate, both for students and institutions. It's time to build institutional resilience and, in so doing, contribute to the success of every student. In 2024, higher education leaders will use data and technology to increase mission, operational and financial resilience. Don't be left behind.

[36] Americans Are Losing Faith in the Value of College. Whose Fault Is That? - The New York Times (nytimes.com) New York Times Magazine, September 5, 2023 -paid access-

On-Site Visits

Frédéric Habert & John Augeri, PhD - French Delegation / Shoji Kajita, PhD, Takuto Matsuhashi & Tatsuya Tohyama - Japanese Delegation

Visit to Harper College

Presentation

Harper College is an institution of higher education located in Palatine, 40 km from Chicago. Founded in 1965 and opened in 1967, the college takes its name from William Rainey Harper, an educator and first president of the University of Chicago. Harper College offers a diverse range of academic programs, including university degrees, certificates and professional training programs, mostly in 2 years and at moderate cost. The 13,500 (20,000 with evening classes) students can choose from a wide selection of fields of study, ranging from the humanities to the applied sciences. There are 640 teaching staff and 810 administrative staff (full-time and part-time). The community college organizes community events, volunteer activities and partnerships with local businesses to strengthen ties between the institution and the community.

Harper College offers a wide range of student services, including academic advising, health services, extracurricular activities and financial aid resources to support students throughout their educational journey. Many Harper College students choose to continue their studies at universities after completing their programs. The college facilitates this process by collaborating with various institutions to simplify transfers, including Depaul University, Roosevelt University, Northern Illinois University and Southern Illinois University. In addition to traditional academic programs, Harper College offers continuing education and professional development opportunities for adults seeking to acquire new skills or change careers. Finally, it values diversity and inclusion by striving to create a welcoming environment for students from all backgrounds and by offering scholarships.

Digital Strategy

Riaz Yussuff has been CIO at Harper College for the past 2 years. His department has a staff of 85, 20 student employees and 20 contractors. The department favors innovation with its $17m budget. In the area of cyber security, they use Ivanti to deploy patches and raise staff awareness with annual training. They have had problems with phishing on student e-mails (attempted scams). They also use a VPN for certain applications. Overall, they encourage BYOD (using personal equipment) and offer 3,000 Chromebooks on loan to the library.

In terms of strategy, they have set up a digital project management process with committees at different levels (users, decision-makers, IT department) to involve all stakeholders. This makes it possible to define a 4-year strategic plan, as well as a digital roadmap for this period. For applications, they host their Active Directory and the rest is in the Cloud, but as if it were on premise. They use Fusion for SaaS management, Blackboard as a teaching platform with Analog (remote monitoring system) for online exams (especially during the pandemic). They have 7 Hyflex classrooms at $25,000 each and are planning 14 in the future. They use Webex, but can also use Zoom, Teams and Panopto solutions. These rooms are mainly used to record lessons, as the majority of courses are face-to-face. However, some pioneering teachers use them to develop their innovative practices. Although they do not offer training in digital tools for students, they do have access to a helpdesk and tutorials, as well as a Chatbot in their CRM (Salesforce). In future, the student portal will be migrated from Banner to Elusion.

Visit to University of Chicago

Presentation

This university was founded in 1890 by John D. Rockfeller. It is a private, non-profit institution. It has around 16,000 students, with a different distribution from the others, as there are fewer undergraduates (7,000) than masters (10,500). There are 2,800 teaching staff and 16,000 personnel, including the university hospital. It is the most expensive university in the USA, with tuition fees of $60,000 and up to $100,000 for Law. Its operating costs are covered by tuition fees and donations. The acceptance rate for applicants is 7%.

It is the site of the 1st atomic reactor (Fermi), and has 99 Nobel Prize winners, notably in chemistry, physics, economics and medicine. It has a strong research focus, with 9 campuses worldwide (including one in Paris). It is regularly ranked among the world's top 10 universities, and 6th in the USA. The issue of higher education and its cost is of strategic importance. Student debt is a problem, but they offer scholarships and their students have a lower debt ratio than others in the region. Finally, competition from online courses is disrupting the lower end of the education market, but not affecting them.

Digital Strategy

The university's operations are highly decentralized. The central IT department employs 275 people, and there are a total of 815 IT specialists in the faculties. They share Peoplesoft tools, as well as in-house developments, but the faculties also have their own software. The IT Director, Kevin Boyd, proposes solutions for everything, but nothing is imposed on the various departments. There are 3 Data Centers (with a dedicated team of 6 people) with 55 petabytes of data and a 400 Gbps network (notably to remote laboratories).

The main challenge in the ICT field is security (with Chinese threats in particular), and they have defined a procedure for storing research data, which is mandatory for sensitive data. Furthermore, data management is an important issue in keeping pace with the ever-increasing amount of data to be stored, analyzed and manipulated. Given the diversity of fields (physics, etc.), current tools are no longer sufficient for analysis. As far as administration is concerned, they use the cloud (finance, alumni,...), but also Office 365 , and Gmail for students. They also have a Privacy Officer in charge of personal data protection. An effort is also being made to provide high-performance IT resources with a good level of support for research.

Short-term projects include the transformation of the financial management system (move to Oracle Cloud Finance), accelerated renovation of wired and wireless networks, identity management evolution (replacement of Shibboleth), generative Artificial Intelligence and user experience enhancement. In the field of education, and in particular online courses, they mainly practice hybridization and have few distance courses. Zoom is used for continuing education on Saturdays. Generally speaking, students want to be in contact with teachers on campus. They use Canvas as their teaching platform. It is used for on-campus courses, continuing education and working groups. According to their data, 80% of courses use Canvas (the percentage is higher for undergraduates). But they don't yet know how to discriminate between types of use, so they can then provide support and advice. Use is based on volunteer teachers, and there are no standard courses or templates to follow. Generally speaking, they aim to simplify the student experience in terms of educational information systems. They use Panopto (video capture) for some flipped classroom courses (based on videos and quizzes) and find that this approach is more interesting and more successful, even if it requires more work. For students with difficulties, or those who are not native English speakers, this means they can view the course at will.

The leadership provided by Mr. Kevin Boyd is well-described in the IT Strategic Plan. In special, he focused on providing trusted services rather than developing brand-new services. It is underpinned by his corporate background and the CIO experiences at School of Business, University of Chicago.

Learning Spaces

In terms of Learning Spaces, the University of Chicago is demonstrating a proactive strategy, which nevertheless had to take into account the historic character of several of its buildings. While this aspect may have presented constraints in terms of architectural renovation or transformation, the fact remains that a variety of spaces are offered to students: formal (renovated Classrooms and Lecture Theaters), informal (Learning Commons-type) and transitional. Some of these are based on furniture that allows flexibility in spatial configuration, particularly appreciated in group activities.

Furthermore, several of these spaces have evolved to adapt to new trends in learning practices, notably around hybridization and HyFlex. In particular, they are equipped with A/V equipment to enable continuous communication and exchanges with remote students. These include multi-directional ceiling microphones (tile-shaped), or a device for detecting the position of the teacher in front of the blackboard in a lecture hall (in the form of sensitive mats) enabling automation of the video capture zone during the lecture, and thus optimization of the content generated.

The governance and the operation of these Learning Spaces, in line with IT issues, is decentralized. However, within the same structure or department, standardization of equipment and procedures is applied to optimize maintenance and facilitate use by Faculty.

Datacenter

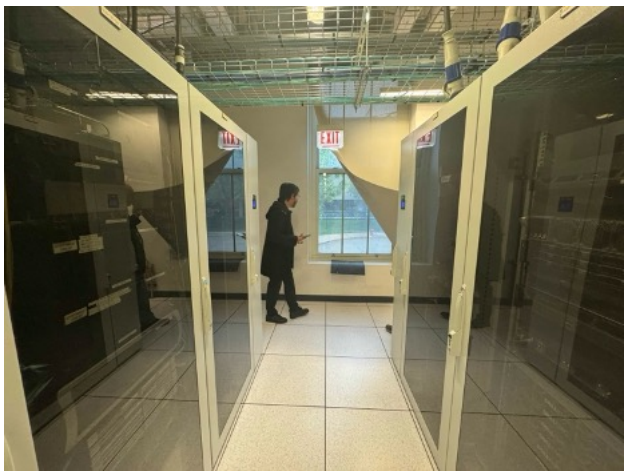
The University of Chicago operates two types of data centers as facilities for operating and managing information systems.

The data center used primarily for mission-critical systems related to university operations is equipped with 80 standard 19-inch racks (42U), each capable of using up to 15 kW of power. On the other side, the data center used mainly for research systems is equipped with 147 standard 19-inch racks (42U) and can use up to 25 kW of power per rack. The data center for research systems is also equipped with water-cooling facilities for HPC and machine learning computers, which allows the equipment to operate more efficiently.

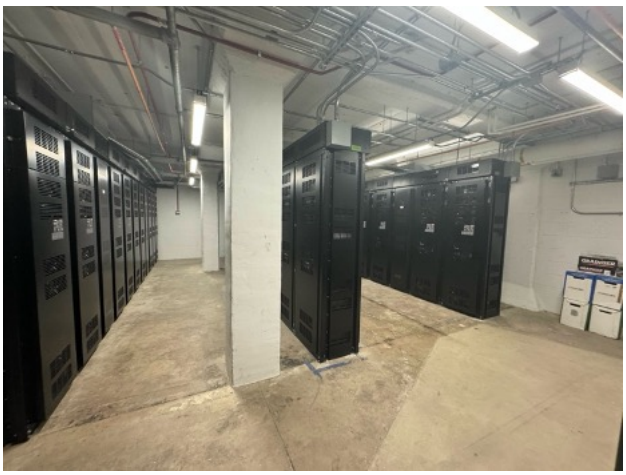
In addition, the power used by the server equipment is supplied in both data centers by UPSs that support CVCF (constant voltage and frequency). This enables the UPS system to supply power for up to 20 minutes in the event of a power outage, even in an environment where servers use 100% of the 2.5MW, the maximum power available in both data centers, contributing to 24/7/365 operation of the information systems.

In addition, some of the racks are sealed, and air conditioning equipment installed between the racks blows cool air from the sides to cool the equipment. The system is designed to cool equipment with the minimum amount of power required by collecting warm air at the back of the rack and creating an airflow that prevents cold and warm air from leaking out.

Note that in data centers used for mission-critical systems related to university operations, large windows are installed if the air conditioning system cannot operate due to a breakdown or unintended power outage. When designing data centers, windows are generally avoided for safety and temperature/humidity stabilization reasons. However, police regularly and frequently patrol the data center, and bulletproof window glass that cannot be easily broken is used to make the risk acceptable. Regarding temperature and humidity stabilization, as mentioned above, the use of sealed racks makes it possible to install windows as there is no need to stabilize the temperature and humidity in the data center.



A look inside the data center



UPSs that can supply 2.5MW of power for 20 min

Science DMZ

The University of Chicago has received a grant, and it is providing the Science DMZ, a network infrastructure built specially for researchers in data-intensive science. The Science DMZ is a special network designed for efficient high-performance computing and large-volume research data transfer, unlike a typical campus network. It has a dedicated server (data transfer node) that specializes in data transfer and is designed to efficiently handle high-speed data transfer, as well as to relax restrictions imposed by security policies to prioritize data transfer performance. This Science DMZ includes support for VC (Virtual Circuit), SDN (Software-Defined-Networking), and 100 Gbps Ethernet.

While enabling effective high-speed data transfer, the university has also been mindful of security and has taken several steps to make the extensive campus network more secure. One of these measures has been to restrict all external remote access protocols from outside to the university, and it has built in such a way that remote access is not possible without the use of a VPN and two-factor authentication. This response has caused some researchers to complain that they no longer have direct access to the computers in their laboratories from the outside as before, but only for legitimate reasons, such as network research, for example, by separately preparing a low-speed DMZ for research that does not require a VPN using two-factor authentication, this has been successfully handled without increasing the risk to the university as a whole.

The Science DMZ is a very useful network for research projects dealing with big data and collaborative research requiring large-volume data sharing with remote locations and is expected to continue to contribute to the efficiency data linkage with other research institutions in this university's academic research and improve the productivity of researchers.

Visit to Oakton Community College

Presentation

Oakton College is an institution of higher education located 34 kilometers from Chicago. Founded in 1969 to meet the growing higher education needs of Chicago's north suburban community. This community college offers a variety of academic and technical programs ranging from general studies to specialized technical programs and professional development courses, usually in 2 years. The 7,400 students can choose from a variety of fields of study, including the liberal arts, sciences, management, health and industrial production activities, with courses in nursing and truck driving, for example. It maintains partnerships with local universities and businesses, offering students transfer opportunities (notably Northwestern University) and employment after graduation. Oakton College primarily targets students from disadvantaged backgrounds in the surrounding area (tuition fees are more expensive for those from outside the district) and those from ethnic minorities, in order to promote social mobility. The economic model is based on tuition fees (1/3), a state subsidy (10%) and the remainder financed by the equivalent of local housing taxes. It should be noted that enrolments have been declining since 2009 (with 12,000 enrolled) due to demographic trends, even though there has been a 6% increase in registrations since the end of the pandemic.

Digital Strategy

The school IT department, headed by Prashant Shinde, has 40 people, with a budget equivalent to 11% of that of the community college. In the area of security, they have had no problems internally, but 2 of their suppliers have been affected. 11% of the IT department's budget is devoted to security, including a simulated attack by a service provider every year, which enables them to assess their vulnerability and decide on staff training actions. However, their modest size in the American higher education sector does not make them particularly vulnerable to attacks from unfriendly countries.

The use of data is a strategic issue for the management and responsiveness of the institution, and in particular for the implementation and support of their strategic program up to 2030. The Data Warehouse will provide the means to measure this objective in a way that is accessible to staff. One of the applications is to measure equity (by collecting information on ethnicity, age, gender, etc.) in order to provide personalized access to training (adapted course content and assessment). This should also help to ensure that timetables are adapted to students' needs, and to optimize the funds used for the success of foreign students ($1M/year). Equity initiatives include teacher training and the recruitment of tutors to keep students motivated (especially black students).

In the field of pedagogical engineering, they use D2L on the cloud as a pedagogical platform (courses, information and grades), Screenpal to create videos and Sharestream to broadcast them, all accessible from their D2L. Support is available around the clock with a virtual assistant, or on a more limited basis via chat/phone with an agent. They broadcast content online, but are confronted with the disparity of access possibilities for their students.

ELI Annual Meeting 2023

John Augeri, PhD - French Delegation

Context

ELI Annual Meeting, the second EDUCAUSE conference held annually in May or June over three days, is, as its title suggests, focused on issues related to Teaching and Learning practices. Organized by EDUCAUSE Learning Initiative (ELI)[37], it is a smaller event than the EDUCAUSE Annual Conference held in October, which it complements (this year 300 participants compared to 8000). However, this event benefits from a well-established image with audiences whose profiles may be different and more specific than those of the Annual Conference (Raculty/Researchers, Heads of Departments, ICT and related services Directors, Digital Vice-Presidents, Teaching Vice-Presidents, Instructional Designers), and who also devote real loyalty to it through regular attendance.

In addition to its Annual Meeting, ELI is also directly involved in several publications: the annual *Horizon Report | Teaching and Learning Edition*[38] (for which several members of the EDUCAUSE French Delegation are regularly serving in the panel of experts who contribute to the perspectives addressed), the *2023 Students and Technology Report: Flexibility, Choice, and Equity in the Student Experience*[39], the *2023 Faculty and Technology Report: A First Look at Teaching Preferences since the Pandemic*[40] (to which the article *Hybridizations & HyFlex* returns at length) or the *2023 EDUCAUSE Horizon Action Plan: Generative AI*[41].

While the 2023 edition of this report is the first one to include a formal coverage of the event, several members of the EDUCAUSE French Delegation have already participated and/or presented posters or sessions at various ELI Annual Meetings. It should also be noted that the author of this article has been selected as member of the Program Committee for the 2023 and 2024 editions. Finally, ELI Annual Meeting has already been mentioned directly or indirectly in previous editions of this report, for example in 2022 in Aurélien Saïdi's article *The Technician and the Pedagogue: a Teacher's Subjective View on the conference*.

This article reviews the main topics covered during the 2023 edition of ELI Annual Meeting, illustrating them with a selection of sessions and posters, before concluding with a mention of the articulation with the EDUCAUSE Annual Conference.

[37] A branch of EDUCAUSE, since renamed *Teaching and Learning Program*

[38] https://library.educause.edu/resources/2021/2/horizon-reports

[39] https://library.educause.edu/resources/2023/8/2023-students-and-technology-report-flexibility-choice-and-equity-in-the-student-experience

[40] https://library.educause.edu/resources/2023/8/2023-faculty-and-technology-report-a-first-look-at-teaching-preferences-since-the-pandemic

[41] https://library.educause.edu/resources/2023/9/2023-educause-horizon-action-plan-generative-ai

Structure and main topics of the 2023 edition

ELI Annual Meeting 2023 was held from June 7 to 9, 2023 in Anaheim, California, not far from the Convention Center which has itself hosted the EDUCAUSE Annual Conference on several occasions. As usual, and following a similar pattern to EDUCAUSE Annual Conferences, this event was structured around opening and closing plenary sessions, sessions based on the tracks listed below, a poster area, and an exhibit hall.

The theme of this 2023 edition was *Together Towards Tomorrow: Shaping the Future of Teaching & Learning*. Logically, it focused in particular on new practices arising from the pandemic, exploring - and questioning - their future(s). The various tracks of the conference, established by the program committee, were as follows:

Equity, Mindset & Practice: Voluntary reconsideration by teachers, staff and stakeholders of practices, policies and initiatives to promote success for all students.

The Future of Educational Technology: Integrating technologies into physical and digital environments. Political, operational, practical and ethical dimensions.

Fostering the Practice & Profession of Teaching: Teacher training and change management for the implementation of redesigned courses in multiple modalities.

Innovative Learning Environments & The Future of Higher Education: Defining a new normal for Learning Environments from Hybrid and HyFlex perspectives.

Advancing Student Support & Success: Holistic consideration of students' cognitive, emotional and psychosocial needs for success.

Examples of sessions and posters

Among the variations on the tracks listed above, multimodality (Hybrid and HyFlex configurations, synchronous/asynchronous) and Faculty Development were the focus of sessions representative of the trends in these areas.

Online, In-Person or Hybrid ? Yes ! Horizon Report Exemplar Stories (EDUCAUSE, University of Massachusetts Amherst, Foothill-DeAnza Community College District, California State University San Bernadino)

This session, the title of which reflects one of the items in the EDUCAUSE Top-10 issues 2023 (also mentioned in the previous edition of this report), looked at various aspects of the implementation of Hybrid and HyFlex configurations. To this end, the 2023 edition of the *Horizon Report | Teaching and Learning Edition* was evoked in relation to the presence of HyFlex in the list of perspectives identified as key ones in terms of technologies and practices in Higher Education. On this basis, three significant case studies were presented. University of Massachusetts Amherst (through its LRC / Learning Resource Center[42]) presented its HyFlex SI (Supplemental Instruction) project, which involved redefining its teaching system, with particular emphasis on the use of the LMS. California State University San Bernardino also talked about its VR Meet XR Meet the Matrix project, which integrates XR and artificial intelligence components in a multimodal configuration. Foothill-DeAnza Community College District presented its Humanizing Online STEM Classes initiative, which explores ways of creating welcoming, supportive and inclusive distance learning environments, based on inter-university cooperation[43].

[42] https://www.umass.edu/lrc/

[43] https://humanizeol.org/about/

Active Flex (Athens State University)

This presentation focused on Athens State University's response to a decline in enrollment following the pandemic. The Active Flex project, in this case, aims to remove the barriers students may face in accessing courses, make them more engaging, and create closer connections with campus life. For the institution, Active Flex represents an evolution of the HyFlex concept, with a particular focus on Active Learning and collaborative working. The team in charge of Active Flex presented the main thrusts of the instructional design implemented in the development of courses (in particular, creation of high-quality asynchronous content, development of resources for teachers), and in increasing the flexibility of their access (in particular, coordination of schedules, automation of tasks). The presentation also discussed the results of this approach in terms of perception, and therefore potential for student retention: 91% of participants rated the format positively, and 90% as more engaging.

Beyond Teaching Remotely, Let's Go Fully Asynchronous (University of San Francisco)

University of San Francisco presented a 100% asynchronous distance learning initiative. Implemented on modules of different disciplines offered during the summer, it relied on a selection of teachers who benefited from structured coaching from ITS[44] as well as support from the institution, and on a course design process taking place over five months. Since 2020, 25 teachers have been involved in setting up 21 courses. The growth in enrollment has been very significant: from 160 in 2020, 607 were registered in 2023. It's also worth noting that qualitative surveys carried out on these modules have shown that they are at least as well received - if not better - than traditional courses, in terms of aspects such as instructional design, teaching practice, student engagement and learning outcomes. Nevertheless, the presenters stressed that design planning, teacher workload, understanding of the very idea of such a teaching modality, and technological limitations remain challenges to be taken into account.

Walking the Walk: Modeling Tech-Forward, Culturally-Responsive Practices in Faculty Training (Minnesota State University)

Minnesota State University, for its part, addressed the issue of DEI[45] in teacher training, with a session describing the implementation of *Faculty Learning Communities* (FLC). Surveys, the results of which were also presented as part of this session, validated the effectiveness of this format in addressing points of attention relating to pedagogical practices themselves, as well as to uses of technology. An open book entitled *Faculty Learning Communities for Culturally Responsive Teaching*, written by one of the people in charge of this session and recounting the FLC experience, is now available[46].

A number of posters were also presented. The University of Chicago, which was also the subject of one of the EDUCAUSE French Delegation's on-site visits this year[47], presented its Learning Technology Group, which structures and coordinates actions around the institution's LMS. In its poster Teaching with Analytics to improve Student Success: Review, Amend, Apply, Indiana University focused on the effective use of Learning Analytics such as LMS behavior, video viewing and e-book reading to improve student success. In the poster Distinguished Course Repository, Kennesaw State University presented its approach to building a collection of excellent courses in a variety of formats, and promoting them internally and externally. University of Maryland, Baltimore County presented its initiatives to train students in digital uses and culture (a *Digital Tech Credential*) in its poster The Future of Tech Talent; How UMBC is preparing Students for the Digital Age. Lastly, our Dutch colleagues from SURF looked at scenarios and trends for the Future Campus, How could the future of the campus look like in 2040 ?

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[44] Instructional Design Team

[45] *DEI* (*Diversity, Equity and Inclusion)*, which has been addressed in several editions of the Conference and of this report.

[46] https://minnstate.pressbooks.pub/crtflc/

[47] See the article *On-Side Visits* of this report

Comments and positioning in relation to EDUCAUSE Annual Conference

The 2023 edition of the ELI Annual Meeting has not departed from the vocation of this conference, by clearly focusing on themes relating to teaching and learning practices, treating them - at least for part of the sessions - from a forward-looking angle. This approach is all the more appropriate given that the aspects concerned are still in a post-pandemic phase, with tensions between a return to the pre-COVID situation, and the perpetuation of practices born of this situation. Some of the latter, in fact, claim to foreshadow a new normal in the middle to long-term, raising fundamental strategic, operational, technological and even conceptual questions that are potentially restructuring for Higher Education institutions.

While these changes are still underway on a global scale, some US institutions are already providing very concrete illustrations, in the form of actual achievements that were presented at the conference. Flexibility in access to teaching - under the name of HyFlex or others - optimized asynchronous learning, and other developments in Faculty Development are just some of the key themes discussed, reflecting their growing integration into academic and institutional strategies[48].

Participation in the EDUCAUSE Annual Conference in October, four months after the ELI Annual Meeting, confirmed the complementary nature of the two events. Given their respective thematic scopes, participants can choose to attend one or both, depending on their profile and expectations. Once again, the ELI Annual Meeting stands out for its focus on questions and issues relating to technology-enhanced pedagogical practices, rather than on the technology itself.

Finally, it should be noted that a few days after the EDUCAUSE Annual Conference was held, it was announced that the next ELI Annual Meeting would be held in full distance mode.

[48] See the articles *Learning Spaces* and *Hybridizations & HyFlex* of this report, which address these trends

Learning Spaces

John Augeri, PhD - French Delegation

Meeting of the Learning Space Design Community Group

The Annual Conference in Chicago was the occasion to hold the traditional meeting of the EDUCAUSE *Learning Space Design Community Group*. Once again, the meeting provided an opportunity to exchange views on topical issues and challenges affecting Learning Spaces. Among these, three were the focus of particular discussion.

Governance

The question of governance, and in particular of the entity responsible for implementing Learning Spaces projects, remains central in many institutions, and even more so in the context of industrialization. While it's natural for such projects to require cross-functional involvement at institutional level (typically: IT, A/V and ICT department, facilities, etc.), the latter can involve players who are certainly complementary, but who retain a degree of independence (operational and decision-making) between themselves. Consequently, the question of an identifiable (and identified) entry point for any question relating to Learning Spaces may prove to be an issue. Discussions have underlined the importance of a coordinating and supporting entity, which can take the form of a steering committee to build bridges (as some institutions have mentioned in relation to their experience), or a single project manager (whose job title may itself be an issue).

Data-driven approach, assessment and Learning Analytics

The industrialization, or even generalization, of Learning Spaces depends not only on conceptual and equipment issues, but also on the validation of the actual transformations they can bring about in teaching and learning practices. Metrics and evaluation are thus increasingly becoming fundamental issues for these new spaces[49]. The Learning Spaces Design Community Group meeting addressed this issue from the angle of data-driven decision, dashboards adapted to the different spaces, or Learning Analytics applied to multimodal and HyFlex configurations[50].

A/V equipment and adaptation to HyFlex configurations

As a direct consequence of the pandemic and its prospects in terms of hybridization, Learning Spaces need to adapt technologically in order to host activities that meet these configurations. A/V equipment is a major component of these developments. Discussions at the meeting underlined the importance of shorter development cycles in today's A/V world[51]. They also returned to the perspective of the HyFlex, which - while representing a potentially strategic challenge for certain institutions[52] - is by its very nature directly dependent on A/V equipment, and therefore intimately linked to issues concerning it. It should also be noted that these aspects are all the more important when it comes to standardizing the design and equipment of Learning Spaces, which should be promoted as part of an institutional policy.

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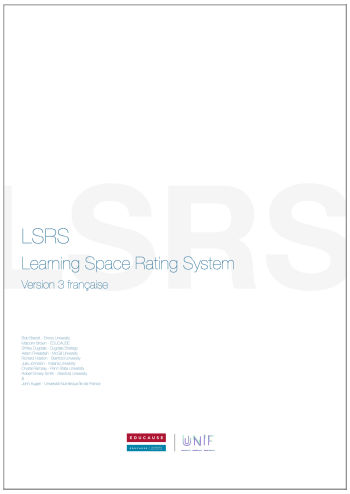
[49] See the part *Trends and Perspectives of the Learning Spaces* below in this article

[50] See the part *Trends and Perspectives of the Learning Spaces* below in this article

[51] See the part *Trends and Perspectives of the Learning Spaces* below in this article, and the article *Hybridizations & HyFlex*

[52] Here again, see the article *Hybridizations & HyFlex*

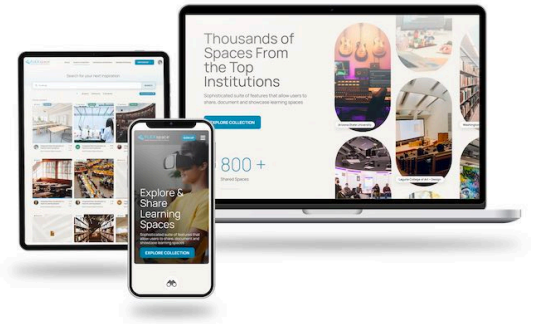
Lastly, the meeting was an opportunity to recall the availability of V3 of EDUCAUSE's Learning Space Rating System[53] (LSRS). This tool, which has already been presented on several occasions in previous editions of this report, offers an evaluation framework particularly suited to Active Learning Classrooms, but which can also be used as a best practice guide for a wider spectrum of Learning Spaces. It consists of a rating sheet with a set of criteria that reflect its overall approach to Learning Spaces. The first part of the rating sheet is devoted to questions of institutional context, planning and support, while the second focuses on the possibilities and characteristics of the various spaces: environmental quality, layout and furniture, technology and tools, and inclusion. Linked to the rating sheet is a guide to each of the criteria, setting out how to validate them using practical, concrete examples. French and Japanese translations of the LSRS are available[54].



FLEXspace 3.0

The FLEXspace project, best known for its database of Learning Spaces (6,000 users from 1,400 institutions in 70 countries), and regularly mentioned in previous editions of this report, took advantage of the Chicago conference to present some major updates.

FLEXspace will be upgraded to V3. Changes in this new version include a complete redesign of the interface (with special consideration for mobile terminals), the possibility of discussions at record level, and reorganized idea walls to encourage collaboration. There's also an optimized global search feature and a simplified process for registering new spaces. FLEXspace V3 will be available in early 2024.



[53] https://www.educause.edu/focus-areas-and-initiatives/teaching-and-learning-program/initiatives/learning-space-rating-system

[54] https://www.educause.edu/focus-areas-and-initiatives/teaching-and-learning-program/initiatives/learning-space-rating-system

Trends and Perspectives of the Learning Spaces

The EDUCAUSE Annual Conference 2024 program included a forward-looking session entitled *Future Trends in Learning Environments*. Moderated by Lisa Stephens (SUNY/UB & FLEXspace), Helen Chu (Stanford), Joe Way (UCLA & HETMA), Rebecca Frazee (UCSF & FLEXspace) and the author of this article, it proposed a discussion around major trends and perspectives related to learning environments (physical and digital) in the post-COVID era.

Equity and Inclusion in the Design

Stanford presented its strategic plan *Stanford Classrooms Reimagined*, scheduled on ten years, and which aims to integrate a student-centered and inclusive approach into the renovation of the institution facilities (60 rooms have already been updated for summer 2021). This plan is based on the involvement of numerous players within the institution, and on the implementation of standards for A/V, furniture and design, control systems and support. It also pays particular attention to the mental health issues that began to affect students during the pandemic, and to accessibility issues more generally. Its aim is to promote equity and inclusion[55] (taking into account ADA standards), well-being and integrative learning. These principles are reflected, for example, in adjustable-height tables located as close as possible to the entrance to the room, in seminar rooms whose size ensures that everyone has a place at the table, in the installation of microphones within the spaces to ensure that distance-learning students can hear what everyone is saying, in the installation of specialized listening systems, and in the design of spaces that support small-group activities and collaboration to promote a sense of belonging to a community of learners.

With courtesy of Stanford Learning Technologies & Spaces (https://lts.stanford.edu/)

This part of the session went beyond the Stanford case, to consider more generally the potentially segmenting factor that A/V can represent in a world of Higher Education in which remote and hybrid training is set to become widespread, with on one side the institutions investing in high-quality and high-performance equipment, potentially contributing directly and indirectly to their attractiveness, and on the other side the other ones[56].

Measuring results in Learning Spaces

The presentation then focused on the issue of evaluation, and more specifically on the methods used to measure the results obtained in Learning Spaces. Beyond questions of design and furniture and/or technological equipment, which have historically focused most of the attention, the assessment of Learning Spaces is increasingly being taken into account through the implementation of quantitative and qualitative indicators aimed at qualifying the reality and nature of the transformation of teaching and learning practices.

The research carried out by the *Mosaic Initiative* at Indiana University[57] was mentioned in particular. Some of the protocols implemented incorporate technologies such as hemispherical ceiling cameras coupled with motion detection systems (e.g. positioning tags worn by users), and sound level meters. The results they generate can be represented in the form of heatmap or sound diagrams (see examples below), to be connected to the various teaching phases of the course in which the recordings were made.

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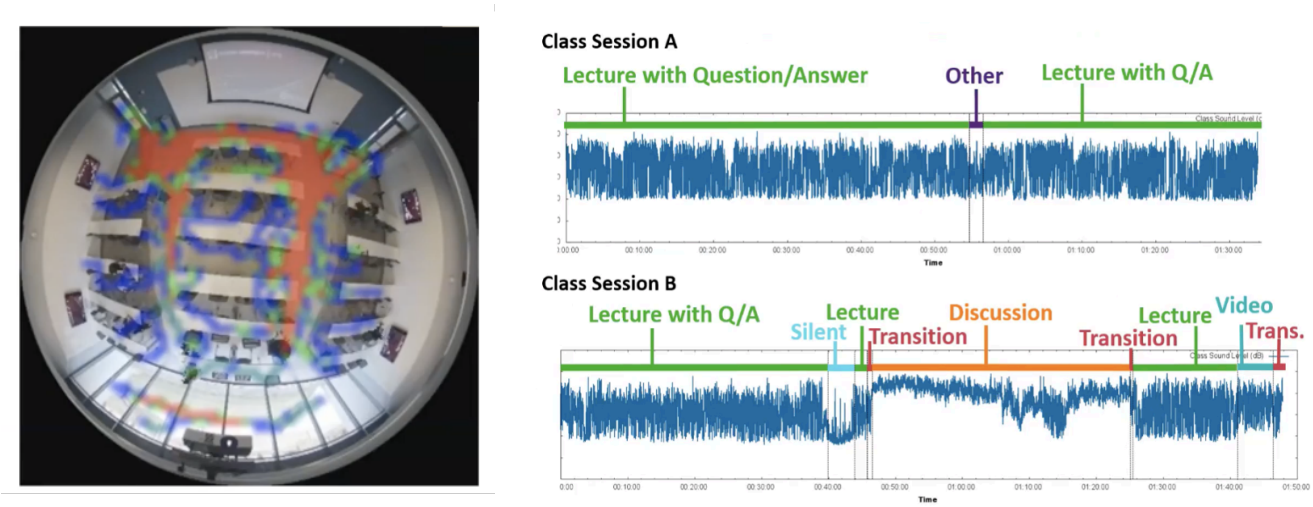
[55] See the article about this topic in the 2022 edition of this report

[56] See the interview of Joe Way about this topic, published in the AVNetwork website: https://www.avnetwork.com/news/is-pro-av-the-new-divide-in-education

[57] A webinar held on February 23rd 2023 on this topic is available at the following URL: https://iu.mediaspace.kaltura.com/media/t/1_8ek18ply

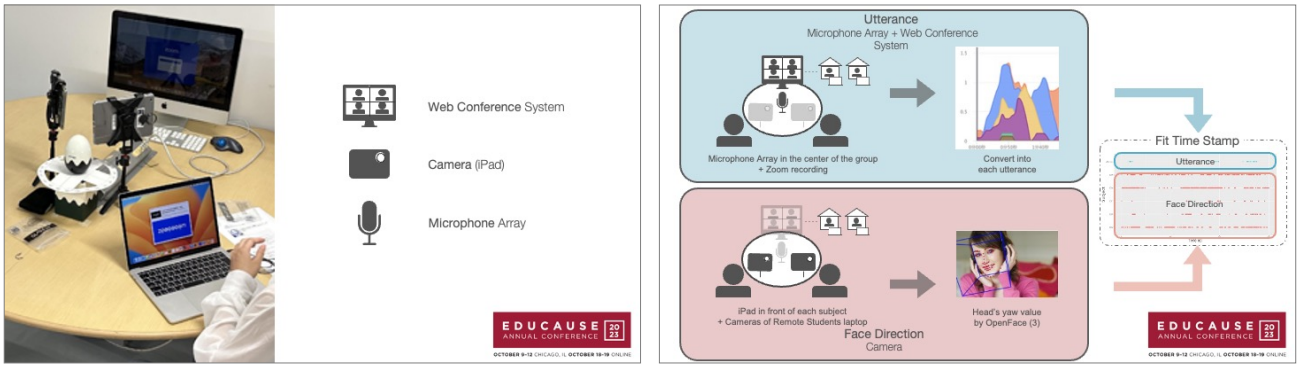


Examples of results obtained from the research carried out by Mosaic Initiative, Indiana University (courtesy of the authors)

Learning Analytics in multimodal configurations

Following on from the presentation on the measurement of results obtained in Learning Spaces, the session also focused on the special case of multimodal configurations, and in particular those simultaneously involving face-to-face students (potentially within Learning Spaces) and others in distance learning. This multimodality, which can be part of co-modal or HyFlex configurations, regularly and logically raises the question of equity between different groups of students, and their respective engagement in learning activities. On this last point, the implementation of Learning Analytics through a specific protocol can provide a relevant basis for the evaluation - and steering - of innovative pedagogical systems, and thus possibly validate their sustainability.

Sophia University (Tokyo, Japan) initiative in this field[58] was presented. Its aim is to evaluate and compare the active involvement of two groups of students (one face-to-face, the other synchronous distance learning), using a body posture detection system (head orientation) and a voice recording system based on mobile terminal cameras and multi-directional microphones. The initial results of this experiment, in progress at the time of the Chicago conference, will be published.



Protocol of the research carried out by Sophia University (courtesy of the authors)

[58] And with whom the author of this article had the opportunity to collaborate.

Hybridizations & HyFlex

John Augeri, PhD - French Delegation

The hybridization of courses and the prospects for this are certainly one of the most notable consequences of the pandemic on teaching and learning practices. Logically dealt with on a regular basis at the various EDUCAUSE conferences since 2020, they were once again addressed at the Annual Conference in Chicago[59], mainly from two angles that this article proposes to relate: the publication of two reports dealing with the practices of teachers and students, and a pre-conference workshop specifically focused on HyFlex. It should be added that these same themes were also addressed as part of the *Future Trends in Learning Environments* session to which the *Learning Spaces* article in this report returns in detail, and in different talks and posters mentioned in the *Innovations and Trends in Educational Technologies - 360° view* article.

EDUCAUSE Research reports on trends among Teachers and Students

In August 2023, ECAR[60], the EDUCAUSE research center already mentioned in previous editions of this report, published two reports dealing with post-COVID changes in teaching practices (in the first report) and learning practices (in the second). Respectively entitled *2023 Faculty and Technology Report: A First Look at Teaching Preferences since the Pandemic*[61] and *2023 Students and Technology Report: Flexibility, Choice and Equity in the Student Experience*[62], they offer a list of metrics, the main trends of which were presented in a specific session[63] at the Chicago conference. The first chapter of this article looks at the main parts of these results that are directly or indirectly connected to the issues of hybridization (deliberately pluralized) and HyFlex.

[59] In addition to the ELI Annual Meeting in June, see the corresponding article in this report.

[60] https://www.educause.edu/ecar

[61] https://library.educause.edu/resources/2023/8/2023-faculty-and-technology-report-a-first-look-at-teaching-preferences-since-the-pandemic

[62] https://library.educause.edu/resources/2023/8/2023-students-and-technology-report-flexibility-choice-and-equity-in-the-student-experience

[63] EDUCAUSE Research: Results from the 2023 Student and Faculty Studies https://events.educause.edu/annual-conference/2023/agenda/educause-research-results-from-the-2023-student-and-faculty-studies

Faculty's perceptions and expectations

The *2023 Faculty and Technology Report: A First Look at Teaching Preferences since the Pandemic*[64] is EDUCAUSE's first survey of teachers since 2019. This report describes the results of the study in four main areas:

- Modality preferences and the impacts of teaching in non-preferred modes
- Experiences teaching online and hybrid courses
- Technology and digital availability of course components
- Types of support needed and utilized for teaching

These results obviously take on particular significance in view of the transformations that the pandemic has brought about in teaching practices, and the questions and issues that their possible perpetuation raises. For the purposes of this article, we have therefore focused on the findings relating to the first two areas[65].

When it comes to preferences in terms of teaching modalities, several key facts[66] can be mentioned. A small majority (53%) of teachers prefer face-to-face teaching, but almost all of them are happy to use digital technology to enrich their practice in this same modality. 18% opt for 100% distance learning, and 20% for hybrid. It should be noted that there has been an evolution since the 2019 study, which showed 73% of teachers preferring full or semi-full face-to-face teaching, and 9% full distance learning. Another important finding of the study, particularly with regard to hybridization, is that 68% of teachers favor a single modality for all their classes. 25% are more inclined towards a combination of modalities, and 15% favor hybridization for their entire practice. The last two categories underline the flexibility that these modalities offer them and their students, compared to face-to-face teaching. However, these preferences need to be set against a reality in the field that may be different: 31% of the teachers questioned say that they do not give all their courses in their preferred modality. 59% of this population stress that this situation is the result of an institutional obligation, leaving them no choice in the matter.

With regard to experience of online and hybrid teaching[67], the survey shows that only 4% of teachers had never taught a single course in one of these two modalities. While, logically, 69% of teachers said they have had this experience during the pandemic, 48% still claimed to be teaching at least one of their courses in one of the two modalities at the time of the survey - well after the emergency measures had been put in place. Asked how their past experience in distance or hybrid teaching had influenced their current preference, 71% of teachers replied no change, or an increased preference. The study also showed that 86% of teachers with a preference for hybridization prefer to implement a single modality for all their students in a given time slot. Moreover, 76% prefer to decide for themselves which modality should be applied to each slot, thus not leaving the choice to the students.

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[64] https://library.educause.edu/resources/2023/8/2023-faculty-and-technology-report-a-first-look-at-teaching-preferences-since-the-pandemic

[65] However, we invite the reader to consult the full report, which deals in particular with the apprehension of technological components in teaching practice, and accompanying issues.

[66] The full results for preferences in terms of teaching methods are available at https://www.educause.edu/ecar/research-publications/2023/faculty-and-technology-report-a-first-look-at-teaching-preferences-since-the-pandemic/modality-preferences

[67] Full results on preferences for online and hybrid learning experiences are available at https://www.educause.edu/ecar/research-publications/2023/faculty-and-technology-report-a-first-look-at-teaching-preferences-since-the-pandemic/online-and-hybrid-teaching

Students' perceptions and expectations

The second report, entitled *2023 Students and Technology Report: Flexibilité, Choice and Equity in the Student Experience*[68], is student-focused and covers three main areas:

- Supporting students on and off campus
- The role of students as consumers in the educational marketplace
- Equity and accessibility in teaching and learning

Among these areas, and for the purposes of this article, we have once again focused on aspects directly or indirectly related to issues concerning hybridizations or HyFlex[69].

When it comes to supporting students on and off campus[70], and more specifically the technological component, the report first highlights a significantly different levels of satisfaction between Internet access on campus and at home. Only 32% of students are satisfied with connectivity on campus (42% are dissatisfied), compared with 72% who are satisfied with access at home. The report then looks at the shift in students' lifestyles. It shows that students living off-campus are more likely to report having a family life and/or a job, factors weighing in favor of learning modalities that offer flexibility and/or a distance option. Conversely, and predictably, on-campus students are more likely to be socially connected, and therefore more likely to participate in face-to-face courses. These results, however, need to be assessed in relation to the type of teaching activities undertaken, with those involving a practical component or interactivity (group work) concentrating the most preferences for face-to-face. The specific case of exams also shows a disparity between the two populations, with 32% of off-campus students favoring on-site exams, compared with 68% of on-campus students.

On the question of preferences in terms of modality and potential choice[71], the report first recalls the market reality of higher education in certain territories - notably North America - which has already been mentioned several times in previous editions of this report. In this respect, he mentions the need for institutions to adapt to students' preferences in all their plurality and to demonstrate responsiveness in this area, while underlining the issue of equity. Half of all students (53%) have a preference for traditional, on-site course experience.

However, and coming back to the question of choice and flexibility, one notable outcome emerges from the report: students' responses go beyond their individual cases, and position the question of hybridization from an ethical angle. 82% of them feel that "*every student should be able to participate in course activities in whatever ways work best for them*". The breakdown of this result between the different activities shows that a majority or plurality of students feel that the choice of modality should be offered for lectures, presentations, tutoring, research activities, but also - and here again it's worth emphasizing - examinations. The same majority felt that practical work, interactive or group activities, and course discussions should be conducted face-to-face for all students.

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[68] https://library.educause.edu/resources/2023/8/2023-students-and-technology-report-flexibility-choice-and-equity-in-the-student-experience

[69] Here again, we invite readers to consult the full report.

[70] Full results on supporting students on and off campus are available at https://www.educause.edu/ecar/research-publications/2023/students-and-technology-report-flexibility-choice-and-equity-in-the-student-experience/supporting-students-on-and-off-campus

[71] Full results for the modality preference and choice issues are available at https://www.educause.edu/ecar/research-publications/2023/students-and-technology-report-flexibility-choice-and-equity-in-the-student-experience/empowering-students-to-choose

Analysis and et comments

These two reports, which once again prove all the richer the more they are read in their entirety, provide a number of insights into the challenges and prospects of hybrid and HyFlex configurations in the post-COVID phase. The question of a lasting transformation of the new practices put in place during the pandemic, and more specifically of the sustainability of a proportion of distance learning of courses offered in hybrid mode, or even of open HyFlex curricula, has indeed been regularly raised since 2020 (as, for example, in the context of the ELI Annual Meeting covered in this same report). Beyond their middle and long-term projection, however, these possible prospects currently seem to be coming up against the reality of a return to face-to-face teaching, which has been the effective norm in many institutions as soon as the sanitary situation allowed. A modality which, moreover, seems to correspond to the preference of a majority of students, at least for part of the learning activities, and to that of teachers (bearing in mind that the latter seem to favor the option of a technologically enriched face-to-face setting). Taking into account the overall metrics and results presented in these two reports, however, provides a richer reading, particularly with regard to potential changes in teaching and learning practices. The prospect of greater hybridization of courses, in particular, is all the more likely to be taken into consideration as it could be based on various factors highlighted in these reports on the part of both teachers and students, as well as on more general, and in particular societal, considerations.

Indeed, while the *2023 Students and Technology Report: Flexibility, Choice and Equity in the Student Experience* indicates that just under half of students favor traditional face-to-face learning, it also highlights the fact that a significant proportion of them accept or subscribe to alternative modalities, i.e. distance or hybrid learning. The same report also mentions the large majority of students (82%) who, beyond their own personal situation, feel that everyone should be able to choose their own modality. These perceptions, combined with possible considerations of personal life that might interfere with participation in face-to-face courses, or simply of the comfort represented by the possibility of taking a course without having to commute, and with the assurance of high-performance connectivity, further position the prospect of hybridization - and a flexible one - as a potentially realistic prospect.

This hypothesis is also echoed by teaching staff in the *2023 Faculty and Technology Report: A First Look at Teaching Preferences since the Pandemic*, particularly in relation to the growing acceptance of the principle of going beyond the traditional classroom setting, and the experience gained in this area during the pandemic. As far as teaching teams are concerned, the focus seems to be more on flexibility, and therefore on learning modalities, which, as we've seen, students demand. Teachers thus seem to favor a "controlled" hybridization in which they define the learning modality for each session, and the fact that this modality applies to the entire student contingent.

The post-COVID landscape thus seems to be witnessing the emergence of conditions that could make the prospect of 'industrialized' hybridization possible - even likely - in the middle and long-term. Two issues remain unresolved, however: the acceptance and integration of such hybridization at institutional level, and the form it may take. On the first point, let's recall that the *2023 Faculty and Technology Report: A First Look at Teaching Preferences since the Pandemic* underlines the limitation that the institutional framework (and the relative obligations in organizational terms) can represent. It should be noted, however, that there are significant examples of deliberate institutionalization of hybrid courses (particularly in the US), very often connected to a rationale of differentiation and attractiveness to students. As for the form of hybridization, it is all the more important because of the real divergence between teachers and students. While the latter seem to favor flexibility in the choice of modality, teachers tend to want to retain control over how their groups will participate in the different sessions. A further question concerns the number of modalities, and in particular the effectiveness - or otherwise - of an asynchronous distance learning option. This flexibility and triple modality are particularly differentiating features between a conventional hybridization system and a - true[72] - HyFlex (Hybrid-Flexible) configuration.

The HyFlex is a prime example of the aforementioned strategies for the institutional integration of hybrid training programs to enhance the attractiveness of the school and its curricula. HyFlex continues to be the focus of particular attention at both the ELI Annual Meeting in June and the EDUCAUSE Annual Conference in October,

[72] See the article *Hybride/HyFlex Trends: Myth or Reality ?* in the 2022 edition of this report, which mentions the distortion between the original concept of HyFlex, and the implementations declared as such during the emergency response to the pandemic.

and was the subject of a dedicated pre-conference workshop at both events, the Chicago edition of which is reported below.

HyFlex implementations: Tools and Strategies

The specific Hybrid-Flexible (HyFlex) configuration, which was particularly exposed in the second phase of the responses to the pandemic, continues to be the focus of particular attention from practitioners and facility management[73]. This trend, already addressed in the 2022 edition of this report, goes beyond the logic of responding to an emergency situation (in which the HyFlex concept has often been distorted) to consider medium and long-term sustainability, and is reflected in the presence of the topic in several sessions at EDUCAUSE conferences. This was the case at the ELI Annual Meeting in June (see the corresponding article in this report), as well as at the Annual Conference in October, where a comprehensive pre-conference workshop was held on the theme Beyond the Basics, Advancing your HyFlex Implementation. The latter focused on tools (particularly technological) and strategies for optimizing the implementation or conversion of a course to HyFlex.

At the Annual Conference in October, the workshop moderators Brian Beatty (San Francisco State University, widely recognized as the creator of the HyFlex concept), Glori Hinck (University of St. Thomas) and Cathy Littlefield (Peirce College), all three involved in the HyFlex Learning Community[74], began the discussion by describing their respective journeys to HyFlex, which were intentional on the one hand (in particular, San Francisco State University's need to meet enrollment and access challenges), and/or the result of a combination of circumstances on the other. They then recalled the fundamental principles of HyFlex: the triple modality (face-to-face, synchronous distance and asynchronous distance) and the four pillars of student choice of modality, reusability, equivalence and accessibility.

The workshop then addressed three main issues: the technological component, the question of student involvement in the various modalities, and implementation strategies.

Technology pour the HyFlex compatible classrooms

The implementation of HyFlex structurally involves a technological component[75]. In particular, this concerns the A/V equipment of classrooms used by face-to-face students, an aspect on which several examples and feedback were discussed. These include San Francisco State University's Burk Hall 170 Active Classroom / HyFlex, about which an interview with Brian Beatty was published by EdTech Magazine[76], and of which a 360° view is also available[77]. In particular, the use of equipment such as PTZ (Pan Tilt Zoom) cameras with automatic tracking, document cameras, multi-directional and ceiling microphones, or multiple monitors with wireless connection was mentioned[78].

Discussions also highlighted the possibility of an iterative approach, which can start with relatively light equipment before evolving towards more complex, richer solutions.

Strategies for the engagement in the HyFlex courses

The plurality of modalities inherent in HyFlex logically raises the question of student engagement, particularly with synchronous and asynchronous distance learning. A number of involvement-related questions have been listed for the pedagogical engineering phase: How do students interact with the content? How do they interact

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[73] Here again, see the article *Hybrid/HyFlex Trends: Myth or Reality ?* in the 2022 edition of this report

[74] https://www.hyflexlearning.org/

[75] Component also discussed in a specific article on the HyFlex Learning Community website: https://www.hyflexlearning.org/2022/04/29/technology-for-hyflex-classrooms-major-considerations/

[76] https://edtechmagazine.com/higher/article/2023/05/explore-technology-behind-todays-hyflex-classroom

[77] https://s.insta360.com/p/85ae78f16ef27f02e0441f5e61760317

[78] Let's remind here that several examples of HyFlex rooms are presented in a specific gallery in the FLEXspace database. https://flexspace.org/

with each other during learning phases? How do they interact with the teacher? The moderators then stressed the need to consider both face-to-face and synchronous distance learning students as a single group, ensuring intentional interaction with both populations (while being aware of the difficulty of this practice). They also suggested inserting references to asynchronous students during synchronous phases, such as "*for those who will watch this later online...*".

Overall, the recommended approach is one of unified student consideration, based on the use of common activities and assignments, common assessments and exams, and the assignment of students from all modalities in group projects.

Strategies for implementation

The last part of the workshop was focused on the logistical, administrative and institutional aspects of implementing a course in HyFlex. It was an opportunity to emphasize the importance of cross-functional involvement of support services, as part of a strategic approach to the project. Support for teaching teams (pedagogical engineering and training) as well as for students was highlighted as a fundamental point, illustrated by several feedbacks from course leaders (including specific modules on LMS). Administrative aspects were also discussed, with - once again[79] - the need for a commonly-accepted definition of HyFlex, but also the need to qualify HyFlex in the information systems that manage registrations (with the choice management inherent in this model).

Lastly, in addition to recalling the existence of the *Hybrid Flexible Course Design*[80], the workshop also provided an opportunity to announce the 2nd edition of the *HyFlex Collaborative Conference*, supported by several of its moderators, to be held on June 27th 2024 in remote and asynchronous mode[81].

[79] A session of the EDUCAUSE Annual Conference 2022, especially, highlighted this stake, which may sometimes represent a real difficulty, see the article *Hybrid/HyFlex Trends: Myth or Reality ?* in the 2022 edition of this report

[80] Edited by Brian Beatty, with contributions from the other two workshop moderators, and freely available at https://edtechbooks.org/hyflex

[81] https://aatlased.org/hyflex-collaborative/hyflex-collaborative-conference/

Two challenges for IT Management

Emmanuelle Vivier - French Delegation

During the edition 2022 of EDUCAUSE, the theme *Leadership and future workforce* encompassed all issues related to managing a digital department. In the 2023 edition, the theme was divided into two: *Leadership, partnerships and strategy* and *Future of work and today's workforce*.

Among all the presentations on offer, and in connection with the visits to institutions made by the Delegation, two issues included in the Top-10 Issues 2024 will be developed, namely:

- Adapting to the future and cultivating institutional agility
- Resilient hiring: recruiting and retaining talent in adverse circumstances

Adapting to the future and cultivating institutional agility

The IT departments of American institutions are demonstrating a need for formalizing their strategy and the resulting project portfolio in the interests of the success and influence of their institution, while overcoming current challenges such as budgets constraints, technological and risk developments, reorganizations, changes in management methods, staff departures and fluctuating team motivation[82].

For example, the institutions visited by the French Delegation at EDUCAUSE were able to provide us with a concise document outlining key points for the coming years, which were extremely enlightening in terms of their current concerns, but also inspiring thanks to their highly pragmatic approach.

The information technology departments we interviewed formalized the essential elements that characterize their activity on a double-sided A4 sheet for the University of Chicago, and on a ten- page document for Harper College: mission, guiding principles, core values and strategic objectives broken down into action plans.

In a very clear presentation, the Oakton college also highlighted its strategic focus areas including cyber security, data-centric approach, development of equity of treatment between students, investment in online technologies for teaching and student support.

These presentations and guiding documents each demonstrate a commitment to transparency and proactive engagement in the service of the institution.

Let's take a closer look at the content of these reference documents and the concepts they cover.

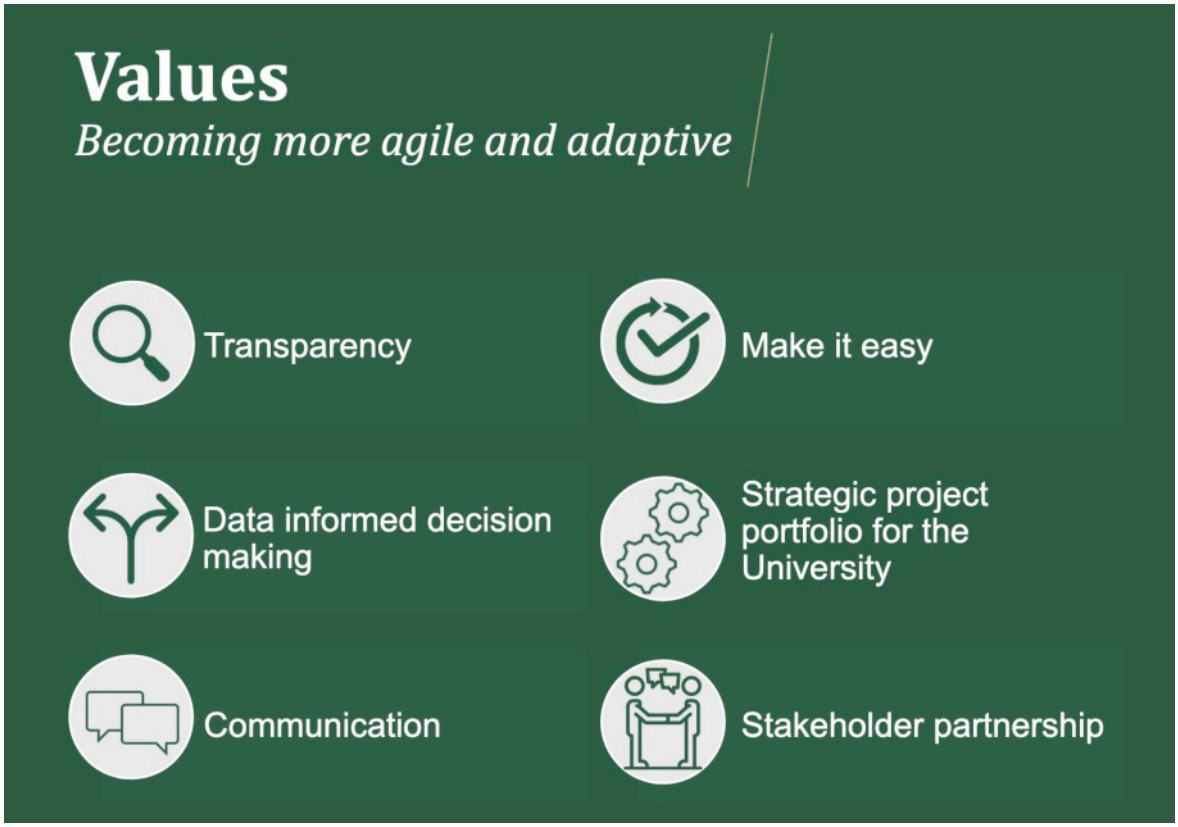
[82] IT service foundations : journey of transformation

Values

The institutions share common values, both among those visited and those present at the EDUCAUSE conference. These values include :

- Transparency/integrity: decisions are explained, roles and responsibilities are clearly defined, opportunities and objectives are shared. All stakeholders feel involved in the decision-making process.
- Respect/trust: acknowledging individual differences (diversity, equity, inclusion), dialogue encouraged, decisions once adopted collegially are supported by all, feedback from users is collected through regular surveys and taken into account constructively.
- Excellence: constant vigilance to provide cutting-edge technologies and innovative solutions.
- Collaboration and partnership: stakeholders are involved not only in the decision-making process for choosing learning technologies and tools, but also in the development of these solutions, which are essential to student success.

These values are summarized in an informative poster from the University of North Carolina Charlotte[83].



Summary of the values that should govern IT governance

Strategic objectives

Selected strategic axes align with ours: modern technologies to support student success, accessibility and improved user experience, robust infrastructures, security and cyber risk management.

Others are only just beginning to emerge in France; at the University of Chicago, for example, there is a strategic focus on generative AI, with increased support for teachers. Improving the user experience is also the focus of

[83] *Exploring the Intersection of data, planning & empowerment : Creating a structure to transform IT Project Governance*

attention, with the need for simplicity and consistency, the integration of search engines, and consideration of the digital accessibility of different resources.

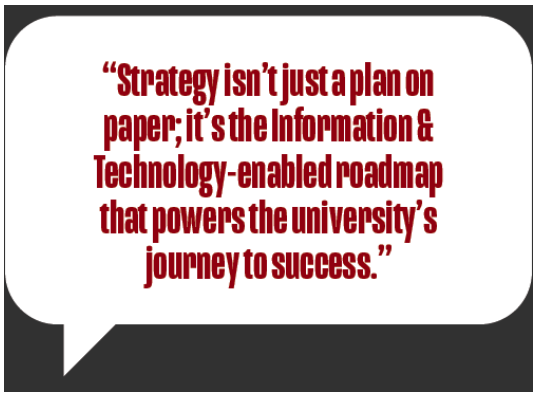
Lastly, a strategic axis is becoming central, which was also presented to us during our visit to Oakton College, and which concerns the analysis of data (financial, administrative, educational). This "data-centric" approach offers the assurance of making informed, timely decisions.

These strategic objectives are further managed in a project portfolio with tools and monitoring.

Project portfolio management

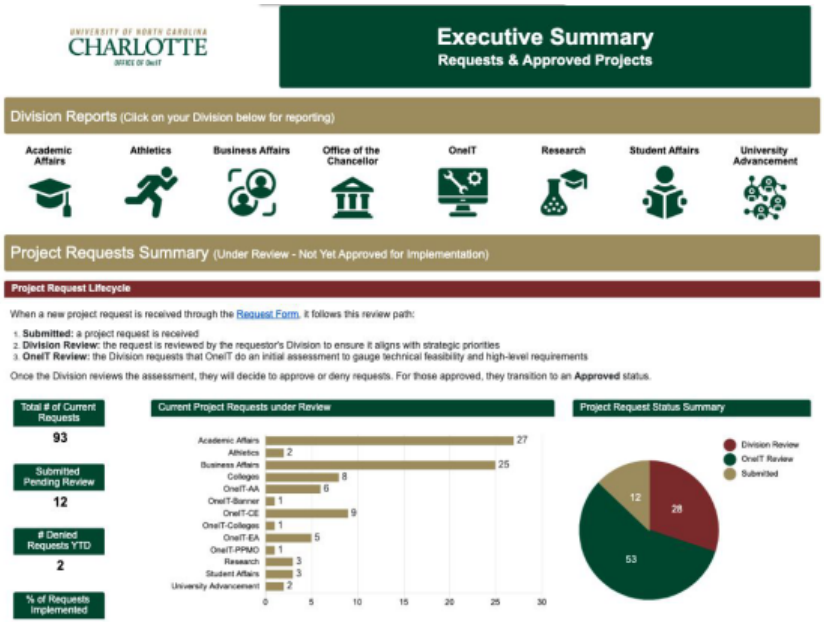
The project portfolio is built and prioritized according to a number of guiding principles :

- Analysis of existing processes and identification of areas for efficiency improvement
- Annual call for projects from the various departments of the institution, possibly with the application of quotas; maximum number of projects allocated for each department.
- Project prioritization based on alignment with corporate strategy (e.g. infrastructure security)[84]
- Estimating and control of resource consumption for various projects
- Guaranteed transparency and regular communication to the community about portfolio developments
- Critical analysis of the project request; learning to say no if the project is not justified or exceeds the quota



The role of strategy

By way of example, a project appraisal process is shown below; any project submitted is first examined by the relevant department to check strategic alignment, then by the IT department to verify technical and financial feasibility, before final approval, planning and finally operational implementation. The notion of a project quota per department is also present.



Project appraisal process

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[84] Curiosity and Change : a framework for aligning technology investments with university objectives, The university of Oklahoma

Once the strategy and project portfolio are established and validated, the next step is to optimize human resources management to ensure implementation. In this respect, it is essential that the IT department works hand in hand with the human resources department.

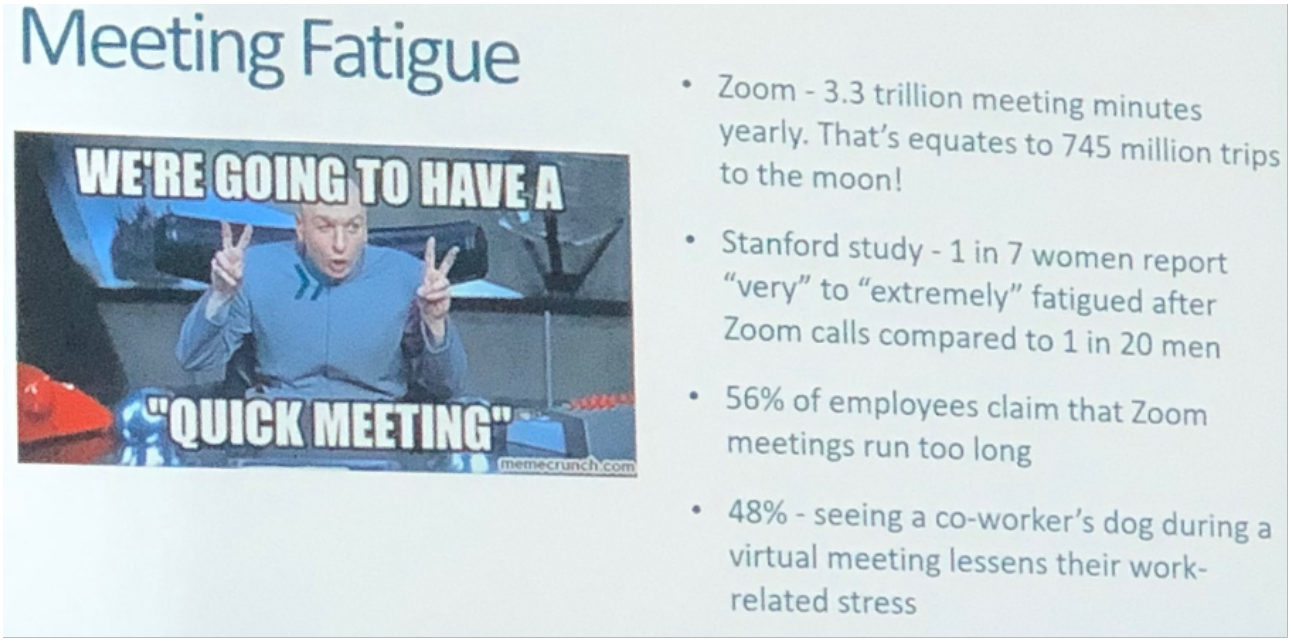
Resilient hiring: recruiting and retaining talents in unfavorable circumstances

Work evolution and burnout

A conference on the theme of burnout and changing work[85] laid the foundations for the psychological state of IT teams in the current post-health-crisis period, with upheavals in work organization and ever-greater challenges to be met.

A number of factors are particularly significant in terms of their capacity to generate stress at work: an increase in the number of meetings linked to the development of videoconferencing, an increase in the number of e-mails to be processed, the introduction of new tools that will further increase the number of requests (e.g. instant messaging), and an increase in the number of documents and projects to be processed.

The three signs of burnout: feelings of exhaustion, disengagement/cynicism, lack of professional effectiveness. Burnout makes the brain feel foggy, hampers concentration and decision-making, and makes small tasks seem huge and insurmountable.



Findings and stress-causing factors

According to a Stanford study, a number of stress-generating factors are highlighted: excessive number and length of meetings, women are more tired than men after Zoom meetings, and personal life often intrudes on professional life.

The smooth, professional image projected during video conferences hides a completely different reality (see photo below: behind the scenes).

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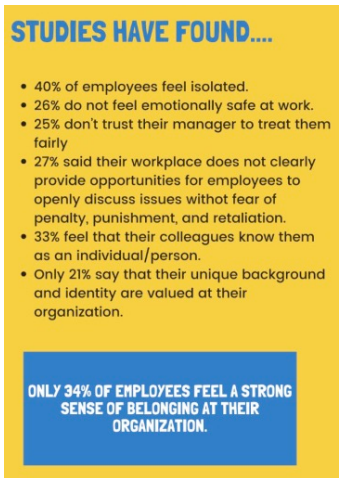
[85] *Combating burnout to reach our goals*, Jennifer Moss

The other side of a videoconference

Jennifer Moss even explains that the explosion in the use of videoconferencing, which forces employees to confront their own image all day long, has led to a boom in cosmetic surgery !

Solutions to prevent burnout and unhappiness at work

- Before scheduling a meeting, ask yourself the right questions: is the meeting really necessary, who should attend, what are the objectives, how long should it last ?
- Schedule non-work meetings: how are we doing? Who's doing well, who's doing badly ? How can we simplify each other's lives ?
- Take productive breaks: mental, physical, emotional, sensory, social, spiritual, creative
- Having a best friend (a social life): reduces the risk of burnout by 41%, increases feelings of psychological security by 27%
- Feeling emotionally safe at work
- A sense of belonging[86] (only 34% of employees feel this way). Without a sense of belonging, employees feel isolated, do not feel treated fairly, do not have the opportunity to exchange ideas, and are not recognized for their individuality.



Studies on the sense of belonging

A sense of belonging reduces the risk of turnover and the number of days of absence, and boosts productivity.

[86] *Creating a culture of Diversity, Equity, Inclusion and Belonging*, Roger Willimas University IT

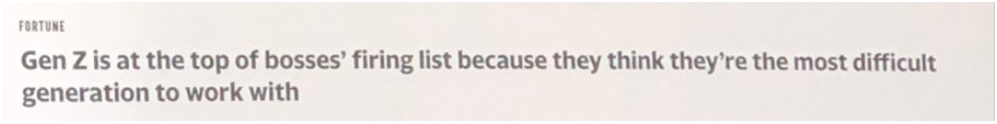
Benefits of a sense of belonging

The clash of generations and the mindset towards work

In the 1960s, Douglas McGregor, a professor at the Massachusetts Institute of Technology (MIT), observed that employees had different expectations of their company depending on their generation.

Generation X, Millennials (Generation Y) or Generation Z, each "category" of employee has its own particular relationship to work, a parameter that it is now essential to take into account when building appropriate recruitment strategies and long-term engagement.

Generation Z (born between 1995 and 2012) account for 6% of the workforce. Parents are among their best friends (50%) and are often consulted when responding to a job offer. They have been brought up in the age of the Internet and new technologies, and are fervent supporters of innovation, social networking and other collaborative tools. Job security, well-being and mental health are among their primary concerns. The quest for recognition and meaning at work is another of their specific characteristics; Generation Z wants to do a useful job and make a real contribution to the company's progress. What's more, they want to work for an inclusive and responsible company that promotes diversity in the workplace. The question they ask themselves: What am I prepared to sacrifice for my job? They want to optimize their professional and personal lives, and demand flexibility (telecommuting, innovative offices). We can compare their characteristics with those of previous generations.



Millennials or Generation Y (born between 1980 and 1995), the so-called « digital natives », account for 39% of the workforce. This generation is very attracted by mobility. It's also a generation motivated by collaboration and the quality of relationships with hierarchy: a policy of feedback, transparency, horizontal hierarchical relationships and trust constitute the ideal employee experience for this generation.

Generation X (born between 1965 and 1980) account for 35% of the workforce. They are fiercely independent, honest, straightforward and unfiltered, yet highly respectful of hierarchy. They are less attached to the company's capacity for technological innovation than subsequent generations, but they are very attentive to remuneration and professional success. It's a sandwich generation that has to manage both parents and children. This generation needs to be reassured, and is looking for reassurance in the form of responsibility (project management or supervision of juniors).

Baby-Boomers (up to 1964) account for 19% of the workforce. They are optimistic by nature and believe that anything is possible. They want to revolutionize society. They are in the process of retiring. Every day, 10,000 baby boomers turn 65. In 6 years' time, Generation Z will represent almost 30% of the workforce.

Succession planning

With boomers retiring in droves, succession planning is a hotly debated topic. Succession planning was initially reserved for key positions in the company, and was intended to accompany the end of a career. Today, with the arrival on the job market of new generations who are more mobile than the "boomers", and the shortage of candidates, succession planning has taken on a whole new meaning. The departure of an employee, whether voluntary or not, can become a real handicap for the company: loss of know-how and interpersonal skills, inability to fill the position, etc.

The consequences of these changes mean that, without exception, all employees are now concerned by succession planning. Companies need to ensure that they are able to fill every strategic position in their organization, with a sufficiently large and diverse pool of candidates and talent.

The various stages of succession planning can be as follows[87]:

- Clearly identify high-risk strategic jobs. Those requiring essential knowledge and skills, but also management positions. Not forgetting jobs held by employees nearing the end of their careers, and those whose departure may be envisaged
- List the skills and knowledge required for each position, and in particular identify the behavioral skills needed
- Conduct an internal audit on the skills and talents of current employees
- Matching expected skills with existing skills
- Implement and communicate training programs to encourage internal promotions.
- Consider/encourage the retraining of non-IT staff to overcome external recruitment difficulties
- Anticipate external hires

Succession planning can even be the subject of an annual review with the institution president to validate the strategy to be followed. Speakers at the conference on succession planning and recruitment in general highlighted a number of qualities sought in candidates which they felt should be prioritized in the recruitment process: resilience, adaptability, curiosity and flexibility, but also emotional intelligence and a sense of dialogue. They all indicate that we may prefer to recruit a person with solid human rather than technical qualities, and propose an appropriate training plan.

Mentorship

Mentoring recognized as a valuable tool for succession planning. As with the previous edition of EDUCAUSE, this opportunity is highlighted by the various stakeholders. Mentoring is not reserved for student employees, but we note that 50% of the people recruited by IT departments are alumni, and that they have been or will be accompanied in their discovery of the institution by a mentor. The benefits of mentoring for both mentor and mentee are well identified in the extract below, including personal development, skills transfer, commitment, development of managerial skills, development of a positive corporate culture. Nevertheless, it's important to emphasize the need to match the interests, skills and objectives of the mentor and the mentee, if the process is to have the best possible chance of success.

Benefits of mentorship

[87] *Succession Planning : Cultivating Future IT Leaders*

In conclusion, we can say that American Higher Education IT Departments have effectively managed the challenges posed by the pandemic. They were able to upgrade their infrastructures and invest massively in cloud hosting. They have also invested in risk management, particularly cybersecurity. Thanks to these necessary efforts, they can now put themselves fully at the service of the institution's strategy and the values and projects that will contribute to its success, while at the same time mastering data management, a guarantee of the institution's sustainability and the reliability of decision-making.

Today's major challenge lies in managing the human resources weakened by the upheaval in work organization and anticipating the massive retirement wave that will occur over the next few years.

Innovations and Trends in Educational Technologies - 360° View

Thierry Koscielniak, PhD - French Delegation

This article describes a full tour of EDUCAUSE 2023 conference with a focus on Educational Technologies (EdTech). This year it was all about generative artificial intelligence (GenAI) but the author also looked at immersive technologies, as has been the case since 2016. Other topics were explored throughout the sessions and Exhibit Hall.

This article would not had been as rich without the help of GenAI, as all the posters have been analyzed and processed from the PDF files to produce a strategic summary with the use of ChatGPT 4 Pro (April 2023 release). This summary was then revised by the author, but only slightly, as the results are striking. Without Gen AI the chapter « Other Topics Sessions » could not have been written in time.

All photos in this article were taken with the author's cell phone. The English language has been optimized using DeepL.

Generative AI sessions

The EDUCAUSE 2023 annual conference was completely swamped with AI-related sessions! The author of the article was lucky enough to be able to attend some of them, as the rooms were generally full.

In the EDUCAUSE online library, a page is dedicated to AI, with links to highly relevant resources[88]. Before writing the abstracts on his visits, the author of the article highlighted the following three references:

- The 2023 EDUCAUSE Horizon Action Plan for Generative AI
- The synthesis document: 7 Things You Should Know About Generative AI
- A course taught during October 2023 for EDUCAUSE members: ChatGPT in Higher Education: Exploring Use Cases and Designing Prompts (Learning Lab Online Course)

Following these three references are summaries of a round table of EDUCAUSE experts, two posters and a corporate panel.

[88] https://library.educause.edu/topics/infrastructure-and-research-technologies/artificial-intelligence-ai

2023 EDUCAUSE Horizon Action Plan for Generative AI[89]

The 2023 EDUCAUSE Horizon Action Plan for Generative AI focuses on creating an equitable, accessible, and ethical future in higher education. Strategies include ensuring unbiased AI development, enhancing access to educational technology, promoting critical thinking about AI tools, and using AI to enhance human relationships and complete undesirable tasks. Real-time analytics and personalized digital assistants will support student learning, while institutions will foster AI literacy, create collaborative environments, and invest in AI infrastructure. Multi-unit and institutional collaborations will be vital, with an emphasis on ethical guidelines and compliance. The plan presents a comprehensive approach for integrating Generative AI into the higher education landscape, emphasizing innovation, ethics, and collaboration.

7 Things You Should Know About Generative AI[90] (EDUCAUSE Review)

This documents is from the "7 Things You Should Know" series of EDUCAUSE Review articles. It outlines key insights:

1. What Is It ? Generative AI creates human-like content and is rapidly integrated into various sectors, including education, evolving into versatile tools.
2. How Does It Work ? It operates through neural networks and large language models, predicting and generating new content based on massive datasets.
3. Who's Doing It ? Students, faculty, librarians, and administrators are using generative AI for a variety of tasks, from essays to administrative decisions.
4. Why Is It Significant ? Generative AI allows for innovation and design at scale, altering professional landscapes and educational practices.
5. What Are the Downsides ? Challenges include ethical concerns, the pace of technological advancement, risks of plagiarism, and data privacy issues.
6. Where Is It Going ? Future trends include private organizational tools, larger and cleaner datasets for more accurate tasks, and integration into everyday applications.
7. What Are the Implications for Higher Education ? There's a need for AI literacy, ethical usage, and strategies to integrate AI into teaching and administration effectively. Institutions must consider how AI changes learning, assessment, and the nature of academic work.

ChatGPT in Higher Education: Exploring Use Cases and Designing Prompts (Learning Lab Online Course)[91]

Part 1: Exploring AI Prompting
Part 2: Refining AI Prompts
Part 3: AI-Generated Prompts and Pedagogical and Design Best Practices
Part 4: Review and Reflect: Applying AI to Your Work

Learning Outcomes:

- Demonstrate an understanding of the capabilities and limitations of conversational AI platforms, including ChatGPT by OpenAI, such as their ability to generate text, answer questions, and carry out conversations.
- Identify appropriate use cases for incorporating AI into various higher education workflows, such as student support services, research, and teaching.
- Apply best practices for prompting and leverage AI capabilities for specific tasks and contexts.
- Evaluate the output of AI-generated work and make appropriate adjustments to ensure that the output meets professional standards and expectations.
- Collaborate effectively with colleagues and stakeholders to identify opportunities and risks in integrating AI capabilities into higher education workflows.

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[89] https://library.educause.edu/resources/2023/9/2023-educause-horizon-action-plan-generative-ai

[90] https://er.educause.edu/articles/2023/12/7-things-you-should-know-about-generative-ai

[91] https://events.educause.edu/courses/2023/chatgpt-in-higher-education-exploring-use-cases-and-designing-prompts-1

- Participants will critically analyze the ethical considerations related to prompt generation, including bias, misinformation, and intellectual property rights - including strategies for responsible usage.

Generative AI Implications for the Future: EDUCAUSE Expert Panel Recommendations[92] (Panel session)

The EDUCAUSE 2023 Expert Panel on Generative AI Implications for the Future comprises diverse academic leaders and focuses on understanding and navigating the evolving landscape of generative AI in education. The panel's goals include collecting signals of change, identifying implications of AI's increasing capability, addressing the needs of the field, and providing strategic guidance for staying ahead. Key themes identified are critical AI use and digital literacy, preparing students for future workforces, ethical and equitable AI use, academic integrity, personalization in learning, enterprise AI approaches, and evaluating AI tools. The panel also encourages exploring questions around AI's broader impact and invites ongoing community engagement and feedback to shape future strategies and actions in higher education. This initiative reflects a proactive stance towards understanding and integrating generative AI in a way that is ethical, equitable, and enhances teaching, learning, and administrative functions in higher education institutions.

Here are some oral feedbacks from the experts:

- « This technology is transformative. The capabilities are crazy and we are still in a demo mode. »
- « Fantastic possibilities but dangerous for deep fakes »
- « Philosophy will be important: questioning ethics issues about the nature of reality. »
- « The providers don't understand how its work! »
- « AI will be as a copilot. The term copilot comes from Microsoft. »
- « If there is any suspicion of cheating, discuss it directly with the student. »
- « For homework it's the best way to learn literacy. But don't use is as a search engine. »
- « Students should learn to prompt and discover the strengths and weaknesses of AI
- « Too many AI tools: see https://theresanaiforthat.com/ »
- « Don't trust the first output! »

At the end of the session, participants were sent a question via a mobile app to choose three topics from a list selected by the experts[93]. 190 people have voted.

Rank	Topic	Percentage
1	Using AI as a copilot: Use cases and best practices	17 %
2	Enterprise approaches to AI: Governance and guidelines	15 %
3	Using AI critically: Digital Literacy for students, faculty and staff	14 %
4	Ethics and equity: privacy concerns and parity of access	10 %
5	Evaluating AI tools: Functionality, privacy and cost	10 %
6	Helping students use AI as a partner to prepare them for the workforce	9 %
7	Academic integrity in an AI world: What does "originality" mean ?	9 %
8	Preparing students for the workforce of the future	8 %
9	Augmenting learning with generative AI: Personalization	7 %

No topic appears really strongly at the top of the ranking.

[92] https://events.educause.edu/annual-conference/2023/agenda/generative-ai-implications-for-the-future-educause-expert-panel-recommendations

[93] https://app.sli.do/event/uEsxFp7cvHvuLDhd2GtF2p/live/polls

Generative AI Is More than a Tool- It's a Digital Collaborator[94] (Poster)

The Digital Gardener Initiative (DGI) at Indiana University and the Generative AI integration focus on redefining digital literacy and education through AI collaboration. DGI promotes digital ways of knowing, doing, and making, seeing Generative AI as more than a tool but as a digital collaborator enhancing learning experiences. The initiative underscores the symbiosis of humans and AI in crafting richer, dynamic educational content. It encourages educators to approach teaching with a digital literacy lens, integrating Generative AI authentically into student activities and assessments. The goal is to foster a digital literacy culture, preparing individuals to navigate the complexities of the digital age with a mindset of exploration, critical thinking, and adaptability, while also understanding AI's capabilities and limitations.

Using OpenAI to Enhance Student Support: A Higher Education Case Study[95] (Poster)

Florida SouthWestern State College implemented Ocelot's AI-driven communication platform to transform its student support strategy. By integrating Generative AI (OpenAI) and Human-Centered AI, the college shifted from a reactive, phone-heavy approach to a proactive, multi-channel strategy, significantly enhancing the student experience. Ocelot's platform includes AI-powered texting, a chatbot, and AI-assisted live chat, which reduced call volume by 1/3 and saved 230+ hours of staff time. The implementation prioritized personalized student engagement, compliance, and streamlined communication, resulting in a 300% increase in chatbot engagement and doubling the likelihood of students registering for classes after receiving text reminders. This human-centered AI approach ensured accurate, compliant responses across multiple channels, supporting students throughout their academic journey and improving overall institutional efficiency.

Making the Promise of AI Real in Higher Ed: a Panel Discussion[96] (Industry led session)

At the EDUCAUSE 2023 annual conference, this panel presents a multifaceted view of AI's role in transforming higher education:

- The Chief Innovation Officer of Microsoft Education US discusses Microsoft's AI initiatives like Azure AI, which powers analytics and cognitive services to create personalized learning experiences. He highlights collaborations with universities to implement AI-driven research tools and AI-infused curriculums that prepare students for the AI-augmented workforce.
- The Executive Director at the University of Michigan-Ann Arbor showcases their work on AI for academic support services, leveraging data analytics for student success and operational efficiency. They might present on the use of AI chatbots for student queries and AI-driven platforms for streamlining campus operations.
- The Vice President Information Technology and CIO of the University of South Florida shares insights on deploying AI for campus safety and smart campus initiatives. The focus might be on AI tools that analyze student data for insights into health, well-being, and academic progress.
- The Vice President of Anthology on product management elaborates on integrating AI in Anthology's suite of higher education solutions, like using predictive analytics to enhance student retention and success, and AI to customize learning management systems for diverse educational needs.

Each panelist then provides practical examples and tools:

- Microsoft's Officer introduces Microsoft Teams as a collaborative tool that integrates AI to organize study groups, harnessing cloud services to support hybrid learning environments.
- The Executive Director from Michigan describes their AI-enabled monitoring systems that analyze student engagement in virtual learning environments, providing instructors with actionable insights.
- USF's VP & CIO discusses their predictive analytics dashboard that forecasts student success, allowing for timely interventions and support services.
- Anthology's VP showcases their AI-enabled CRM systems that personalize student communications and support services, catering to the unique needs of various student communities.

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[94] https://events.educause.edu/annual-conference/2023/agenda/generative-ai-is-more-than-a-tool--its-a-digital-collaborator

[95] https://events.educause.edu/annual-conference/2023/agenda/using-openai-to-enhance-student-support-a-higher-education-case-study

[96] https://events.educause.edu/annual-conference/2023/agenda/making-the-promise-of-ai-real-in-higher-ed-a-panel-discussion

These examples reflect the broad potential of AI in higher education, from personalizing learning to optimizing institutional operations, all while saving time for instructors and creating inclusive, customized platforms.

XR sessions

This chapter is the eighth in a series of articles begun in 2016 in the delegation's previous reports[97] :

2016 - Learning with Virtual Reality - page 44
2017 - Teaching with virtual reality - page 42
2018 - Immersive Learning: Promises kept ? - page 48
2019 - Immersive Learning: Massive Feedback in 2019 - page 61
2020 - Immersive Learning : grand cru 2020 - Production réduite et d'excellente qualité - page 105 (no English translation)
2021 - Using immersive technologies to teach - page 38
2022 - Immersive Learning: XR Station, a demonstration dedicated space - page 75

On the EDUCAUSE online library, a page of summary documents to begin discovering immersive technologies and their educational applications: Extended Reality (XR)[98].

Zero to Hero: Empowering Faculty to Explore and Utilize XR/VR Technologies for Research and Pedagogy[99] (poster)

Illinois State University's "Zero-To-Hero" program, in collaboration with the Provost and Office of Technology Solutions, is bringing Extended Reality (XR) to classrooms across various academic colleges. The program includes an AR/VR Bootcamp, teaching asset acquisition, basic C# scripting, materials & lighting, VR deployment, and 3D interaction. Participants from diverse disciplines, including Applied Science, Fine Arts, Nursing, Arts and Sciences, Education, Business, and the Library, undergo six two-hour sessions to create and deploy their VR applications. Future plans involve grant inquiries, curriculum integration, exploring alternative engines, and additional bootcamps to further harness XR's educational potential. The initiative is led by university faculty and graduate students, signifying a multidisciplinary approach to immersive technology education..

Technical Support for Integrating VR Technology in a Pilot Course[100] (poster)

The University of Texas at San Antonio's pilot course in Philosophy of Space Exploration utilized VR technology to enhance student learning and engagement. Immersive VR environments allowed students to explore astronomical realms, fostering an authentic learning experience. The course used Oculus Quest 2 due to its extensive content library, superior performance, and ergonomic design. ManageXR facilitated seamless VR content management and distribution. The total investment was $55,432, demonstrating a significant commitment to integrating innovative technology in education. The course aimed to share experiences, discuss VR optimization, and address accessibility, setting a precedent for future educational endeavors involving immersive technologies.

Optimizing Complementary Use of AR and VR in the Classroom while Minimizing Accessibility Barriers[101] (Panel Session)

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[97] http://tinyurl.com/delegation-Fr-EDUCAUSE

[98] https://library.educause.edu/topics/emerging-technologies/extended-reality-xr

[99] https://events.educause.edu/annual-conference/2023/agenda/zero-to-hero-empowering-faculty-to-explore-and-utilize-xrvr-technologies-for-research-and-pedagogy

[100] https://events.educause.edu/annual-conference/2023/agenda/technical-support-for-integrating-vr-technology-in-a-pilot-course

[101] https://events.educause.edu/annual-conference/2023/agenda/optimizing-complementary-use-of-ar-and-vr-in-the-classroom-while-minimizing-accessibility-barriers

This panel session focuses on enhancing learning in a multivariable calculus classroom using Augmented Reality (AR) and Virtual Reality (VR). It emphasizes the need for a framework of best practices to ensure meaningful XR learning activities, highlighting the importance of sound pedagogical principles. Key objectives include sharing project results, discussing optimization strategies for AR and VR, and minimizing accessibility challenges. The initiative utilizes best practices for choosing, using, and designing XR learning applications, considering factors like cost, pedagogy, accessibility, and ease of use. The results indicate that both AR and VR positively impacted learning, and future research will focus on optimizing their complementary use and addressing accessibility concerns. The presentation underscores the trade-offs involved in technology selection and the importance of designing materials with purpose, user control, and considerations for diverse user needs.

XR Community Group Meeting[102]

Some members of XR Community Group

This community is led by Randy Rode, Senior Consultant at Yale University and Colleen Bielitz, VP Strategic Initiatives & Outreach at Southern Connecticut State University. The group meets regularly[103] and has a forum like all the other EDUCAUSE community groups. Link[104] to join the XR group forum. The Q&A discussion forum is very active online and all EDUCAUSE members interested in the subject should join this group. The meeting was an opportunity to share project milestones and views on the XR market. What a great community!

The Current State of Extended Reality for the Classroom[105] (Community Groupe Meeting)

This session was a meeting of the EDUCAUSE Community Group (see previous chapter). As this was an informal meeting in the Community Group Corner located in the EDUCAUSE conference lobby, the author did

[102] https://events.educause.edu/annual-conference/2023/agenda/xr-community-group-meeting

[103] https://www.educause.edu/community/xr-extended-reality-community-group

[104] https://connect.educause.edu/community-home?CommunityKey=70ee8002-b716-4412-81e6-6a2bd605d58c

[105] https://events.educause.edu/annual-conference/2023/agenda/the-current-state-of-extended-reality-for-the-classroom

not have the opportunity to take notes on the discussion. The following 9 points and summary were therefore generated by ChatGTP4 Plus (April 2023 release) using the session title as a prompt.

Group picture of the meeting participants

1. Technological Advancements: VR and AR hardware and software have become more affordable and accessible. Devices like the Oculus Quest 2 and HoloLens, along with mobile AR capabilities, are making it easier for educational institutions to adopt XR technologies.

2. Curricular Integration: Educators are increasingly incorporating XR into a variety of subjects, from science and medicine to history and language arts, offering immersive and interactive experiences that can enhance understanding and retention.

3. Skill Development: XR is being used to develop practical skills, especially in fields like medicine, architecture, and engineering, where students can practice in a risk-free, virtual environment.

4. Distance Learning: XR technologies are enabling new forms of remote education, allowing students to participate in virtual classrooms and labs, and to experience field trips and cultural sites virtually.

5. Engagement and Motivation: XR has been shown to increase student engagement and motivation, providing novel and interactive ways to explore complex topics and abstract concepts.

6. Research and Collaboration: Universities and tech companies are collaborating on research to further understand the effectiveness and possibilities of XR in education, leading to more evidence-based practices and innovative applications.

7. Challenges: Despite its potential, XR in education faces challenges, including high costs for some technologies, the need for technical support and training, potential health effects, and ensuring accessibility for all students.

8. Future Trends: Looking ahead, it's expected that XR will become more personalized, with AI integration making learning experiences more adaptive. Also, as technology continues to develop, it's likely that we'll see lighter, more comfortable headsets and even more immersive and realistic experiences.

9. Ethical and Privacy Considerations: As with any technology, there are ethical considerations, particularly concerning data privacy and the psychological effects of prolonged VR use. Educational institutions are navigating these issues with policy and guidelines.

In summary, XR in the classroom is at an exciting point of growth, offering transformative possibilities for education. However, its integration is a complex process that requires careful consideration of pedagogical, technological, and ethical factors. As the technology continues to develop and more research is conducted, we can expect to see even more innovative uses of XR in education.

Empathy Unfolding: Immersive Learning and Neuroeducation Insights through eXtended Reality Simulation[106] (poster)

This poster addresses the declining empathy in the nursing profession, particularly impacting low-income and ethnically diverse patients. The proposed solution contrasts the traditional disease-centered perspective, where patients are defined by their illness and treated with rigid, one-size-fits-all pathways, with a patient-centered care approach. This approach emphasizes treating patients as individuals, fostering trust and shared decision-making, and empowering both patients and healthcare providers to have a voice in healthcare decisions.
The study aims for interdisciplinary collaboration to produce an immersive, story-driven extended reality (XR) study to investigate the effect of 2D and 180° virtual reality (VR) micro-story interventions on nursing students' empathetic concern. It integrates micro-storytelling across the curriculum, from novice to expert levels, and employs various interdisciplinary processes including IT, Neuro-Education, and patient story production, emphasizing empathy in general education, science, and clinical aspects.
The study design includes behavioral tests, neurophysiological tests, and assessments of transformational learning and empathetic concern. The mixed-methods findings, indicated by significance levels ($p<0.05$), suggest a measurable impact of the interventions. This approach signifies a critical shift towards understanding and enhancing empathy in healthcare through innovative educational strategies and technology, aiming to improve patient care and outcomes.

Reality Bytes: The Good, the Bad, and the Ugly-Crying of Using Virtual Reality in the Classroom[107] (poster)

Central Methodist University's "Reality Bytes" project explores the use of Virtual Reality (VR) in the classroom, detailing its implementation, applications, and observed outcomes. The university purchased 40 Quest 2 headsets, distributing them across various academic divisions and teams. Notable VR applications included Oxford Medical Simulation, Anne Frank House, Virtual Speech, Wander Workrooms, Anatomage, A Dark Matter, and WIN Reality.
In practice, the Anne Frank House VR was used in a literature course focusing on Holocaust writings, enhancing student empathy and perspective-taking. Virtual Speech was utilized in public speaking courses, providing a platform for students to practice and receive feedback on their speaking skills. The First Steps app was incorporated into Comparative Religion and Philosophy courses to explore identity and embodiment.
The project emphasizes the transformative potential of VR in education, enhancing student empathy, curiosity, and engagement while providing realistic learning scenarios and feedback. Despite facing challenges like device issues, app sharing blocks, onboarding, and faculty reluctance, the initiative developed best practices, including trained staff, marketing to faculty, creating dummy accounts, and using mobile carts for transport.
The strategic use of VR at Central Methodist University represents a commitment to innovative teaching methods, emphasizing immersive learning to enhance student understanding and engagement. The initiative's success and lessons learned provide a valuable roadmap for other institutions considering integrating VR into their curricula.

VR Learning Design Compendium: Design Artifacts to Inspire VR Education[108] (poster)

The VR Learning Design Compendium by Grand Valley State University is a pioneering guide addressing instructional design in Virtual Reality. It presents an analysis of educational VR artifacts, focusing on pedagogical implications to inspire and guide learning designers. The compendium is categorized into Interactive Design for engagement, Immersive Design for presence, and Relational Design for empathy. An example discussed is the use of 'floating hands' in VR settings like Anne Frank's house, illustrating how design elements can guide interaction and narrative engagement, while also offering practical design recommendations to overcome disadvantages like visibility issues. This strategic resource aims to enhance educational VR by providing insights, inspiration, and guidance for creating engaging and effective learning experiences.

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[106] https://events.educause.edu/annual-conference/2023/agenda/empathy-unfolding-immersive-learning--neuroeducation-insights-through-extended-reality-simulation

[107] https://events.educause.edu/annual-conference/2023/agenda/reality-bytes-the-good-the-bad-and-the-ugly-crying-of-using-virtual-reality-in-the-classroom

[108] https://events.educause.edu/annual-conference/2023/agenda/vr-learning-design-compendium-design-artifacts-to-inspire-vr-education

VR Meditation at The Ohio State University[109] (poster)

The "Using Virtual Reality to Meditate on Campus" project by the College of Engineering at Ohio State University leverages VR technology to enhance the well-being of the campus community. With the increasing prevalence of mental health disorders and substance abuse among younger adults, the project, backed by Buckeye Wellness Innovators and grant-funded research, aims to provide an immersive meditation experience through VR.

The initiative utilizes the Quest 2 headset for its mobility and user-friendly interface, supported by high-spec PC hardware for optimal performance. Best practices like Kiosk Mode and on-site support ensure streamlined and accessible VR experiences. Organizational practices focus on breaking down silos, developing mobile units for wider access, following accessibility practices, and centralizing the experience on campus.

Applications like Guided Meditation VR, Bliss, TRIPP, and Cosmic Flow are managed through platforms like SideQuest, Arbor XR, and Steam, indicating a robust and flexible application environment. The future of the project includes using AI to develop more immersive experiences, providing developer software for student-created content, and fostering partnerships for VR course creation. This initiative represents a strategic commitment to leveraging VR for mental well-being and educational innovation.

Other topics sessions

A breakout session on digital accessibility and posters on Analytics, OER, Interoperability and HyFlex. For more insights on HyFlex, see the article *Hybridizations & HyFlex* in this report.

The State of Digital Accessibility in Higher Ed: 2023 Survey Takeaways[110] (Breakout session)

The "State Digital Accessibility" presentation at the EDUCAUSE 2023 Annual Conference by Kyle Shachmut from Harvard University and Eudora Struble from Wake Forest University provides strategic insights into digital accessibility in educational settings. The presentation underscores the importance of IT Accessibility as a facet of diversity, equity, and inclusion (DEI), advocating for resources and institutional effort to improve digital access.

Key points include:

1. Community Advocacy: The EDUCAUSE Community Group for IT Accessibility[111] meets monthly to advocate for resources and institutional efforts, emphasizing the need for baseline data and evolving knowledge to guide initiatives.

2. Staffing and Resources: Many institutions report inadequate staffing dedicated to accessibility roles, with 59% reporting fewer than two staff and 17% having none, indicating a widespread challenge in allocating sufficient resources.

3. Universal Design: Recognizing universal design and accessibility as DEI in action, the presentation stresses the importance of inclusive design in educational technology.

4. Emerging Technologies: The integration of emerging technologies, including Generative AI, is highlighted as a crucial factor in advancing digital accessibility.

5. Data and Metrics: The lack of large-scale datasets on accessibility and the need for comprehensive metrics to track progress and guide efforts are identified as significant challenges.

6. Institutional Challenges: The presentation acknowledges the challenges institutions face without adequate data and metrics, emphasizing the need for a strategic approach to build a more inclusive digital environment.

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[109] https://events.educause.edu/annual-conference/2023/agenda/vr-meditation-at-the-ohio-state-university-1

[110] https://events.educause.edu/annual-conference/2023/agenda/the-state-of-digital-accessibility-in-higher-ed--2023-survey-takeaways

[111] https://www.educause.edu/community/it-accessibility-community-group

This presentation at EDUCAUSE 2023 provides a strategic overview of the current landscape, challenges, and future directions in digital accessibility in education, advocating for a concerted effort to ensure that digital resources are accessible to all.

Additional ressource: “Get to know the EDUCAUSE IT Accessibility Community Group" poster[112]

Sourcing and Incorporating Quality Open Educational Resources (poster)[113]

Lone Star College's guide for sourcing, creating, and sharing Open Educational Resources (OER) emphasizes understanding and respecting creator rights via licenses like Creative Commons. Efficient sourcing involves surveying the market for appropriate scope, sequence, and content, and establishing quality criteria such as credibility and accessibility. Organizing links and attribution information in one place is crucial for ease of use. When sharing OER, consider the appropriate license, platform, and audience, and ensure compliance with platform vetting, accessibility, and file requirements. This strategic approach aims to foster ethical use and sharing of OER, enhancing educational materials while respecting creators' rights and ensuring broad, effective dissemination.

Additional ressources: https://rise.articulate.com/share/VlXOXSPZwCxtqA4yHO15TOJxuCXdcusr#/

OER attribution builder: https://www.openwa.org/attrib-builder/

Here's Your Easy Button for Implementing Learning Tools Interoperability (LTI) Advantage (poster)[114]

This poster highlights the strategic approach to integrating the Learning Tools Interoperability (LTI) Advantage into educational institutions. It emphasizes tailoring the LTI Advantage to enhance digital learning environments with a focus on security, power, and flexibility, while addressing the inherent complexities of varied institutional needs.

Key considerations include:

1. Functional Needs and Access: Customizing to institutional requirements, focusing on user roles, custom fields, and substitution variables to ensure a robust digital learning environment.

2. Enhancing User Experience: Streamlining navigation and interactions within digital platforms to reduce clicks, optimize the mobile experience, and ensure full accessibility for all users.

3. Efficient Administration: Automating processes like enrollment and roster management, ensuring secure and unique identifiers, and providing comprehensive usage data for better oversight.

4. Content Management and Flexibility: Enabling instructors to easily add and manage tools, supporting complex hierarchical relationships, and providing reliable end-user support within the digital learning context.

5. Vendor Collaboration and Support: Ensuring ongoing communication, up-to-date documentation, clear roadmaps for feature development, and a collaborative approach to meet educational goals.

The poster emphasizes the importance of a thoughtful, comprehensive approach to integrating LTI Advantage, considering the varied and complex needs of educational institutions, instructors, and learners. It suggests a strategic, tailored approach to adoption, ensuring that technology enhances learning experiences without imposing undue burdens on users or administrators.

Follow-up reference from 1EdTech company:

Digital Learning Environment Integration Considerations: Why You Should be Using LTI Instead of APIs or Building Custom Integrations for Your Products[115].

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[112] https://drive.google.com/file/d/16wFfuqRBQPZyBJowdxO37sOKGLAe6X09/view

[113] https://events.educause.edu/annual-conference/2023/agenda/sourcing--incorporating-quality-open-educational-resources

[114] https://events.educause.edu/annual-conference/2023/agenda/heres-your-easy-button-for-implementing-learning-tools-interoperability-lti-advantage

[115] https://www.1edtech.org/hed/iln/dle-considerations

Predictive Analytics for Advising: Hard Truths and Lessons Learned from a Pilot (poster)[116]

This poster provides strategic insights into the deployment and implications of predictive analytics in academic advising. The Penn State's Data Empowered Learning (DEL) team developed an adviser-facing application called LIFT, which uses machine learning to predict student-course outcomes, leveraging 8.6 million records to inform decisions before the semester starts.

Key challenges and lessons include:

1. Data Literacy Problem: Advisers initially struggled with interpreting and operationalizing analytics data, highlighting the need for extensive training in data comprehension.

2. Feel Bad Problem: Ethical challenges arose when predictive analytics conflicted with advisers' preconceived notions about students, prompting a reevaluation of interventions.

3. Demographics Problem: Incorporating demographic data increased accuracy but raised significant ethical concerns regarding potential biases in courses, instructors, and enrollment processes.

4. Surveillance Problem: The institutional culture around data privacy and the perceived surveillance impact on certain populations necessitated a careful approach to data use and communication.

5. Spotlight Problem: Analytics can reveal systemic biases, creating institutional challenges in addressing emergent data issues and the resulting inequities for students.

6. Institutional Values Problem: Balancing optimizing for grade performance and retention versus learning and ethical advising posed significant dilemmas.

7. Catch-22 Problem: While transparency in algorithms is crucial for trust, overreliance on predictive analytics without understanding can lead to flawed interpretations and decisions.

8. Faculty Review Problem: The data's underlying biases need to be understood to ensure faculty aren't unfairly evaluated based on biased metrics.

The pilot emphasized the importance of data literacy, ethical considerations, and the need for a holistic approach to integrating predictive analytics in advising. It provides a strategic framework for institutions considering similar initiatives, highlighting the potential benefits and complexities of using predictive analytics to support student success.

On-Demand and In-Demand: Marshall University's Approach to Implementing HyFlex (poster)[117]

This poster aims to understand faculty perspectives, organizational support expectations, and the impact of technology in HyFlex courses. Launched in Spring 2023, the pilot involved 11 faculty members and 298 students, covering subjects like Cyber Forensics, Business, Health Sciences, Psychology, and more.

Key strategic objectives include:

1. Faculty Insights: Determining the most significant hurdles faculty face when considering HyFlex for their courses, aiming to address and mitigate these challenges through targeted support.

2. Organizational Support: Discussing the required organizational support for faculty development, ensuring that instructors are adequately prepared and supported in their HyFlex teaching efforts.

3. Technology and Systems: Understanding the role and impact of classroom technology and learning management systems in supporting HyFlex modalities.

4. Future Goals: By 2027, Marshall aims to increase the number of courses offered in flexible formats (blended, hybrid, online, or HyFlex) by 60%, reflecting a strong commitment to expanding flexible learning options.

5. Classroom Upgrades: Upgrading 60% of classrooms by 2027 to support active and flexible learning, ensuring an equitable remote learning experience for hybrid learners.

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[116] https://events.educause.edu/annual-conference/2023/agenda/predictive-analytics-for-advising-hard-truths-and-lessons-learned-from-a-pilot

[117] https://events.educause.edu/annual-conference/2023/agenda/on-demand-and-in-demand-marshall-universitys-approach-to-implementing-hyflex

6. Classroom and Faculty Support Programs: Implementing programs to assist instructors with technology management and hybrid learning challenges, along with faculty development programs and best practices to support flexible course modalities.

Marshall University's strategic plan for HyFlex implementation emphasizes a comprehensive, supportive approach to flexible learning, focusing on faculty readiness, technological infrastructure, and a long-term vision for increasing flexible and hybrid course offerings.

Getting Started with HyFlex: Building a Strong Foundation for Flexible Learning Environments (poster)[118]

This poster explores the strategic implementation of HyFlex courses, allowing students to choose their learning mode: in-person, online (synchronous or asynchronous), or a combination.

Key considerations for a successful HyFlex model include:

1. Flexibility and Student Choice: The core of HyFlex is to provide multiple learning options, ensuring students can select the mode that best fits their needs and circumstances.

2. Equivalency in Learning Options: All modalities must offer equivalent content, learning outcomes, and assessments to ensure a consistent and fair learning experience.

3. Use and Reuse of Resources: HyFlex encourages the use of existing materials and resources, emphasizing efficiency and consistency in course delivery.

4. Accessibility for All: Ensuring that all students, regardless of ability or circumstances, have access to the necessary materials and learning activities.

5. Institutional Customization: Each institution should define and communicate its HyFlex model clearly, tailoring it to meet specific needs and contexts.

6. Continuous Feedback and Improvement: Soliciting and incorporating feedback is crucial for the ongoing enhancement of the HyFlex experience.

7. Community Engagement: The creation of a learning community around HyFlex, such as HyFlexLearning.org, provides a platform for sharing research, resources, and best practices.

This strategic summary underscores the importance of flexibility, equivalency, efficiency, and accessibility in designing and implementing a HyFlex learning environment. By focusing on these areas, institutions can offer a more personalized, inclusive, and effective learning experience.

Maximizing Access and Inclusion: A HyFlex Approach to Meeting Diverse Learner Needs (poster)[119]

This poster presents a strategic overview of HyFlex (Hybrid-Flexible) course design aimed at meeting the diverse needs and preferences of students. This approach allows students to choose how they engage with course content, supporting Universal Design for Learning principles by offering various ways of acquiring knowledge, demonstrating understanding, and engaging with content, instructors, and peers across different delivery modes.

Key strategic insights include:

1. Understanding Diverse Needs: Recognizing the wide range of student circumstances, including work, family commitments, disability status, and other factors influencing learning preferences.

2. Increasing Demand for Flexibility: Students increasingly demand flexible and convenient learning modalities to better fit their diverse lifestyles and commitments.

3. Ensuring Access and Inclusion: Prioritizing digital accessibility by addressing core skills in course content and using accessibility checkers to ensure that all students can participate fully in their chosen learning mode.

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[118] https://events.educause.edu/annual-conference/2023/agenda/getting-started-with-hyflex-building-a-strong-foundation-for-flexible-learning-environments-1

[119] https://events.educause.edu/annual-conference/2023/agenda/maximizing-access-and-inclusion-a-hyflex-approach-to-meeting-diverse-learner-needs-1

4. Supporting Technology Use: Providing students and faculty with the necessary training, support, and tools like high-speed internet and virtual desktops to facilitate effective participation in HyFlex courses.

5. Addressing Equity: Aiming to provide equal access to opportunities and resources for all students, especially those who might otherwise be excluded or marginalized.

6. Leveraging Evidence: Drawing from sources like the EDUCAUSE 2023 Students and Technology Report and the 2023 EDUCAUSE Horizon Report, which emphasize flexibility, choice, and equity in the student experience.

7. Community Engagement and Resources: Encouraging participation in the HyFlex learning community and offering research resources and sample strategies for successful implementation.

This strategic summary underscores the importance of flexible, inclusive, and well-supported learning environments in meeting the varied needs of today's students, highlighting HyFlex as a viable and effective approach to enhancing access, engagement, and success in higher education.

Seneca Polytechnic's Hyflex Classroom Technology Journey (poster)[120]

The poster about Seneca Polytechnic's journey into HyFlex classroom technology provides a strategic framework for integrating flexible learning environments. HyFlex courses allow students to choose between in-person, online synchronous, and online asynchronous sessions, enhancing accessibility and accommodating various learning needs and schedules.

Key insights from the journey include:

1. Technology Implementation: HyFlex classrooms are equipped with ceiling microphones, dual cameras, whiteboards, and software-agnostic equipment, ensuring all students, whether remote or in-class, have a seamless learning experience.

2. Evolution from Flex 1.0 to 2.0: The transition from the initial setup to an enhanced version included improvements like rear-facing cameras, ceiling microphone arrays, dual monitor arms, and expanded ITS support, demonstrating a commitment to continuous enhancement.

3. Faculty Preparation: Intensive training, Flex Ambassadors for real-time support, and a comprehensive online course with hands-on practice were implemented to prepare faculty for this new mode of teaching.

4. Student Feedback: HyFlex courses were well-received, offering students flexibility, reduced stress, and opportunities for growth in metacognitive awareness. However, the need for community and connection across modes was also highlighted.

5. Teaching Strategies: Faculty are advised to design asynchronous pathways first, flip the classroom for active learning, move away from high-stakes exams, and engage students in helping online peers.

6. Challenges and Adaptations: Initial challenges such as audio visibility and managing videoconferencing were addressed in subsequent iterations, reflecting a responsive and adaptive approach to technology integration.

7. Impact Measurement: The usage of HyFlex courses at Seneca Polytechnic surged from 50 to over 700, with 116 classrooms equipped, indicating significant adoption and scalability.

Seneca Polytechnic's HyFlex initiative represents a strategic commitment to flexible, inclusive education, offering valuable insights for institutions looking to implement or enhance their own flexible learning environments.

[120] https://events.educause.edu/annual-conference/2023/agenda/seneca-colleges-hyflex-classroom-technology-journey

Exhibit hall

As usual the exhibit hall at EDUCAUSE conference is HUGE (Pictures below). More than 250 exhibitors presents on stands. Surface of stand generally represent the financial weight of the company ! You will find there vendors for IT technology and also for educational digital solutions.

Unfortunately the exhibit hall opening hours are very short:

Tuesday, October 10 - 10:15 a.m. -> 4:45 p.m.
Wednesday, October 11 - 10:15 a.m. -> 4:00 p.m.

So you have to run in-between sessions to visit stands that you have to check before on the map unless you will be quickly lost in the alleys. But the author found little time to visit old acquaintances and also good friends from Apereo Foundation.

Hopefully the poster sessions are located within the exhibit hall !

There is also two spaces dedicated to EDUCAUSE Central + Emerging Tech Zone. The first provide a location to get informations about EDUCAUSE association and to meet EDUCAUSE executives and the second was previously called the « Startup Alley », a more understandable name. (Pictures below).

Stands visited in the general space

LMS creators, vendors and integrators : Moodle / Apereo Foundation (Sakai) / Anthology (Formerly Blackboard) / D2L / Instructure / K16 Solutions / Open LMS / Instructure

Meta for Education[121] : This year Meta's stand was designed as a Chemistry Lab with demonstrations of Quest3 Mixte Reality abilities (Picture below).

Revolution Lightboards[122]: Manufacturer and provider of lightboards and self-service (Picture below).

Stands visited in the Emerging Tech Zone

Wooclap[123]: an European company with an office based in Montreal which provides a tool transforming typical presentations into dynamic, co-constructed interactive learning moments.

Ziotag[124]: Generative AI auto-chaptering platform that makes the information contained within video and audio content accessible for everyone including those people with disabilities.

eduLAB[125]: Transforming technical education through virtual labs and tailored contextualization services. Suited for a range of technical courses: Cybersecurity, Networking, Artificial Intelligence, Cloud Computing, Web Development, Programming, Engineering, and Gaming Development.

APL nextED[126]: a cloud-based academic operations ERP that streamlines academic processes and centralizes faculty management.

LearningClues[127]: Introducing CourseGPT™: The ability for learners to receive responses to questions that are informed solely by what was presented in class videos or made available in the course LMS.

Kritik Education[128]: A peer assessment platform that puts students at the center of learning.

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[121] https://about.meta.com/immersive-learning

[122] https://revolutionlightboards.com

[123] http://www.wooclap.com/

[124] https://ziotag.com/

[125] https://www.edulab.com.au

[126] https://aplnexted.com

[127] http://www.learningclues.com

[128] https://www.kritik.io/

Here is the map of the hall[129]

Pictures from the Exhibit Hall

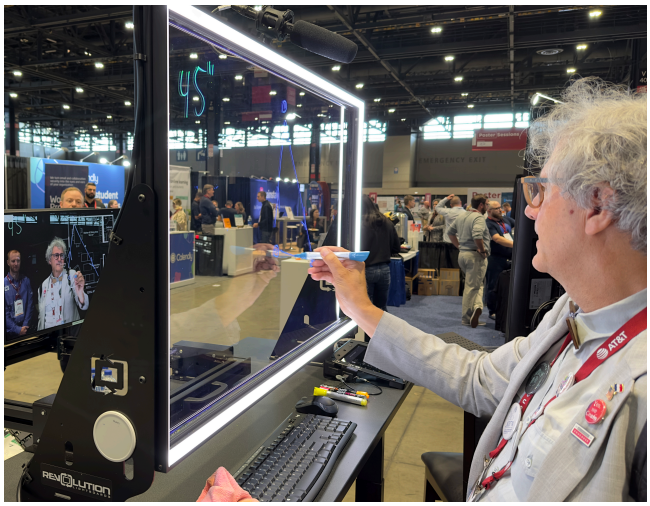
West Side of the Exhibit Hall

Stands / EDUCAUSE Central / Posters area

[129] https://s23.a2zinc.net/clients/EDUCAUSE/E23/Public/EventMap.aspx

EDUCAUSE Central

META stand: MR Chemistry Lab



Revolution Lightboards stand

AI and Student Success: an ubiquitous presence

Bruno Urbero, PhD - French Delegation

Introduction

By 1975, predictions were already pointing to a correlation between complete knowledge of students' lives and their academic success. For almost fifty years, institutions have systematically collected and stored student education data and all other accessible information in their information systems, in order to demonstrate the reliability of this model, which they have then exploited in a positive way. However, it is only in recent years, with the integration of artificial intelligence (AI), that this model has finally been validated.

Prior to this validation, many institutions collected a plethora of data on their student data, going beyond mere schooling: curriculum choice, grades, course attendance, social interactions (virtual and physical), survey responses, use of university services, ethnic minority membership, skin color, receipt of public aid, living conditions below the poverty line, resource issues, health and disability, financial concerns, presence of excessive debt, food difficulties, family responsibilities, life instability, receipt of or eligibility for a Pell grant, and so on.

Holistic knowledge of the student is based on all these data, and validation of the model has shown that they enable early prediction of the risk of dropping out, thus facilitating the implementation of measures to improve student retention in their course of study, mainly at undergraduate level. Dropping out is a double failure, both for the student, who faces not only a personal setback but also significant debt, and for the institution, whose reputation can be damaged by individual failures, leading to a direct loss of income, a fall in rankings (such as the Carnegie classification), long-term funding difficulties, and challenges in recruiting and attracting investors, including alumni.

Although students are informed about data collection and use, the considerable cost of this process legitimately raises questions about the need to collect all this information. A number of initiatives are underway to ensure data confidentiality and anonymity.

The rapid evolution of this subject, driven by the agility of the institutions, is obvious. In just three years, this topic has gone from a research topic, aimed at validating the model, to experimentation, initially on a small scale, and then to implementation on a school-wide scale. Dropout remediation solutions, including escalation to a counselor and the use of approaches like "nudges" to redirect students when a dropout is detected, have supplanted the theory of the model, which is no longer even mentioned.

Now that the reliability of the model has been established, the solutions are mainly commercial, coming from university companies, specialized start-ups or established publishers who have taken up this theme. The focus has now shifted to the implementation of these solutions in institutions and the resulting analyses, which are the subject of feedback.

To create a student-centered ecosystem, universities and community colleges are undertaking a digital transformation of their existing information systems, promoting interoperability, data integrity and governance to support students throughout their studies.

Most of the projects quoted are deployed within a short timeframe, ranging from a few months to an academic year, which goes some way to explaining the dynamism of this theme. The presence of commercial solutions based on a limited number of learning management systems (LMS), such as Canvas (41%), Blackboard (28%), Moodle (17%) and Brightspace (14%), has enabled not only rapid standardization of solutions, but also easy integration into existing information systems, generating economies of scale in American higher education.

Analyzing students' digital experience through user research

A significant part of the student experience, including accessing services, attending courses, connecting with peers, and finding information about the university, is achieved through technological solutions via various digital tools and applications. However, this experience can sometimes be hampered by legacy systems, multiple applications hosted by different parts of the university, and the introduction of new tools.

The University of California - Fresno[130] undertook an in-depth study of the role of technology and the issues surrounding student access to digital services, as well as the barriers associated with the processes. This campus-wide project involved all stakeholders, from senior management to the students themselves. The research team worked to understand the current state and design a future, easy-to-navigate application to provide easy access to digital services and resources, with the aim of improving the digital experience for students.

In line with EDUCAUSE and Gartner recommendations, improving the user experience should be a top priority for institutions. Seamless access to campus resources and services, including course support and campus life, is identified as one of the keys to student success. California State University, Fresno (CSU-Fresno) surveyed students about their expectations, synthesized the results, created prototypes and tested them. This research initiative actively involved students in all phases of the project, making it possible to assess the impact of digital tools on their experience, identify the most-used applications and websites, gather feedback on how they work, and understand difficulties in use.

Students expressed high satisfaction with university applications, particularly Canvas and Google. However, for some less frequently used processes, they would like to see improvements on the difficult aspects of navigation. Similarly, they aspire to more concise and rapid communications, with clear priorities, as well as easy access to services and modern interfaces.

The proposed model was validated and put into production in spring 2023, after six months of implementation. It incorporates the tasks most in demand by students, such as checking grades and updating schedules, booking an appointment with an advisor, reserving study rooms, finding out about student organizations, etc., thus meeting expectations in terms of ergonomics.

Improve student success using cross-listing across a range of institutions

The "California Community Colleges[131]" is a virtual campus of 116 colleges, hosting 1.9 million students and offering over 10,000 online courses, encompassing more than 90 certification and/or degree pathways for students affiliated with these institutions. The "California Virtual Campus (CVC)" is a collaborative initiative of the California Community Colleges (CCC) to increase access to and success in high-quality online courses, so that more students can achieve their educational goals.

This arrangement enables students to take courses at any of the 115 partner colleges, without having to change their home college. This flexibility gives students access to courses that are not available locally, eliminating the need to change colleges and considerably broadening the range of courses on offer without having to relocate. Online enrolment is instantaneous and limited to the open enrolment period of participating colleges, guaranteeing all eligible students, whatever their priority status, equitable access to courses.

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[130] *Analyzing the Student Digital Experience through User Research* - Max J. Tsai, Innovation Officer | Interim Director of Digital Transformation, California State University, Fresno - Katherine Rae Lathos, User Experience Designer, California State University, Fresno - Kate Miffitt, Director for Innovation, California State University, Office of the Chancellor - Allison Green, User Experience Designer, California State University, Office of the Chancellor

[131] *Eliminate the Application! How California Uses System-Wide Cross-Enrollment for Student Success* - Marina Aminy, Executive Director, CCC Online Education Initiative (OEI) - Mike Vogt, Director of Strategic Planning and Operations -Information Technology, Foothill-DeAnza Community College District

Virtual campus operation does not impede access to financial aid and scholarships. All participating institutions have signed a financial aid agreement, allowing students enrolled at two different colleges to receive federal and state financial aid funds, based on combined units taken at both colleges.

More than three quarters of California's higher education students are enrolled in one of the CCC colleges, underlining the fact that this system benefits the vast majority of California students. This inter-institutional collaboration significantly facilitates the achievement of students' educational goals by providing simplified access to online courses and automating registration between independent colleges. Cross-registration eliminates many of the obstacles associated with registering, taking courses and, ultimately, graduating.

By means of a single application covering all colleges, students can search for courses offered by the 116 colleges on the virtual campus. They can register centrally for the courses that interest them, make the corresponding payment, and the courses are then integrated into the Canvas dashboard of their home institution. In this way, students can follow their courses, complete their curriculum and obtain their certification and/or diploma with ease.

Optimizing the financial aid process, increasing enrollment and retention with AI

The New Jersey Institute of Technology[132] (NJIT) has optimized its financial aid processes by adopting solutions from Ellucian. The issue of financing education is more acute for disadvantaged groups, particularly first-generation students, who face both financial challenges and difficulties in accessing information.

Major concerns and criticisms focus on rising tuition fees, the complexity of accessing federal aid and the cost of education, which doesn't always seem to be offset by future salary prospects. Recognition of the value of higher education in the United States is undeniable, but its high cost is an obstacle for many students.

Due to the demographic crisis, institutions are facing recruitment difficulties on a national scale. This decline in enrolments calls for the urgent adoption of new strategies. Uncertainty over funding and eligibility criteria represents the main barrier to recruitment and, subsequently, to student retention.

NJIT found that 1/3 of students who don't go on to higher education think they can't afford it, and 73% of dropouts report that the financial aid process has had a significant impact on their results.

By addressing the needs of each stage of the student journey, NJIT has turned the process on its head and overcome recruitment barriers, improving student retention. Students are supported at every stage by a virtual advisor based on artificial intelligence:

- During the school search, the school promotes cost transparency by presenting the full cost of tuition to the student via a personalized cost calculator.
- When registering, a digital offer and appropriate notifications are made available.
- For financial support, streamlined scholarship management is implemented.
- During registration, forms are collected and validated automatically.
- In the event of a student dropping out, emergency funding is available.

Speed of response is a key factor in recruitment. Students begin to consider other options if there is no response to their request for financial support. After 2 weeks, 17% are considering an alternative, 58% after one month and 79% after 2 months.

The main obstacle to changing financial aid solutions is the slowness of implementation. To remedy this, NJIT opted for a commercial solution. This choice of partnership enabled the university to implement a solution quickly, with precise, on-time deliverables: the registration module was delivered after 1 month, the virtual

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[132] *Transforming Challenges into Success: How One Institution Flipped the Script and Halted Barriers to Increasing Enrollment and Retention* - Chaitrali Rane Manager of Student Financial Aid Information New Jersey Institute of Technology - Nathalie Walther Director, Strategic Programs, Ellucian

advisor in 2 months, the cost calculator in 4 months, and the extension of scholarships to the entire campus in 6 months to 1 year.

The abandonment of the inefficient and frustrating paper-based process has been made possible by digital verification, allowing administrative staff to focus on more complex tasks. This dematerialization has streamlined the awarding of scholarships, reducing the risks associated with handling physical documents.

The use of a commercial solution has reduced paper processing through digital verification, leaving administrative staff to concentrate on more rewarding tasks. These paperless processes are quicker and easier for students to use, attracting and retaining them.

What's more, going digital reduces paper use and administrative costs, increases transparency in the allocation of financial aid, and has a positive impact on budgets and the environment.

The cost calculator enables students and their families to make informed decisions by transparently outlining tuition fees, ancillary costs and potential financial aid. This transparency reinforces students' confidence in the school.

Observed benefits include elimination of administrative formalities, reduction of errors and delays, acceleration of the overall process, reduction of risks associated with handling physical documents, real-time tracking of students, automatic reminders, meeting deadlines, reduction of calls and queries, freeing administrative staff from manual tasks, and increased efficiency.

The full implementation of this solution took NJIT 3 years and led to a significant increase in enrolments, as well as increased student commitment and success in the first year of implementation.

Using AI to foster interaction with and between students

Mercy College[133], a private multi-campus institution, has identified major challenges in the accessibility of resources and the ease of obtaining information for its students. According to a survey conducted among them, 87% said they had difficulty finding admissions information and filling out forms, 84% had difficulty obtaining consistent advice between different sources, and 80% found the answers between these sources confusing, risking not completing their enrolments properly or even dropping out. It should be noted that 30% of students are first-generation students.

To address these issues, Mercy College implemented AI-based communication tools to integrate campus data sources and enhance the student experience. This AI-enabled communication platform has significantly strengthened connections between students and provided personalized support in the face of institutional needs. In an ever-changing digital landscape, higher education institutions need to engage students through fluid and effective communication.

The use of AI natural language query processing has enabled the integration and exploitation of campus data sources, standardizing access to this information and improving students' ability to locate personalized information. The solution adopted is a chatbot, named Mercy-chatbot, using Ocelot Chatbot multilingual technology. Initially equipped with just 500 responses, the chatbot relies on an intermediary layer that queries the school's various databases to provide answers to students.

The advantage of this solution is that it doesn't require any expertise to define the answers. As soon as it went live, the chatbot responded to 90% of student queries, simplifying data exchange and boosting student satisfaction. In addition, the number of calls decreased by around 25%.

Each chatbot query, consisting of an average of twenty questions/answers, sends personalized information such as the advisor's name and contact details, results and student grades. This ability to centralize data sources eliminates the need to contact several separate departments or systems.

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[133] *Empowering Student Interactions: AI-Driven Strategies for Communication and Institutional Efficiency* - Todd Pratella Executive Director of IT Mercy University - Jeff Butera Senior software Architect Ocelot

Implementing this solution has freed up staff time for more value-added tasks, such as sophisticated targeted e-mail campaigns. The aim of this solution is to improve interaction between students and educational staff, without seeking to replace the latter.

As a result, student satisfaction has increased, as they get immediate answers without time constraints, and no longer need to access multiple systems or contact different administrative offices. The solution took 8 months to set up, and handles around 4,000 queries per hour from 10am to 4pm, but remains available at any time of the day or night. Ultimately, it aims to answer all students' questions concerning enrolment, retention, welfare and access.

Develop an application that brings value to students to encourage their commitment

Ohio University[134] has developed the "Go OHIO" application with the aim of making it easier for students to navigate the university's resources and thus increase their commitment with their curriculum. A diverse group of student experts was formed to pilot the development of this application, following the project from its initial conception through to its beta phase and full launch. The group adopted an approach based on continuous collection of student feedback, usability testing, collaboration with various stakeholders, and documentation of success metrics to assess the value of the project and ensure transparency at all levels.

Although the project focuses on student commitment via technological solutions, the university has also increased the number of educational advisors, in line with the student success model. However, an emerging trend shows that students prefer digital exchanges to face-to-face meetings with their advisors. The evolution of student preferences in the use of technological solutions is still being evaluated to determine whether it is a change in usage or a technological drift.

The development of the application, carried out in just a few months using the agile method, took into account the specific needs of both online and on-campus students, with strong student participation in all phases of the process. Initial requirements gathering structured the application, the beta phase enabled student feedback to be used for incremental developments, and data transparency and beta-test participation ensured buy-in from the cross-functional business group.

The aim was to launch the mobile app by June 2023, meeting users' expectations in terms of ease of navigation, accurate and up-to-date information, a directory of useful people and services, important dates, explanatory videos on complex systems, and solutions for connecting with other students. The application also offers the possibility of evaluating students' progress in response to a question asked, enabling misunderstood questions to be corrected and the interface to be adjusted in the event of erratic navigation.

The launch of the application was a strong success for Ohio University, exceeding expectations in terms of downloads (2 times higher than hoped) and usage (2.6 times higher than expected).

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[134] *Student Engagement Tactics: Building Technology That Delivers Value to Students on Day One* -Julie Chiki Campus Engagement Specialist Ohio University - Jen Van Nostran Product Manager Ohio University

Developing a student-centered ecosystem to foster a sense of belonging

American universities, such as Cornell and Wisconsin-Madison[135], are striving to create a strong sense of belonging among students throughout their academic life cycle by implementing student-centered ecosystems. These institutions have leveraged their CRM (Customer Relationship Management) to personalize student interactions, provide access to diverse data sources, establish consistent problem-solving methods, and foster interdepartmental collaboration to deliver a seamless student experience. The strategies adopted aim to implement and continually improve CRM technologies, placing the needs of students and Student Affairs staff at the forefront of their design.

Although numerous platforms exist at these universities, the solutions and processes presented are based primarily on Salesforce. This vendor's CRM provides advisors and the university with a complete view of students, their education and associated metadata. It offers personalized dashboards for each student, including progress tracking, alerts, etc. The aim is to provide counselors with a 360° view of students.

The user interface is designed to facilitate the journey, enabling users to interact with others, trigger actions, make decisions, communicate without delay, and generate reports. Centralized access to data creates a personalized user experience by contextualizing exchanges with data specific to each student, through a web and mobile application accessing all the university's services and resources.

The application responds faster than an e-mail system, increasing the coordination of the application team. With a more personalized user experience thanks to the centralization of information, universities are planning to go even further by integrating other types of data, such as family data, management of pending requests, data from other departments, etc.

Three main axes guide the application to strengthen the sense of belonging: providing and tracking holistic engagement through an advice portal, ensuring equitable access to resources and opportunities, and orchestrating key moments in student life. An alert interface has also been created in the event of imminent risk, reinforcing the university's support in the event of unmet vital needs, serious medical problems, serious mental problems, threat to self or others, or inability to locate a student. This approach also strengthens the sense of belonging to the university community.

The student experience covers aspects such as integration, finances, learning, extracurricular activities, counselling, career, community life and graduation. The application is designed to support students in all these aspects of their university life.

Confidentiality: an asset for the university

The University of Illinois[136] has set up a team dedicated to identity, privacy and cybersecurity, whose fundamental principles are based on supporting the autonomy of individuals and their participation in the management of identifying information. This team, focused on the concepts of consent, transparency and trust, has become a strategic partner for all stakeholders involved in the management and protection of student data.

The team's recommendations cover a variety of areas containing personal data, such as learning analytics, student health/wellbeing, student success, in-class and out-of-class experiences, community building and application development. A central aspect of these recommendations is to enable students, alumni and other individuals to oversee the management, processing and sharing of their data, while maintaining a balance between data confidentiality and availability.

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[135] *A Sense of Belonging: Leveraging CRM Technology to Establish a Student-Centric Ecosystem* - Rebecca Joffrey Chief Innovation Officer Cornell University - Kyla Faroll Associate Director Entreprise & Engagement Solutions University of Wisconsin-Madison

[136] *Student Success – Privacy Enables the University* - Phil Reiter, Associate Director, Privacy – University of Illinois Urbana-Champaign - Stephen Collette, Manager, Privacy Operations– University of Illinois Urbana-Champaign - Aaron Collie, Manager, Privacy Engineering– University of Illinois Urbana-Champaign

Privacy guidelines focus on minimizing the storage and use of personal data, with particular emphasis on taking privacy into account right from the design stage of applications, covering all uses, both academic and related to campus life.

The team also made specific recommendations for the use of artificial intelligence (AI), taking into account aspects of data protection, transparency in development, and consideration of RGPD guidelines. This includes guidance for uses of generative AI and chatbots, as well as the creation of a privacy center for students to manage their data and consents.

The rapid evolution of AI offerings requires an emerging take on data protection, confidentiality, transparency and user control. AI and its regulatory framework are constantly evolving, requiring careful implementation based on ongoing assessment of program outcomes, including benefits, risks and harms, particularly with regard to privacy breaches.

Conclusion

Reference to the model predicting student dropout based on holistic knowledge has been widely accepted without the need to question it. The solutions implemented to anticipate and treat student dropout are mainly based on artificial intelligence (AI) and are often provided by commercial companies. These solutions are implemented rapidly, usually in less than a year, and are subject to feedback to optimize their operation.

University governance selects priority areas for solution optimization, such as enrolment processes, scholarship allocation, student communication, student commitment, and so on. The implementation of these solutions is often accompanied by a total or partial redesign of the university's information system (IS). This redesign aims to integrate heterogeneous and unconnected systems, offering students seamless navigation and high-value, personalized information.

Taking data confidentiality into account, in addition to complying with regulatory constraints, makes data collection and management more efficient and less costly. Solutions often incorporate mechanisms for accessing and rectifying data, reinforcing students' confidence and adhesion to the solutions developed.

These AI-driven solutions, although more technological than human, effectively contribute to increasing student retention by cultivating a strong sense of belonging and commitment to their university community. Achieving the ultimate goal of actively contributing to student success is clearly progressing thanks to the use of AI.

What's up Doctor Data ?

Sylvie Haouy & David Rongeat - French Delegation

EDUCAUSE gives you a dose of data literacy

EDUCAUSE 2023 puts the spotlights on the emergence of a new concept around data, scarcely identified today in French Higher Education: data literacy. A number of papers discussed the characteristics of data literacy and presented concrete actions to foster its dissemination and usage.

But first, what is “data literacy”? According to Wikipedia, data literacy is the ability to identify, collect, process, analyze and interpret data in order to understand the phenomena, processes and behaviors that generated them, with a critical eye. More concretely, data literacy seeks to develop a person's ability to understand, analyze and work with data, and thus to express themselves effectively. These individual skills can as well be transposed to an organization.

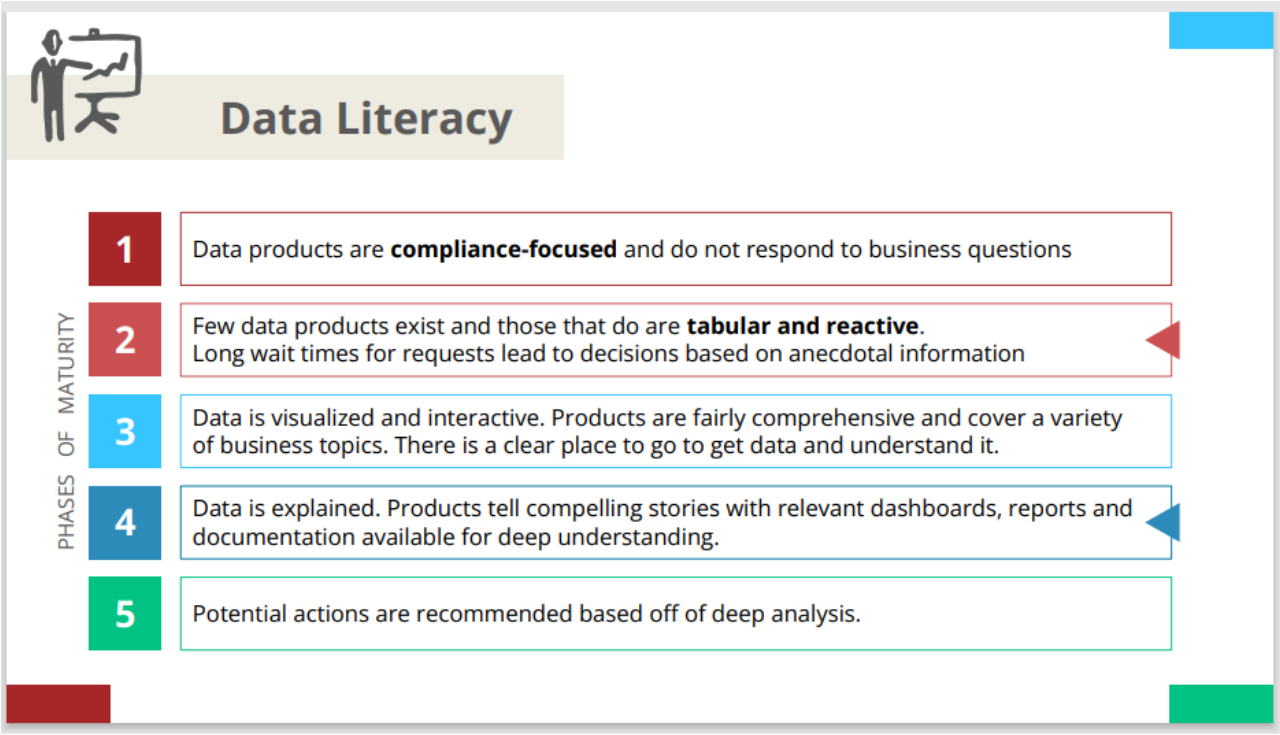
It covers topics such as data exploration, data understanding, acculturation to data management for all players, data analysis, creative experimentation around data, data visualization, critical evaluation of data and communication of results.

With the growing amount of data in all fields, people need to be supported and trained around the use of this data.

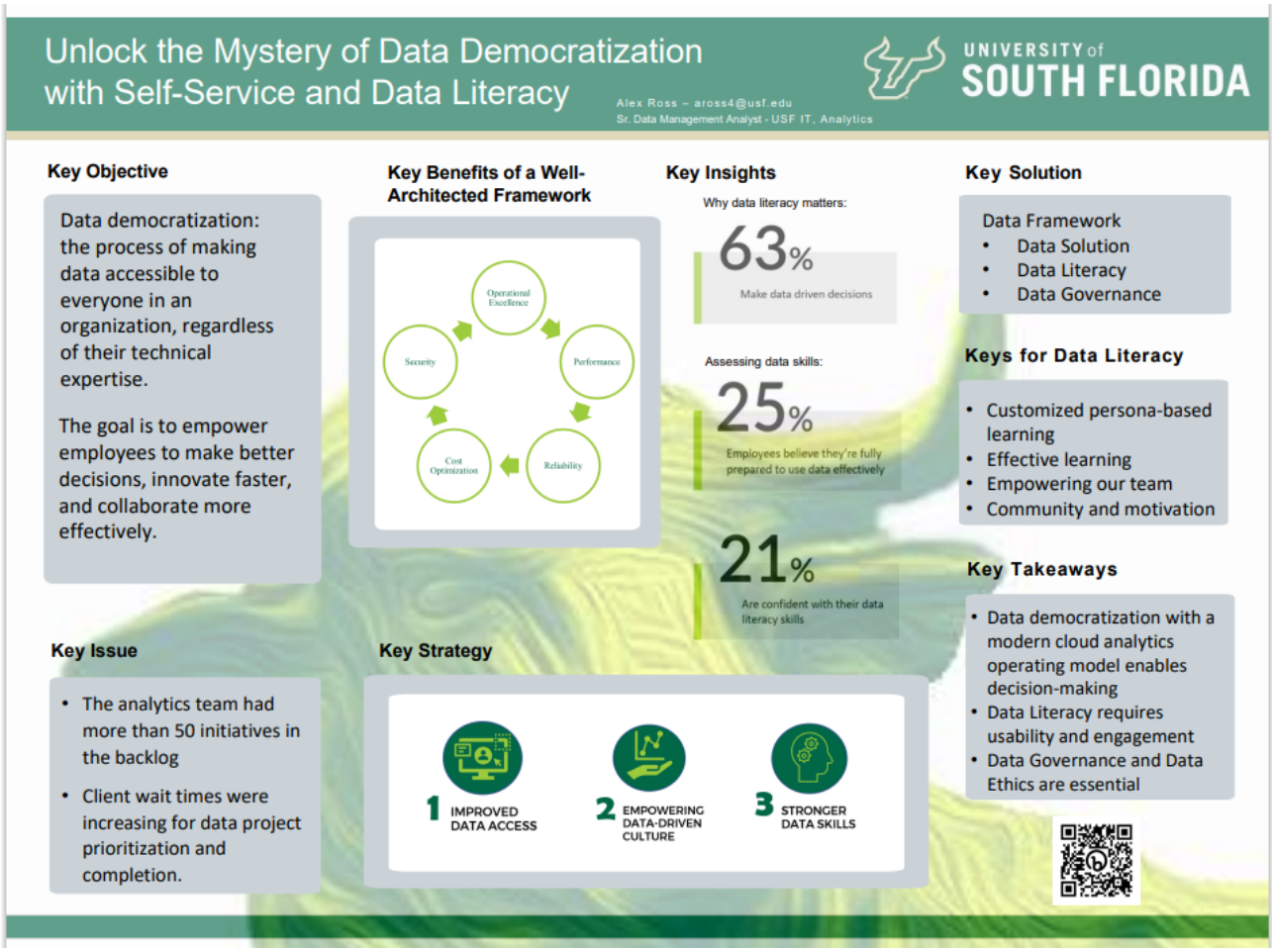
Literacy can therefore be seen as the "CARE" for data management: CARE being meant as the attention given to data management, with evidence of empathy and seeking for a long term well-being.

In some American universities, data literacy is obtained thanks to specific training including awareness-raising, presentation of the data governance in place, and knowledge of regulations. These are planned in particular for each recruitment, whether for administrative positions or for teaching and research positions. While in the French research world, we have implemented trainings to both data management plans and researchers' digital identities management, American practices can be perceived as a generalization in terms of both scope and scale.

In other institutions, data literacy is used to improve student success, whether through better support for their academic careers thanks to data, or through the development of dedicated data skills.



Phases of Maturity in Data Literacy from Mariacopa Community College's presentation "Making data less difficult"



Poster EDUCAUSE 2023 about Data Literacy

A booster injection of Data Governance - Strong, shared governance -

For the record : the immense scope covered by data governance

Data governance applies to a wide number of data centric tasks

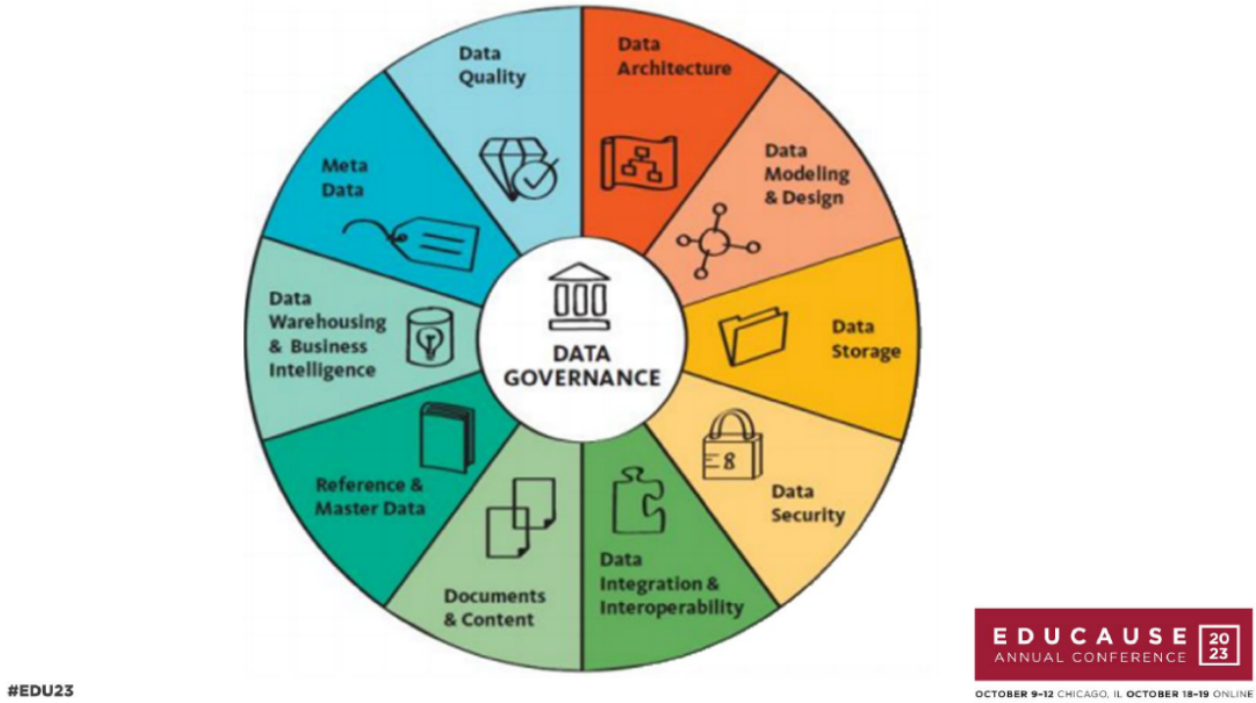


Illustration from the presentation "HUG a CDO" in a chapter entitled "Why do IT and business units need to collaborate? "

An inspiring organizational scheme

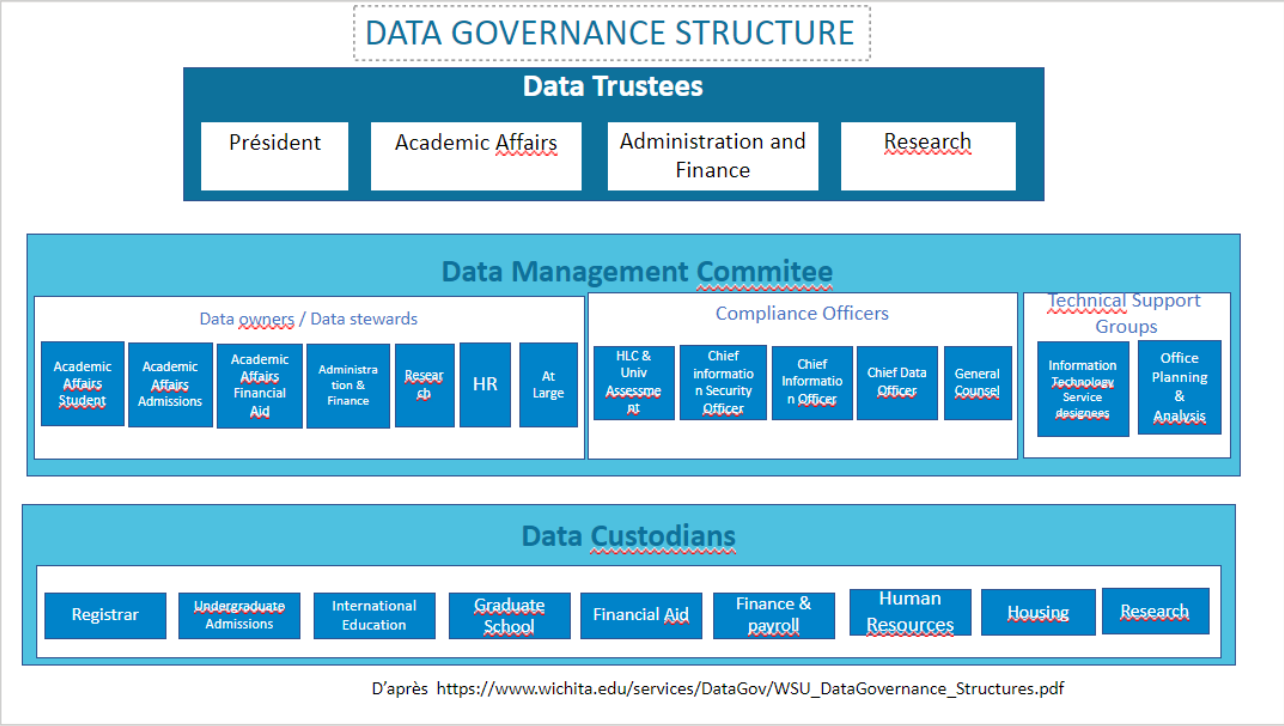
The Data Governance Community Group had a strong presence at EDUCAUSE 2023 with, in addition to the classic poster, several workshops and testimonials on the implementation of data governance and the popularization of the role of Chief Data Officer (for example, via a participatory workshop entitled "Hug a CDO").

The elements presented below concerning the University of Wichita are based on a method and a set of tools proposed by this working group.

The University of Wichita[137] provides us with an inspiring model for a founding document. It sets out all the elements required to set up a data governance policy, and describes the statutes, bodies and functioning of such bodies as the Data Governance Council.

This model is used, tested and adapted by several institutions (no recent statistics available).

[137] https://www.wichita.edu/services/DataGov/



Proposed data governance model (after Wichita University)

This system involves all the hierarchical layers in the operation of a facility, and represents all professions and activities (management, functional, technical, etc.).

The proposal highlights the different levels of organization required for collaborative governance and the search for buy-in from all the institution's players:

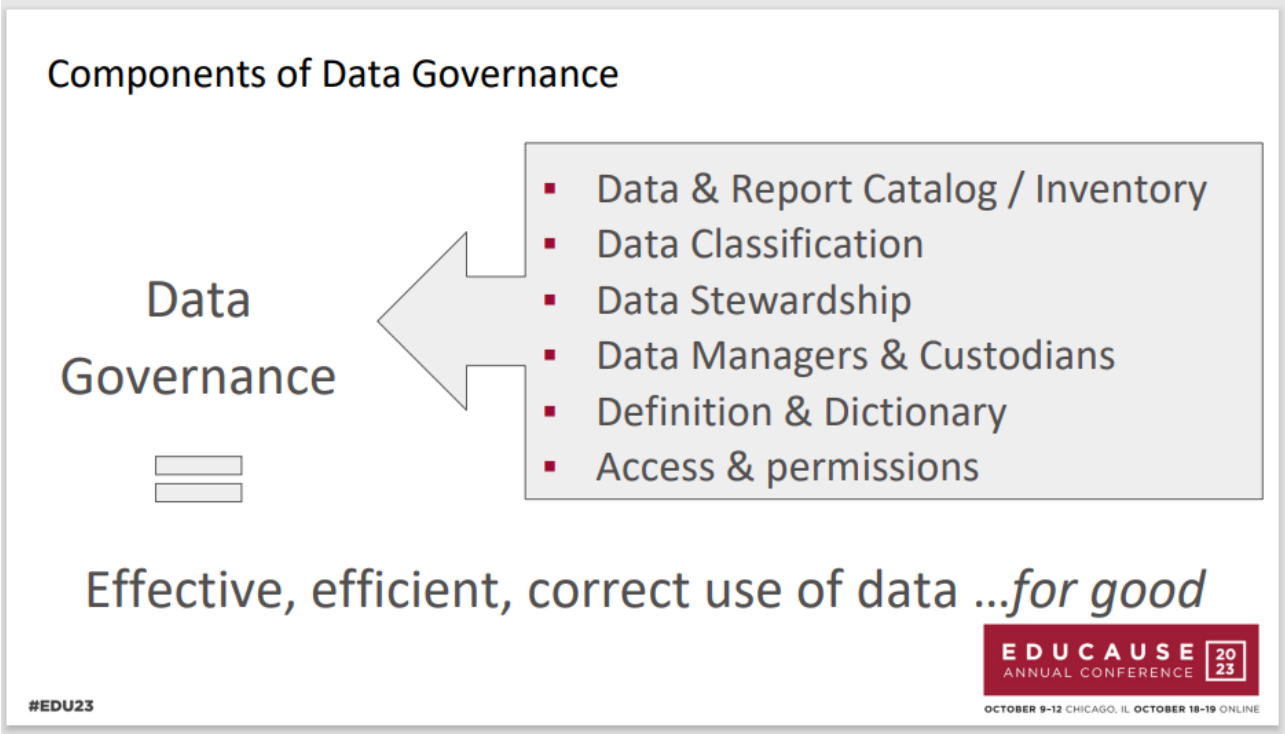
- A strategic level with "Data Trustees", which clearly shows that this subject goes far beyond IT, and that properly managed data throughout its lifecycle is the basis for decision-making on issues such as user service, strategic development, and cost reduction for a facility. Trustees define strategic data priorities and arbitrate proposals or conflicts identified by the Data Management Committee.
- A decision-making level, the "Data Management Committee", which includes data owners, data stewards, compliance officers and those in charge of data management (IT Department and Steering Department). Data owners can decide on data access rights, while data stewards can decide on data management policy in a functional area or more transversally.
- And finally, the operational level, which brings together, in an advisory capacity on the Governance Councils, those responsible for data in a specific functional area, known as "Data custodians", who are in charge of maintaining this data.

This matrix organization includes all data-related professions, covers all functional areas and the geographical dimension, and includes representatives from different campuses.

Meetings of the Data Governance Council, moderated by the Chief Data Officer, can be organized on request with all or some of the members of the Data Management Committee and all or some of the data custodians.

The aim is to supervise data in terms of its integrity, consistency, compliance, ethics and security, on the one hand, and to determine current uses and new query requirements, on the other.

Temporary working groups can be set up to investigate specific themes and provide input for the Governing Board's discussions.



Extract from "Using Data Strategically : The EDUCAUSE Data Governance Action Plan"

Collaborative, shared governance

This proposal does not advocate a centralized organizational model, such as that seen in our French institutions, with a steering department that manages an institution's entire data policy for a single specific objective lacking cross-functionality : it proposes shared, collective governance.

This system promotes confidence in data with a shared vision of it, it puts aside "centralization" type organizations and offers collective work on data and not putting a single person in the driver seat. For example the CDO (Chief Data Officer) role is rather to synchronize people efforts and consolidate a shared strategy.

This model aims at strengthing and unifying the vision of data for the 3 major job categories in institutions: administration, research and education.

Other feedback

The University of Chicago has welcome the French delegation to the 2023 EDUCAUSE conference. The subject of setting up its data governance is under active consideration, and it shared its strategic objectives for 2024. One of them concerns "Decision making and data" covering two aspects:

- Provide enhanced data analysis and reporting capabilities
- Collaborate with key partners to improve the quality, accessibility and governance of administrative data

Four Canadian universities also shared their progress on institutional data governance and presented their current actions and level of maturity ("Data is the new what?" Presentation), with a specific focus on the governance of "indigenous" data.

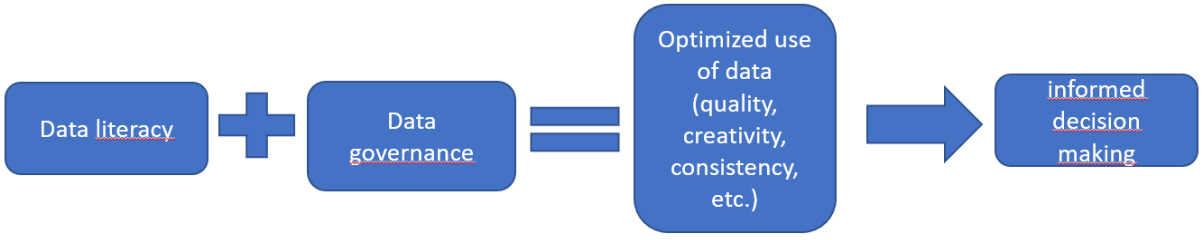
"Data is the new what?" Excerpt from the presentation of Canadian universities

A prescription for healing and being more resilient - Conclusions and perspectives -

Combining data literacy, in the sense of understanding and sharing data, with participative data governance is an effective way of launching a general approach to data in the organization.

This "prescription" then improves the use of data, increasing its quality, consistency, and ease of sharing, while at the same time calling for the creativity of the stakeholders.

All this work involved then contributes to having better information for decision-making, the famous "informed decision making", based on a common and coherent point of truth.



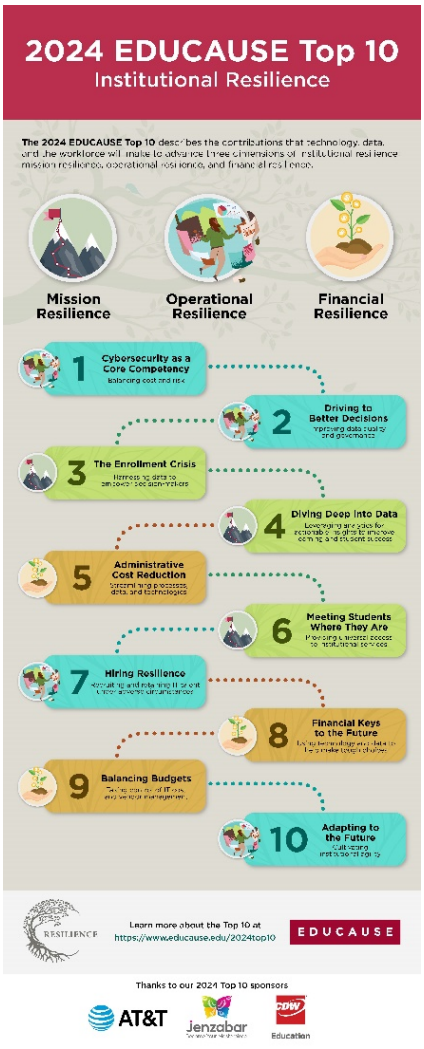
Logical path between data literacy, data governance and informed decision making

For further information, a source of reference on this subject is the document “Understanding and Developing a Data-Informed Culture[138]” published by EDUCAUSE, which provides concrete tools in its final section. Far away from American journalist Roy Rowan’s quote: "Management is the art of making decisions from insufficient information."

Vatsala Sarathy from Stanford graduate School of Business gave an interesting talk entitled "How to create a Data-Driven Culture", which presents a journey around an organization that is curious about its data. One of the key recommendation from his presentation stands at recruitment time for people exposed to data : chose people who are curious, capable of creativity, and willing to capitalize on dysfunctions. She wishes that institutions can become data-curious organizations.

All these plans about data strategy, to be successful require two fundamentals which are acculturation and training of all staff in the subject of data.

This high-dose " prescription " on data is ranked in second and fourth positions in the EDUCAUSE 2024 Top 10, via the two themes "Driving to better decision" and "Diving deep into data".



In summary a proposal for data hygiene to increase the resilience of our institutions :

“Master your data, share with others and be creative”

[138] https://library.educause.edu/-/media/files/library/2022/5/understandinganddevelopingdatainformedculture.pdf

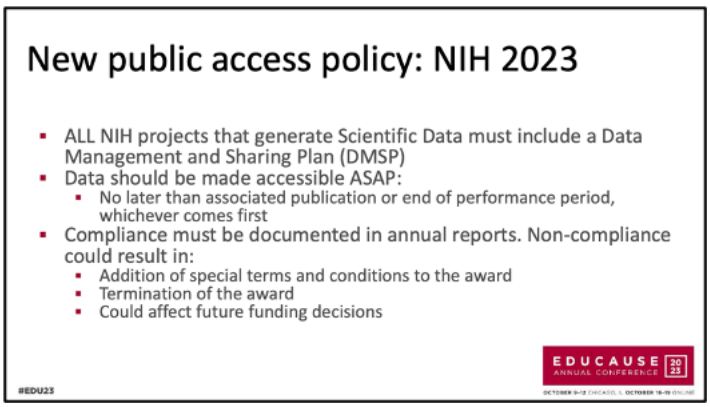
Research Data Management: Current Status and Challenges

Tatsuya Tohyama - Japanese Delegation

The management and utilization of the vast amount of research data generated in research activities is an extremely important issue for research institutions. The various data collected and generated in the research process are indispensable assets for verifying research results and making new discoveries.

The Nelson Memo, released in August 2022 by the Office of Science and Technology Policy (OSTP), requires recipients of federal research grants to make publicly available papers and related data sets that are the result of publicly funded research. This is a revised version of the 2013 Holdren Memo and differs significantly in that it places a greater emphasis on data release than in the past.

In response to the Nelson Memo, major funding agencies, such as the National Institutes of Health (NIH), have established specific policies regarding the sharing of research data. For example, the NIH's data sharing policy, which will take effect in January 2023, requires the sharing of evidence-based data sets when publishing research findings. The NIH data sharing policy also emphasizes reproducibility and requires the sharing of not only experimental data, but also data necessary to reproduce the computational environment.



Excerpt from “Grow Your Research Computing and Data Program”

In one session[139], it was noted that the demand for a wide range of data management services, including storage, security, long-term preservation, and publication support for research data, is rapidly increasing at various universities against the backdrop of the mandatory publication of research data. In addition, the establishment of a consistent management system from data creation to storage and release, as well as strengthening the linkage between research data and analysis software to ensure reproducibility, are also considered important.

Furthermore, the scope of support for research data management is also an issue for consideration. While many institutions consider support to achieve a certain level of data management essential, some do not provide support for more advanced needs beyond a certain level, while others provide flexible support as needed, indicating that each institution is making various efforts[140].

[139] https://events.educause.edu/annual-conference/2023/agenda/recent-developments-in-research-data-management

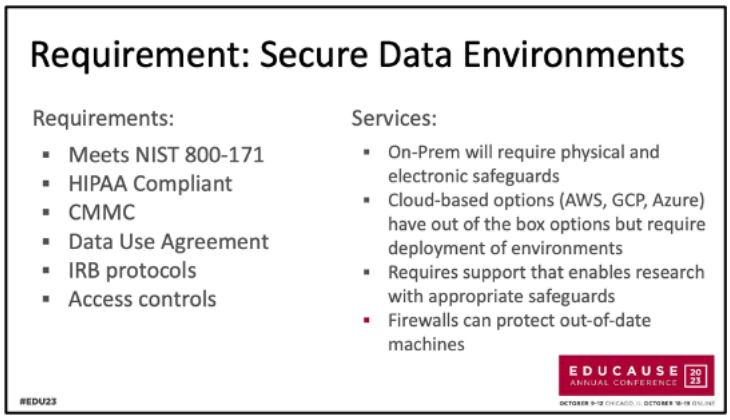
[140] https://events.educause.edu/annual-conference/2023/agenda/grow-your-research-computing-and-data-programnbspseparate-registration-is-required

Handling of research data

How to properly manage and preserve large and complex data sets, such as large-scale simulations, genome analysis, and image analysis, is a serious problem for many institutions. In one session, it was introduced that when promoting large-scale projects, management and preservation plans are formulated from the initial stage because handling of large-scale data sets is inevitable, but that sufficient measures are often not taken except for such special large-scale projects[141]. In addition, for long-term preservation of large-scale data, it is essential to have a system that can secure storage capacity and cope with complex data structures, but many institutional repositories are not equipped with such functions. In the presentation, it was introduced that some institutions have introduced measures such as excluding some of their research data from research data management as a short-term solution.

However, as the era of using AI moves into full swing, it is expected that opportunities to create large-scale data will increase in the social sciences and humanities as well, and in light of these medium- and long-term trends, it is essential to respond to large-scale data. In particular, in the medical field, while the importance of image data such as life log data, sensor images, and surgical images is increasing, the storage format and management methods for such data have not been established, and it was pointed out that a new approach, including standardization of metadata descriptions, is needed. Another issue is the development of an analytical infrastructure for the appropriate use of large-scale data. It is necessary not only to accumulate data, but also to create an environment in which researchers can refer to and analyze data from all angles.

Research data may contain sensitive data, including personal and confidential information, the proper management of such sensitive data is an important issue. In addition to simply meeting legal requirements, measures must be taken to comply with various security standards, including NIST 800-171, HIPAA, and CMMC. One session pointed out that while immediate release of research data is required, some data cannot be released, and that general repositories such as Dryad and Figshare tend to be reluctant to accept research data requiring restricted access due to the risk that they cannot adequately guarantee the confidentiality of the data they introduce It was pointed out that this is the current situation. Therefore, it has become necessary for each research institution to prepare its own recipient, but it was also pointed out that it is necessary to create a mechanism to release data on a limited basis, because it is difficult to be widely used if it is treated as non-public data.



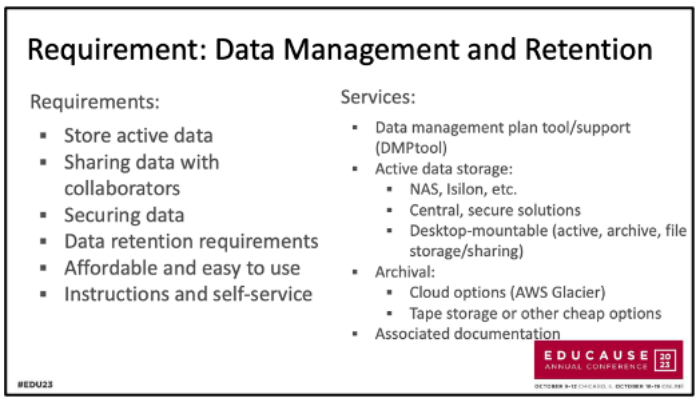
Excerpt from “Grow Your Research Computing and Data Program”

In addition, developing an analytical infrastructure called a "data enclave" for the safe storage and analysis of highly confidential information is also an essential issue for consideration. Traditionally, "data enclave" have been secured by cutting off connections to the outside world and placing them under strict security control. However, this has greatly reduced convenience and has become a barrier to the effective use of research data. One session introduced the construction of data enclave on cloud services as one way to solve this problem. Building data enclave on the cloud is expected to greatly improve convenience, as it allows access from anywhere and enables expansion of computing resources. However, countermeasures against security risks such as unauthorized access and information leaks have become important issues, and it was pointed out that comprehensive efforts are needed to introduce strong authentication functions, encrypt data, strengthen log management and auditing, prevent internal fraud, and establish governance.

[141] https://events.educause.edu/annual-conference/2023/agenda/recent-developments-in-research-data-management

Storage of research data

Research data preservation requirements such as store active data, sharing data with collaborators, securing data, and data retention requirements are being sought. One session[142] presented the various strategies universities and research institutions are considering achieving these requirements. Among them were reports that some universities that have traditionally invested in institutional repositories are expanding existing repositories, while others are moving to cloud storage services that provide access to large resources at low cost. In addition, universities with large-scale storage resources, such as large computer centers and supercomputer centers, are considering using such existing resources as a long-term storage platform for research data.



Excerpt from “Grow Your Research Computing and Data Program”

It was also reported that there is a movement to fundamentally review current institutional repositories in light of the life cycle of repositories. This seems to be due to the fact that there are cases where institutional repositories released more than 10 years ago are facing serious challenges due to aging, forcing them to choose between updating their institutional repository platform or migrating to a new platform.

There is generally no clear policy established as to when and how research data should be disposed of. It is not realistic to generally decide on "permanent retention," and it is necessary to assume that data will be deleted after a certain period. However, many institutions have not established at what point and based on what criteria the value of data should be determined, and some reported that it is important for each institution to develop its own data lifecycle management policy. As a policy for life cycle management, it was proposed that, from the standpoint of cost-effectiveness, the standard policy is to dispose of data after a certain period of time, and that data requiring permanent preservation be considered on a case-by-case basis. It was also explained that in the humanities and social sciences, the value of data often changes over time, and that it would be desirable to consider measures such as setting a certain grace period for the handling of historical materials, followed by a process to seek expert opinions again. In any case, it was reported that it is important to formulate a detailed policy according to the nature of the data after sufficient discussion among the parties concerned[143]. Furthermore, in one session, it was reported that ethical and legal considerations are also essential when disposing of data, and that a thorough disposal process must be followed for personally identifiable information and for data that pose security risks. The committee also commented that a strict management system should be established, including the establishment of a special committee for disposal, and that when considering the disposal of data, it is important to establish a process to make a rational decision after thorough discussion from multiple perspectives, including the research community and related companies.

In addition, it was reported that it would be desirable not only to establish a policy on data retention periods, but also to consider institutionalizing periodic reviews. It is important to recognize that the data retention period is only a temporary standard, and to update the policy as appropriate in response to changes in research fields or changes in social conditions involving new values. In addition to the physical disposal of data, clear rules need to be established for the handling of metadata and other related information. Since metadata contains important information such as research background, methods, and location of related materials, some reported that metadata should be stored for a certain period after the main body of data is disposed of so that it can be used for future research[144].

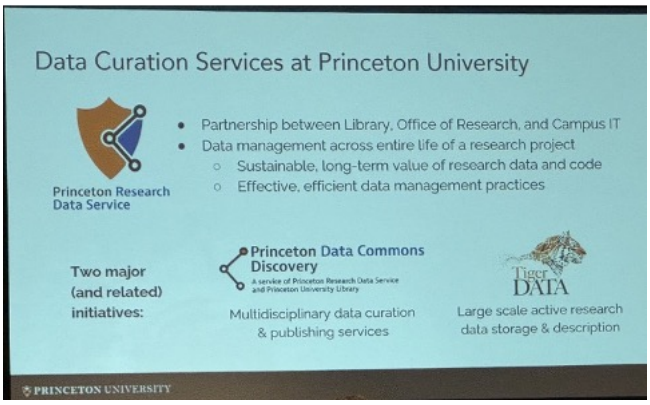
[142] https://events.educause.edu/annual-conference/2023/agenda/recent-developments-in-research-data-management

[143] https://events.educause.edu/annual-conference/2023/agenda/recent-developments-in-research-data-management

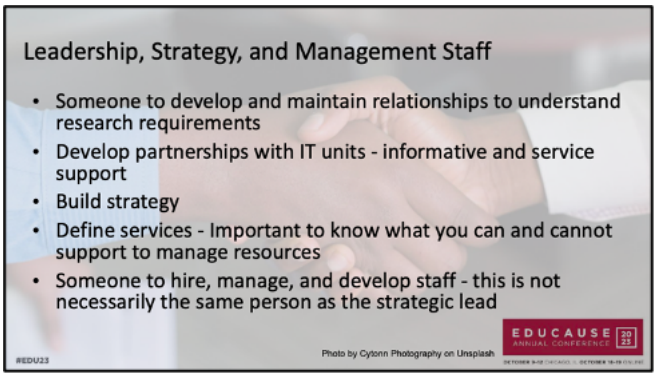
[144] https://events.educause.edu/annual-conference/2023/agenda/from-curation-to-compliance-supporting-research-data-sharing-at-scale

Organizational structure supporting research data management

In a case study of Princeton University[145], it was reported that a cross-departmental organizational structure, including the library, IT department, and research promotion department, is essential for providing effective research data management services throughout the university. In addition, it is also important to establish an organic collaboration system among a wide range of related departments, including the legal department. Furthermore, the operation of research data management services requires the securing of diverse human resources, including leadership personnel, system infrastructure personnel, user support personnel, and communication personnel. It was also reported that it will be necessary to procure human resources in a variety of ways, including salary innovations and the use of student assistants[146].



Excerpt from "From Curation to Compliance: Supporting Research Data Sharing at Scale"



Excerpt from "Grow Your Research Computing and Data Program"

In university organizations, changes in leadership often trigger a review of strategies and replacement of relevant personnel, and in many cases, the interdepartmental cooperation that has been built up to date is disrupted. In addition, as new management issues erupt one after another since COVID-19, the focus on research data management may also take a back seat. One session[147] reported that the establishment of a permanent interdepartmental collaboration system from a long-term perspective is an important issue for the future Specifically, it was reported that establishing a permanent committee on data management and institutionalizing the participation and mutual understanding of each department would be a promising option, and it was suggested that establishing such a top-down framework would make it possible to develop medium- to long-term organizational efforts on an ongoing basis.

Conclusion

I have summarized the status and issues surrounding research data management in universities and other research institutions based on the contents and discussions of related sessions at Educause Conference 2023. None of these issues can be solved immediately, and long-term efforts are required.

First and foremost, it is important to establish an institution-wide system to address these issues. In addition, a cross-organizational governance structure must be established, research data management must be positioned as an important management issue for the institution, and a system must be built to ensure that sufficient human and financial resources can be secured over the long term.

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[145] https://events.educause.edu/annual-conference/2023/agenda/from-curation-to-compliance-supporting-research-data-sharing-at-scale

[146] https://events.educause.edu/annual-conference/2023/agenda/grow-your-research-computing-and-data-programnbspseparate-registration-is-required

[147] https://events.educause.edu/annual-conference/2023/agenda/recent-developments-in-research-data-management

In addition, a deep dialogue among stakeholders is required on how research data management itself should be conducted. It is necessary to look at the entire lifecycle of data, from collection, processing, preservation, release, and disposal, and to examine issues and optimal solutions for each process in cooperation with industry, academia, and the public sector.

Thus, research data management is an important issue that universities and research institutions must seriously address as we move toward a fully-fledged data-driven society. The mission of universities and research institutions is to appropriately manage high-quality research data, ensure transparency in the research process, and develop an environment that allows maximum use of data in society. We felt that universities and research institutions are required to seek and implement appropriate research data management methods according to their own circumstances.

Computing, Storage, Network… Where does the Cloud fit in ?

Olivier Wong-Hee-Kam - French Delegation

Previous editions of the EDUCAUSE Report trace Cloud trends (IaaS, PaaS, SaaS)[148] :

- Follow UP – On the Cloud again, p.52 EDUCAUSE Report 2021 (English version)
- Cloud & SaaS, p. 91 – 94, rapport EDUCAUSE 2020 (in French, no English version available on that year)
- Cloud, p.50 – 53, EDUCAUSE Report 2018 (English version)
- Cloud: presence at EDUCAUSE and trends, p 31 – 36, EDUCAUSE Report 2017 (English version)

In the last article, the author wrote: “In general, the Cloud is now acquired, and many universities have embraced a Cloud First policy.” This observation is confirmed in 2023: during the opening of the session « Moving Core IT to the Cloud: Strategies for Small Colleges »[149] : the presenter stated: “Tambellini research shows that in 2022 more than 95% of ERP selections were for SaaS-architected solutions, and we know it’s a similar statistic for other core IT systems. But the journey is especially difficult and important for small institutions with limited resources”. Instead of a “Cloud First” approach, their financial resources and existing infrastructures require a more pragmatic "College First" strategic approach. Visiting Oakton College[150] was an opportunity to observe this delicate process indeed relevant today for many parts of the information system.

The picture is more contrasted for issues related to research support (data centers) or network infrastructure.

Cloud in Research ?

The following presentations address strategic, technical and financial issues when it comes to designing, deploying, maintaining high-performance computing (HPC) and storage infrastructure, whether "on premise" or using cloud providers.

[148] The term Cloud or Cloud computing covers a galaxy of services. The main ones are SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). These concepts are cited below and explained in this article https://en.wikipedia.org/wiki/Cloud_computing

[149] Support available at https://events.educause.edu/annual-conference/2023/agenda/moving-core-it-to-the-cloud-strategies-for-small-colleges by Michelle Hobbins, CIO / Associate Vice President for Information Technology & LIS, Carthage College & Nathan Phillips, CIO, American College of Healthcare Sciences & Bill Thompson, Director Digital Infrastructure, Lafayette College.

[150] See the article *On-Site Visits* of this report

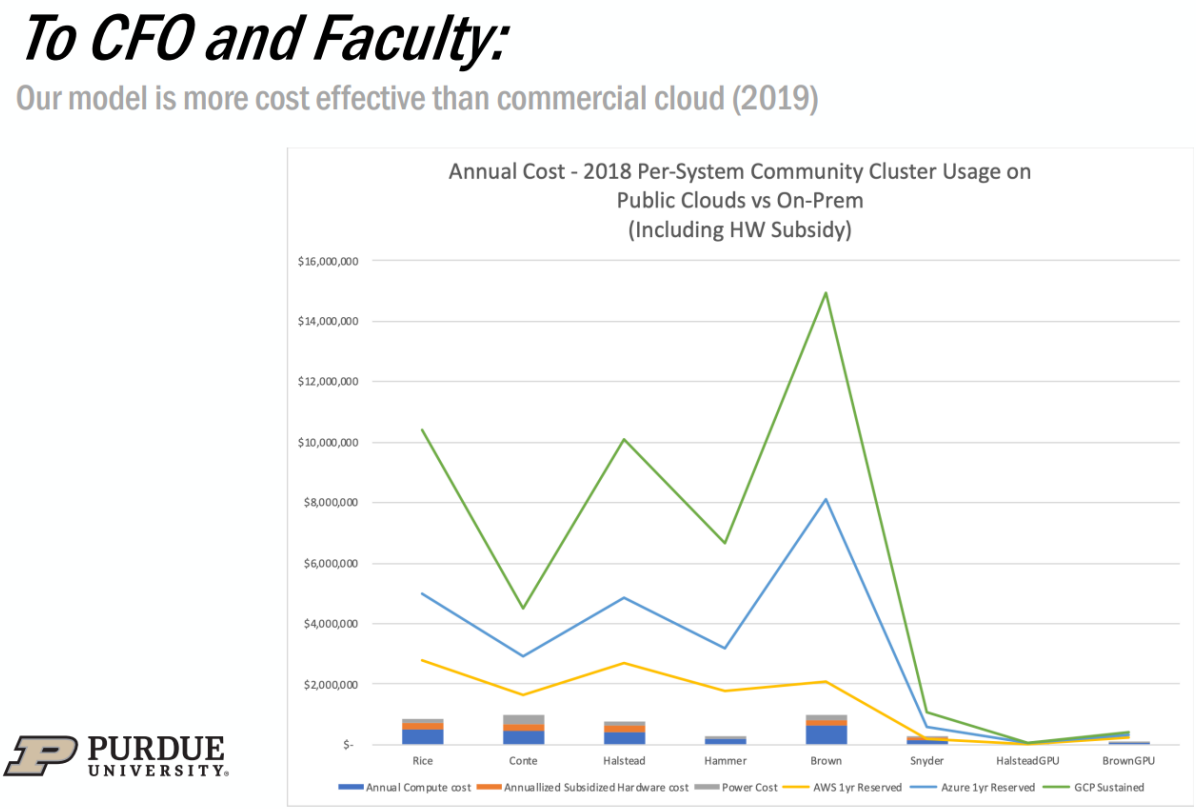
Adventures in Communicating Value of Research Computing Investment (Purdue University)[151]

Purdue University has promoted mutualization of computing resources “on-premise” for its various colleges since 2006, by creating the Rosen Center for Advanced Computing (RCAC)[152] : the Center hosts several shared clusters. Among them, ten of which are currently among the world’s top 500 supercomputers[153]. This long-term commitment comes from a desire to democratize HPC tools.

The presentation focuses on communication strategy towards the institution's local actors, summarized in 3 steps :

1. Know your Stakeholders, and what is important at the institution at this point in time
2. Have quantitative Center metrics telling your story based on the interests of the specific stakeholder, given the institution’s priorities in the current context
3. Get Testimonials. Don’t underestimate the power of qualitative data

The strength of this strategy lies in the depth and exhaustiveness of the measurement approach exposed in point 2. Exploring different dimensions is possible to answer the issues of key stakeholders.



Annual cost compared for each cluster versus public clouds providers.
Preston Smith, Purdue University

For example, the progression of investments reported to the computation capacity shows an optimization of costs : Figure above[154], the presenter compares the total annual costs of different clusters of the university with those of generalist cloud offers (Amazon AWS, Microsoft Azure, Google GCP). The latter appear systematically two to ten times more expensive. This type of computation workloads doesn’t get along with the cloud's elasticity: the very high computing and storage capacities available almost instantly are unused and cost more.

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[151] Support available at https://events.educause.edu/annual-conference/2023/agenda/adventures-in-communicating-value-of-research-computing-investment by Preston Smith, Executive Director, Rosen Center for Advanced Computing, Purdue University.

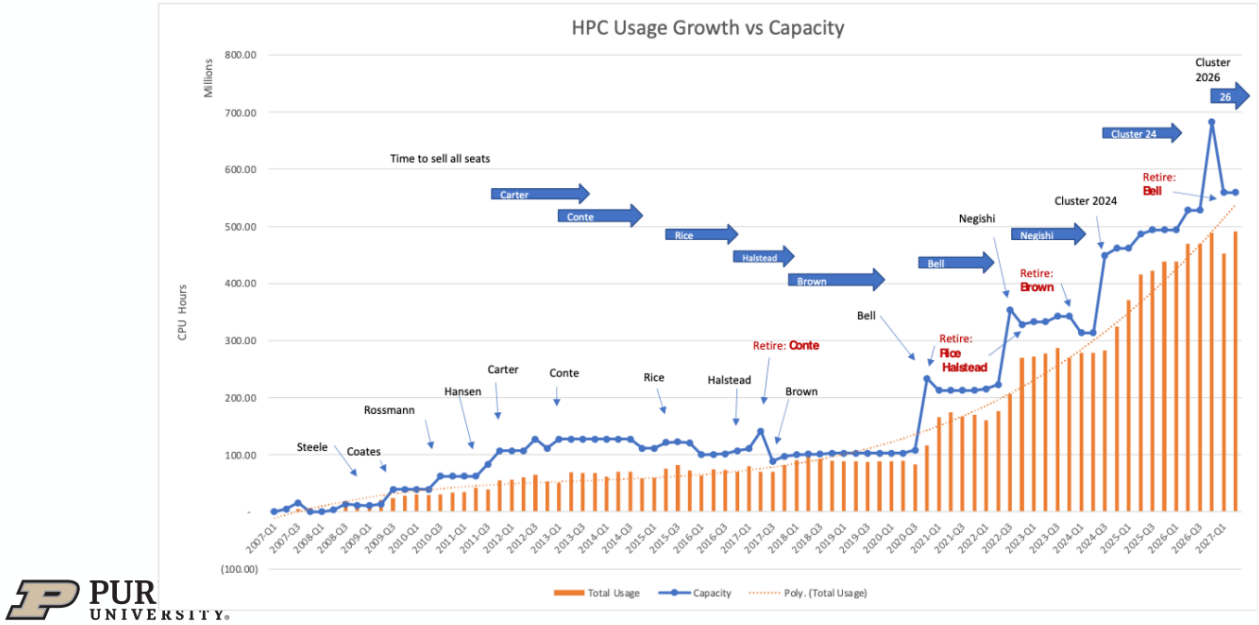
[152] https://www.rcac.purdue.edu/about

[153] RCAC Annual Report 2022, p.7 https://www.rcac.purdue.edu/files/publications/annualreports/2022-Annual-Report.pdf

[154] Source : https://events.educause.edu/annual-conference/2023/agenda/adventures-in-communicating-value- of-research-computing-investment

To CIO and CFO:

We understand our sales and usage patterns well enough to plan our lifecycle needs



Growth over time for HPC usage versus capacity.
Preston Smith, Purdue University

On this point, the presenter emphasizes the very strong convergence of computing capacities along the nature of workloads: Figure above[155] shows a strategic planning of investments where HPC clusters occur at the right time to serve researchers' projects, while ensuring every cluster is fully occupied in order optimize the return on investment .

Communication towards different profiles of stakeholders highlights the direct contribution of RCAC to research performance: majority of research funding obtained by RCAC users, positive return on investment, significant contribution to the university's overall funding, greater productivity in research according to multiple criteria (scientific field, publications, citations, H-index, expenses, fundings).

The contribution to the teaching and learning is also addressed positively: over the last five years a graph shows a growth of courses and graduates based on RCAC's resources.

A research work conducted by the presenter tries to model (scientific) production as a function of work (staff salaries) and investment (calculation speed measured in TeraFlop/s). The conclusions are specific to Purdue University. This approach makes it possible to map the influencing factors according to research performance criteria, and even to compare different institutions.

[155] Source : https://events.educause.edu/annual-conference/2023/agenda/adventures-in-communicating-value- of-research-computing-investment

Scaling Research Computing Environment: A Journey to the Cloud! (Bentley University)[156]

In 2021, Bentley University's computation infrastructure was near its end of its useful life. It no longer met researchers' needs (economics, finance, management, mathematics, etc.): advanced statistical analysis, big data, natural language processing, Machine Learning (ML), Deep Learning. At that time, the size of the staff was clearly insufficient given the challenges: recently obtained fundings meant that research activities had to start quickly.

The presenters summarized the approach implemented after two years of hindsight. They began by identifying 5 issues linked to their context to guide future choices :

- Management of technical and financial environment: researchers independently determining the use of computing clusters, with diverse financial models
- Cloud vs. physical servers : limited adoption of cloud computing, but potential shorter run times, variability in hardware replacement cycles (from 3.5 to 10 years)
- Security : legally regulated enclaves (HIPAA, CUI, etc.), with a mix of security standards
- Storage and backup : balance between bandwidth and capacity, up to archiving (cold storage)
- Training and technical support : emphasis on thorough documentation, diverse support models, status and connectivity dashboard, assistance by system administrators for performance optimization as necessary

After studying a panel of institutions with a similar size and scientific problems, they note that the majority of them were "on-premise". However, a physical infrastructure hosted on-campus (or on colocation in another Massachusetts campus) means :

- Investment budget (CAPEX – Capital Expense) in computing and storage servers
- Annual operating budget (OPEX – Operating Expense) to maintain the environment in the data center on-campus

The Cloud approach is chosen because there is not enough time, particularly to recruit profiles with the right skills. What's more, they can mobilise an OPEX budget quickly, and this outsourcing gives them the experts they need. The chosen solution is Microsoft Azure, following a comparative study with Amazon AWS and NERC[157].

The next step was to define the needs with representative use cases in the form of four "Research Computing Persona". Each profile is described in terms of its scientific objectives, ML skills and specific needs, particularly in terms of parallel computing or the preferred operating system. The needs are described in terms of the complexity of the algorithm (which has an impact on the duration of the workloads) and the size of the data sets.

To meet these needs, the chosen Cloud solution proposes 3 types of environments, with a range of prices depending on the features already integrated. For each environment prices vary according to the type of virtual machine which is described in terms of the number of CPU cores, GPU, RAM, storage, and location. All this configuration data is summariszed in a spreadsheet. The file is used to cross-reference the needs (persona) with all the available offerings: around ten typical scenarios are then established, making it easier to analyse the objectives of the researchers, whose workloads are qualified in terms of intensity and frequency. By configuring the desired options in the file, they can quickly obtain realistic cost forecasts in relation to their needs.

The spreadsheet is also used during the deployment phase as a cost control tool. Cloud dashboards provide data (consumption, cost) that are integrated into the spreadsheet. Then the presenters are able to forecast overall trends on a weekly basis, well in advance of the monthly billing deadline.

This ability to forecast costs is essential in a Cloud context: informing users enables them to adopt good practice and optimise the use of virtual machines. For example, they were able to indicate which of their virtual machines had been switched off via the daily shutdown at midnight: laboratory managers were then able to encourage their researchers to shut down their virtual machines properly earlier, thereby avoiding unnecessary extra costs.

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[156] https://events.educause.edu/annual-conference/2023/agenda/scaling-research-computing-environment-a-journey-to-the-cloud by Cilfton Chow, Sr. Research Technology Consultant, Bentley University & Gaurav Shah, Director, Academic Technologies, Bentley University.

[157] The NERC or New England Research Cloud is a service (IaaS, PaaS, SaaS) offered by the Massachusetts Green High Performance Computing Center, a regional inter-institutional consortium https://nerc.mghpcc.org/about/

Support for researchers is an important aspect and starts with a formal contract. The aim is to specify scientific needs, not to specify equipment. Each user manages their own budget, with no charge-back for support. Ideally, the contract should be formalised before any funding is obtained, so that a Cloud budget (in OPEX) can be included et the very start of the research project.

Such an approach requires new skills: in addition to system administration on the Cloud solution, it is essential to master cost modelling as part of a FinOps (Financial Operations) approach. This “Cloud first” approach is not exclusive: the team will still support a minority of specific needs when it seems appropriate to acquire a dedicated machine.

Data Centers of the Future: They Are More Exciting Than You Think (University of Chicago)[158]

The presenters addressed a number of trends discussed with the audience in terms of needs and technologies, illustrated with concrete examples :

- HPC needs are in strong expansion (explosion) with an increase in the bay density (25kW and more) which requires significant electric power supply and special care about weight
- Cooling[159] needs are increasing, and concerns are raising about hot spots management: therefore energy demand is increasing, and related costs too
- Flexibility in design and operation becomes a necessity, along with strong integration with the community of stakeholders. An open-minded approach is needed about design and cost modelling (peer evaluation, industrial partnerships, publications, and communications)
- Reducing the environmental footprint requires a global approach on the whole current technical stack, with openness to alternatives: colocation, Cloud, geographical migration (climate, cost of energy)

The reflections presented below synthetize a transcription of the exchanges. Some parts were deepened during the visit to the University of Chicago's data center[160] : Ray Parpart, Director Data Center Strategy & Operations, toured the behind-the-scenes with passion, humility, and transparency.

The data center is spread over three buildings (the oldest of which has been in service since 1960) for a capacity of 1400m² occupied by about 400 bays. These are occupied at more than 80% by more than 4000 servers. 55 Po of storage of different storage technologies coexist with a great variety of computing nodes (CPU, GPU, FGPA). The renovation of the main building was constrained by the original envelope and its architectural limits. This point illustrates the flexibility approach in designing a data center: various measures have been provided to manage the risk of flooding which structurally affects a part of the building. As a flooding incident, such measures were able to deal efficiently with it, fortunately without major damages to the infrastructure.

The DEEP Gold[161] certification awarded in 2022 testifies the level of commitment and work accomplished to reduce the environmental footprint of the data center which had become the 4th largest power consumer of the University. University’s sustainability optimizations improved the overall efficiency of cooling: use of rear door heat exchangers that reduce cooling energy, the treatment of the raised floor as a slab space that eliminates bypass airflow, and a shift in voltage that produces less heat off transformers. Among future evolutions, direct-to-chip liquid cooling is studied. Immersion cooling, despite desirable high efficiency, seems difficult to implement due to frequent physical interventions.

The automation approach[162] deployed around their DCIM[163] software in the last 10 years offers flexibility, as processes become more resilient, risks of errors are minimized, and intervention times are reduced. Time savings are reinvested in optimizing the data center design, investing in predictive analysis, and strengthening

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158 https://events.educause.edu/annual-conference/2023/agenda/data-centers-of-the-future-they-are-more-exciting-than-you-think by Kemal Badur, Chief Technology Officer, University of Chicago & Ray Parpart, Director Data Center Strategy & Operations, University of Chicago

159 About chilling technology in a data center : https://www.techtarget.com/searchdatacenter/tip/Data-center- cooling-systems-and-technologies-and-how-they-work and a video https://youtu.be/xBxyhxmhigc

160 See the article *On-Site Visits* in this report

161 https://datacenterevolve.com/sites/default/files/UChicago%20Case%20Study.pdf

162 See article and recording here : https://www.sunbirddcim.com/blog/3-real-world-use-cases-driving-data- center-automation-integration

163 Data Center Infrastructure Management https://www.techtarget.com/searchdatacenter/definition/data- center-infrastructure-management-DCIM

hosting services: IaaS for users migrating machines from a department and PaaS for users wanting virtual machines on a shared or dedicated cluster .

Researchers have a wide range of HPC needs now present in all disciplines. University of Chicago created the Research Computing Center (RCC)[164] to support them. The Center promotes best practices sharing, retaining internal skills up to date (architects, developers, cloud or data engineers): they provide training, scientific animation, and thematic expertise. The “Midway” cluster dedicated to the RCC represents nearly half of the data center's bays. The RCC developed of collection of software covering the major fields of scientific computing, tailored to quickly burst workloads on Midway. Other approaches are promoted: workloads running on Cloud platforms (AWS, GCP, Azure) is possible with an internally developed software called Skyway[165] : “Skyway enables users to run computing tasks in the cloud from Midway in a seamless manner without needing to learn how to provision cloud resources. Since the user does not need to setup or manage cloud resources themselves, the result is improved productivity with a minimum learning curve.” Users can efficiently choose to outsource (or not to).

The Research context is important here: the nature of the workloads implies that the on-premise clusters are occupied at full capacity and permanently. Here, the Cloud appears as a complementary solution to get a result quicker or to experiment temporarily before obtaining fundings for the final solution. However, if all the workloads were to switch to the Cloud it would be difficult to bear the global OPEX.

The physical space needed for the data center remains a major challenge for the University of Chicago. Colocation has been explored with specialized players but in the end, there are only a few who can accommodate such needs. At present, the decision has not been taken because long-term financial sustainability remains uncertain given the level of OPEX required.

The University is also investing in international collaborations, through its wholly owned affiliate UChicago Argonne LLC[166] which manages the first national laboratory Argonne. Known for its historical participation in the Manhattan Project, the laboratory founded the Argonne Leadership Computing Facility[167] in the early 2000s to host multiple supercomputers. Aurora[168] is the latest addition to the stable: created with several innovations, it should exceed 2 Exaflop/s when ready for service, aiming for 1st place in the Top 500. .

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[164] Created in 2012 https://rcc.uchicago.edu/about-rcc and presented by Hakizumwami Birali Runesha, associate vice president for research computing and director of the Research Computing Center, University of Chicago

[165] Description at https://cloud-skyway.rcc.uchicago.edu/ and code published at https://github.com/rcc-uchicago/skyway

[166] https://www.uchicagoargonnellc.org/about

[167] https://www.alcf.anl.gov/

[168] Description at https://www.alcf.anl.gov/aurora

Network

"*NaaS or No NaaS*" the presentation[169] title summarizes the key question for CIO as network costs (investment and maintenance) are increasing while campus budgets are more and more limited. As the trending approach "as a Service" affects every part of the digital world, the network professionals wonder about the emerging concept of "Network as a Service" (NaaS).

The following presentations do not show an implementation of a NaaS approach but highlight the current sensitivity towards building a highly valuable service based on network. The latter appears here as a driver of innovation serving strategic goals.

Modernizing the Campus Network to Support Success (University of Illinois Chicago)[170]

The University of Illinois Chicago (UIC) is a public institution, with 16 colleges and a hospital, an enrolment of 34,000 students, and $460M invested in research annually. The campus has 110 buildings (including 3 for the data center, 1700m²) located just west of downtown Chicago. To give a baseline, the network infrastructure has: 800 network closets; 2,000 switches with 108 routers; 64,000 network ports; 6,000 access points and about 32,000 peak concurrent devices on wireless network; 7,700 VoIP phones, and 200 "silent panic buttons" underneath desks.

Early 2020, the recent vice-chancellor in charge of innovation published his office vision focusing on research and students, which implies several challenges for the network team:

- A solid strategic network plan must be designed to achieve these new objectives
- The team of 8 network engineers struggles with emergencies and outages, without enough time to invest in strategic reflections about modernization of the network
- The dependence to one specific vendor, used for every aspect of the network, is questionable
- Technical debt is considerable and there are many years of deferred maintenance
- Documentation must accurately cover technical debt and deferred maintenance

First a thorough network assessment was conducted, with an analysis of the network's performance, reliability, and security. In this context, the current Zero Trust approach represents an opportunity: the network modernization project is perceived here as much as a security project.

Prioritizing improvement points according to the strategic roadmap of the vice-chancellor helped the team to establish a strategic network plan with actions described in terms of objective, deadline, and budget.

A large part of the presentation is dedicated to different ways of communicating with stakeholders. The objective is to get institutional support and aim for an alignment of strategy and operation, enabling the team to purge technical debt while achieving intermediate objectives for each project.

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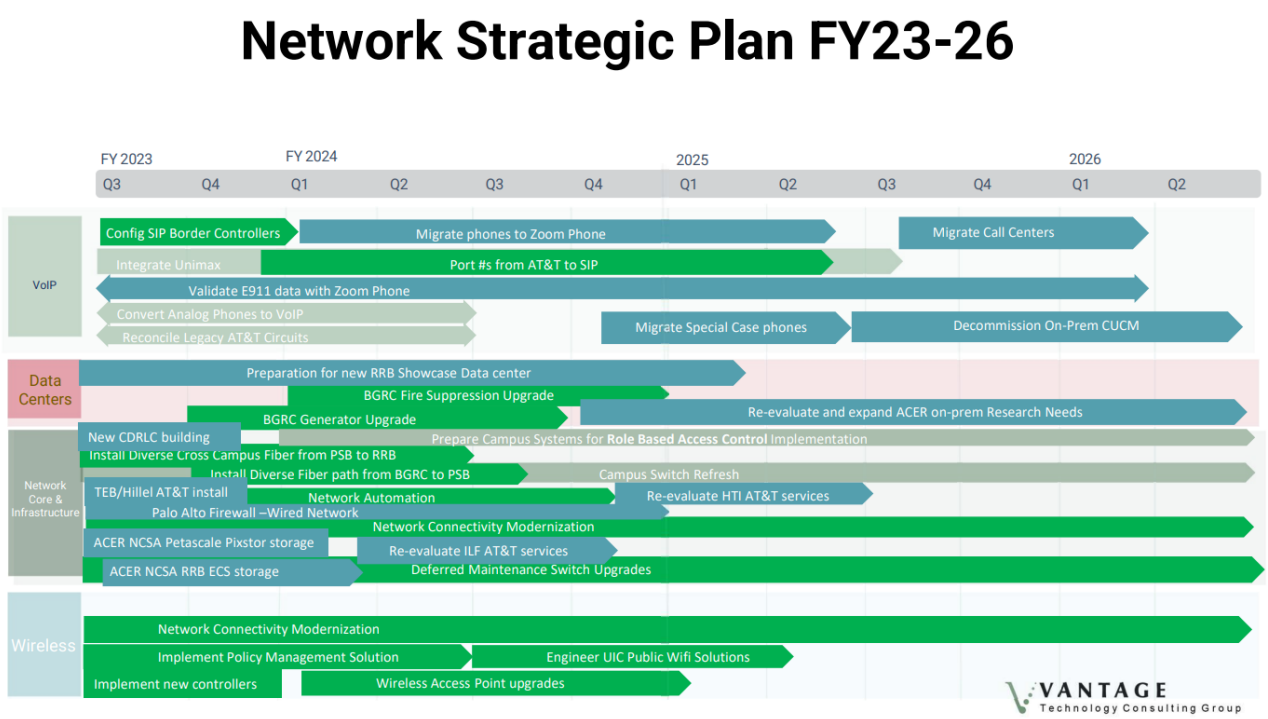
[169] https://events.educause.edu/annual-conference/2023/agenda/naas-or-no-naas

[170] Support available at https://events.educause.edu/annual-conference/2023/agenda/modernizing-the-campus-network-to-support-success by Jelene Crehan, Director of Infrastructure, University of Illinois Chicago & Jon Young, Vice-President, Vantage Technology Consulting Group. Recording of a similar presentation available at https://internet2.edu/modernizing-campus-network-to-support-success/

To deal with the workload, the team chose to outsource certain tasks or projects, or even to recruit additional staff. Automation and the use of orchestration have particularly helped the team by enabling them to :

- Reduce errors by eliminating the need for manual input, which reduces the risk of human error. The time freed up is allocated to more strategic activities, and improves the team efficiency
- Automate tasks and processes that require many manual actions. This also enable the team to take on more tasks without having to increase staffing levels
- Visualize the status of tasks and projects for more efficient prioritization and more informed decisions

The Covid-19 crisis disrupted the start of the strategic network plan. The team was able to adapt and successfully carry out the actions during these last 3 years. On the Fugure below, the projections for the next 3 years are already in place: some topics planned testimony the rise in maturity compared to the initial situation (next-generation firewall with ML, Role Based Access Control implementation).



Network Strategic Plan. Jelene Crehan, University of Illinois Chicago & Jon Young, Vantage Technology Consulting Group

Transforming IT into a Strategic Campus Asset[171]

Ryan Turner, Director of Networking at the University of North Carolina at Chapel Hill, has put in place a strategy around his team aiming:

- A stable and resilient budget
- A sustainable growth trajectory
- An innovation approach

This strategy is based on several key pillars described below.

The team is considered a strategic asset separate from the IT department, with a dedicated budget and different funding model. The network team of 10 technicians is responsible of 10,000 switches and 150,000 devices, 24

[171] https://events.educause.edu/annual-conference/2023/agenda/transforming-it-into-a-strategic-campus-asset by Ryan Turner, Director of Networking, University of North Carolina at Chapel Hill

hours a day, 7 days a week, and 365 days a year. This team is considered essential to ensure the proper functioning of the network.

Automation and delegation allow the team to focus on transformative projects. DevOps principles are embraced to produce high-value-added software solutions and strengthen skills within the team. Such profiles attract others, making it easier to recruit talented people.

A long-term strategic alliance with suppliers must be built, refusing to be trapped by an opportunistic sales approach "take it or leave it."

The team is also encouraged to adopt an innovation approach by taking initiatives and developing complex and inspiring projects and avoid silos. To be more globally efficient, users are authorized and encouraged to take charge of certain basic services, allowing the team to focus on such tasks with higher added value.

Communication is at the heart of the strategy. The presenter encourages proactive communication and emphasizes incorporating and listening to user feedback. Establishing formal processes improves the quality and speed of communication and must be tested and trained: in the advent of an issue or just an issue suspicion, information must be sent quickly without waiting for the problems to worsen. For example, he recommends alerting users as soon as a service becomes unavailable even if the restoration should take less than 10 minutes, because a 5-minute silence is long enough to stack much more problems.

Communication is formalized in detailed semi-annual campus reports (Figure below[172]) with examples and images[173]. The objective is to extend mere accountability and transparency, reporting to stakeholders and users how investments are utilized. These reports also help memorialize achievements, which is useful to present the long history of successes to renewed direction or governance.

Networking Report July - December 2022. Ryan Turner, University of North Carolina at Chapel Hill

172 Source : https://its.unc.edu/2023/02/17/new-networking-biannual-report/biannual-report-july-though- december-2/

173 All reports are publicly published at https://its.unc.edu/resource/data-networking/

Private mobile network

Two presentations gave an overview of the deployment of private mobile networks (4G or 5G) within universities, citing examples of use :

- Connecting the Campus through Private 5G[174]
- Innovative Wireless Network Catalyzes University of Colorado Innovation Program[175]

Currently, the private mobile network market has not yet taken off significantly due to costs and low return on investment. Wi-Fi costs are low because the technology has been mature for 20 years. On the contrary, 5G and 4G are more recent and more expensive. Moreover, apart from recent smartphones, few devices are equipped with 5G compared to Wi-Fi which is very widespread in a wide range of devices.

The private mobile network presents advantages in complement to the wired network to address specific connectivity situations :

- Emerging use cases
- Dedicated critical applications
- Advanced security and access control

A 4G or 5G public or private network can define a slice of the network, like a dedicated lane on a road (bus lane or carpool lane) to have a fast lane adapted to certain users. For example, separate generic needs can be separated for specific bandwidth issues or latency needs: video streaming, real-time drone, automated guided vehicle[176]. 5G allows to differentiate needs according to terminals. Uplink or downlink can be prioritized for specific devices. Other advantages are greater coverage than Wi-Fi with fewer access points needed; radio spectrum less crowded, thus minimizing interferences; integrated security (relies on SIM card).

In Wi-Fi, none of this is possible: each terminal connects on an available slice, which causes bandwidth issues and latency rises when many people connect to the Wi-Fi network. For example, this occurs during large gatherings (sports competitions, big shows, or public events).

Several players have gathered (integrator, university, city) for a shared objective: testing 5G network solutions in a dense urban environment such as downtown Denver. The university serves as a giant laboratory for IaaS services for connectivity and IoT (Internet Of Things) devices as well as for incubating businesses on real-life 5G use cases. The incubator serves to protect intellectual property and support specific needs of project teams.

The chosen 5G autonomous solution is open source, providing an "on-premise" solution at a reasonable price. The financial breakdown between players is balanced in the best interests of each. This enables for partnerships with providers: the objective is provide an open platform that can connect different types of technologies. Compared with a 5G network from a public operator, there are many advantages:

- Local management of users and their security (identification relies on SIM card)
- No billing based on usage, which would be prohibitive for experiments
- Possibility of migrating towards an access license according to user demand, which represents a potential source of funding
- Scalability of the architecture according to needs

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[174] https://events.educause.edu/annual-conference/2023/agenda/connecting-the-campus-through-private-5g by Ram Venketaramani, Senior Director, Solutions, Service Provider & Edge BU, VMware LLC. Recording of a similar presentation « Are You Afraid of Adopting Private 5G? Address Your Fears with VMware at https://www.youtube.com/watch?v=RTo4Ksl8dBo

[175] https://events.educause.edu/annual-conference/2023/agenda/innovative-wireless-network-catalyzes-university-of-colorado-innovation-program-1 by Dan Griner, Director of Smart Futures Lab, University of Colorado Denver & Chad Michels, Higher Ed Account Executive, World Wide Technology & Patrick Rhatigan, Business Development Manager, RF Connect & Tyler Svitak, Executive Director, Colorado Smart Cities Alliance

[176] Automated Guided Vehicule might use network communication for navigation

Several use cases from research projects or the incubation program are mentioned :

- Help localization and guiding for blind or visually impaired people, where the precision of the 5G network is essential
- Augmented Reality information using a phone on points of interest in the city
- Snow tolling robot or delivery robot navigating in the campus with real-time control from a remote server
- Radio propagation studies inside buildings

In this niche sector, suppliers and integrators are positioned to hold the whole or a part of the infrastructure, from its deployment to its operation and maintenance, with the appropriate software suite, and management of radio use licenses, with advanced automation features.

A few thoughts

These various experiences have similar strategies in the face of shared challenges :

- Communicate with key decision-makers and stakeholders about their strategic importance in relation to the financial implications. Communication is best carried out on a partnership basis (rather than in an authoritarian manner), given the strong autonomy of the various components
- Plan for the long term. Anticipate financial flows and support staff skills development, while keeping a close eye on market developments and user needs
- Innovation as it drives attractiveness both in terms of financial returns and talent retention

Many of the issues raised may also be valid in the French context :

Recruiting skilled staff in the digital field is particularly difficult: even the most prestigious universities hardly compete with the substantial financial resources from other sectors. Off-presentation, most of the presenters indicated emphasizing the working conditions (service hours, holidays, etc.), the interest and diversity of the technical subjects, and the reputation of the institution. Several directors invest in training and upgrading the skills of their teams, to retain them for as long as possible.

Budget is under pressure both in terms of costs and financing. Inflation in energy costs is compromising investment capacity. Some universities are optimizing by mutualization of resources locally or by outsourcing appropriate services. While the entire Cloud sector is increasing its prices, unilaterally and with little room for negotiation, universities' budgets are tending to shrink. The business model is suffering from a decline in incoming students due to the demographic cliff.

The environmental impact of digital technologies is a matter of concern, as demonstrated by the University of Chicago, which is committed to reducing its environmental impact. “Finally, being green in supercomputing has truly become a global endeavour. The top 10 spots of the GREEN500 are occupied by 8 different countries: United States (3 times), France, Australia, Sweden, Spain, Finland, Germany, and South Korea.”[177]. The big 3 Cloud providers are highlighting their ecological efforts, but are nevertheless being questioned by players such as Carbone4[178].

[177] https://www.top500.org/lists/green500/2023/11/

[178] https://www.carbone4.com/en/analysis-carbon-footprint-cloud

Demand for digital resources is rising sharply, driven by underlying trends such as Big Data and Artificial Intelligence. The Cloud is growing rapidly[179] and seems to be the ultimate solution to deal with such as this demand, wanting to become a kind of measure unit by itself for the maturity of an information system. However, the offer does not appear to be fully adapted to the needs of Research, except for certain specific requirements :

- Highly variable workloads, which benefit from the responsiveness and elasticity of the Cloud
- Intense but one-off or infrequent needs, for which on-premise investment would be risky

In other sectors, the feverish rush to the Cloud is showing signs of abating. Two recent examples are indicative of the thinking underway :

- LinkedIn, despite being a subsidiary of Microsoft, is abandoning its total "Cloud only" migration to Microsoft Azure launched in 2019 in favour of a hybrid Cloud[180]: in this approach, part of the information system is on-premise while certain applications are in the Cloud
- Software publisher 37signals has decided to leave the public Cloud and opt for colocation. Its decision is explained in detail[181] and illustrates the concept of "Cloud Repatriation", i.e. a migration from the Cloud to its own infrastructure.

These steps back are the result of a pragmatic approach to analysing needs and the difficulties encountered. The focus seems to be on the desired level of control in several areas: cost, performance, visibility, security, sovereignty, and regulatory constraints.

In French higher education, Cloud solutions have been deployed at a rising rate since the Covid-19 crisis but is still below the North American level. In this respect, the hybrid Cloud strategy represents an interesting way of avoiding costly subsequent reversals, while at the same time aiming to control the environmental impact.

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[179] Global revenue from public cloud services up 19.2% year-on-year in the first half of 2023, according to IDC tracker https://www.idc.com/getdoc.jsp?containerId=prUS51501823 and https://www.businesswire.com/news/home/20231211563210/en/Worldwide-Public-Cloud-Services-Revenues- Grew-19.2-Year-Over-Year-in-the-First-Half-of-2023-According-to-IDC-Tracker/

[180] https://www.cnbc.com/2023/12/14/linkedin-shelved-plan-to-migrate-to-microsoft-azure-cloud.html

[181] 37Signals share their thoughts on the public Cloud and their architecture choices :
- https://www.networkworld.com/article/972064/cloud-vs-on-prem-saas-vendor-37-signals-bails-out-of-the- public-cloud.html
- https://dev.37signals.com/37signals-datacenter-overview/

Security, Privacy and Compliance

Julien Gibert - French Delegation

No wonder cybersecurity has been ranked number 1 priority among the ten top issues of this year's EDUCAUSE conference: although the financial impact of a data breach in higher education and research remains lower than in healthcare, pharmaceuticals or finance, the average cost has been close to 4 million dollars per year over the last two years, according to an IBM study[182]. An ever-increasing amount of data circulates in information systems made up of both in-house software bricks and external modules. Furthermore, they are accessed from different locations via virtual private networks and all kinds of terminals.

To address the risks of piracy and data disclosure, each state comes up with specific regulations in addition to those imposed by the federal government. Compliance with these regulations is mandatory to obtain state funding, but also to attract foreign students from countries with strict data protection regulations, such as GDPR[183] in Europe.

To ensure data confidentiality, strong security measures must obviously have been set up upfront.

To tackle those challenges, institutions must delve into different areas: network configurations (firewalls, multi-factor authentication, etc.), penetration tests, installation of SIEM-type tools (log collection and analysis), implementation of zero-trust architectures, certifications, use of frameworks, training for staff and students, dedication of internal or external teams (notion of managed SOC[184]).

Allocating budgets to security is key

At Oakton Community College, John Wade, Director of Information Systems, explains that two people work full-time on the cybersecurity issue, and that a third person is currently being recruited. 1% of the Community College's overall budget is allocated to cybersecurity.

At Harper Community College, in the Chicago suburbs, one of the three crew in the IT department (composed of three full-time employees) is dedicated to security. On his arrival at Harper, CIO Riaz Yussuf committed the 6th goal of his strategic plan to security. This goal is broken down into the following objectives: to protect confidentiality, integrity, and availability of data, to provide a secure technology environment for remote and on-campus access and to enhance the security posture to guard against emergent cyber threats.

[182] https://www.ibm.com/downloads/cas/E3G5JMBP

[183] https://gdpr-info.eu/

[184] https://en.wikipedia.org/wiki/Security_operations_center

Utilizing frameworks to facilitate compliance with rules and regulations

In the Exhibit Hall, Scott Foy from WTC presents how his company can help institutions to comply with CSF Framework[185]. Mr. Foy confides that the various current cybersecurity frameworks tend to overlap, and that none is necessarily superior to the others. There is no legal obligation for universities to implement this type of Framework, it is more of a proactive approach to put into motion best practices. This type of approach obviously has a cost, and implementation is often spread over several years.

CSF defines five functions, themes that cover the elements required to implement cybersecurity management (Figure below). Links to regulations and references are also provided. The Framework then defines levels of maturity for the organization to which it applies, and finally “profiles” that enable the prioritization of actions to be launched and the measurement of the organization's progress.

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CSF framework functions

Frameworks are useful for structuring cybersecurity processes within institutions, but compliance with specifications even becomes mandatory when it comes to universities handling research data, known as CUI CUI[186] (Controlled Unclassified Information). From there on, controls verifying NIST[187] standard 800-171 (often reinforced by various standards such as DFARS, ITAR, DIBCAC, CMMC) become a federal obligation.

Katrina Biscay from the University of Cincinnati emphasizes just how confused CISOs can be when faced with this multitude of regulations, each of which is relevant to a specific area of data. VP Technology at Virginia tech, Matt Wolfe is responsible for the security of data used in research labs. But as a biochemist by training, he admits that regulations are not his area of expertise. In 2022, however, the move to a cloud-based infrastructure accentuates this need for clarity. They called in a company to set up CMMC level 2 certification, derived from the 800-171 standard. This certification covers hundreds of controls. It is published by the Department of Defense and applies to all external software claiming to be integrated into the university's information system. CMMC

[185] https://nvlpubs.nist.gov/nistpubs/CSWP/NIST.CSWP.04162018.pdf

[186] https://researchcomputing.princeton.edu/systems/secure-research-infrastructure/what-cui

[187] National Institute of Standards and Technology, a U.S. Department of Commerce Standards Agency

reinforces DFARS regulations, notably by requiring third-party vendors to have assessment carried out by a third party (C3PAO).

The solution implemented by Prevail makes it possible to manage the security of CUI data both in terms of storage and transmission, in shared documentation as well as in emails, seamlessly integrating with Outlook or Gmail. It leverages a zero-trust architecture, with password-less authentication, end-to-end encryption and sharing of CUI data only with identified third parties. This makes it compatible with the use of cloud services. The provider insists that hundreds of hours were spent studying NIST / CMMC documentation to ensure the compliance of the proposed solution.

It should be noted that the advent of the cloud has contributed to the emergence of so-called Zero Trust architectures. The implementation of this type of architecture paves the way for facilitating certifications such as CMMC .

Another Framework for evaluating third-party application modules is HECVAT, used by over 166 American universities. This is a set of tools proposed by the HEISC (Higher Education Committee of Experts on Data Security and Privacy) that enable software module suppliers to self-assess their product according to the criteria it must meet to be accepted into the institution's information system. HECVAT covers security, confidentiality and accessibility.

Eva Dale, Web Services Director and Digital Accessibility Coordinator at Ohio State University, points out that universities are required to take accessibility into account in their projects because they are funded by the government. The control rules are based on the WCAG[188] (Web Content Accessibility Guidelines) of the W3C, the international standards organization for the World Wide Web. She explains that when purchasing external software, the university asks vendors to make their software compliant with accessibility requirements. Unfortunately, such compliance is not systematic, and the means of exerting pressure are all the weaker when the software is the only one to meet the required service. What's more, vigilance is required when upgrading software versions, as previously compliant software can sometimes lose its accessibility.

The use of Framework is now an established practice at universities, as confirmed by Mike Ruel of the University of Chicago. As Director Network Engineering and Operations, he specifies that the prestigious university's infrastructures meet the NIST 800-53 moderate level standard.

Management of privacy is delegated to each university

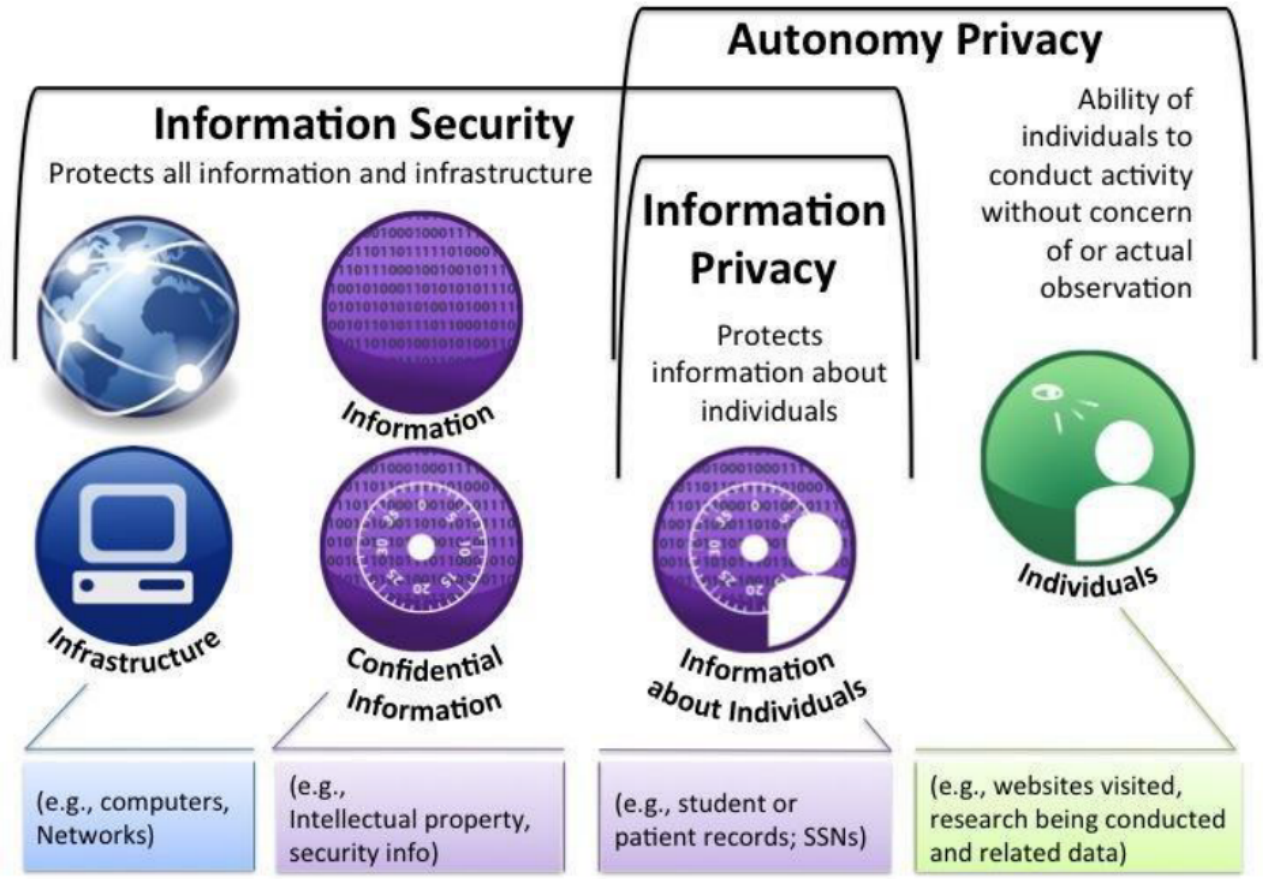
Unlike European citizens, whose personal data is protected by the General Data Protection Regulation, Americans have no national regulations. Even if a state like California has adopted the California Consumer Privacy Act, the general culture is still one of "opt-out", meaning that data is massively collected and analyzed by default, and that it is necessary to express explicitly if you don’t want to give away your data.

Each university is free to choose how to manage its students' personal data and what information to provide them on the subject.

In a presentation concerning how to weave privacy considerations in strategic decisions, Svetla Sytch, Assistant Director of Privacy and IT Policy at the University of Michigan, argues for informing the students about the implications of the use of artificial intelligence. Despite a widespread lack of interest, students need to understand what their personal data will be used for, and consider which data they are comfortable to share.

[188] https://www.w3.org/TR/WCAG21/

As far as providing educational resources, EDUCAUSE has published the CPO Primer[189] which characterizes the role of the DPO in higher education, defines his or her functions and clarifies how the notions of security and confidentiality intersect (Figure below). This document lists the various regulations and types of data (HIPAA for health, ADA for disability, etc.) and provides guidelines for launching a data confidentiality program within one's institution.



Source: UC Berkeley (2016)

Confidentiality is a subset of information security

In the absence of clear legislation on data sharing, the University of Illinois feels it has a duty to guarantee the security of its members' data. It therefore sets its own principles of good conduct in terms of data sharing. Under the aegis of both a CIO and a CISO, a relatively recent team has set up a "privacy center"[190] whose mission is to provide the most transparent possible information on the use of personal data, notably via artificial intelligence (Figure below). For libraries, it describes how and what data is collected via integrated library management systems, how long it is kept and for what purpose (improving the user experience, solving problems linked to interlibrary loans, billing, etc.).

[189] https://library.educause.edu/-/media/files/library/2023/6/cpoprimer2023.pdf

[190] https://cybersecurity.illinois.edu/manage-and-protect-my-data/

Select a Data type and find out more about what data is collected by the University of Illinois, how it is managed, and what happens to it throughout its lifecycle.

Academic Data	Cybersecurity Data	Employee Data
Health Data	Library Data	Printing Data
Prospective Student & Admissions Data	Videoconferencing Data	Wi-Fi Location Data

The Privacy center website describes the data collected

The center also aims to raise awareness on the subject, so that users who are to provide personal data can make informed choices about sharing it. It emphasizes the need for clear data-sharing policies. It also provides information on the risks involved in the use of personal data by AI: data disclosure and copyright infringement, for example.

So, in the absence of a law, the university community is taking the issues surrounding the confidentiality of personal data head-on and knows how to provide concrete answers.

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Oakton Community College

Harper College

THE UNIVERSITY OF CHICAGO

CNLL Groupe Logiciel Cellule Nationale Logicielle

CSIESR Association Loi 1901

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