

#EDU21 fr

# EDUCAUSE Annual Conference 2021

French Delegation Report

Foreword	3
French Delegation 2021	4
<b>Introduction &amp; Trends of HE in USA</b>	<b>5</b>
<b>Top-10 IT Issues 2022: The HE we deserve</b>	<b>8</b>
<b>Artificial intelligence and chatbots in Higher Education: towards a glass ceiling in terms of use ?</b>	<b>9</b>
Artificial Intelligence	9
Somes uses of Artificial Intelligence HE	10
The uses that can be seen, a perceptible reality	11
HE Institutions producing AI	18
As a conclusion	21
Bibliography	21
<b>Artificial Intelligence in Student Success : a polymorphic implementation</b>	<b>22</b>
An implementation according to the means of the university	22
Individual and Collective Progress	23
Eliminate Bias and Design flaws	24
Use the collected Data for other purposes	25
As a conclusion	26
<b>Ethics, Equity, Inclusion and Digital Accessibility in the context of the Pandemic</b>	<b>27</b>
Introduction	27
Ethics, digital, and equity in the face of racist cultural influences: knowing how to identify them: What discriminatory spikes are we constructing in our work?	28
Digital inclusion: What is the role of information technology? How do we address digital access for people with disabilities?	31
Conclusion	34
References	35
<b>Trends of e-Learning in 2021, pandemic year</b>	<b>36</b>
Designing a new normal after the outbreak	36
Sizing the HyFlex to the post-pandemic campus	36
Beyond Covid, what future for e-learning in higher education?	37
Relieving the stress of online learning	38
Using immersive technologies to teach	38
<b>Learning Spaces : new perspectives ?</b>	<b>41</b>
Post-COVID perspectives for Learning Spaces	41
Learning Space Design Community Group meeting	41
Learning Spaces and HyFlex	42
Tools	43
<b>Faculty Development : from a response to the emergency to a logic of sustainability</b>	<b>45</b>
Faculty Development and response to the pandemic	45
International Feedback	46
Lessons learned and middle/long-term projection	48
<b>Data in a post Data Lake Age</b>	<b>49</b>
Building more than a simple Data Lake	49
<b>Follow UP</b>	<b>52</b>
On the Cloud again	52
Cybersecurity, Number 1 of the Top Ten	53
Data Privacy	54

## Foreword

For the eighth consecutive year, a French Delegation was formed to participate in the annual EDUCAUSE conference. Since 2013, this initiative has been structured around complementary profiles from the French Higher Education digital sector, all of them being keen to open up to the international arena in order to find sources of inspiration and points of comparison, but also to highlight remarkable achievements. From an initial philosophy of simple participation, which prevailed during the first years of this Delegation, we have progressively moved to a resolutely more active approach, at various levels.

The members of the Delegation's steering committee actively participate in the life of EDUCAUSE, through various involvements: as proposal reviewers for the EDUCAUSE Annual Conferences and the EDUCAUSE Learning Initiative Annual Conferences, as members of the panel of experts mobilized for the drafting of the EDUCAUSE Horizon Report, or as members of various thematic Community Groups (XR and Learning Spaces in particular). In addition, there have been about 15 presentations made by members of the French Delegation at various EDUCAUSE conferences since 2017.

The recognition of these different levels of intervention has allowed us to establish privileged connexions with EDUCAUSE and in particular its executive members (President, Vice Presidents and Directors), and more globally within the North American Higher Education community, with which some formal collaborations have already been established over time. These connexions contribute to the realization of our fundamental objectives: exchange, sensitize, inform, and share in order to support the development of digital technology in French Higher Education.

Every year, our traditional restitution gives concrete expression to this desire, and has become a major annual event that we know to be appreciated. As for the accompanying report, it is being disseminated more and more, and is based on an English translation that we have quickly put in place. Outside of Europe, it is awaited and read every year in the United States, Canada, Japan, Singapore, Australia and New Zealand. This new edition of our report follows the restitution that took place on March 17th, 2022. It deals with the different workshops followed during the EDUCAUSE conference held in October 2021. It can also be completed by the different tweets posted by the delegation under the #EDU21fr hashtag.

The 2021 edition of the EDUCAUSE conference was again placed as in 2020 under the sign of the global health crisis. It was only accessible by distance for international participants like us without flights. However, a limited number of sessions outside the plenary sessions were filmed and broadcasted. The short duration (one month) of online viewing of these videos would have made it difficult to write the articles in this report. However, our intervention with the EDUCAUSE organization allowed us to have access to some of the sessions outside of the deadline and we would like to thank our contacts for this.

We wish you a pleasant and informative lecture.

The EDUCAUSE French Delegation steering committee members  
John Augeri, Laurent Flory, Thierry Koscielniak, Bruno Urbero

# French Delegation 2021



**John Augeri**

Program Director and Researcher  
Ile-de-France Digital University  
EDUCAUSE Horizon Report Higher Education Expert  
Learning Space Rating System Translator  
Learning Spaces Community Group Member  
john.augeri@unif.fr



**Christian Cousquer**

ICT Expert  
Le Cnam  
Developers Representative at Apereo uPortal  
christian.cousquer@lecnam.net



**Laurent Flory**

Digital Workplace and Communication Tools Program Director  
Université Claude Bernard Lyon 1  
CSIESR Board Member & International Strategy Leader  
laurent.flory@univ-lyon1.fr / laurent.flory@csiesr.eu



**Frédéric Habert**

EdTech Director  
Nantes University  
frederic.habert@univ-nantes.fr



**Thierry Koscielniak**

Chief Digital Officer  
Le Cnam  
CSIESR Board Member / EUNIS Board Vice-Secretary  
EDUCAUSE Horizon Report Higher Education Expert  
Extended Reality XR Community Group Member  
thierry.koscielniak@lecnam.net / thierry.koscielniak@csiesr.eu



**David Rongeat**

Chief Digital Officer  
AMUE  
david.rongeat@amue.fr



**Bruno Urbero**

Director  
National Software Agency  
CSIESR Board Member  
bruno.urbero@enseignementsup.gouv.fr / bruno.urbero@csiesr.eu



**Pascal Vuylsteker**

Former CIO CEMS  
Master Student ENSG/CNAM  
pvk@vuylsteker.net

# Introduction & Trends of HE in USA

Laurent Flory

This Educause 2021 edition was held in the Fall of 2021 in a hybrid mode. For the second time, the French Delegation attended the online version of the conference, as access to the US territory was closed. For this reason, you will not find our feedback on university study tours in this report.

The 2020 version had a slightly too strong marketing dimension; this year, the "regrets", if they were, came mainly from the hybridization. Designed to be face-to-face but also delivered online, the organization of the conference demonstrated the difficulty of reconciling virtual and real. Although inspiring, the number and variety of presentations seemed slightly below usual, probably as I.T. teams were very busy managing the pandemic issues.

From a political standpoint, the tensions of the presidential (and House) elections were much less than in the previous year. Despite the tragic invasion of Capitol Hill, the Biden administration was in place. While this Biden administration is undeniably more diverse and inclusive<sup>1</sup> than Trump's, it does little better in terms of timing. Despite a reasonable majority in the House of Representatives<sup>2</sup> (the lower House), the lack of a significant majority in the Senate<sup>3</sup> (the upper House) has delayed its implementation. The slight majority in the Senate, associated with the negotiations and vote on the various health crisis relief measures, has resulted in difficulties in legislating many of the pending issues affecting higher education. The laws on security audit obligations for university information systems, net neutrality, or reorganization of the legal framework for higher education are still (and always) awaiting instruction by elected officials and the administration. Many (70%) Republican voters still consider that Biden stole the election, according to different studies. It illustrates how American society still seems highly divided. Yet the mood in higher education is considerably more appeased for this first post-election edition. The 2022 mid-term elections will be crucial for the Biden administration, with 34 seats up for renewal<sup>4</sup>.

The health crisis has resulted in an extraordinary influx of federal funding from an economic perspective. The US federal government has provided \$1 trillion in American Rescue Plan (ARP) assistance to address the impact of the health crisis. Higher Education and Research received \$152 billion<sup>5</sup> in aid through three Higher Education Emergency Relief Fund (HEERF) plans. These funds provided emergency aid to students and institutions and (re)launched structural programs, notably around infrastructure, and especially very high-speed research networks and actions to reduce the digital divide. This massive injection of money into the economy has made it possible to strongly limit the economic and social impacts of the health crisis. Yet it is the primary origin of the inflationary thrust in the USA faces today.

This edition was supposed to be the after-crisis edition. It was not the case, as the pandemic, which is still relevant today, clearly impacted most of the interventions and conference contents. The North American Higher Education industry's predicted crisis shifted to the back burner in 2020 and came back to the forefront in 2021. The number of higher education institutions continues to decline (at three times the rate of the previous decade), through mergers, acquisitions, or closures<sup>6</sup>, despite federal support, which has presumably maintained certain institutions on life support.

---

<sup>1</sup> With twelve non-whites (including the first native inside) among his administration officials compared to 4 for Trump and 10 for the Obama administrations.

<sup>2</sup> 221 Democrats vs 212 Republicans elected

<sup>3</sup> With 48 democrats and 2 independents for 50 republicans, there is a balance, so it is with the way of the President Mrs. Kamala Harris which counts double in case of equality that the democrats have "the majority".

<sup>4</sup> 14 Democrats and 20 Republicans are up for re-election.

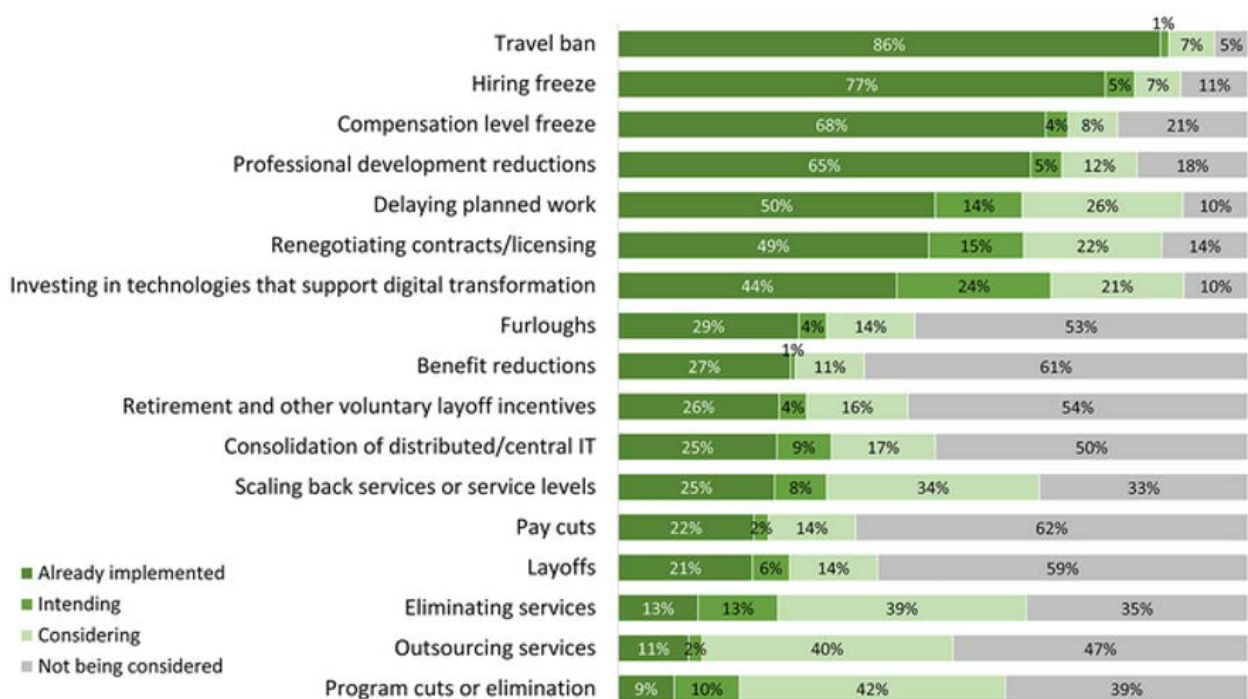
<sup>5</sup> EUR 133 billions

<sup>6</sup> <https://www.insidehighered.com/news/2021/08/02/number-colleges-shrinks-again-including-publics-and-private-nonprofits>

The crisis has vigorously challenged the value proposition of universities. The "premium" experience of the North American campuses, which justified some of the very high tuition costs, has been questioned by the lockdown. The decrease in enrollment, expected<sup>7</sup> at -15%, has been limited to -2.4% on average over 2020-2021. Nevertheless, this conceals a reduction of around -7.9% of new entrants. The pandemic has also led to a sharp drop in revenues from services and related benefits. In addition to enrollment fees, institutions charge for all services offered on campus, from cafeterias to libraries, from sports halls to dormitories, e-learning tools, and additional courses. Revenues from those services plummeted between 2019 and 2020 due to the lockdown. For example, Stanford University<sup>8</sup> has experienced the highest decrease (-46%), with a loss of \$164 million in revenue. The average loss was -16.7%<sup>9</sup> for private colleges. In addition, some students are now claiming the refund of advanced fees or even initiating class action suits against institutions (in Arizona, for example).

The demand crisis that has gradually appeared over the last few years is forecast to be a significant issue by 2025 named demographic cliff —being a conjunction of 1. a shortfall in the age distribution caused by the drop in the 2008 birth rate due to the economic crisis, 2. the problems of student debt<sup>10</sup> (reducing young adult's will to access higher education) and 3. the decline in the number of international students (both as alternatives solutions emerge globally and because of the hardening conditions to work in the USA for international students)<sup>11</sup>.

In late 2020, a quick survey of the EDUCAUSE community found that nearly two-thirds (63%) of respondents reported overall decreases in the IT budget for the 2020-2021 academic year, with a median reduction of 10% and significant impacts on travel hires, but also, to a lesser extent, program shutdowns or layoffs:



<sup>7</sup> <https://www.chronicle.com/article/how-did-these-pandemic-predictions-turn-out>

<sup>8</sup> How Did These Pandemic Predictions Turn Out? (chronicle.com)

<sup>9</sup> <https://www.chronicle.com/article/the-coronavirus-has-emptied-dorms-and-dining-halls-heres-why-refunds-for-them-are-a-tricky-calculation/>

<sup>10</sup> Reaching a total of 1,580 billion dollars in November 2021 or 1,390 billion (1.39E12) euros for an average debt of 38,792 USD per student (or 34,000 EUR) <https://www.newyorkfed.org/microeconomics/hhdc.html>

<sup>11</sup> Students who very often pay more and used to serve as an additional income source in recent years and who are now either tempted by local universities or by distance learning modules and limited in their travel initially by Trump's immigration laws and then by the health crisis.

Given this crisis, the higher education industry must inevitably reinvent itself, develop new offers and acquire new customers. Digital technology will be at the heart of these new strategies. Beyond the specificity of each of the presentations, they all included major transversal items. Students, usually at the center of educational issues, are now (re)becoming the focus of all issues. The digital divide, a significant marker of the social and ethnic fracture, has strongly impacted students' lives during the pandemic crisis. Thus, the questions of Diversity, Equity, and Inclusion that have emerged in recent years have become a significant issue that you will find throughout this report.

As in Europe, the pandemic has accelerated the digital transformation. The questions of financial sustainability, rationalization, and integration of deployed solutions will be at the heart of the issues for CIOs, with students as the focal point. Many presentations reflect this, particularly the 2022 top 10 IT issues and the deployment of AI uses. Many universities are moving from local tests to widespread production releases. In particular, we should underline the rise of chatbots to lighten the workload of technical or administrative teams and offer more services to students. The issues of how to leverage new services and uses and improve the quality of services to students are evident in the sessions dedicated to e-learning. Not surprisingly, we also find questions about academic training tools and the critical role played by digital pedagogy teams during the crisis.

The few issues related to the hybridization of the conference and expectations for the end of this crisis strengthen our impatience for a return to an on-site delegation. See you next edition in the Fall of 2022 in Denver, Colorado.

In the meantime, enjoy your reading...

# Top-10 IT Issues 2022: The HE we deserve

Laurent Flory

EDUCAUSE "top 10 issues for 2022" is online on EDUCAUSE website<sup>12</sup>. Therefore, it will not be detailed in this English version of the French Delegation report as English readers should use the original online report and documents.

Yet we would like to have a few words on a vision we shared more extensively in the French edition of our report with our community. In this report we found that common underlying keywords/trends/concepts were addressed in many issues, and we try to offer another way to see and read this 2022 report. Those eight cross issues keywords/trends/concepts are addressed in many of the top 10 IT issues foreseen for 2022.

		Priorities									
		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Keyword / Trend / Concepts	Transversality & Communication	x	■	●		x	●	■	x	x	
	HyFlex	x	■	●	●	x	●		x	x	
	Integration & Standardisation	x	■	●			●	■	x		
	Creativity & Innovation			●		x		■	x		●
	Infrastructure, Security, Sourcing & Contracting	x			●	x			x	x	
	Agility, Flexibility & Progressiveness				●	x				x	●
	Managerial Approaches & Exemplary			●	●			■			●
	DEI			●			x	■	x		

<sup>12</sup> <https://www.educause.edu/research-and-publications/research/top-10-it-issues-technologies-and-trends/2022>



# Artificial intelligence and chatbots in Higher Education: towards a glass ceiling in terms of use ?

David Fongeat

An overview of artificial intelligence (AI) as seen at EDUCAUSE for this 2021 session. A quick presentation of the subject of AI and chatbots is followed by a few uses of this technology and feedback from concrete cases of its use across the Atlantic: those that are visible and those that are underlying. As institutions are not only consumers of this technology, a paragraph is dedicated to their positions as producers and contributors around AI.

On the occasion of these different testimonies and presentations, questions about ethics, protection of personal data, contributions, limits of this technology and whether it is now completely integrated in the Higher Education system, or whether these questions will have an influence on its wider adoption, especially in Europe, appear in the background.

## Artificial Intelligence

Let's quickly define what artificial intelligence (AI) is by consulting the article "Data, data everywhere - the expansion of machine learning" in the 2020 report of the French delegation: according to John McCarthy, it is "*the set of theories and techniques implemented to create machines capable of simulating intelligence*", the underlying concept is that "any intellectual activity can be described with sufficient precision to be simulated by a machine".

Another definition is given in the INRIA white paper "Education and digital technology - Challenges and issues"<sup>13</sup> as "the automation of processes and behaviors that we humans perceive as intelligent".

The topic of artificial intelligence appeared in recent years in the trends to follow of EDUCAUSE, at least since 2016, technologies that would impact Higher Education (HE). The topic was indicated as an important point of EDUCAUSE 2020. Surprisingly, few sessions of this 2021 EDUCAUSE conference were explicitly about the topic. Except for a few sessions on learning analytics (discussed elsewhere in this report), a theme endemic to HE, the AI-related topics were mainly about hubs.

---

<sup>13</sup> Gérard Giraudon, Pascal Guitton, Margarida Romero, Didier Roy, Thierry Viéville. Education and Digital. Challenges and Issues Inria, pp.137, 2020, Livre Blanc Inria N° 04. <hal-03051329v2> <https://www.inria.fr/sites/default/files/2020-12/Livre%20Blanc%20Inria%20C3%A9ducation%20et%20num%C3%A9rique.pdf>

## Chatbots, who are they ?

One of the most visible uses of artificial intelligence is chatbots. They are functionalities that allow a dialogue, in natural language, between a user and a digital service. Their name comes from the Anglicism's "chat" and "bot" (contraction of robot).

These "conversational agents" are new forms of interface between man and machine. They respond appropriately to users' requests.

We consider that chatbots are part of the Artificial Intelligence domain because, at a minimum, they use natural language comprehension and formulation technologies, language defined as a capacity to express a thought and to communicate. The most advanced chatbots contain self-learning mechanisms (called "Machine Learning"), use massive data, and anticipate users' reactions. Some are very advanced and become real "knowing" companions. Trivially, we can categorize chatbots by their interface:

- Instant messaging,
- Connected speakers or voice assistants,
- Voice chat,
- Telephone.

To better understand chatbots: Digital collection "Chatbots at the crossroads of intelligence: Uses, technologies and Higher Education and Recherche"<sup>14</sup>

In the next few paragraphs, you will discover feedback from institutions and use cases from HE, mainly for student users.

## Somes uses of Artificial Intelligence HE

### Trends in 2021

The topic of AI appeared in the Top 10 important topics identified by EDUCAUSE in 2016. It's not highlighted anymore. Perhaps because AI is seamlessly integrated into solutions, this technology is no longer a hot topic. Let's look at the feedback presented here to build all or part of a response.

In the EDUCAUSE 2020 report of the French delegation, page 36, the topic of student success was linked to chatbots. And this paragraph, page 76 and following, "application of AI in the American Higher Education" testified to the importance of AI in topics such as marketing, pedagogy, student assistance. It also discussed the limitations of AI.

Our colleagues from the University of Toronto<sup>15</sup> summarize the uses of AI as follows: chatbots and virtual assistants, messaging systems, plagiarism detecting software, admissions decision software, student success prediction tools, grading tools, and determine learning content.

They also cite this publication by Jesse Anne Boeding, "How AI-powered chatbots are being adopted and used by higher education institutions to improve the student experience by increasing the number of professionals"<sup>16</sup>.

---

<sup>14</sup> Athanase, S., Mocquet, B. & Rongeat (2019) – Amue - « Chatbots at the crossroads of intelligence: Uses, technologies and Higher Education and Research" ; AMUE [https://www.amue.fr/fileadmin/amue/systeme-information/documents-publications/la-collection-numerique/Les\\_Chatbots-NO1.pdf](https://www.amue.fr/fileadmin/amue/systeme-information/documents-publications/la-collection-numerique/Les_Chatbots-NO1.pdf)

<sup>15</sup> Lau, M., Elias-Cartwright & K. , Newman,D. (2021) EDUCAUSE Annual Conference 2021, Philadelphia - – University of Toronto -Connecting Students to Mental Health Resources Using a Virtual Assistant <https://events.educause.edu/annual-conference/2021/agenda/connecting-students-to-mental-health-resources-using-a-virtual-assistant>

<sup>16</sup> Boeding, Jesse Anne. University of Pennsylvania. ProQuest Dissertations Publishing, 2020. 28000542. And the link : <https://www.proquest.com/openview/21ba5fd352bbd0776d54601ab891fbde/1?pq-origsite=gscholar&cbl=18750&diss=y>

But AI also carries certain restrictions, such as traceability, involvement in individual or collective decisions, ethical issues, and deviations from the educational values of HE, to be read in detail on page 80 and following of the report of the French delegation in 2020.

## The uses that can be seen, a perceptible reality

### A first use case: A chatbot that plays the anonymity and the H24 at the service of the mental health of the student

The Navi project at the University of Toronto is based on an anonymous virtual assistant that directs students to resources, services and programs related to mental health. This Chatbot, mainly based on natural language exchanges, will dialogue with the student to identify his or her problem (stress, sleep disorder, depression,) and thus direct him or her to the most appropriate device. A presentation of the tool can be seen on this [video](#).

The main characteristics of NAVI are:

- Accessible 24/7
- Anonymous
- Accessible around the world
- Receives " feedbacks"
- Connect student to human support
- Done on Watson of IBM Technology

The themes covered in the field of mental health are very diverse, to illustrate we can cite: stress, anxiety, thoughts of suicide, self-harm, drug addiction, eating disorders, access to health care, sleep problems, loneliness, harassment, intimidation, stigmatization of mental health, COVID19... Note that the health crisis (the project begins in 2020) is a vector for increasing mental health problems among students.

A demonstrator version of the chatbot is available online<sup>17</sup>. So, you can see the tool and find out how it works. The NAVI project was set up between March and September 2020; among the important elements of this type of project, NAVI used a Design Thinking method<sup>18</sup> from the start, a description of the conversational flows with the stakeholders, an AI learning phase with students for the test: having the chatbot's AI learn the right answers based on the assessments of the users.

Like any device of this nature, NAVI is "self-learning": the more it is used, the more users give feedback on the relevance of its answers, the better its future answers will be. With each NAVI response, the user is encouraged to give feedback on the response (by a classic thumbs-up or thumbs-down): see Figure 6. This is of course done in support of the project team, which regularly updates the catalog of resources available to the university and its campuses and evaluates the answers provided by the chatbot.

---

<sup>17</sup> <https://test.virtualagent.utoronto.ca/>

<sup>18</sup> [https://en.wikipedia.org/wiki/Design\\_thinking](https://en.wikipedia.org/wiki/Design_thinking)

## Meet the Team:



**Kim Elias-Cartwright**  
*Manager, Strategic  
Initiatives, Division of  
Student Life*



**Meagan Lau**  
*Project Manager, Mental  
Health Virtual Assistant,  
Division of Student Life*



**David Newman**  
*Executive Director,  
Student Experience,  
Division of Student Life*



Fig. 1 : Members of the NAVI Team from the University of Toronto  
who presented the project at EDUCAUSE 2021

An important feature of the project is highlighted: NAVI is completely anonymous. According to the project team, this provides a great deal of added value with regard to the subject: the mental health of the student user. This relative "distance" by exchanging with a digital agent allows the student to avoid possible judgments or stigmatization by a human interlocutor, to have more freedom and transparency in his exchanges, to be more at ease. Since NAVI is used to direct the student towards a program, an appointment, documentation, etc., this first anonymous step reassures the student.

To testify, the affluence of the tool, which the members of the project believe to be justified by anxieties, problems of nocturnal solitude, sleep, ... Also, a H24/7/365 access is a real contribution for the users, availability impossible (or too expensive) to do with a human hotline. The service flow diagram (Figure 4 below) shows this phenomenon of maximum demand in the evening and at night.



Fig. 2 : Service attendance by hour between fall and winter at the University of Toronto

In conclusion, the project team highlights the strengths of its solution: NAVI fills a gap when services are closed (24/7), the service is fast and responsive, and it provides comfort to the user through the anonymity mechanism, which avoids possible judgments or stigmatization. On the other hand, the team noted some drawbacks: obviously limited and simplified answers and potential frustration of the user if the chatbot is not able to answer appropriately.

They learned a few things from this project: mental health is a very broad field, anonymity has advantages but limits the data you can collect, working with an external provider is a way to accelerate this type of project, and finally it is difficult to set goals and targets for this type of project.

In figures: between September 2020 and April 2021, more than 25'000 conversations were processed.

On the substance of the students' requests, the analysis of the conversations allows us to identify a trend, from the most cited to the least cited, on the students' requests: talking to someone, mental health in general, stress, time management, access to care, ...

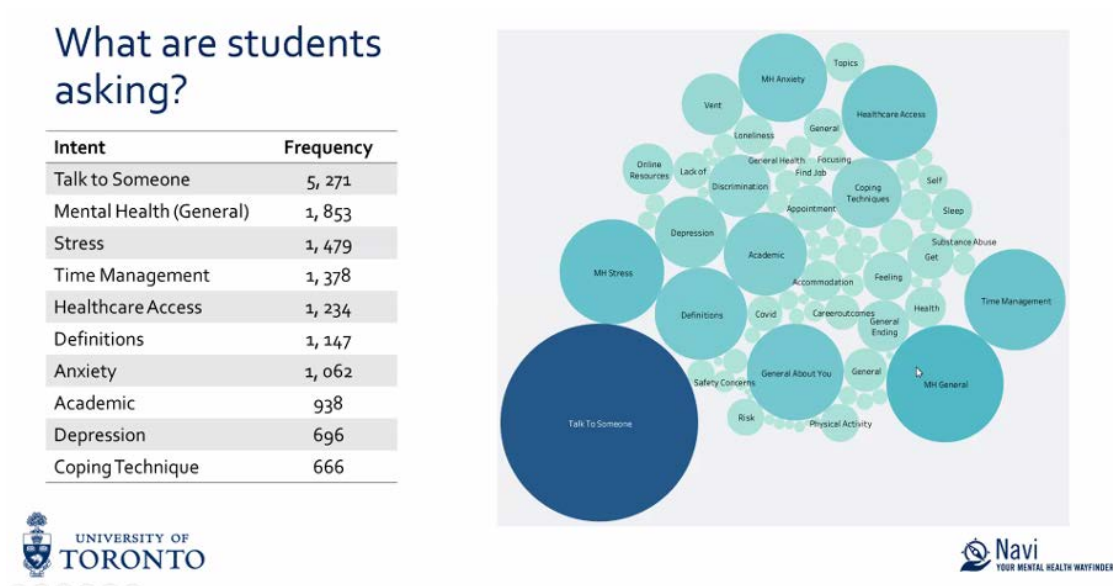


Fig. 3 : Topics discussed by NAVI users

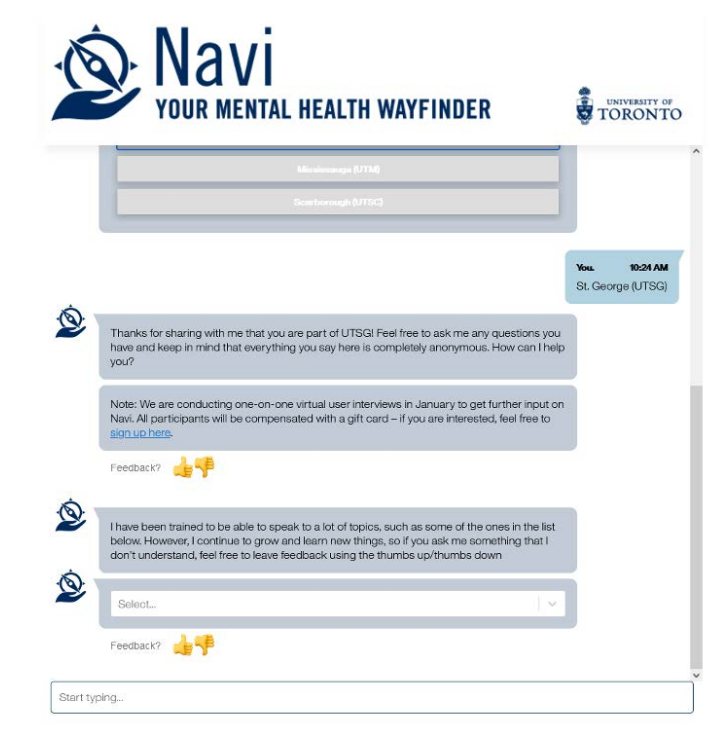


Fig. 4 : First exchanges on the NAVI demonstrator dialogue page

#### A second use case : a generic vision of chatbots

Another presentation titled " Putting AI to Work: Empowering students with a self-service chatbot"<sup>19</sup> was rather an advertisement by the service provider Jenzabar, partner of the EDUCAUSE event.

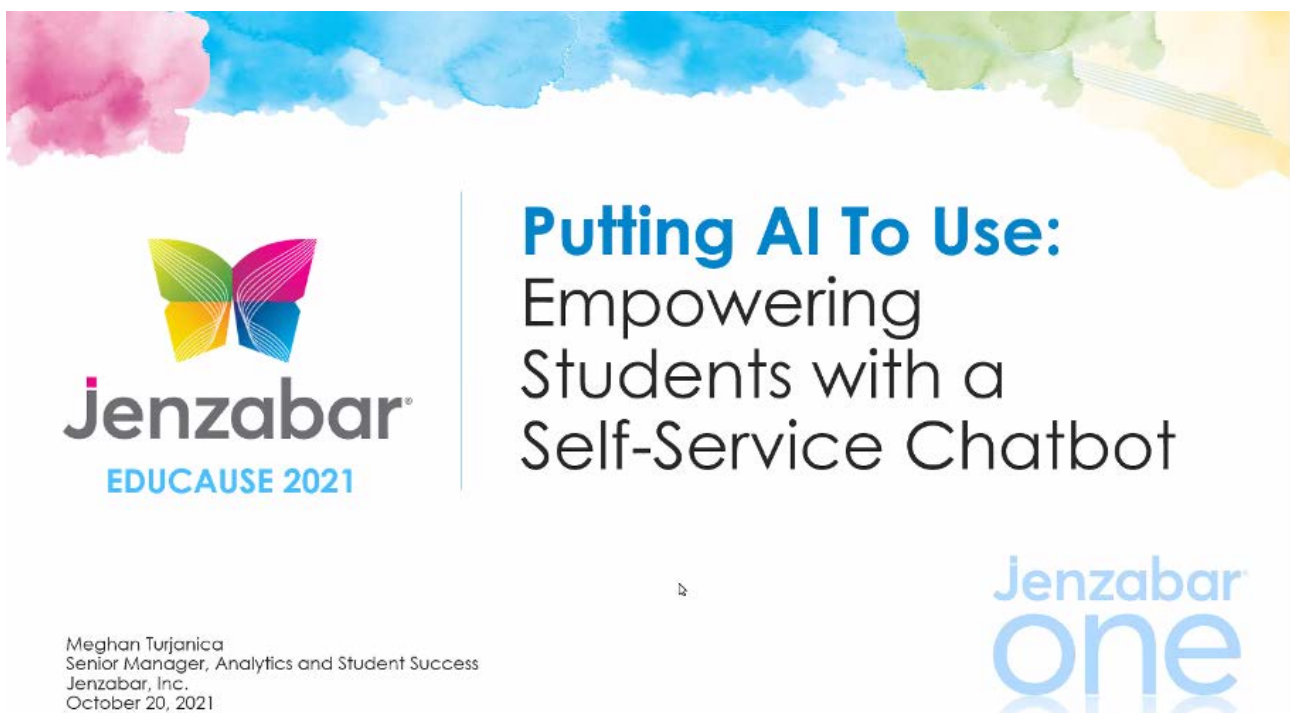


Fig. 5 : Jenzabar Presentation by Meghan Turjanica

<sup>19</sup> Meghan Turjanica (2021) EDUCAUSE Annual Conference 2021, Philadelphia - Putting AI to Use: Empowering Students with a Self-Service Chatbot : <https://events.educause.edu/annual-conference/2021/agenda/putting-ai-to-use-empowering-students-with-a-selfservice-chatbot>

The fundamental elements and announced added values of a chatbot are summarized here :

- Immediacy of answers,
- 24/7 accessibility,
- Time saving for the management services who can concentrate on the most complex files.

All this is completed by highlighting the contributions of the Jenzabar solution which are, according to the service provider :

- The supply of a set of 300 adapted Questions/Answers delivered preconfigured as standard with the service,
- The classic mechanism for measuring the satisfaction of the answers provided by the bot in order to improve or have improved the adequacy of the answers provided by AI,
- The integration of a mechanism to measure "how the student feels", a survey at the beginning of the conversation.

The main use cases observed in the world of Higher Education and Research are :

- Questions about teaching,
- Computer science,
- Admission,
- General information,
- Financial aid.

The presentation allows to explore further what is going on "behind" the chatbot. The question formulated by the user is compared to a knowledge base with many questions and associated answers. If the chatbot finds an answer to this question with a good satisfaction rate called "high confidence interval", it sends it to the user. If the chatbot does not "understand" (i.e. does not find a question in its knowledge base), it proposes to the user to reformulate the question or to direct him to a human interlocutor. This transfer is obviously parameterized according to the topics discussed during the conversation.

Each of the question/answer sequences between the user and the chatbot proposes an evaluation mechanism of the answer given. This is a crucial point because it allows the chatbot to evaluate the relevance of the answer given, to update its knowledge base and to feed the artificial intelligence system it contains. But to do this, all conversations are recorded by the system, which triggered our question, also recorded during the online presentation and summarized below .

*A Q&A sequence in an article about chatbots, nothing more natural.*

*Question: "I understand that all conversations are recorded in the tool, is that correct?"*

*Answer: "Yes, that's right, in the Microsoft Azure system and servers. Users are informed of this at the beginning of their use.*

*Question: "Is it compatible with the GDPR requirements?"*

*Answer: "We are trying to balance the marketing requirements, as this data is used for those purposes, with the GDPR requirements. These cover some US states and Europe. We're trying to balance both the need for the student to get answers and get answers quickly, and also the need to protect privacy. So that's one of the things that we're struggling with is implementing this in the best way possible."*

We touch here one of the topics related to the protection of personal data, to the requirements of privacy protection and to go further, we recommend reading the article "Ethics and privacy protection against the background of a pandemic", by Christine Marle, page 83 in the 2020 report of the French delegation.

A requirement that may impact the deployment of chatbots.

### Chatbot projects at Wayne State College

The Wayne State College intervention<sup>20</sup> covered an overview of chatbot projects. In this chapter, some uses and triggers, the genesis of their project and the team's perspective. The next chapter will present an experience on a use in financial services.

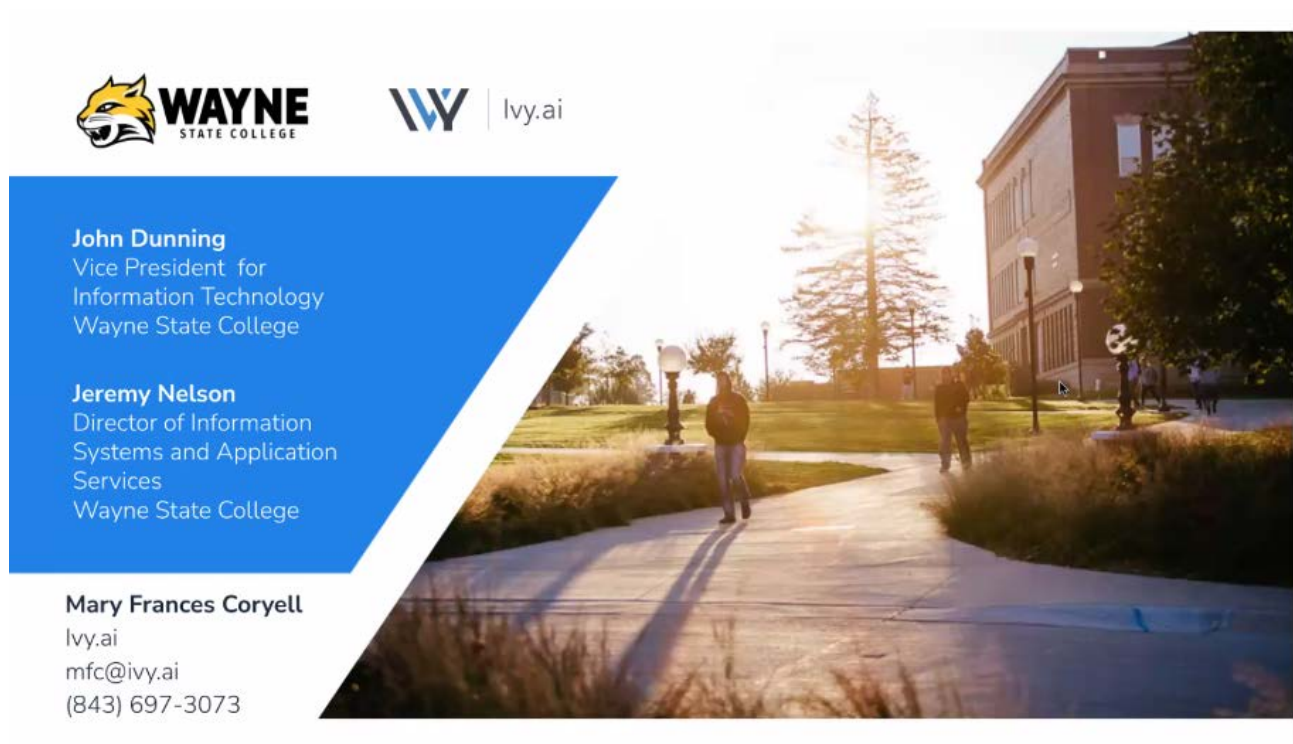


Fig. 6 : Speakers for Wayne State College

La This establishment's IT department was experiencing triple pressure around its user support: shrinking budgets, growing student numbers, and increased volume and complexity of management due to the growing number of personal devices (BYOD: Bring Your Own Device). The challenge was to find ways to provide an extended hour help desk from the campus service center. The same challenge was faced by the admissions department, which had to deal with high staff turnover. The finance department also needed to improve its ability to respond to student requests.

Another element of the context was a significant increase in the Hispanic student population, which involved an issue of equity and language.

Bringing together several departments in this way, IT department launched a chatbot project in 2019, a project that proved even more useful and effective at the start of the health crisis in 2020. Tried and tested on the financial domain (next chapter showing the satisfaction of the users and services concerned) to constitute both a proof of success, a basis for experience acquisition, the IT department used this ChatBot project to address its helpdesk issue relying on a guided conversation mechanism regularly adapted according to user feedback.

<sup>20</sup> Mary Frances Coryell, M-F., Dunning, J. & Nelson, J. (2021) EDUCAUSE Annual Conference 2021, Philadelphia - Examining Wayne State College's Cultural Shift in the Digital Student Journey Using AI Technology <https://events.educause.edu/annual-conference/2021/agenda/examining-wayne-state-colleges-cultural-shift-in-the-digital-student-journey-using-ai-technology>



With a bit of hindsight, several points are highlighted by the speakers.

The first one is the fact that the implementation of an artificial intelligence device implies the collection of data that feeds the system: which questions, which answers to give, which are the relevant answers... In feedback with the users' feedback, the tool improves or it implies to improve the answers given. Classic for a chatbot project. On the other hand, data analysis (especially questions asked) allows to better understand users' requests and thus to proactively resolve certain requests: if there are more and more requests for an administrative procedure, questions about the same device, etc., the business teams can preventively correct this by distributing communication, improving procedures, etc.

The second point of assessment is that users do not only want process automation. They expect dialogue in natural language. This is what the chatbot and its associated AI provide, even if this feedback showed a significant proportion of exchanges in the form of closed questions. This notion of using natural language and dialogue is an important demand. Here is an excerpt from a speaker on this subject:

*" What today's world and today's generations are really looking for is not just a click path, not just robotic process automation, although that is useful, powerful and can help you grow, people really want to be able to use their own language. Ask questions in natural language. People have a great facility for conversation."*

#### A final use case on financial services

Also presented by Wayne State College, the use case highlighted here is a chatbot concerning the topic of financial service to the student. This service includes a part of guided questions and a part of natural language exchanges from the student to the bot. These natural language exchanges feed the reflection of the project team which capitalizes on them, analyzes them and then completes the guided question mechanism and the dictionary of answers.

This service in the form of a chatbot was built from the feedback of the teams in contact with the students: they helped create the first version which was then enriched by the exchanges between the students and the bot. The topics covered are financial aid, payment schedules, and scholarships.

One of the objectives of this "cross-functional" service was to consider a priority of the student user: "they don't need to know that they are changing services, they want answers to their questions", explains a participant. A way of masking the organizational complexities of an institution and of, let's quote, "Breaking down Department silos" put forward by the team as a gain brought by service.

#### Invisible uses, integrated into offers

It appears that artificial intelligence is integrated into certain software solutions used by HE institutions, without it becoming a subject in its own right. AI is sometimes underlying management solutions, integrated into advanced components in cloud solutions. As it has become a classic technological subject over time, this may explain why it is no longer highlighted at EDUCAUSE.

This hypothesis can be confirmed or denied in the next conferences.

## HE Institutions producing AI

HE institutions use AI technologies to improve and develop their operations and offer new services. But they are also contributors, actors of artificial intelligence, whether as "classic" organizations or as producers of knowledge, in research or in learning .

### Adapting to AI

The uses linked to the arrival of AI in institutions have had an impact on organizations. The testimonies on chatbots, above, show an impact on organizations: impact on the user relationship, impact on the workloads of the services concerned, transversality of processes for the benefit of users, transparency of organizational silos...

In another way, the arrival of AI in certain business processes will influence their functioning: impact for teachers in their activities of accompanying students, evolution of recruitment processes in the relationship with prospects, ...

This subject of institutional transformation is dealt with in the last two reports of the French delegation:

- 2019 Page 27 "Digital transformations, #TransfoNumDuSup" Rongeat, D. (2020)
- 2020 Page 40 "Gouverne du bateau The HigherEd digital : la place de l'expérience étudiant" Mocquet, B. (2021) - only in French

One of the speakers at the EDUCAUSE 2021 conference indicated that the impact of AI in organizations and professional practices was equivalent to that of the arrival of social networks: a chosen or endured vector of transformation.

### Research and data

Higher Education and Research institutions also have a position as producers in the field of AI.

Even if this topic has not been highlighted in the various EDUCAUSE 2021 interventions, research in the AI sector is carried out by academic institutions. Several speakers in the sessions on this topic are actually researcher and professors in this field.



Moreover, institutions are producers of data, one of the raw materials of Artificial Intelligence. Whether it is research data, administrative data, educational data, or information from social networks, what was described a few years ago as the "new black gold of the 21st century" is massively produced by higher education and research institutions. These same establishments consume it to feed artificial intelligence systems.

A point of attention has been regularly put forward on the subject of data, it is the subjects of Privacy, ethics, private life, ... that we can encompass in Europe under the term, and thanks to this protective law, of GDPR.

### Train to AI and prepare the students

Higher Education and Research are consumers of AI whether it is for their management, student monitoring, research, marketing, science... let's now observe a trend by replacing the institutions as a vector of training, their primary job, with regard to AI.

One of the EDUCAUSE conferences outlined this under this title " Improving Student Workforce Readiness through Industry Partnerships: Creating Authentic AI Learning"<sup>21</sup>.



## Enhance Students' Workforce Readiness through Industry Partnerships: Building Authentic AI Learning Panel Discussion

- **Adrienne Garber**  
Senior Strategist, Higher Education  
**Dell Technologies**  
Adrienne\_Garber@Dell.com
- **Sionna K. Grassbaugh**  
Associate Dean, School of Business and Information Technology  
**Central New Mexico Community College**  
sgrassbaugh@ccm.edu
- **Kathleen Naasz**  
Dean of Business, Mathematics, Engineering and Technologies  
**County College of Morris**  
knaasz@ccm.edu
- **Gretchen Stewart**  
Chief Data Scientist  
**INTEL Public Sector**  
gretchen.stewart@intel.com





Fig. 6 : Intervenants pour le Wayne State College

Fig. 7 : Speakers at the " Improving Student Workforce Readiness through Industry Partnerships : Creating Authentic AI Learning " conference

It was clearly a promotion of a training device based on the following premise: the massive deployment of AI will imply a strong need for skills in this technology, it is urgent to prepare future managers by training them in AI. The promotional video of this device is available <sup>22</sup>.

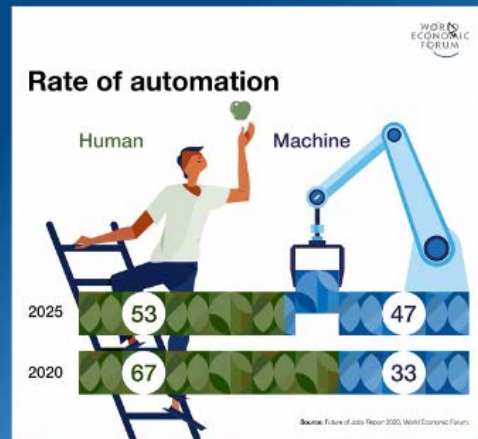
Based on the principle that in a few years, according to one of the speakers, "50% of current tasks will be automated", the proposal of this conference was clearly to train managers on the side of those who will carry out this automation rather than on the side of those who will undergo it.

<sup>21</sup> Garber, A. , Grassbaugh, S. , Naasz, K. & Stewart, G. (2021) EDUCAUSE Annual Conference 2021 , Philadelphia - Enhance Students' Workforce Readiness through Industry Partnerships: Building Authentic AI Learning <https://events.educause.edu/annual-conference/2021/agenda/enhance-students-workforce-readiness-through-industry-partnerships-building-authentic-ai-learning>

<sup>22</sup> <https://www.youtube.com/watch?v=ZZRk1GbtfM0>

# Future of Work

- Changes in Work-task:
  - Shift in division of work between Human and Machine
  - 50% of the world's tasks can be automated by 2025
- Changes in Workforce:
  - 85 million jobs displaced but 97 million new roles will appear
  - Displaced workers: 50% workers need reskilling
  - Current workers: 40% need upskilling
  - New workers: will increasingly need to be AI ready
  - Organizations will have to train workforce for survival and competitiveness



Source: World Economic Forum, [https://www.youtube.com/watch?v=eH1fFdzJAw&feature=emb\\_title&ab\\_channel=WorldEconomicForum](https://www.youtube.com/watch?v=eH1fFdzJAw&feature=emb_title&ab_channel=WorldEconomicForum)

Fig. 8 : A summary of the elements on AI from the World Economic Forum report

Questioning one of the speakers, here is a summary of an exchange:

Question: " Are future executives, current students of AI, aware that some of their future work may also be automated? "

Response Synopsis: "They will do so by learning about the role of AI in professional careers. Indeed, the World Economic Forum estimates that 97 million new jobs will be created by 2025. It's important that learners understand the careers of the future and that we prepare them for them. While some of these jobs will change, there are many more jobs being created where you need a human in the middle."

The answer received may leave some doubts, especially concerning the balance between jobs created and jobs destroyed, but the sources quoted are from the World Economic Forum's evaluation<sup>23</sup> que l'on peut retrouver dans une vidéo<sup>24</sup>. Elle montre une mesure d'impact de l'IA sur l'emploi et les besoins de changement de compétences induits mais met particulièrement en avant cette balance sur des fonctions de cadre ou cadres supérieurs. L'automatisation promue dans ce contexte ne semble pas mesurer toutes les incidences de l'automatisation du travail, sur l'ensemble des activités humaines, l'ensemble des couches sociales. Mais pour aller plus loin, en anglais, le futur du travail vu par le forum économique mondial peut être consulté en ligne<sup>25</sup>.

<sup>23</sup> Forum économique mondial (2020) The future of jobs – Report 2020 <https://www.weforum.org/reports/the-future-of-jobs-report-2020>

<sup>24</sup> <https://www.youtube.com/watch?v=eH1fFdzJAw>

<sup>25</sup> <https://www.weforum.org/reports/the-future-of-jobs-report-2020>

## As a conclusion

Of course, the sessions around chatbots, mostly of high quality, allow the overview restituted in this article: uses, solved problems, algorithmic biases, project assessments, impacts on organizations, functioning, ...

It appears that we have reached a glass ceiling with EDUCAUSE's 2021 program on AI, since there is little new this year, even if we consider that the subject is now integrated into the solutions used, and that its use has become invisible. AI still raises many ethical questions, privacy, values, which is a recent and new field on the New Continent, and which is close to the heart of the congress organizers. This should be the prevailing point about it for the years to come and can therefore have an impact on the more massive adoption of these technologies.

## Bibliography

Gérard Giraudon, Pascal Guitton, Margarida Romero, Didier Roy, Thierry Viéville. Éducation et numérique, Défis et enjeux. Inria, pp.137, 2020, Livre Blanc Inria N° 04. <hal-03051329v2> <https://www.inria.fr/sites/default/files/2020-12/Livre%20Blanc%20Inria%20%C3%A9ducation%20et%20num%C3%A9rique.pdf>

Athanase, S., Mocquet, B. & Rongeat (2019) – Amue - " Les chatbots à la croisée des intelligences : Usages, technologies et Enseignement Supérieur et Recherche " ; Amue [https://www.amue.fr/fileadmin/amue/systeme-information/documents-publications/la-collection-numerique/Les\\_Chatbots-N01.pdf](https://www.amue.fr/fileadmin/amue/systeme-information/documents-publications/la-collection-numerique/Les_Chatbots-N01.pdf)

Lau, M., Elias-Cartwright & K. , Newman,D. (2021) EDUCAUSE Annual Conference 2021, Philadelphia - – University of Toronto -Connecting Students to Mental Health Resources Using a Virtual Assistant / Connecter les étudiants aux ressources de santé mentale grâce à un assistant virtuel <https://events.educause.edu/annual-conference/2021/agenda/connecting-students-to-mental-health-resources-using-a-virtual-assistant>

Boeding, Jesse Anne. University of Pennsylvania. ProQuest Dissertations Publishing, 2020. 28000542. Et un lien : <https://www.proquest.com/openview/21ba5fd352bbd0776d54601ab891fbde/1?pq-origsite=gscholar&cbl=18750&diss=y>

Meghan Turjanica (2021) EDUCAUSE Annual Conference 2021, Philadelphia - Putting AI to Use: Empowering Students with a Self-Service Chatbot / Mettre l'IA à profit : Donner du pouvoir aux étudiants grâce à un chatbot en libre-service <https://events.educause.edu/annual-conference/2021/agenda/putting-ai-to-use-empowering-students-with-a-selfservice-chatbot>

Mary Frances Coryell, M-F., Dunning, J. & Nelson, J. (2021) EDUCAUSE Annual Conference 2021, Philadelphia - Examining Wayne State College's Cultural Shift in the Digital Student Journey Using AI Technology / Examen du changement culturel du Wayne State College dans le parcours numérique de l'étudiant grâce à la technologie de l'IA <https://events.educause.edu/annual-conference/2021/agenda/examining-wayne-state-colleges-cultural-shift-in-the-digital-student-journey-using-ai-technology>

Garber, A. , Grassbaugh, S. , Naasz, K. & Stewart, G. (2021) EDUCAUSE Annual Conference 2021, Philadelphia - Enhance Students' Workforce Readiness through Industry Partnerships: Building Authentic AI Learning / Améliorer la préparation des étudiants à la vie active grâce à des partenariats avec l'industrie : Créer un apprentissage authentique de l'IA <https://events.educause.edu/annual-conference/2021/agenda/enhance-students-workforce-readiness-through-industry-partnerships-building-authentic-ai-learning>

Forum économique mondial (2020) The future of jobs – Report 2020 <https://www.weforum.org/reports/the-future-of-jobs-report-2020>

# Artificial Intelligence in Student Success : a polymorphic implementation

Bruno Urbero

The use of artificial intelligence in improving student success has led to definite advances. It took nearly 50 years, and the use of AI, for Tinto's (1975) model that predicted that knowledge of all aspects of students' lives was correlated with the prediction of their success to be validated.

Once the model has been validated, more than the predictive aspect of the model allowing to anticipate the dropout, the possibilities to remedy it have been proposed, implemented and validated. For universities, it is no longer a question of knowing whether it is necessary to know all aspects of their students' lives, but of implementing the most effective solutions possible with means that are financially acceptable for the university that implements them.

This theme has therefore undergone a real evolution between the 2020 and 2021 sessions of EDUCAUSE. In 2020, it was a question of presenting the validation of the model of retention predictions and dropout remediation. In 2021, it is the implementation of these solutions by universities, or by companies specialized in this field, that are presented.

The solutions developed are always based on a holistic approach to the student and present additional functionalities to the pedagogical tools contributing to student success. These pedagogical tools allow for individual student follow-up, but also for success distributions, by course, by period, etc. The solutions presented below go beyond student success. By leveraging the data collected, they also ensure that the institution respects the diversity, equity and inclusion of the different student populations identified, but also the allocation of loans for low-income students whose chances of success are high.

## An implementation according to the means of the university<sup>26</sup>

The adoption of AI techniques in student success has happened with surprising speed. In one year, the model went from validation to production. Northern Michigan University provides some insight into the speed of this transition.

With an aging population, they anticipate a decline in enrollment that will be problematic by 2030. One of the solutions being considered is to increase the success rate to keep the graduation rate constant. The goal is to move from a dropout rate of 1 in 4 to 1 in 5. Implementing AI and increasing student success comes with returns on investment, which is an additional trigger for the project.

Like all U.S. universities, NMU pays particular attention to its ranking in the Carnegie classification<sup>27</sup>. It has a good retention rate. Improving the retention rate has been assessed as a worthwhile investment for the university and also important at a social level for the local fabric, as students at the university have low

---

<sup>26</sup> Collaborative Student Success : Integrating People, Platforms & Analytics - Jason Nicholas & Bill Richards - Northern Michigan University (NMU).

<sup>27</sup> <https://carnegieclassifications.iu.edu/>

geographic mobility both in terms of their origin and future employment. And the direct impact on the community is estimated to be significant for the university. Increasing the retention rate by 1-2% is a threshold that was deemed sufficient to engage the project. Comparison with similar institutions, which were also engaging in this type of approach, was an additional reason for implementation to maintain their ranking.

NMU is a small university. The choice of solutions to be implemented and the resources to be devoted to the project could not be at the same level as the larger universities, so the choice was made to start with a solution from the University of Maryland and adapt it with local resources. This allows for better control and integration with existing systems (especially LMSs) at a lower cost. It also allows for more scalability (user enhancements, data queries, etc.). In particular, this allowed the inclusion of all the solutions that were used during the health crisis.

Only one developer was needed to implement the system. However, the team in place estimates that two would have been necessary. The application is designed to be "learning-less" allowing for quick adoption and efficient data collection. The multiplication of collected attributes allows a better definition of the student profile and makes predictions more reliable. Increased collection and processing costs were included in the project. But these technical costs are much less than the human costs necessary for its success.

The terminology used in the application has learned a lot from the theoretical part of student success: there is no mention of at-risk or even high-risk students, but of students in need of services or many services. This change in terminology is accompanied by a conceptual change: students are considered individually and their needs are treated in the same way.

The tool implemented, named ESP (Education Success Platform), measures student engagement through their involvement in activities, exchanges with staff, earning them points, registering them in the university's social network (as well as anything that can "get them out of the dorm"). It allows for targeted messaging campaigns, measures student activity, allows for advisor switching without data loss. Integration with the Google calendar is a crucial communication point for students and makes appointments with advisors effective: the application follows student usage and does not create new constraints. Appointments are made in concert with the students and therefore better accepted and followed. Also the management of communication preferences by the students themselves makes them more efficient.

And as in the theory, where computer technology is not enough, 15 counselors were recruited, which represents a tripling of their number. Their availability has been extended to all school cycles. This is the major investment of the project.

The implementation of the solution is therefore very close to the theoretical recommendations.

The health crisis did not allow for an assessment of the impact of this system on retention.

## Individual and Collective Progress<sup>28</sup>

The California State University, CSU, has implemented a dashboard, the Faculty Student Success Dashboard (FSSD), which integrates with the existing educational system by creating an innovative set of data management tools through a one-stop shop. Funding for this project was provided by a foundation (COLLEGE FUTURES Foundation) and was carried out by the university.

The operation and content of this dashboard are known to all students included, but accessible only to teachers. This transparency of operation, which exposes the use that will be made of the data, reduces the bias generated by students wishing to protect their data from uncertain use.

---

<sup>28</sup> Faculty Student Success Dashboard (FSSD) – Amir Dabirian, Afsaneh Hamedani, Joseph Luzzi, Shawn Whalen - California State University, Fullerton.

The FSSD aims to visualize indicators of student success, correlate them to their work, identify gaps in success, and propose concrete actions. It also reveals disparities. Using the data collected, it uncovers biases in sets of individuals within and between courses.

The dashboard allows for precise school tracking (late homework, missing assignments, grades, etc.) with the possibility of assigning immediate and scheduled notifications for correction. The choice of symbols rather than letters or numbers allows for a much more efficient visualization, whether on a weekly basis or in cumulative periods, and therefore a better identification of dropouts.

Data are analyzed for the individual student, but also in comparison to others and in aggregate: whether it is social parameters, student engagement, grade distribution within the term, and across terms. Biases are detected by gender, ethnicity, minority, income...

The tool tracks individual and group performance, progress and success data (retention, graduation), course enrollment, and observes how students' work is reflected both individually and collectively in success indicators. The purpose of this dashboard is to increase awareness of the faculty's role in student success.

Demographic, social, gender, EOP (Educational Opportunity Program), parental education, ethnicity combined with course, achievement, LMS use to measure engagement, course comparison, etc. data are collected and consolidated. They are used to measure and then verify the absence of bias and under-representation.

Collecting the data, consolidating it, and announcing that it will be verified tends to de facto reduce bias. The lack of bias is seen as a path to upward mobility promoted by the university. Early results of the analysis found that academic success was not related to socio-cultural background.

The implementation was planned for the summer of 2020. Due to the health context, the full operation of the device could not be validated.

## Eliminate Bias and Design flaws<sup>29</sup>

Retention prediction and remediation are now considered essential to the functioning of universities. Not only for the success of students, but also for the attractiveness and value of the universities themselves. Consulting firms are coming in to help universities with the implementation of holistic tracking of their students. Remedial strategies that require organizational change and the implementation of substantial technical and human resources are not implemented everywhere. Although it is not possible to say which of the organizational or IT aspects has fallen behind, it is certain that the pandemic has prevented either the implementation or the validation of the model.

To achieve equity in higher education, institutions must identify the structural barriers faced by underserved students and address the policies and practices that impact the student experience. This includes being able to identify student minorities such as those who are first generation to access higher education, low-income, mature students, marginally oriented, transgender, veterans, disabled, incarcerated, or favoring youth. In addition to administrative data are collected: work with schedule changes, presence of children, a non-English speaking home, etc.

Holistic knowledge of the student requires all-encompassing data collection for all aspects of the student's life that is intrusive. All accessible data is retrieved: from the K12 and from all national databases available online. As well as any questionnaire the student has answered. Social aspects are also collected such as income-based public assistance, living below the poverty line, resource issues, health and disability, concerns about waiting for a paycheck, excessive debt, difficulty feeding oneself or one's family, unstable life, Pell Grant eligibility or receipt, etc. are necessary for the student to know, understand and make decisions.

Once this data is obtained, it is necessary to determine how and why to use it.

---

<sup>29</sup> Knowing our students : designing an experience that serves students holistically – Laurie Fladd, Julia Lawton – Achieving The Dream



Services must be neutral and student-centered, i.e., not focused on advising or orientation processes that are focused on institutional expectations. The student's voice must be considered and involved in decisions and care must be taken to avoid unintended barriers. A very important workload is the collection of student expectations. It takes hours and hours of interviews between students and advisors to have actionable qualitative and quantitative data to make procedural or structural decisions. And so it takes real and available human resources.

Every decision should be made for the benefit of the student, not the institution. Making decisions based on the decision-makers' perspectives on those students is a false sense of the need for students. It is the individual decisions made for the students, made for the students and the life of the institution, that will lead to the success of the students who will ultimately serve the interests of the university in terms of name recognition, valuation, graduation rates, etc.

It is especially important to consider individual and community experiences at this time. Indeed, students and institutions are adjusting to the changes brought on by the coronavirus pandemic and the social unrest caused by systemic racism. The health crisis and racism have affected some communities more directly than others and are a reminder of how external experiences affect students' academic experiences differently. Ultimately, providing students with a system that promotes equitable outcomes reinforces their sense of belonging on campus regardless of their background and signifies that faculty and staff expect them to succeed.

Students are therefore particularly sensitive to their environment and to positive and encouraging messages. The job of the counselors is to find the challenges and opportunities that will lead the students who need them to success. The idea is not necessarily to propose solutions and choose one idea or option initially, but to analyze all the possible options and then propose the ideas with the best impact and the most added value and also those that are the most positive and above all feasible and achievable without multiplying them. 2 to 4 leads are sufficient, not more.

## Use the collected Data for other purposes<sup>30</sup>

One-third of American students who drop out of college do so for financial reasons, and three-quarters of the loan applications that are denied are overwhelmingly for those from non-high-income families. The majority of loans granted to students are based on the FICO score (a comparative estimate of an individual's creditworthiness based on an analysis of his or her credit file). This excludes at-risk students from low-income households.

Funding U is a company that was created to provide loans to low-income, high-potential students.

Predictive analysis is done on education, debt repayment projections based on graduation, but also on the use of other loans, credit cards, debt levels, payment incidents, etc. Student work and achievement are the basis for the loans.

The data have been collected for 4 years. It is sufficient to build a consistent data model. Using this model, the company has allocated more than 1200 loans over the past year. The lending company itself borrows from financial partners (such as Goldman & Sachs).

The start-up of the activity was slow, as it took time to convince these financial partners of the feasibility of the project, which consisted in lending funds to students classified as non-creditworthy. The financing of students is therefore done outside the usual schemes, mainly ethnic minorities.

62% of funded students belong to families with incomes < \$40k annually. Among these students, funding defaults of \$5-600 annually over the first few years represent a strong dropout risk and also an insurmountable barrier to graduation while the data analysis classifies them as hard workers with a strong prediction of success.

---

<sup>30</sup> "Last gap" loans : using predictive analytics to guide low-income students to graduation. Jeannie Tarkendon, Funding U. - John Clark, WGU Labs.

Their selected borrowers have a 92% non-repeat graduation rate since 2016 and 96% of loans are repaid. This 4% struggling to repay compares to the 13% in the same situation who have obtained federal loans.

## As a conclusion

The holistic student approach has proven to be effective in student success, both in retention and graduation. On the other hand, this approach is very intrusive. Ethical behavior in applications is therefore paramount. Many factors promote this. First of all, there is the regulatory aspect, but above all it increases the reliability of the data and therefore produces better quality applications and lowers the cost of collection. Indeed, students knowing the future of their data do not seek to bias them to preserve their privacy.

On a more global level, AI techniques allow the university to know its teaching and to see if there are disparities. This is a very efficient way to fight against discrimination and even to avoid its appearance, simply because it will be immediately identified.

The efficiency of AI in processing data allows for individualized solutions. For the student, it is a more precise follow-up and better advice received at the right time. This will increase their chances of success. The university that promotes this approach will have indirect, but very real benefits: the improvement of student well-being and ultimately their success will increase its "graduation" rate, improve its ranking vis-à-vis other universities, attract investors and increase its financial value.

# Ethics, Equity, Inclusion and Digital Accessibility in the context of the Pandemic

Christian Cousquer

## Introduction



During the 2020 edition of EDUCAUSE, there was a lot of talk about ethics and privacy. The 2021 edition is no exception to this trend, with a very interesting and revealing nuance: to the ethical issues, questions of equity, inclusion and digital accessibility have been added. American universities were already practicing student data analysis before the pandemic, either to try to keep students in school or to recruit the best people. But the increased use of digital technology during the COVID crisis has accelerated the collection of data on subjects as sensitive as health, ethnicity, etc., and the cross-referencing of these data has changed in scale, and questions - not to say

abuses - are multiplying, and even within a generation that social networks had made relatively insensitive to the issue of sharing their data, the consequences are visible.

Although not one of the ten main themes developed during this conference, ethics and equity were nevertheless at the heart of one of the opening lectures "Beyond Buzzwords: Innovation, Inequity, and Imagination in the 21st Century" by Ruha Benjamin from Princeton University. Is this an effect of the late years of the previous administration, when these topics were exacerbated to write it off in a cryptic way, by the numerous racial cases - of which the assassination of George Floyd is an emblematic figure - and by the aggravating effects of the pandemic on underrepresented student communities?

While digital accessibility - understand, accessibility of IT resources to people with disabilities - is still one of the most challenging topics in IT to understand and implement in American university IT, the phenomena of needing equity for and improving inclusion of marginalized communities has changed in scale. Many analyses and attempts at remediation are growing.

And, when we talk about ethics, what do we put behind that word? We will examine different, sometimes divergent, but often complementary approaches from the following conferences or online sessions:

- Beyond Buzzwords: Innovation, Inequity, and Imagination in the 21st Century
- Equity-Oriented Teaching with Digital Learning Systems
- Inclusive Innovation: What's Information Technology's Role?
- Student Voices: The Digital Learning Equity Reality
- XR Security, Privacy, Safety, and Ethics Considerations in Higher Education
- Teaching Practices for Educational Equity
- BIPOC and White Supremacy in the Academic Workplace: Developing Our Own Analysis Tool

- Big Time Accessibility at Small Institutions
- Beatitudes of Digital Equity
- IT Accessibility Community Group
- Breaking through the Apathy Fog: An Awareness Campaign for Digital Accessibility in Higher Education

## Ethics, digital, and equity in the face of racist cultural influences: knowing how to identify them: What discriminatory spikes are we constructing in our work?

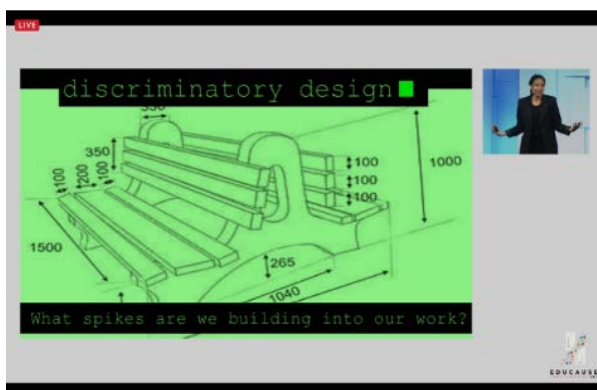
By way of background, the concepts of ethics and equity should be defined here.

### Ethics

For the philosopher, ethics is the science of morality, or - an even more pertinent definition - the morality of reality. Ethics is a philosophy anchored in reality. It is therefore a matter of an organization thinking, about the moral rules it will set for itself in order to function.

### Equity

From the Latin *aequitas* ("spirit of justice, equality, just proportion") is a principle implying fair treatment, the absolute respect of what is due to each person. Thus, equity is the virtue that allows the generality of the law to be applied to the singularity of concrete situations and that aims to establish legal equality, taking into account *de facto* inequalities. The notion of equity calls for those of impartiality and justice, and is close to that of equality of opportunity (which is more in the domain of ethics), whereas the notion of equality is close to that of equal treatment (which is more in the domain of morality), although these notions are close. In human society, equity allows a positive discrimination adapting the consequences of the Law (often general) to the circumstances and singularity of situations and persons (historical, socio-cultural specificities linked to individual pasts and cultures).



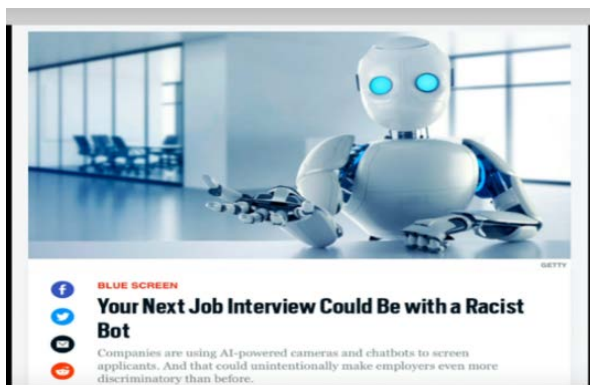
From everyday applications to complex algorithms, technologies have the potential to hide, accelerate, and deepen discrimination while appearing neutral or even benevolent to the racist practices of an earlier era for Ruha Benjamin.

In her presentation, she explores a series of discriminatory designs using the example of an Austrian artist's retractable spiked bench to get us thinking about these issues:

« What spikes are we building into our work? »



« How can the often insidious or subliminal American racist cultural influences of modern digital design be challenged ? »



Many modern algorithms have discriminatory effects on non-white American populations and have made headlines. Ruha Benjamin attempts to provide conceptual tools to re-encode equity and justice in digital and social systems. In doing so, she focuses on the role of higher education as a "ground zero" - a starting point - for re-imagining and re-tooling the default parameters of Science, Technology and Society.

Not only Black American populations, Hispanic and Native American populations were also mentioned under the term BIPOC for Black, Indigenous, and people of color in another presentation "BIPOC and White

Supremacy in the Academic Workplace: Developing Our Own Analysis Tool."



The normalization of a certain pattern of behavior that has negatively affected society as a whole, but has literally devastated BIPOC communities, is so blatant to Patricia Juarez, that, like any normalized pattern, this one is very difficult for non-white populations to identify these patterns. Thus she asserts that we just know that they are uncomfortable, that we don't like them, but we don't know exactly why because "it's the norm." These patterns or behaviors conform to a phenomenon so widespread, so "natural," that we no longer stop to examine and analyze it, much less call it by its name:

white supremacy. While white supremacy is a global phenomenon, it has a particular and unique "flavor" in the United States, and particularly in the academic workplace.

Patricia Juarez as a BIPOC woman, seeks to teach people to identify how this phenomenon operates in the workplace. Identifying and being able to put a name to the problems is the first step in addressing these issues. During her presentation/workshop, she used a simple but accurate card-based analysis tool to identify some of the most prevalent white supremacy patterns in the workplace. This tool is taken from the book "Dismantling Racism: A Workbook for Social Change Groups" by Kenneth Jones and Tema Okun.

Another way to address this equity was done in a very evangelical way in "Beatitudes of Digital Equity."

### Be Equity Minded

- Assess access to technology
  - Technology survey
  - Observe how students are accessing materials
- **Acknowledge the digital divide**
  - Working space limitations
  - Mobile reliance
- Post campus resources to course (advocate if necessary)
- Create course materials with equity in mind
  - Device agnosticism
  - Mobile first
  - Universal Design (Accessibility)

The global pandemic that has forced many universities to switch to online environments has highlighted the disparities between campus populations at many universities. For Takiya Moore and Andreea Kosa of California State University Northridge, this is an opportunity to improve the learning environment for all members of a campus, thinking about how it will take shape and codifying lessons learned. Just as universal design benefits everyone and promotes a more inclusive environment, designing for digital equity and inclusion can benefit everyone by expanding student experiences

through collaborative knowledge sharing and exposure to diverse thinking.

### Be Relational

- **Be a safe person**
  - Let students bring their whole selves
- Be willing to communicate about non-course related issues
- Validation and positive messaging related to their course work
  - I believe in you
  - You can do this
- Be open and share your stories

This aspiration can be met when the lived experiences of all students are included, respected, and reflected in their learning environments, and when all students can fully participate in the classroom of the future. Dr. Frank Harris' Strategies for Diversity, Equity, and Inclusion were developed to create "seven beatitudes" reflecting approaches to incorporating the spirit of equity. They draw on examples of how technology can be used to help incorporate each of these "beatitudes."

For example, diving into the "Be Race Conscious" strategy, they discussed the use of culturally and ethnically diverse imagery, surveying students for demographic information, and the need to include references that recognize the context and history of diverse ethnic groups in the United States in a course.

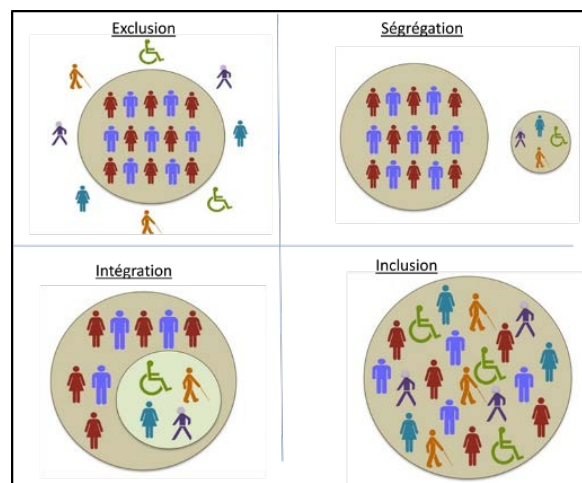
- Increase diversity of image artifacts
- Survey students for demographic information
- **Include references that acknowledge background or history of groups**
  - contribution of minorities to the field
  - text by diverse authors
- Review campus dashboards for student performance in the program or course if available
- **Cultural competence:** The ability to understand, appreciate and interact with people from cultures or belief systems different from one's own
- **Cultural humility:** A process of reflection and lifelong inquiry, involves self-awareness of personal and cultural biases as well as awareness and sensitivity to significant cultural issues of others

# Digital inclusion: What is the role of information technology? How do we address digital access for people with disabilities?

## Inclusion

In the notion of inclusion, there is no distinction between those who are in the norm and those who are not. Everyone is "normal", regardless of the deviation from a pseudo-norm that would be defined by an average performance in a population. The norm is extended to all. Inclusive education differs from the "integration" or "mainstreaming" model of education, which tended to be concerned primarily with disability and special educational needs, and with learners who were changing or becoming "ready" or deserving of inclusion in the mainstream system. In contrast, inclusion is about the child's right to participate and the school's duty to accept them.

The emphasis is on full participation of students with disabilities and respect for their social, civil and educational rights. The sense of inclusion is not limited to physical and cognitive disabilities, but also encompasses the full range of human diversity with respect to ability, language, culture, gender, age, and other forms of human difference. Richard Wilkinson and Kate Pickett have written that "students' performance and behavior on educational tasks can be profoundly affected by how we feel about ourselves, how we are seen, and how we are judged by others. When we expect to be viewed as inferior, our abilities seem to diminish." This is why the United Nations Sustainable Development Goal recognizes the need for adequate physical infrastructure and the need for safe and inclusive learning environments.



## Digital Accessibility

Digital accessibility consists in making online services accessible to people with disabilities; disability being defined as: any limitation of activity or restriction of participation in society suffered in its environment by a person because of a substantial, lasting or permanent impairment of one or more physical, sensory, mental, cognitive or psychic functions, a multiple disability or a disabling health condition. It is not the disability that is the cause, it is the maladjusted society that is the source of causality ("suffered in its environment »).

**MAKING TECHNOLOGY ACCESSIBLE**

- Perceivable** - Information and user interface components must be presentable to users in ways they can perceive.
- Operable** - User interface components and navigation must be operable.
- Understandable** - Information and the operation of user interface must be understandable.
- Robust** - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

#EDU21

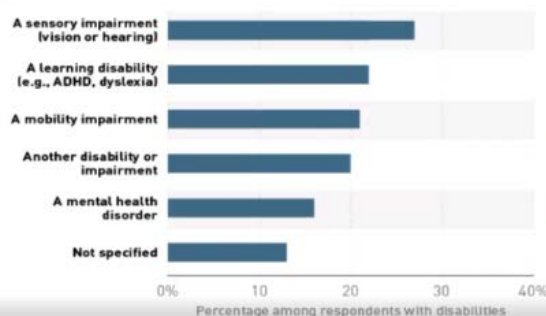
Digital accessibility thus consists in making public or private online communication services accessible to people with disabilities, i.e.:

- **Perceptible:** for example, facilitating the user's visual and auditory perception of content; providing text equivalents to any non-textual content; creating content that can be presented in different ways without loss of information or structure (e.g., with a simplified layout) ;
- **Usable:** e.g., provide the user with guidance for navigating, finding content; make all features keyboard-accessible; allow the user sufficient time to read and use the content, turn in an assignment; do not design content that may cause seizures;
- **Understandable:** e.g., make pages work in a predictable way; help the user correct input errors.
- **and robust:** for example, optimizing compatibility with current and future uses, including assistive technologies.

Digital accessibility is regulated by a W3C standard, the Web Content Accessibility Guidelines WCAG 2.1, transposed into law in the United States in the Americans with Disabilities Act (ADA) in 1990 and transposed in France in the Référentiel général d'amélioration de l'accessibilité - RGAA Version 4.1 (formerly Référentiel général d'accessibilité des administrations). Digital accessibility is something very technically defined, as an example:, the RGAA has 106 criteria of control RGAA including an average of 2.5 tests per criteria. A failure to comply with a single test renders a criterion invalid and makes the content inaccessible to some.

In the early stages of the pandemic, an estimated 20,000 higher education institutions worldwide ceased normal operations, sending nearly 200 million students home. While the impact was widely felt, it had compounding effects on underrepresented and marginalized student communities and in particular for students with disabilities due to the inadequacy of IT for their needs.

**The Higher Education IT Workforce Landscape**

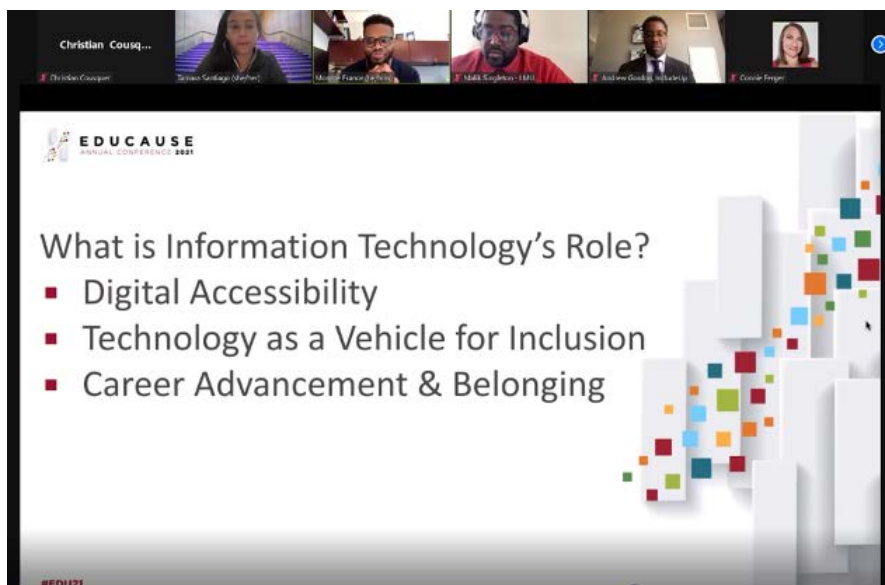


#EDU21 Source: The Higher Education IT Workforce Landscape, 2019 (Educause)



This systemic shock has exacerbated and accelerated the changes in higher education. This changing landscape requires inclusive innovation if institutions and the students they serve - all students - are to succeed. Information technology departments play a critical role in innovating and positioning higher education institutions to achieve their goals, including diversity, equity, and inclusion.

In the presentation *Inclusive Innovation: What's Information Technology's Role?* the presenters analyze three areas in which information technology departments are well positioned to advance campus DEI (Diversity, Equity and Inclusion) goals, primarily through digital accessibility, closing community gaps and making learning more accessible. They also mentioned the current and future challenges that information technology is or will be facing - again to achieve inclusive innovation - as technologies such as AI, robotics, and Virtual Reality are adopted more widely in higher education. Finally, the last area is how to promote a culture of inclusive innovation efficiently.



Barriers to digital accessibility in higher education are generally not related to deliberate resistance. It is more often a problem of awareness, a measurable lack of practical knowledge about the need to design accessible content.

Faculty and staff are often unaware that the digital spaces in which they create or publish content may be inaccessible to people with disabilities. For these individuals, the ethical and business case for accessibility-aware design would likely have a significant impact, and would better enable them to learn the technical and legal requirements associated with digital accessibility standards. Two presentations: "Big Time Accessibility at Small Institutions" and "Breaking through the Apathy Fog: An Awareness Campaign for Digital Accessibility in Higher Education" detailed the efforts of Portland State University and California Institute of the Arts to facilitate sustainable change in accessibility through awareness and capacity building, focusing on practical resources, sustainable support models, and strategic communication.

Managing accessibility and the accommodations it can induce is an essential part of delivering university services to make them equitable to all students. Accessibility is a forward-looking process that involves advocating for the provision of software and hardware that is appropriate for all users. It also concerns teaching materials and all web and documentary resources, right up to the procurement and purchasing processes of universities.

## Why is Digital Accessibility Important?

- **It's good for business.**
  - SEO optimization, enrollment and retention, etc.
- **It's the right thing to do.**
  - People with disabilities have a right to equal access.
- **It's the law.**
  - The ADA, Section 504 of the Rehabilitation Act, etc.

#EDU21

## Establish Buy-in

- Facilitate institutional buy-in from the top down.
- Establish a university commitment to accessibility.
- Bring relevant stakeholders on board from the start.
  - Work *together* make a plan, scope deliverables, and foster trust in the work.



#EDU21

Accommodation or remediation is the process, sometimes retroactive, of making reasonable modifications to these resources and processes for students with disabilities or learning difficulties. This is a difficult and sometimes daunting task at almost all institutions, and even more so at small colleges. Voluntary policies, partnerships, and organization at all levels are essential. So some small institutions are working with other departments and other universities to achieve these accessibility goals. All of these institutions have now understood that AI-based accessibility overlays are tools that should not be deployed in an IT environment because of the various lawsuits filed for accessibility violations or failures caused by these solutions.

## Conclusion

The relations between the different social and ethnic communities of the American Society have been affected really and tangibly during the last years. Digital technology, far from smoothing out differences and antagonisms, has in many ways insidiously or involuntarily deepened them. There is no doubt that the non-white and disabled populations have paid a high price for some past mistakes and the current pandemic. It is interesting to note that, in response, things, strategies are being structured to remedy this. The United States is much more proactive in addressing these than most other societies.

## References

### Equity:

WHITE DOMINANT CULTURE and SOMETHING DIFFERENT : <https://www.cacgrants.org/assets/ce/Documents/2019/WhiteDominantCulture.pdf>

### Accessibility:

The Business Case for Digital Accessibility, W3C : <https://www.w3.org/WAI/business-case/>

Accessibility foundation modules, W3C : <https://www.w3.org/WAI/curricula/foundation-modules/>

### Overlays:

Web accessibility overlay tools: lies and gum balls. Julie Moynat, on April 11 2020 : <https://www.lalutineduweb.fr/en/web-accessibility-overlays-lies-gum-balls/>

Overlays are not the solution to your accessibility problem, Sheri Byrne-Haber, on January 14, 2020 : <https://sheribyrehaber.medium.com/overlays-are-not-the-solution-to-your-accessibility-problem-c5ffe44bd61f>

Video: Accessibility Overlays: What You See You Already Have, Karl Groves, on January 27, 2020 : [https://www.youtube.com/watch?v=nGQ\\_n6iey\\_w](https://www.youtube.com/watch?v=nGQ_n6iey_w)

7 Reasons Why Accessibility Overlays Aren't a Magical Solution, digilou, on March 3, 2020 : <https://carneydevelopit.wordpress.com/2020/03/03/7-reasons-why-accessibility-overlays-arent-a-magical-solution/>

### [In the U.S., overlay tools do not prevent lawsuits](#)

Accessibility Overlays in Digital Content, Brad Henry, on May 13, 2020. There are some lines about companies getting sued in the United States despite the presence of an accessibility overlay : <https://www.tpgi.com/accessibility-overlays-in-digital-content/>

Organizations with \$33 Billion in annual revenue were sued over accessibility in one week last month, Sheri Byrne-Haber, on October 19, 2020 : <https://sheribyrehaber.medium.com/organizations-with-33-billion-in-annual-revenue-were-sued-over-accessibility-in-one-week-last-month-3e9f430427ae>

2020 Full Year Report Digital Accessibility Lawsuits, UsableNet, on January, 2021 : <https://info.usablenet.com/2020-report-on-digital-accessibility-lawsuits>

# Trends of e-Learning in 2021 , pandemic year

Frédéric Habert & Thierry Koscielniak

## Designing a new normal after the outbreak

There is a paradox between the desire for a return to normality and the fact that the actors have evolved after the use of Zoom and the experience of distance learning. Four axes of evolution emerge thanks to Blended Learning:

### Enable new types of educational activities.

From this point of view, technologies can replace (the same pedagogical objective is reached), amplify (the objective is the same but the technology allows additional activities) or transform (the objective is different and can only be achieved thanks to technology) educational activities.

### Engage students through interactions with others using contents.

For students' engagement, the technology must allow to interact and produce sequences in addition to passive listening.

### Enhance lesson activities by including real-world skills that benefit students beyond the classroom.

Interactions can develop social skills and exchanges with professionals, for example.

### Expand the time and spaces where students can learn.

The use of video tutorials, for example, allows for flexibility in time but also in the construction of a customised course.

## Sizing the HyFlex to the post-pandemic campus

The HyFlex<sup>31</sup> (Hybrid Flexible) was developed during the pandemic to deal with the challenge of the variety of situations, particularly of students: between those who could come to campus and those who could not. Now the question arises of extending these systems based on different criteria.

### Fit the university's strategy and get the support of the teaching staff.

For example, meeting the equity objective by limiting the impact of the digital divide. The teams have set up specific classrooms on campus but also in rural communities and have supported teachers in the design of these multi-modal courses.

### How do I create "pilot" courses?

The challenge is to bring together a cross-functional project team to support teachers and ultimately convince others through these POCs (proof of concept).

---

<sup>31</sup> 7 Things You Should Know About the HyFlex Course Model – EDUCAUSE Learning Initiative <https://library.educause.edu/resources/2020/7/7-things-you-should-know-about-the-hyflex-course-model>

### Establishing a commonly shared definition.

Distance learning (synchronous and asynchronous) and classroom courses, allowing students to move seamlessly between the two formats.

### Provide infrastructure and training

Teacher training should enable them to consider the different modalities experienced by students. Feedback and mentoring from colleagues are also important.

Providing classrooms allowing simultaneous exchanges with face-to-face and distance learning students in a fluid manner is a factor of success. Help to access digital services for students is also crucial (loan of a computer, self-service room, etc.)

The Fort Lewis College experiment shows that students with A, B and C grades were as numerous in HyFlex courses as in other modes, but there are 9% fewer D and F grades than in equivalent non-Hyflex courses. In addition, student verbatim reports are positive, emphasising the wider range of learning modalities that is offered.

## Beyond Covid, what future for e-learning in higher education?

According to Unesco, the pandemic has disrupted the education of 1.4 billion students of all ages worldwide. In the United States, higher education institutions have faced up to the urgency of the situation, with difficulties in terms of equipment and support, often by transposing face-to-face courses directly to distance learning. However, there have been successes thanks to pedagogical and technical resilience. Teachers, institutions, and students have taken up distance learning.

To capitalize on this situation, one requires to consider these innovations as part of the institution's strategy: to provide the means for teachers, technicians, and instructional designers to follow up to develop innovative approaches and to mainstream them in the institution.

This implies developments of :

**Substitute courses** : these courses set up in urgency are to be improved and made permanent. This pedagogical corpus can help the thinking about distance or hybrid training and allow the implementation of a real strategy if the necessary support is provided: particularly in terms of instructional design. It has been observed that well-designed online courses are as effective as onsite courses. With appropriate means and a judicious approach, this dynamic can create the emergence of a real offer of distance courses and can also improve face-to-face and hybrid courses.

**Instructional designers** : their role has been crucial during the crisis and will be even more critical in order to get the most out of all the work that has been done. This is reflected in an increased demand for these profiles. Universities are increasingly distinguishing their value and the quality of educational technology services.

**Students** : the pandemic has highlighted the digital divide, with 65% of teachers reporting that students without equipment or connections did not have sufficient access to alternative programs. For these students, apart from some ambitious local programs of decentralized digital resource centers, the supply of USB sticks, CDs and even written materials was the solution offered. However, full or partial distance learning also has advantages that some students would like to keep. In order to ensure long-term success, they need to be provided with methodological support (technical skills, time management, self-discipline). And finally, it is also necessary to provide administrative assistance (orientation, technical support, schooling) comparable to that which they can benefit from on campus.

**Teachers** : one study states that before the pandemic 34% of teachers considered themselves inexperienced and only 22% very experienced. If many of them had no choice during Covid19, it becomes necessary to offer them skills development to develop hybrid or distance learning courses.

**Management teams** : they must learn from the crisis. They must also devise a strategy and operational processes that include long-term technical and infrastructure support. In this regard, 70% of executives surveyed say they want to invest in developing the skills of distance learning teachers and 36% will explore more sophisticated ways of designing online courses.

**Infrastructures** : during the pandemic, emergency solutions appeared (Zoom, Webex, Skype, Bluejeans, Blackboard, Adobe Connect, Google Drive, Microsoft Teams, Google Workspace, etc.). With the benefit of hindsight, universities are trying to determine the technological choices that best support their strategy. These new tools are becoming increasingly important (learning analytics, virtual and augmented reality, artificial intelligence, gamification, portfolios and course recording systems).

All these advances resulting from the crisis constitute a foundation for improving the service provided to students and the efficiency of the institution. Extrapolating on the return to normalcy, we can imagine improving student participation by capitalizing on collaborative technologies to give meaning to learning, by involving expert students who can tutor others, by developing the use of chat (conversational agent), and by giving access to more asynchronous resources.

## Relieving the stress of online learning

Teachers have seen an increase in the moral distress of students due to the situation brought about by the pandemic.

Different axes were explored:

- Relieving global distress with a little music at the beginning of class, and anonymous forums where it is okay to talk about your discomfort.
- Reduce the stress induced by the online exam by replacing the proctoring systems (webcam surveillance) with tests based on the production of deliverables (reports, prototypes, etc.) or collaborative work and even the shared creation of "cheat sheets" (course summaries related to the exam subject).
- Reduce the stress of the assignment due date by introducing suggested dates and not penalizing lateness so as not to discourage and cause dropouts.
- Reduce the stress of isolation with other students by allowing chat during class or by animating the forums with new homework tips.
- Relieving the stress of lack of access to quality internet by providing audio and video podcasts and text resources that can be accessed on a mobile phone.

## Using immersive technologies to teach

The example of SDSU (San Diego State University)<sup>32</sup>

The VITaL (Virtual Immersive Teaching and Learning) project started in 2016 and is intended to produce open educational resources (OER: Open Educational Resources). About 70 courses benefited from resources using

---

<sup>32</sup> <https://events.educause.edu/annual-conference/2021/agenda/oer-in-vr-sdsus-open-virtual-immersive-teaching-and-learning-resource-library>

immersive technologies: virtual or augmented reality, 360° videos. A simulation creation studio was first created to produce 3D anatomical models; first in a traditional way with an iPhone to photograph the models from several angles and with photogrammetry software.

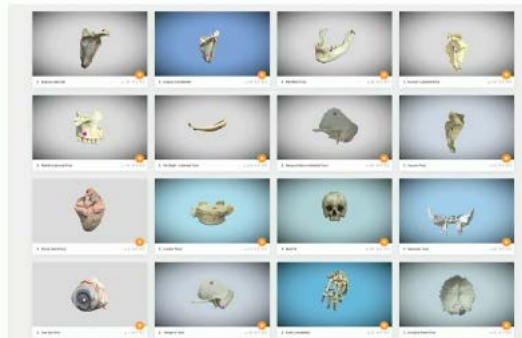
## Explore a Finished Model



Visible hand 3D anatomical model with SketchFab

Then the studio was equipped with semi-professional equipment: 3D scanner and lighting and these models were visible on tablets or using cardboard or a VR headset.

## VITaL Open Resource Library for Anatomy



Library of 54 models provided in OER by SDSU

The library now has models for botany lessons. A platform is being developed to make these models freely available to more than 475,000 students across California State Universities' 23 campuses.

Examples come from two sources:

- The XRReality Center and Lab at The New School<sup>34</sup>, founded in 2017.
- University of Michigan programs: MOOC "XR for everybody", XR Student Fellows program, funding of 22 projects in 11 different faculties, VR simulation of chemotherapy and a nuclear reactor.

When a project involving the use of VR headsets is initiated, the question of biometric data collected by this type of equipment must be addressed immediately. Biometric data can be video recordings of the face with facial recognition, eye movements (eye tracking) or voice prints.

This information has been studied in a reference document of the XRSI (XR Safety Initiative<sup>35</sup>) : the security and privacy framework<sup>36</sup>.

The conclusion is "to support the development of an ethical framework of best practices for the design of XR learning experiences, as well as for the acquisition and management of XR devices and software."

For further consideration, reference materials are online at the XRSI<sup>37</sup> website and at the website of the consortium Champions in Higher Education for XR (CHEX) from the Immersive Learning Research Network (iLRN)<sup>38</sup>. More technical information is available on the Cyber-X coalition website<sup>39</sup>, for example the book: "Standards for Immersive Technologies in Accessibility, Inclusion, Ethics and Security"<sup>40</sup>.

---

<sup>33</sup> <https://events.educause.edu/annual-conference/2021/agenda/xr-security-privacy-safety-and-ethics-considerations-in-higher-education>

<sup>34</sup> <https://xrcenter.newschool.edu>

<sup>35</sup> <https://xrsi.org>

<sup>36</sup> [https://xrsi.org/wp-content/uploads/2020/09/XRSI-Privacy-Framework-v1\\_002.pdf](https://xrsi.org/wp-content/uploads/2020/09/XRSI-Privacy-Framework-v1_002.pdf)

<sup>37</sup> <https://xrsi.org>

<sup>38</sup> <https://immersivelm.org/chex/>

<sup>39</sup> <https://cyberxr.org/>

<sup>40</sup> <https://cyberxr.org/publication/immersive-technology-standards-for-accessibility-inclusion-ethics-and-safety/>



# Learning Spaces : new perspectives ?

John Augeri

## Post-COVID perspectives for Learning Spaces

Learning Spaces, despite the obvious impact that the pandemic has had on their effective use since spring 2020, have nevertheless remained an important topic of discussion at EDUCAUSE conferences over the past two years. The sessions dedicated to Learning Spaces, particularly at the 2021 conference, focused on the new perspectives that these spaces could benefit from in hybrid configurations, that could be sustained over the middle and long term.

One of these sessions, given by the author of this article, and entitled *Learning Space: International Challenges, Perspectives and Opportunities in the Post-COVID era*, focused in particular on the opportunities that could be offered to Learning Spaces - especially informal ones - in hybrid and/or HyFlex patterns relying on an enhanced asynchronous component that, at least for part of it, would involve collaborative work typically supported and catalyzed by the Learning Commons and the Learning Centers. These opportunities are articulated with the prospect of hybrid schemes structured around the added value of both modalities, face-to-face and distance learning, and which would allow Learning Spaces (once again, notably informal ones) to become more integrated into pedagogical schemes.

These perspectives were also reflected in the traditional meeting of the Learning Space Design Community Group.

## Learning Space Design Community Group meeting

The EDUCAUSE Annual Conference was the occasion to hold the traditional meeting of the Learning Space Design Community Group, which was structured in three parts.

The first part addressed the issue of diversifying Learning Spaces, encouraging thinking "beyond the traditional classroom". Two typologies were highlighted as particularly relevant. Firstly, outdoor spaces were discussed not only in the context of the pandemic<sup>41</sup>, but also in a middle and long-term perspective<sup>42</sup>. HyFlex-compatible spaces were then discussed in the light of the particular exposure to which they were subjected in the context of COVID. A HyFlex typology to which we return through a specific session devoted to them, which is described below. This same typology, finally, has been illustrated through examples taken from the FLEXspace<sup>43</sup> database again this year.

---

<sup>41</sup> <https://theconversation.com/outdoor-classes-hold-promise-for-in-person-learning-amid-covid-19-144536>

<sup>42</sup> <https://campustechnology.com/articles/2021/10/06/changing-the-landscape-should-higher-ed-build-classrooms-outdoors.aspx>

<sup>43</sup> [https://members.flexspace.org/node/1913131?pager\\_page=spaces/all&pager\\_index=0](https://members.flexspace.org/node/1913131?pager_page=spaces/all&pager_index=0)

The second part of this session, organized in sub-groups, was the place of thematic exchanges which illustrate the current trends and stakes around Learning Spaces. The following topics were discussed:

- Issues of technology and tools integrated into the spaces
- Faculty Development,
- Informal Spaces (echoing a session devoted to them at the 2018 conference, and given by the author of this article), whose relevance was recalled, particularly in order to allow students to work on online content from campus
- And finally, Technology Sandboxes, presented under the title "Tech Bars" through an example from Saint Norbert College<sup>44</sup>.

The last part of this session focused on foresight, questioning the future of Learning Spaces from different but complementary angles:

- The generalization of Active Learning, and its impact on spaces,
- The consideration of inclusion in design, which was the subject of a specific session,
- Biophilia in design, which is notably addressed in V3 of the Learning Space Rating System,
- HyFlex configurations, which once again confirm their potential for sustainability,
- New generation labs,
- And finally, A/V equipment and in particular their capture functionalities, which echo the HyFlex.

## Learning Spaces and HyFlex

Cisco held a session specifically dedicated to HyFlex configurations. Let's recall that the principle of the latter was conceptualized in the second half of the 2000s - thus well before the COVID pandemic - with the possibility for learners to choose between three modalities: synchronous face-to-face, synchronous remote and asynchronous remote. The idea is to be able to mix these modalities on the same date and between different dates, in order to adapt to specific constraints or affinities, while ensuring equity in the learning experience. Among the three modalities of HyFlex, it is in particular the combination of a synchronous face-to-face and a synchronous distance learning that has been widely used since the beginning of the pandemic, as part of the measures aiming at ensuring social distancing, while allowing a whole contingent of students to participate in different courses.

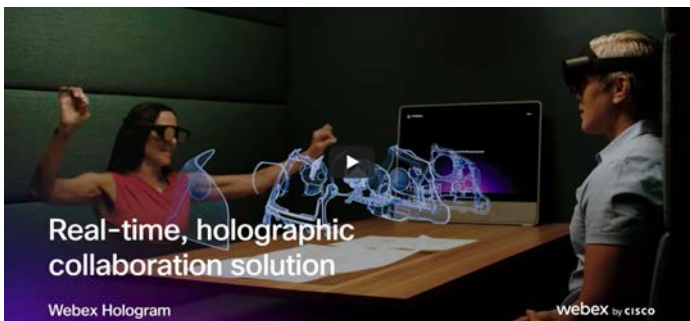
The session thus began with the question of a definition of the HyFlex, submitted to the participants through a live polling platform. Five themes emerged, which highlighted the benefits of these configurations (agility, choice and flexibility), but also the limitations and challenges they can bring (disparity and involvement of participants). The same participatory approach then addressed the question of the perspectives of HyFlex, and its place in the future of the educational world. One answer submitted was particularly representative: the HyFlex would eventually allow and represent a dilution of the boundaries between face-to-face and distance learning, and would by its very nature allow an increased consideration of the expectations of faculties and students.

---

<sup>44</sup> [https://members.flexspace.org/node/1917971?pager\\_page=spaces/all&pager\\_index=0](https://members.flexspace.org/node/1917971?pager_page=spaces/all&pager_index=0)

It is on this basis that the design principles of Learning Spaces compatible with the HyFlex were discussed in a second part, aiming at maximizing their efficiency<sup>45</sup>. Several tools were mentioned as potentially adding value to a HyFlex configuration. Some of them are already relatively common practice: collaborative whiteboards such as

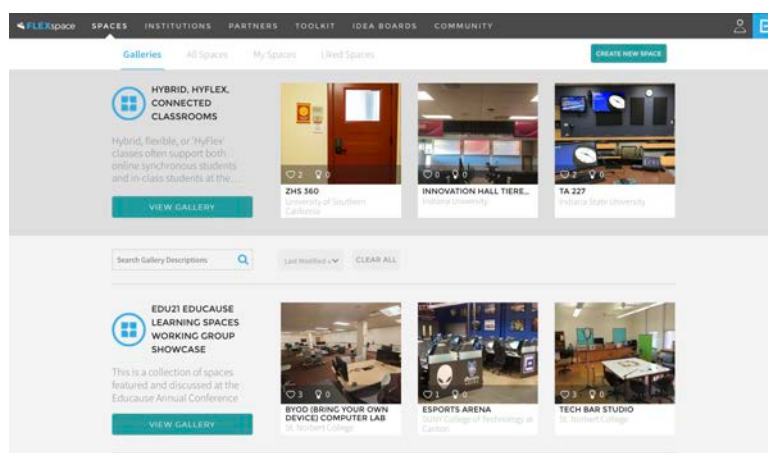
Miro Board, or extensions to PowerPoint allowing to implement surveys and questionnaires during classes. Others are based on newer - and more ambitious - technologies, notably linked to mixed, virtual and augmented reality, such as Microsoft's HoloLens, which is used in a real-time holographic collaboration solution developed by Cisco: Webex Hologram<sup>46</sup>.



Another workshop dedicated to the HyFlex focused on the issue of equivalence of treatment between face-to-face and distance learning students. He reminded us of the need for teachers involved in such an approach to balance the supervision of the two categories, emphasizing the interest, and even the necessity, of setting up corresponding training. The Technology Teaching Fellow program<sup>47</sup> of University of Washington, which the French EDUCAUSE delegation had had the opportunity to visit twice in 2015 and 2018, was cited as an example of such actions, which are part of Faculty Development, which we discuss in another chapter of this report. Finally, the workshop discussed the relevance of using student Teaching Assistants for the distance component of the HyFlex, in parallel with the faculty who works in the face-to-face component, for example in a Learning Space.

## Tools

Finally, the conference was the occasion to mention once again two fundamental tools that have been significantly developed for several years.



The FLEXspace<sup>48</sup> database continues to be enriched with examples of Learning Spaces of various types (including the HyFlex configurations mentioned above), some of which illustrated the sessions held on this topic. FLEXspace, which is open to the whole university community, is now compatible with the V3 of the Learning Space Rating System (LSRS)<sup>49</sup>, published in its original English version at the end of 2020.

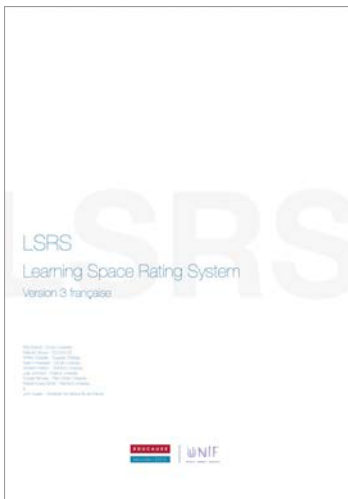
<sup>45</sup> See the chapter Sizing the HyFlex to the post-pandemic campus, page 36 of this report.

<sup>46</sup> <https://projectworkplace.cisco.com/capabilities/hologram/>

<sup>47</sup> <https://teaching.washington.edu/programs/technology-teaching-fellows/>

<sup>48</sup> <https://flexspace.org/>

<sup>49</sup> <https://www.educause.edu/eli/initiatives/learning-space-rating-system>



Let us recall that the [Learning Space Rating System](#) proposes a common framework for evaluating formal Active Learning spaces, based on a list of themes covering all the dimensions related to their implementation and operation, and thus concerning all the stakeholders potentially involved.

This list of themes has been updated and enlarged in the context of the transition to V3, with the inclusion of biophilia in the design, and inclusion (in relation to which EDUCAUSE has been involved for several years<sup>50</sup>). As we announced in our 2020 report, the V3 Learning Space Rating System has been translated/adapted into French by Ile-de-France Digital University, and besides in Japanese by Kyoto University, Osaka University and Ile-de-France Digital University, just like the previous version. These translations/adaptations are available for download<sup>51</sup>.

Finally, a session was specifically devoted to the [Learning Space Feedback \(LSF\) Guide](#)<sup>52</sup>, an evaluation and data collection tool designed by Indiana University's Mosaic Active Learning Initiative<sup>53</sup>, which has a long history of involvement in innovative pedagogies and Learning Spaces. The LSF aims to guide and inform the various decision-makers involved in a Learning Space project through the various stages of collecting, using and sharing data related to the use of these spaces by teachers and students, from a variety of complementary perspectives.



<sup>50</sup> <https://www.educause.edu/about/diversity-equity-and-inclusion>

<sup>51</sup> <https://www.educause.edu/eli/initiatives/learning-space-rating-system>

<sup>52</sup> <https://blogs.iu.edu/mosaiciu/2021/04/06/903/>

<sup>53</sup> <https://mosaic.iu.edu/>

# Faculty Development : from a response to the emergency to a logic of sustainability

John Augeri

## Faculty Development and response to the pandemic

One of the most obvious consequences of the pandemic was the sudden and drastic increase in the need for support for teaching teams. The sudden switch to full or partial distance learning configurations that the vast majority of these teams had to face exacerbated the role of any existing mechanisms, greatly increasing their scope and capacity, if necessary. In the majority of universities, these training programs, presented under the heading of Faculty Development, have thus experienced unprecedented exposure, as one of the pillars of the response put in place to deal with the pandemic, in parallel with the technological devices that have enabled the migration to remote configurations.

The methods of implementation or extension and the nature of these devices are indicators that can illustrate the agility of the institutions facing the emergency. However, and beyond that, the hypothesis of a long-term solution may foreshadow a more integrated institutionalization of digital technology in the strategies of institutions, particularly in the form of hybrid configurations that are part of the long-term.



While these perspectives and their underlying issues were discussed in the background of many of the 2022 conference sessions, they were dealt with exclusively by one of them, entitled Faculty Development during & after the COVID, Lessons from abroad, which proposed an international comparative approach. Three significant examples, implemented in Japan, Australia, and France, were presented and discussed: Kyoto University (Kyoto, Japan), Edith Cowan University (Perth, Australia), and the Ile-de-France Digital University (Paris, France).

The session was an opportunity to discuss the

lessons learned from the implementation of these actions during the pandemic, before proposing a prospective discussion, during which the panel discussed the strategic and operational modalities of their perpetuation.

## International Feedback

The three institutions have in common that they were able to capitalize on a Faculty Development system that was in place prior to the pandemic. Their respective presentations focused on the adaptations made in order to deal with the new situation, in terms of the subjects covered, the organizational aspects and the methods of access.

Edith Cowan University (ECU), a generalist institution created in 1991 and with more than 30,000 students, found itself relatively prepared when the pandemic started. The university was able to rely on a pre-existing Digital First Framework, which was formalized by a concrete policy of digital enrichment of courses, including standards for online teaching. In fact, 25% of the students had already adopted this method before COVID, which gave the teams significant advantages when they switched to distance learning. Besides, and in order to support teachers in their new modalities of practice, ECU has also been able to rely on a range of human resources, including instructional designers, specialized librarians, technological support specialists, as well as trainers and evaluation specialists. A strong digital and technological ecosystem, reflecting the strategic direction

**Preparedness for Pandemic**  
Mandatory Training

Professional Development for Teaching Staff Procedures  
PDC Program

*Long-standing mandatory training professional development courses for all teaching staff, including dedicated module for online teaching*

**PDC111** Introduction to Learning and Teaching in Adult Education  
This course is designed for new and returning staff who are new to the role of teaching in adult education. It provides a foundation for understanding the role of the teacher and the learning process in adult education.

**PDC112** Professional Learning & Teaching  
This course is designed for staff who are already experienced in teaching and learning. It provides a foundation for understanding the role of the teacher and the learning process in adult education.

**PDC113** Professional Learning & Teaching  
This course is designed for staff who are already experienced in teaching and learning. It provides a foundation for understanding the role of the teacher and the learning process in adult education.

**PDC114** Professional Learning & Teaching  
This course is designed for staff who are already experienced in teaching and learning. It provides a foundation for understanding the role of the teacher and the learning process in adult education.

**PDC115** Professional Learning & Teaching  
This course is designed for staff who are already experienced in teaching and learning. It provides a foundation for understanding the role of the teacher and the learning process in adult education.

**PDC116** Professional Learning & Teaching  
This course is designed for staff who are already experienced in teaching and learning. It provides a foundation for understanding the role of the teacher and the learning process in adult education.

of the institution through virtual classrooms and video recording systems, helped prepare the institution for the pandemic. However, the pandemic was a significant challenge for many stakeholders, particularly in terms of supporting teachers. ECU had already incorporated a mandatory training program, which was an obvious foundation for the Faculty Development response. In addition, and following the request of prescribing teachers, Quick Tip Sheets were designed in three weeks, at the start of the pandemic, with the objective of providing concise support

focused on a particular use. In particular, they took the form of video tutorials. At the same time, online workshops, the Just in Time Virtual Workshops, covering the digital tools in place and related practices, were also offered during off-peak hours and on weekends. In parallel to the actions carried out towards faculties, and this is certainly a specificity of this example, ECU has set up a support for students, in order to accompany them in their online learning, and to make sure they are as ready as possible for this new modality.

Kyoto University, one of the most renowned and oldest institutions in Japan, with nearly 23,000 students, had to manage the beginning of the pandemic with the beginning of the academic year, which started in April in Japan. The response implemented by the university was basically centralized and coordinated, relying mainly on the complementary action of two services, respectively in charge of technical and technological aspects, and pedagogical issues. Among the latter, the Faculty Development component, which was dealt with in particular through the Connect web portal which, even before the pandemic, provided access to tools, platforms and services to support digitally enhanced teaching. In response to the urgent needs related to the pandemic, a new section, Teaching Online @Kyoto University, was launched in spring 2020 to provide a variety of materials, resources

Teaching Online@Kyoto U

Keep Learning Online  
Enhance Learning Online

As the basic preventive measure against the spread of the coronavirus COVID-19 infection, we should avoid (I) closed spaces with poor ventilation, (II) crowded together in large numbers, and (III) having conversations at close range. Consequently, it is becoming difficult to have all of our social classes only on the university campus.

Given such circumstances, using online education is reliable and promising option to keep students learning as well as to keep instructors teaching. Furthermore, if the situation gets worst and the university campuses are closed down, distance education will probably become the only viable means to continue support learning and teaching.

Providing support tools and resources (and know-hows) for effective online education

Providing guidance and counseling for instructional design and learning evaluation focusing on online/blended/hybrid learning & teaching

Promoting resource sharing across different departments and educational programs

Building Communities of Practice for cross-departmental learning by faculty, staff, and IAS

What is an online class?  
What is a hybrid class?  
How to succeed learning online classes  
How to lead effectively  
How to communicate  
Contact online classes in collaborative ways  
What is the right of online classes  
FAQ about online classes  
Online lesson resources

and support for distance and blended learning. This section covers aspects such as instructional design, intellectual property considerations, tips for effective use of online tools, and the most effective ways to communicate and engage with students. During the first 18 months of the pandemic, more than 50 workshops were organized on 6 major themes. Among other things, several driving faculties had the opportunity to share their experiences with the community. One of the aspects dealt with, which was more prospective, focused on exploring the prospects of post-COVID for teaching and learning practices. At the same time, Kyoto University has been working hard to optimize the use of existing educational resources (MOOCs, OCWs, SPOCs, and LMSs) and to integrate them into students' daily activities. As a result, the pandemic was also an opportunity to reflect on the institutionalization and industrialization of hybrid education.

Finally, the Ile-de-France Digital University has relied on a training system that has been shared at the regional level since 2009 and is fully integrated into the training programs of its member institutions. The evolution of this system in response to the pandemic has taken shape in two ways. Firstly, in terms of access, this offer, which was historically provided exclusively face-to-face, has obviously been switched to remote. Apart from all the

dimensions linked to the specific and dramatic context in which it took place, this switch, as soon as it was decided to implement it, was seen as an opportunity to be part of the middle and long-term, i.e. beyond the pandemic. This to complement face-to-face training as soon as it would be possible again. Thus, all of the sessions concerned were specifically redesigned and adapted to the constraints and benefits of distance learning, which was formalized by an asymmetrical interactive videoconference format. This format, designed above all to maximize the active involvement of participants and the dynamics of the sessions, was based in particular on a



breakdown of the sessions allowing for the systematic insertion of Q&A moments, making use in particular of chat. In terms of the program itself, a major addition was made in the form of a course specifically aimed at faculties who are required to teach remotely or in hybrid mode. This course, entitled Teaching with Digital, offered 10 modules covering conceptual and fundamental aspects, content production, and learning environments. After a phase of experimentation and adjustments, it was scheduled three times in 2021, and recorded nearly 500 registrations, with a satisfaction rate of 95%. These results, even before the end of the pandemic, confirmed the continuation of the dual face-to-face/remote modality for this training program, and that of the Teaching with Digital curriculum, which has since undergone a major evolution in order to adapt it to the needs of faculties.

## Lessons learned and middle/long-term projection

The panel then proceeded to a substantive discussion, questioning in particular the possible sustainability of the measures put in place in response to the pandemic, and the institutionalization of the corresponding practices in the middle/long-term. From the three feedbacks, it was possible to identify the following main lessons:

- A Faculty Development initiative is all the more effective if it is based on taking into consideration the expectations, needs and, more generally, the well-being of teachers (all the more in a context as specific and restrictive as the pandemic). Regular communication with this population, a question and answer desk or surveys are all relevant solutions in this regard.
- The peer-to-peer approach, involving the facilitation of certain sessions or workshops by faculties who are the driving force behind the innovation (sometimes from the same institution), makes it easier for the rest of the contingent to integrate their practices, and also legitimizes the approach.
- It is definitely worthwhile to set up such systems within a framework of monitoring and inter-university collaboration (on a national or international scale), or even of concrete mutualization.
- The approach to programs must, as much as possible, support a diversity of subjects, pedagogical practices, and personalized paths. It must also be creative, beyond pragmatism.
- The format of the sessions and their scheduling have a significant influence on the potential for participation. A relatively short duration (40', or less than two hours), and scheduling during off-peak hours (e.g., lunchtime) are potentially attractive.

Finally, and returning to the question of what might be the perspectives for such Faculty Development initiatives after the pandemic, the panel raised various issues that might have an inflection:

- The establishment or extension of Faculty Development programs to deal with emergencies has been done in most cases through the allocation of an exceptional budget. Securing it on an annual recurring basis (at least for operating expenses) is necessary to allow for an activity that is maintained over time, and therefore all the more integrated on the institutional level and by users.
- This can be supported by the fact that a significant number of users have shown an evolution in terms of mindset and openness regarding the integration of digital technology in their teaching. The examples given in this session have in particular highlighted this evolution among faculties who, without having been particularly driven by or even sensitive to digital technology before the pandemic, have gradually and truly embraced the possibilities it offers, and this in a perspective that goes beyond the pandemic itself. Capitalizing on this openness, which could be translated into sustainable hybrid models, is certainly one of the main challenges that Faculty Development initiatives have a role to play.
- In the continuity of the two previous points, this capitalization, and more globally these perspectives, finally imply an institutionalization of digital technology in the long term, which would translate in particular into the perpetuation of curricula programmed in distance learning, in hybrid, or in HyFlex. This assumes that stakeholders (as well as teachers, as we have pointed out) will accept all or part of the modalities implemented during the pandemic as permanent models, and not only ERT solutions (Emergency Remote Teaching, widely implemented during the pandemic). Models that would inherently add value to both institutions and learners, and that would be further enhanced by Faculty Development.



# Data in a post Data Lake Age

Pascal Vuylsteker

The data topic is probably a bit of a catch-all, since data is everywhere. It can be identified more specifically in the following few areas listed explicitly in EDUCAUSE.

- Data Privacy
- Data Lake
- Data Security
- Data Analytics as a decision aid

We will focus hereafter on the storage and access aspects of the data.

## Building more than a simple Data Lake

**WGU** is a 25+ year old non-profit university dedicated to fully remote and online education. Their mode of operation is similar to the French OpenClassrooms. Entirely online and professional training.

In the presentation: "Building a Data Lake House — It's Not Just for the Summer Vacation—It's Year-Round Enjoyment!"<sup>54</sup> WGU explains the educational model of the organisation entirely focused on the systematic collection of student activities. As well as its exploitation (with a side note on the opposition they articulate between "Data Centric vs. Data Driven").

To do this, WGU went through 4 different steps and technologies.



"Universities measure the wrong thing. They measure time. They measure prestige. I wanted to base a degree on performance—and that was a real revolution."

—Roy Romer, Former Governor of Colorado

### Better Data = Better Outcomes, e.g.,

- Pace, Progress and Graduation
- Student delight / satisfaction
- Post-graduate impact

## WGU DATA JOURNEY

2009-2012	2013-2017	2018-2020	2021-2025
Excel/ SAS	EDW	EDW 2.0	Data Lakehouse
17 different excel attached to an email sent as monthly report	Using Oracle DB Business logic in stored procedures, Data stored in oracle tables	Using Apache Spark Business logic in Python/ Scala, Data stored in S3	Using Spark and S3 Historic and current data available for Analyst and Data Scientist
Dec 2012 Active: 33,000+ Grads: 2,000+	Dec 2017 Active: 82,000+ Grads: 120,000+	Dec 2019 Active count: 115,000+ Grads: 170,000+	Dec 2025 Projected Active count: 170,000+ Grads: 400,000+
Simple and easy to manipulate	Consistent and reliable	Scalable and performant	Support for predictive and prescriptive analysis
Problem: No single version of truth	Problem: 2017 system became slow and inflexible	Limited to Internal data stores and only few external sources	Internal and external data sources available individually or together

<sup>54</sup> Building a Data Lake House — It's Not Just for the Summer Vacation—It's Year-Round Enjoyment! : <https://edu21.educause.edu/live-stream/23134950/Building-a-Data-Lake-House--Its-Not-Just-for-the-Summer-VacationIts-Year-Round-Enjoyment>

During this session, Narendra Pandya, Director of Business Intelligence at WGU, presents a review of the concepts of Data Warehouse and Data Lake, in order to offer the best of both worlds in what he conceptualises as "Data Lake House". The Data Warehouse is the world of BI (Business Intelligence). To caricature it, it is de-normalised and historicised SQL that is accessed mainly from proprietary solutions.

On the other hand, Big Data, which is generated by the increase in Variety, Speed, and Volume for data (the well-known 3V of BigData) imposes a wider openness that translates into the concept of Data Lake, where more information is deposited in more varied and differently structured formats (and generally less structured ones).

Data lakes store data in its natural/raw form, data that is accessible to several different types of end users, such as product managers, engineers, and data scientists. The flat, raw storage architecture of data lakes has paved the way for machine learning and predictive analytics on many different types of data.

However, data lakes don't have only advantages. If not managed properly, data lakes can result in poor performance for BI and data analytics use cases. In addition, the storage format of natural/raw data can make it difficult to enforce data reliability and security.

This brings us to the introduction of **Data Lakehouses** (original, isn't it?). Data Lakehouses take the raw, unstructured storage format of Data Lakes and make it accessible through a data access layer, in this case named **Delta Lake**. Delta Lake is an open-source storage layer that brings more reliability to Data Lakes, for example through ACID kind of transactions. Beyond the Delta Lake layer, WGU also uses the Apache Parquet file format, a columnar file format, including the per-column type specification, from the Hadoop world<sup>55</sup>.

## DATA WAREHOUSES/ DATA LAKE = DATA LAKEHOUSE



- Pros**  
Great for Business Intelligence (BI) applications
- Cons**  
Proprietary systems with only a SQL interface  
Limited support for Machine Learning (ML) workloads



- Pros**  
Supports ML  
Open formats and big ecosystem
- Cons**  
Poor support for BI  
Complex data quality problems



- Based on **open data format** (Parquet)
- Adds **reliability, performance, governance, and quality** to existing data lakes
  - Simplifies data engineering with a **curated data lake**



<sup>55</sup> DeltaLake vs. Apache Parquet [https://stackshare.io/stackups/apache-parquet-vs-delta-lake#:~:text=Delta%20Lake%20vs%20Apache%20Parquet,%20Doriented%20data%20storage%20format%20\\*](https://stackshare.io/stackups/apache-parquet-vs-delta-lake#:~:text=Delta%20Lake%20vs%20Apache%20Parquet,%20Doriented%20data%20storage%20format%20*).

In conclusion, the Data Lakehouse is still an emerging concept. However, it responds to the criticisms made to the Data Lake, and therefore deserves to be examined.

	<b>Data Warehouse</b>	<b>Data Lake</b>	<b>Data Lakehouse</b>
<b>Storage Data Type</b>	Works well with structured data	Works well with semi-structured and unstructured data	Can handle structured, semi-structured, and unstructured data
<b>Purpose</b>	Optimal for data analytics and business intelligence (BI) use-cases	Suitable for machine learning (ML) and artificial intelligence (AI) workloads	Suitable for both data analytics and machine learning workloads
<b>Cost</b>	Storage is costly and time-consuming	Storage is cost-effective, fast, and flexible	Storage is cost-effective, fast, and flexible
<b>ACID Compliance</b>	Records data in an ACID-compliant manner to ensure the highest levels of integrity	Non-ACID compliance: updates and deletes are complex operations	ACID-compliant to ensure consistency as multiple parties concurrently read or write data

For the sake of completeness, it is interesting to monitor some topics that are now in maintenance mode. These are not new trends, but topics that are always around in the EDUCAUSE conference. They are systematically included in the classic Top Ten IT Issues. We will therefore note here that they are still a concern for American CIOs, and provide some examples of how they were dealt with during the conference. Please refer to previous editions of this report to find these topics covered in more detail.

## On the Cloud again

The Cloud remains present in the eighth place of the Top Ten as well as in the conferences. For more details, you may want to look at the 2018 and 2020 versions of this report to see how its treatment has evolved.

### 8. Weathering the Shift to the Cloud: Creating a cloud and SaaS strategy that reduces costs and maintains control

As with many other topics, Cloud projects are often approached from the perspective of managing large projects, rather than from the technical aspect itself. An approach that is also found in data projects. Indeed, this

kind of project must be managed in a transversal way by including a maximum of departments representing the users. A typical example of these presentations is the one from Princeton, entitled: « Bringing Light to Dark Data: A Collaborative Next-Generation Storage and Metadata Project »<sup>56</sup>.

Some figures are always interesting to grab from those kind of testimonies: in spite of the participation of 25 people working in 4 working groups, the intermediate conclusion of the speakers was the need to recruit 5 additional people in order to complete the project. A full-time developer was included in those 5.



<sup>56</sup> <https://events.educause.edu/annual-conference/2021/agenda/bringing-light-to-dark-data-a-collaborative-nextgeneration-storage-and-metadata-project-1>

### 1. Cyber Everywhere! Are We Prepared?

Developing processes and controls, institutional infrastructure, and institutional workforce skills to protect and secure data and supply chain integrity

On the cybersecurity side, the rule is that protection is not enough. Whatever the seriousness of your protection, any connected system can suffer from an attack. So attention must be paid to the aftermath of the attack. For example, we may look at the presentation by Tony Ocampo from ConvergeOne, whose concern is how ransomware attack backup tools first. Obviously, if a backup device is working properly, then hackers lose the advantage. The company's credo is to differentiate between CR (Cyber Recovery) and DR (Disaster Recovery). To go further on this topic, it is good to explore the vocabulary of the domain. See for example, "SOC, SIEM, XDR, MDR, EDR... what are the differences ?"<sup>57</sup>

Another interest of the conference is to benefit from the naked testimony of universities that have been attacked recently, with a description of the attackers' modus operandi, but also of the appropriate reaction of the targeted university. Thus, California State University San Marcos (CSUSM)<sup>58</sup>, which was attacked in the middle of the pandemic, on September 10, 2020, tells us day after day, the steps of the attack, the method of detection of the attack (first detected thanks to an antivirus and then thanks to the installation of Trend Micro's XDR module), the various responses of the university, the suspense of the successive attacks, and finally the lessons learned during the event. Lessons they share with us, such as the importance of managing former student accounts, the implementation of MFA (Multi Factor Authentication) before the occurrence of a crisis, the potential danger of virtual desktops (which can be used as a starting point for an attack), or the registration of specialised subcontractors upstream of a crisis.

### EVICTION Events

- 11/13/20 - Immediate roll out of Multi Factor Authentication (MFA) to campus community
- Mass enrollment via daily Zoom sessions
- Day before Thanksgiving - CSUSM and Chancellor's Office staff calling over 1,950 students to encourage them to enroll
- 53,032 former student accounts disabled
- 11/16/20 and 11/25/20 CSUSM reached an MFA enrollment of 17,276

### Post Event – Lessons Learned

- Dormant User Accounts Pose Security Risk
- Weakness in Domain Privileged Account Passwords
- Lack of Multi Factor Authentication (MFA)
- Lack of Tiered Physical and User/Group Security
- Unlimited Access to Virtual Desktop
- Limited Visibility into Malicious Activities
- Vendor Contracting Delays
- Lack of Available Resources

<sup>57</sup> SOC, SIEM, XDR, MDR, EDR... quelles différences ? : <https://orangecyberdefense.com/fr/insights/blog/detection/soc-siem-xdr-mdr-edr-quelles-differences/>

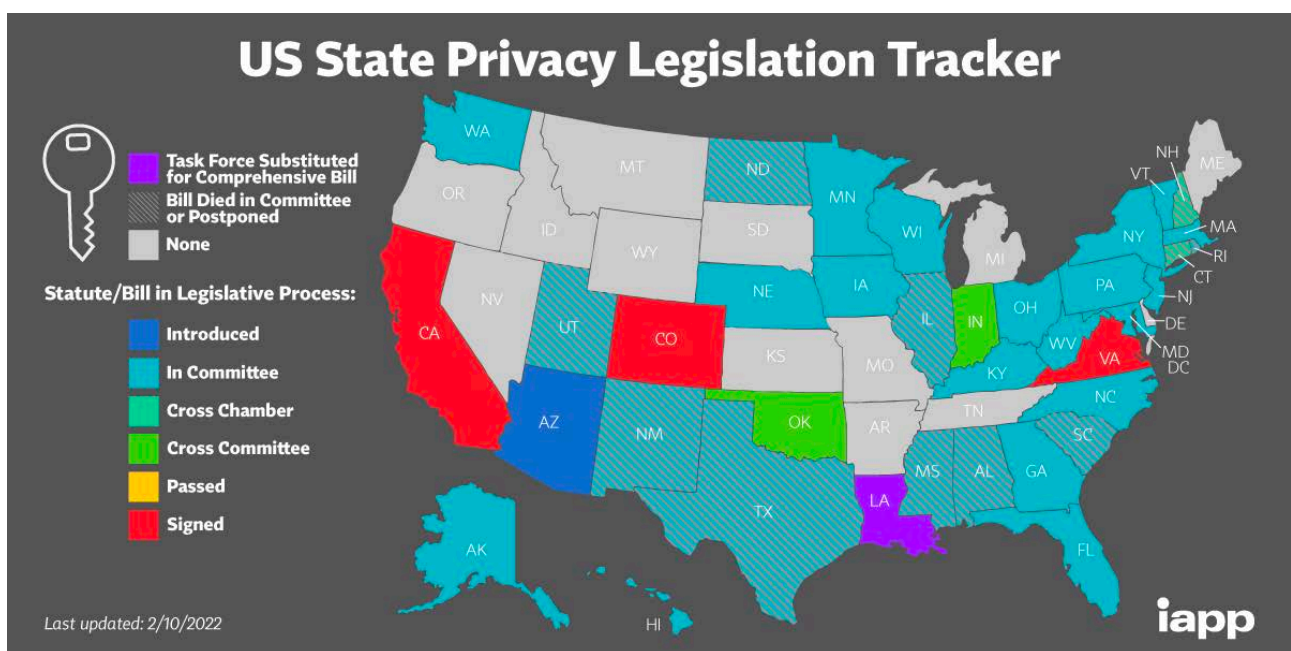
<sup>58</sup>Hitting Bedrock—CSU's Response to a Ransomware Attack and Lessons for Higher Education : <https://edu21.educause.edu/live-stream/19807065/Hitting-BedrockCSUs-Response-to-a-Ransomware-Attack-and-Lessons-for-Higher-Education>

## Data Privacy

One of the best presentations on the topic was given this year by CISOs (!) from the University of Hawaii and Portland State, in the presentation: « GDPR, CCPA: Data Privacy and security Laws - What's Next? »<sup>59</sup>.

The matter is now widely taken into account by universities. Beyond its introduction by the GDPR/RGPD and its confirmation by the CCPA (California Consumer Protection Act) in January 2020, it is now most states that are looking into the subject with mixed success.

Like the two previous domains, the one of the compliance with the various regulations on privacy took a cruising speed, with presentations alternating between a summary of the approach to follow (such as the one mentioned here) or more individual testimonies of specific projects. It should be noted that the confusion between security and privacy remains subtly present since two CISOs made this presentation, where one would expect to see DPOs.



<sup>59</sup> <https://events.educause.edu/annual-conference/2021/agenda/gdpr-ccpa-data-privacy-and-security-laws--whats-next>



## Acknowledgements

To the teams of EDUCAUSE.

To the French Ministry of Higher Education, Research and Innovation.

Our friendly thoughts to Yves Epelboin, Emeritus Professor at Sorbonne University, for his participation in the creation of the Delegation and for sharing his address book of digital experts and CIOs of US Higher Education. The EDUCAUSE French Delegation would not be what it has become without his inspiration and contribution.

## Credits

Contributors: John Augeri, Christian Cousquer, Laurent Flory, Frédéric Habert, Thierry Koscielniak, David Rongeat, Bruno Urbero, et Pascal Vuylsteker

Editor in Chief: John Augeri.

Layout: John Augeri

The statements and opinions expressed are those of their respective authors.

All trademarks belong to their respective owners.



v1.00EN





# EDUCAUSE

ANNUAL CONFERENCE 2021



#EDU21fr