AI in Education: Learning Analytics, Data Privacy, and Data Surveillance

Mohammad Khalil

Fostering Digital Ethics in Higher Education: Ethical Technologies, Responsibility, and Rights in the Digital Age

27 Nov 2025

Online, Kyrgyzstan

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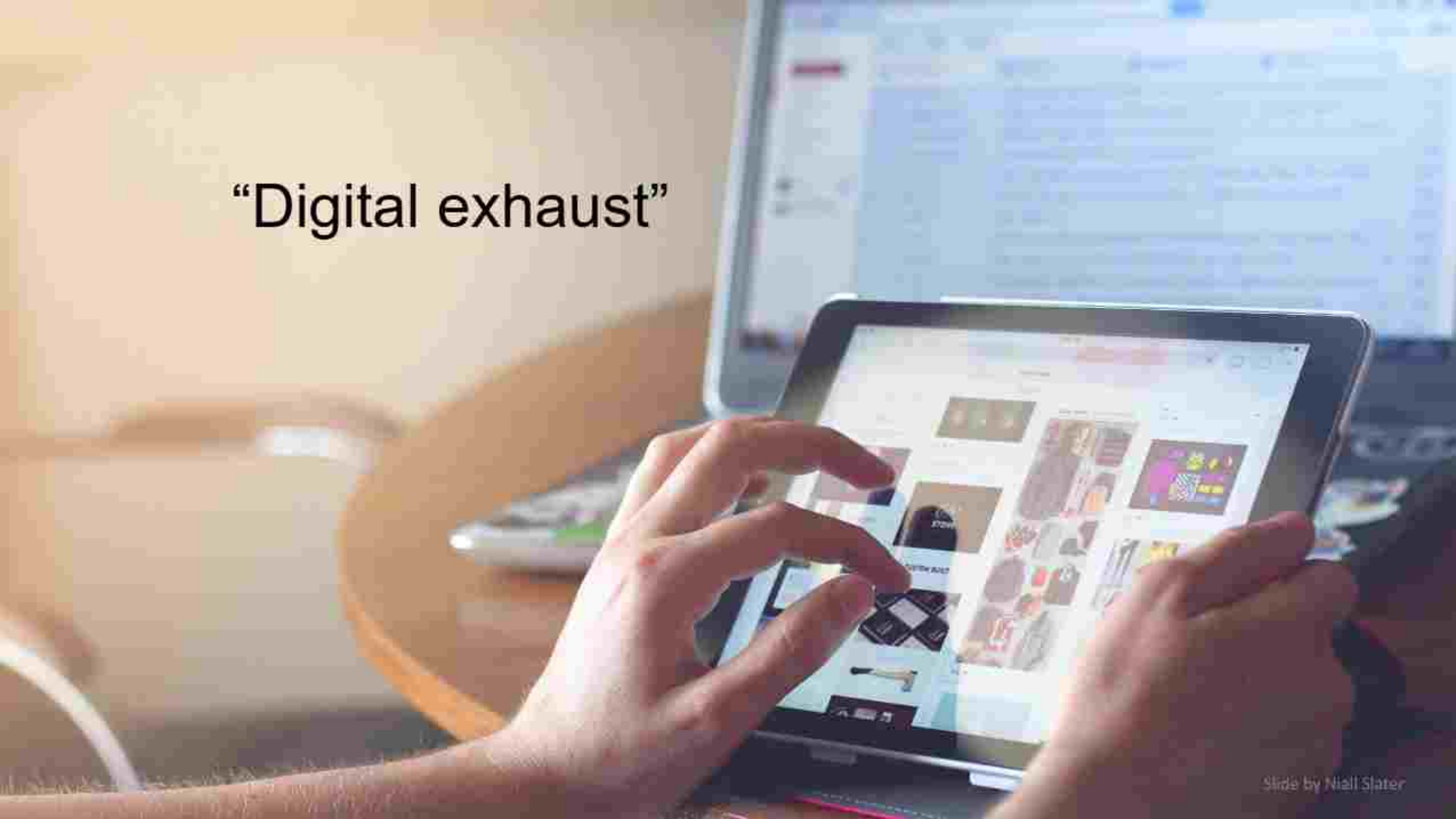
@TUMohdKhalil

SLATE

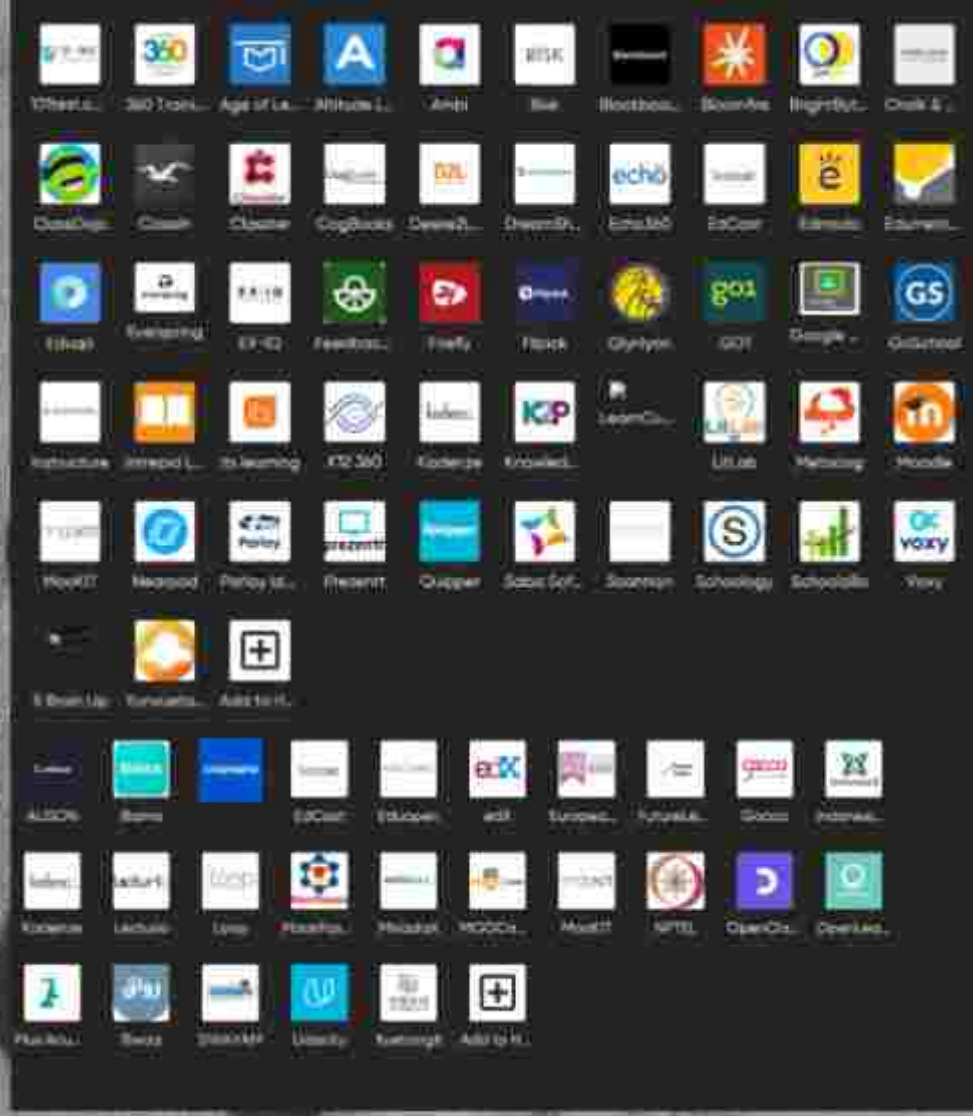
UNIVERSITETET I BERGEN

“Digital exhaust”



Digital traces

Learning platforms



MULTICHANNEL DATA of Learners

Sources of educational data

Mobile Eye-Tracker

Hand gestures
(leap motion)

Motion Sensors (Kinect)

Galvanic Skin Response

Machine Learning

Emotion Detection

Video and
Speech data

CHATPDF

Hugging Face

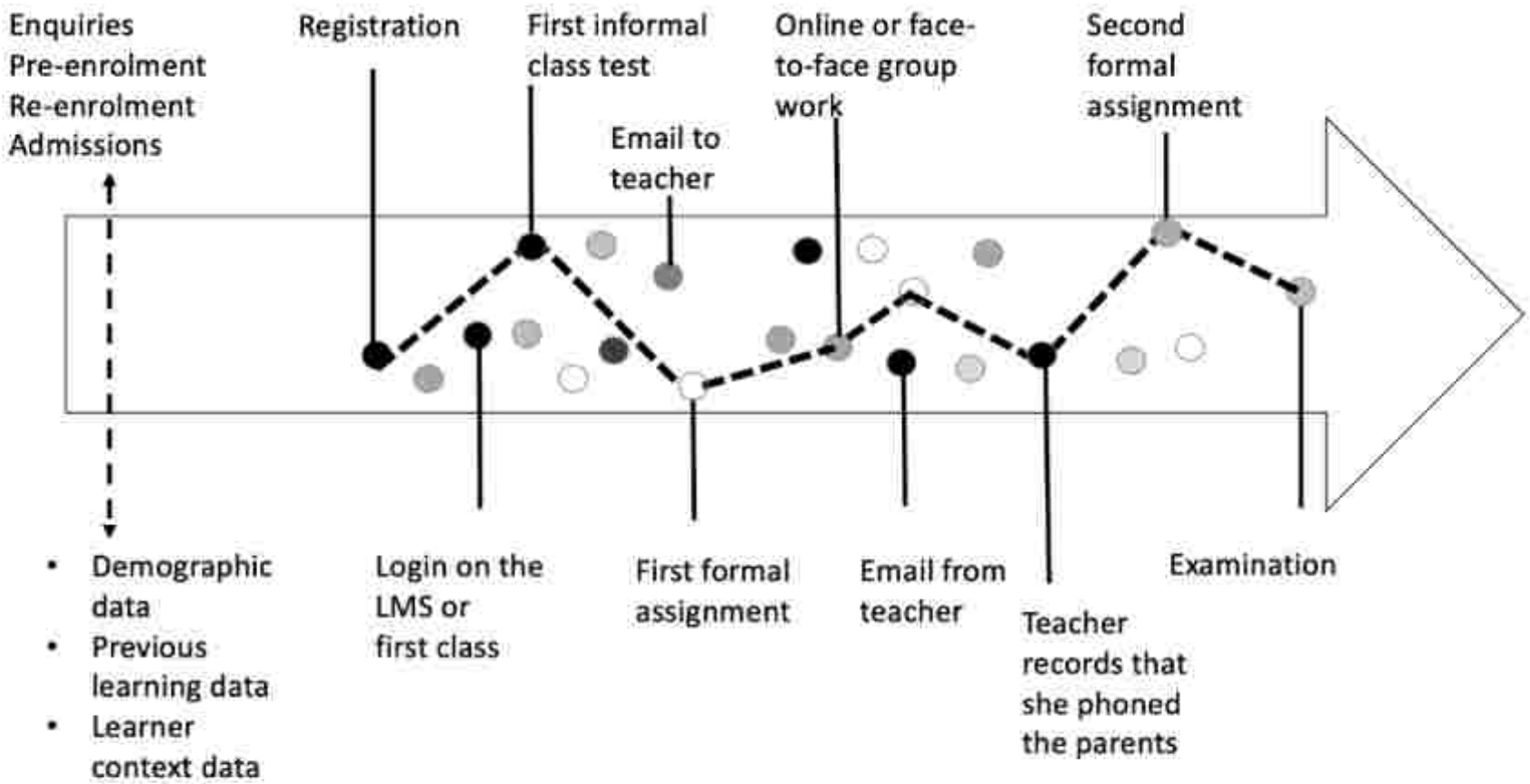
perplexity

Gemini

+ Gen. AI new types of Data

Fliki

An example of data collected in Higher Ed



Visual representation of points of learning analytics

Source: LA: a Primer. Prinsloo, Slade, and Khalil. 2021

Human obsession of quantifying

What data trails may reveal in Education?

One's sentiments

One's beavhiour,

One's social connections,

How one's learns,

And what might one's do next

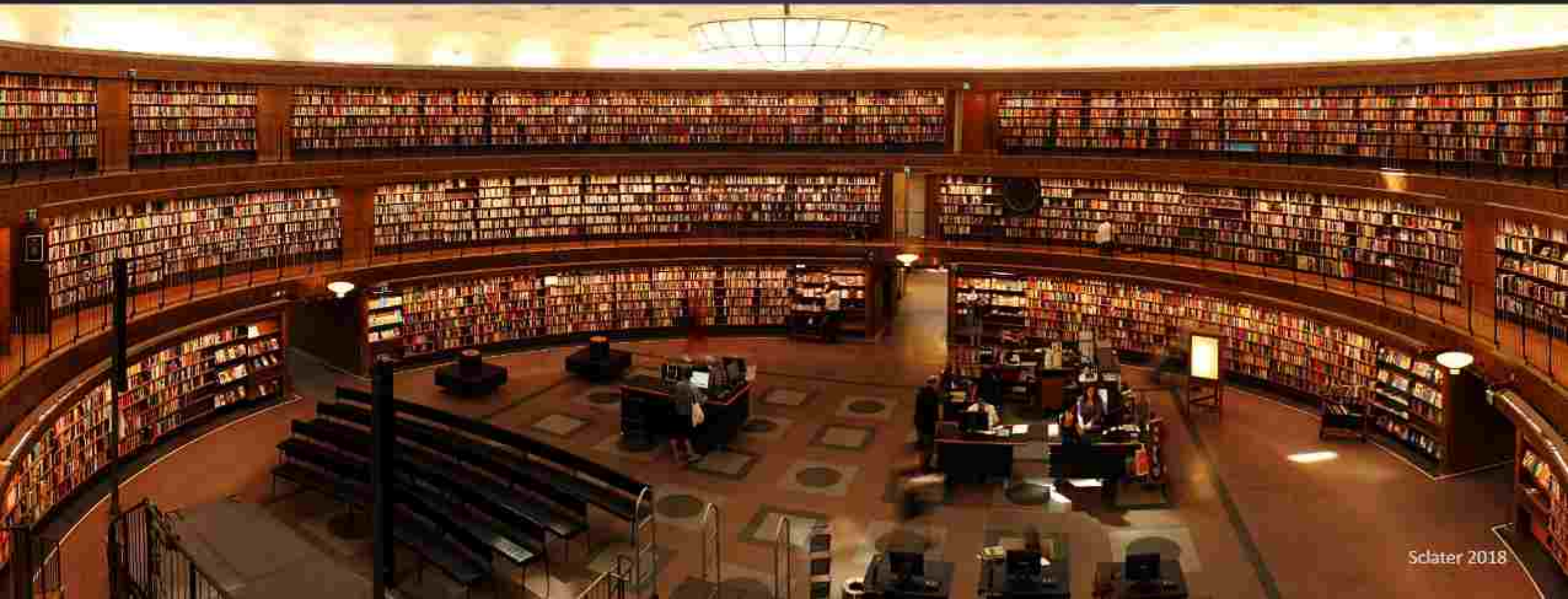
Credit: Wasson

Learning Analytics and AIED

High expectation and vibrant interest

Learning analytics

The use of data about students and their activities to enhance education



Pre-LAK'11 LAK'11 LAK2012

LAK 2013

LAK14 INDIANAPOLIS INDIANA, USA

LAK 15

LAK 24

LAK 16

LAK 17

LAK 18

LAK 19

LAK25

LAK20

LAK 21

VIRTUAL CONFERENCE

LAK22

LAK 23

LAK26

Bergen, Norway

SOLAR
SOCIETY for LEARNING ANALYTICS RESEARCH

Journal of Learning Analytics

KEY TECHNOLOGIES & PRACTICES

2022

2024 EDUCAUSE Horizon Report®
Teaching and Learning Edition

Technological

Concerns about cybersecurity and privacy are increasing.

The use of learning analytics continues to rise.

The digital divide persists.

2021
Teach

KEY TECH

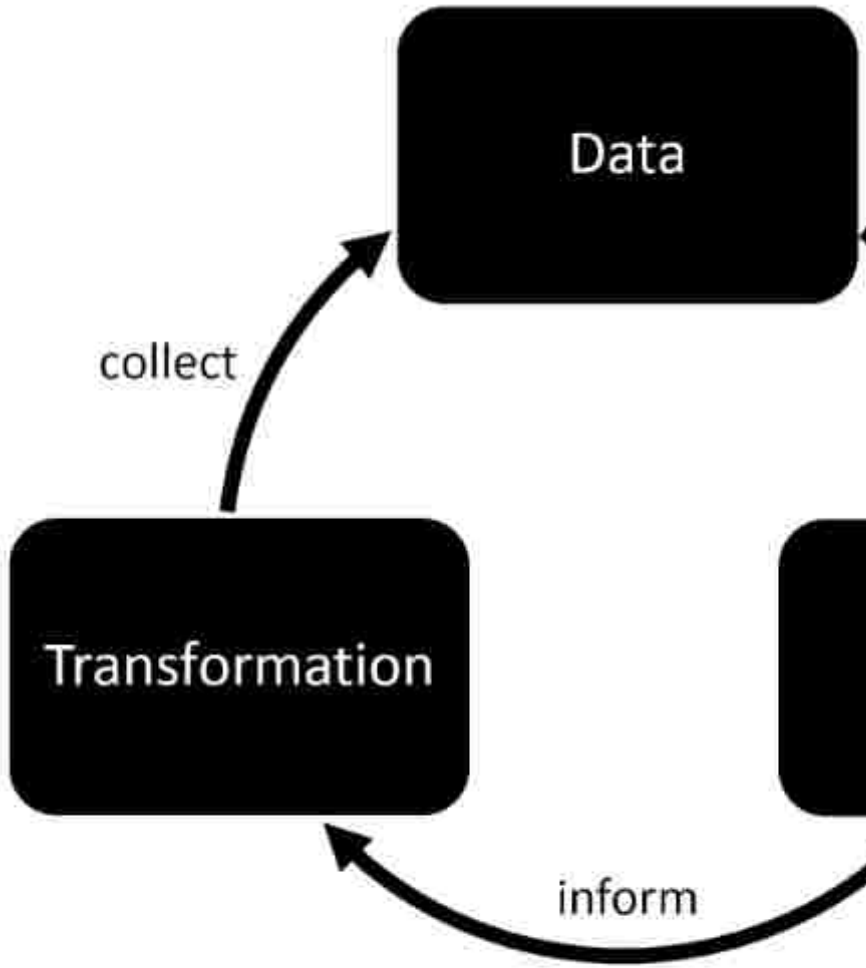
Last year the *Horizon Re*
concept of practices as a
focus on technologies. T
replacing "emerging" with "ke
teaching and learning forward
less relevant than its being key

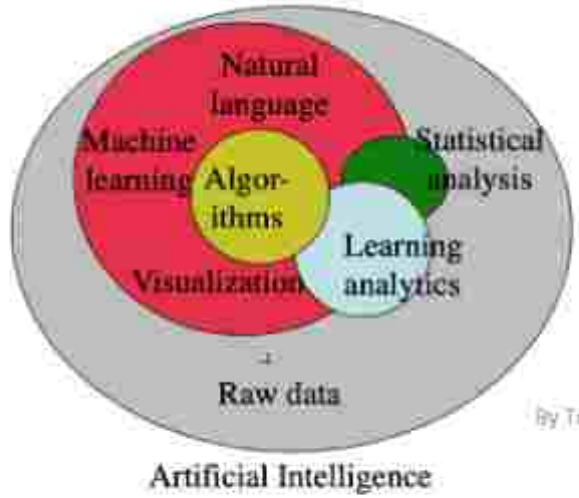
This shift allows these categor
reports more organically, reflec
witnessed over the past 18 mo
developments can renew (or re
the categories of AI, open edu

g Analytics
g Tools
g Spaces
g Hybrid/
ing Modes
als
evelopment for
e Teaching

Learning Analytics

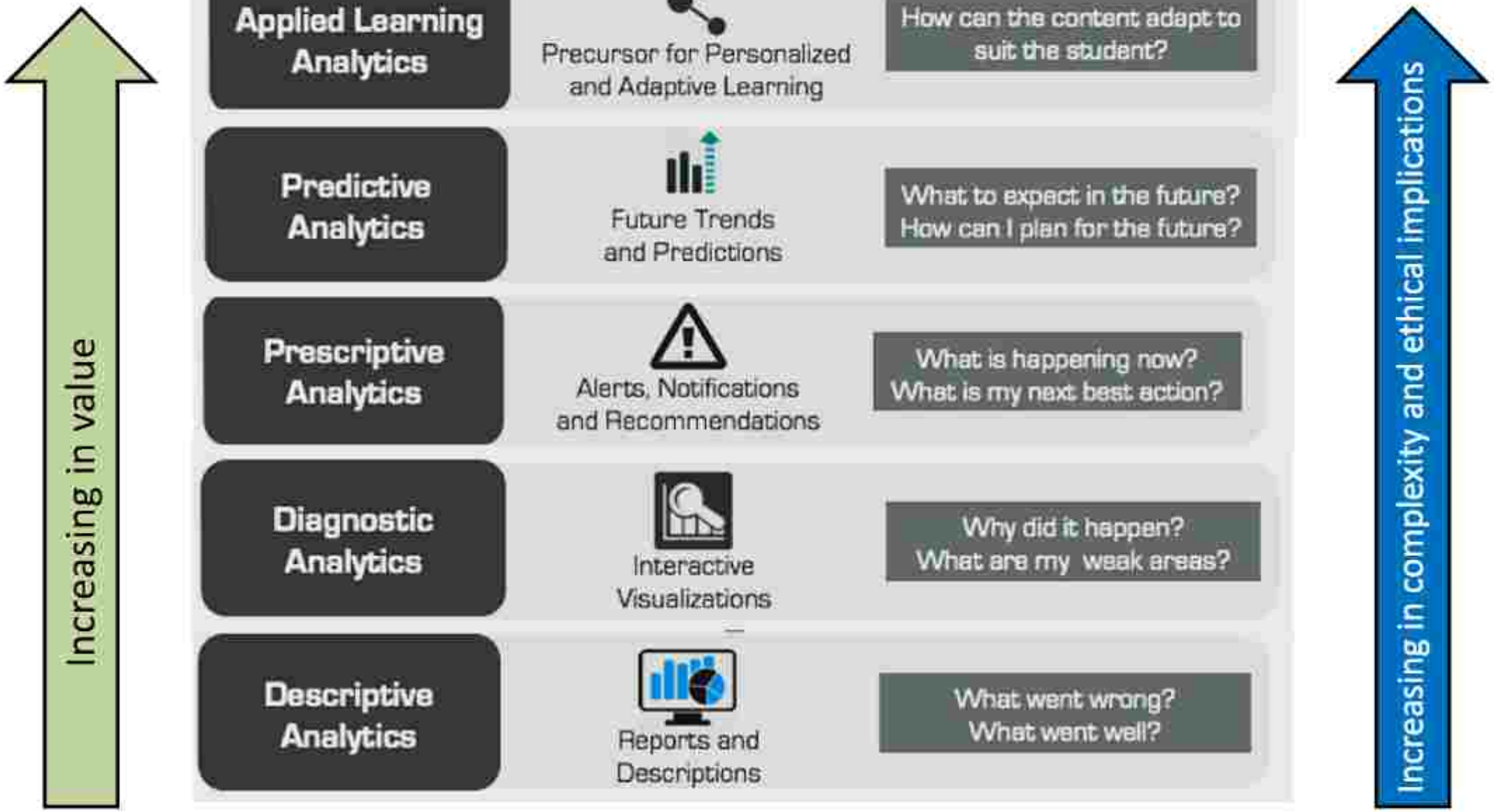
Closing the loop



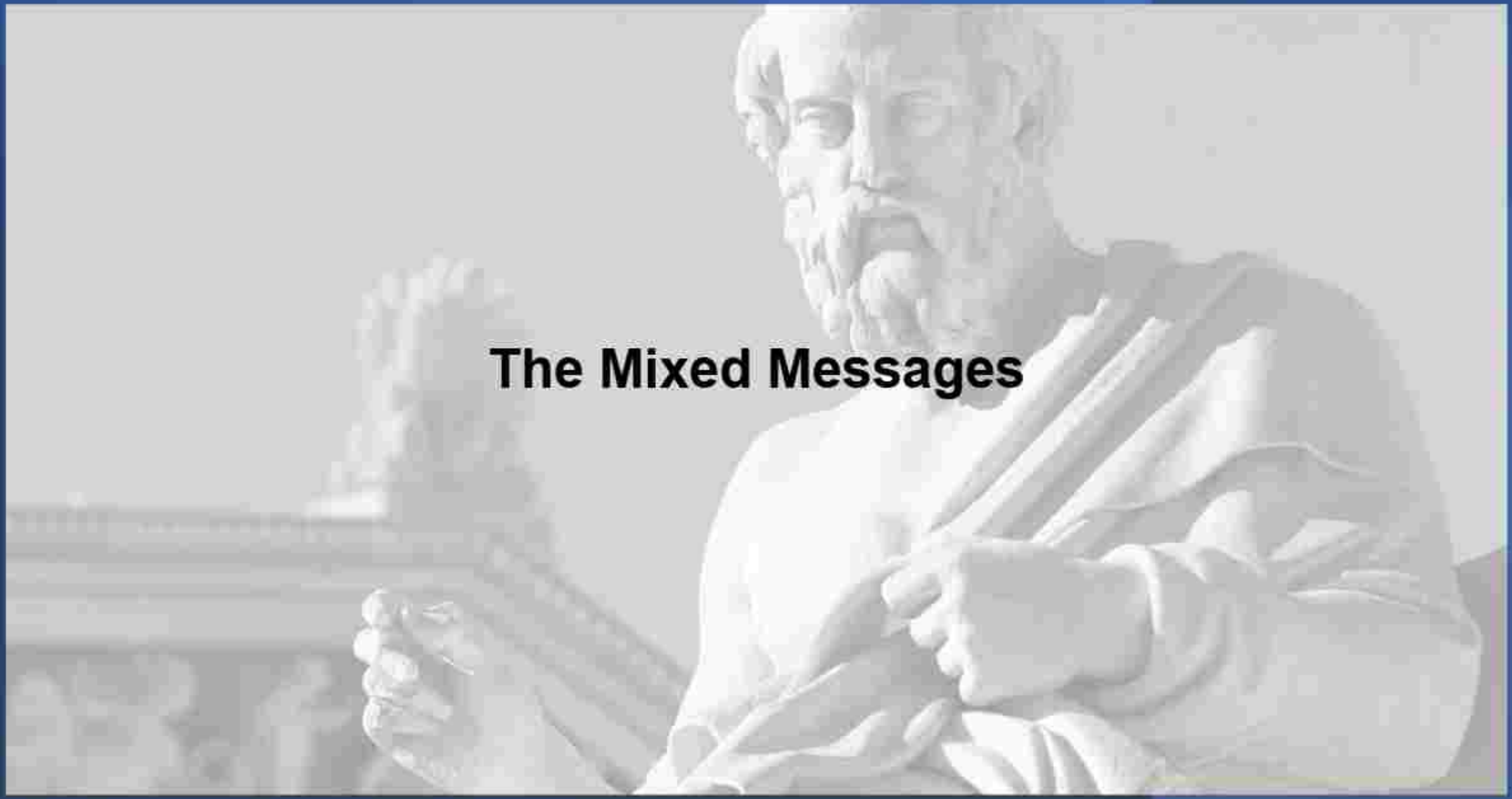


Patterns	•Insight into trends •Informed Feedback •Learning learning & Learning trajectories
Predictions	•Trends (dropouts, success ...) •Actions (early intervention)
Recommendations	•Learning and teaching actions •Pedagogical resources and activities
Quality assurance	•Courses •Programs

Gašević et al., (2019). How do we start? An approach to learning analytics adoption in higher education. Journal of information and learning technology 36(4).



Credit: Prinsloo



The Mixed Messages

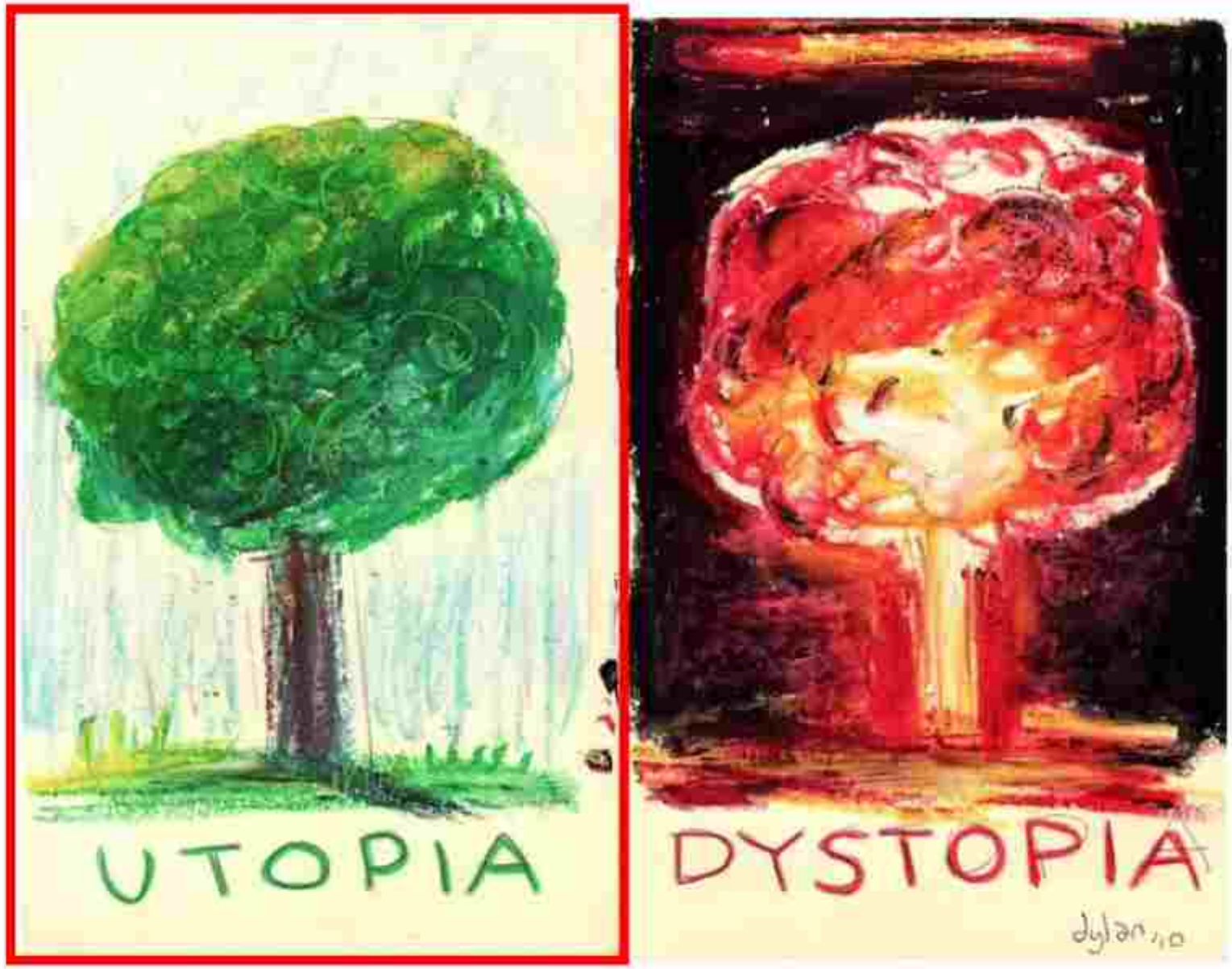


Image by Veronica Sicoe

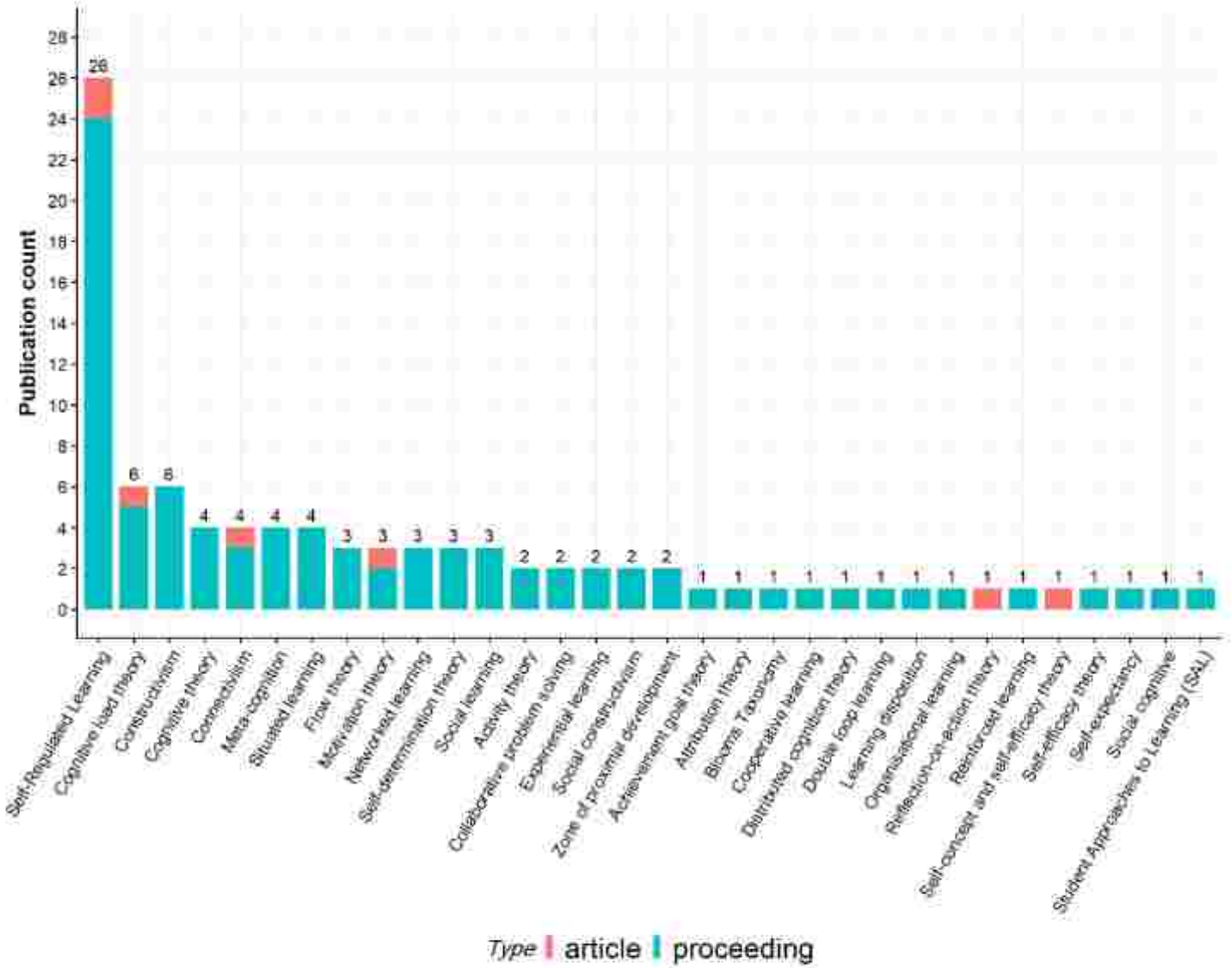
Utopia Message 1:

Data insights enrich learning theories

Data-driven or Theory-driven?

research without theory is blind, and theory without research is empty

- *Bourdieu and Wacquant, 1992*



Khalil, M., Prinsloo, P., & Slade, S. (2023). The use and application of learning theory in learning analytics: a scoping review. Journal of Computing in Higher Education, 35(3), 573-594.

1

Self-Regulated Learning

- MOOC: Serious Gaming MOOC, Erasmus Rotterdam University
- Participants: 655 learners (only 103 active, 2 groups: 39 SRL-W and 64 Non-W)
- Activities: video lectures, reading, quizzes, peer assignments, and discussion forums
- Time frame: 6 weeks

Forethought

Monitoring

Reflection

(Wong et al., 2019)

What was the order of shopped activities?

SRL-Viewers

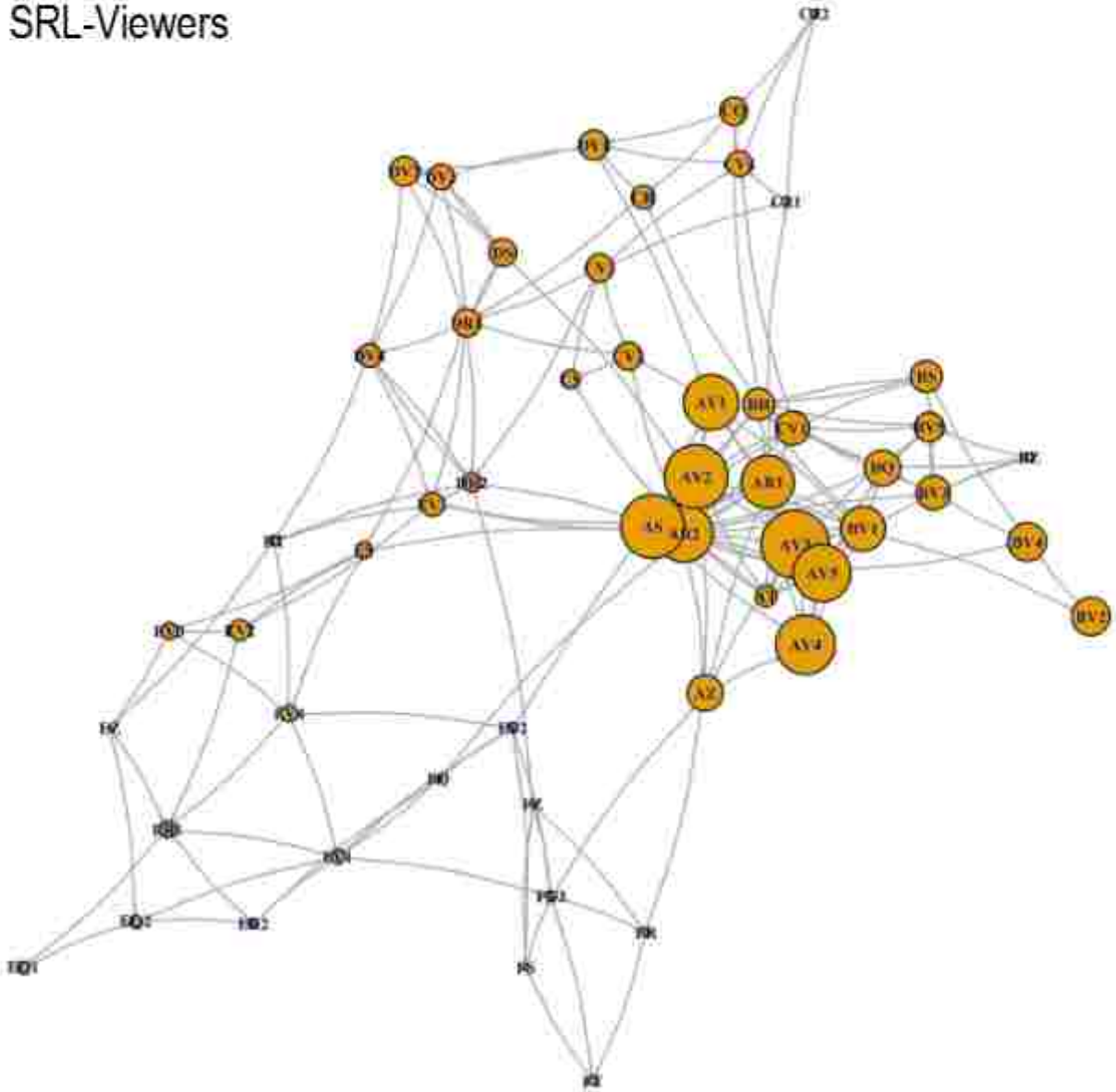
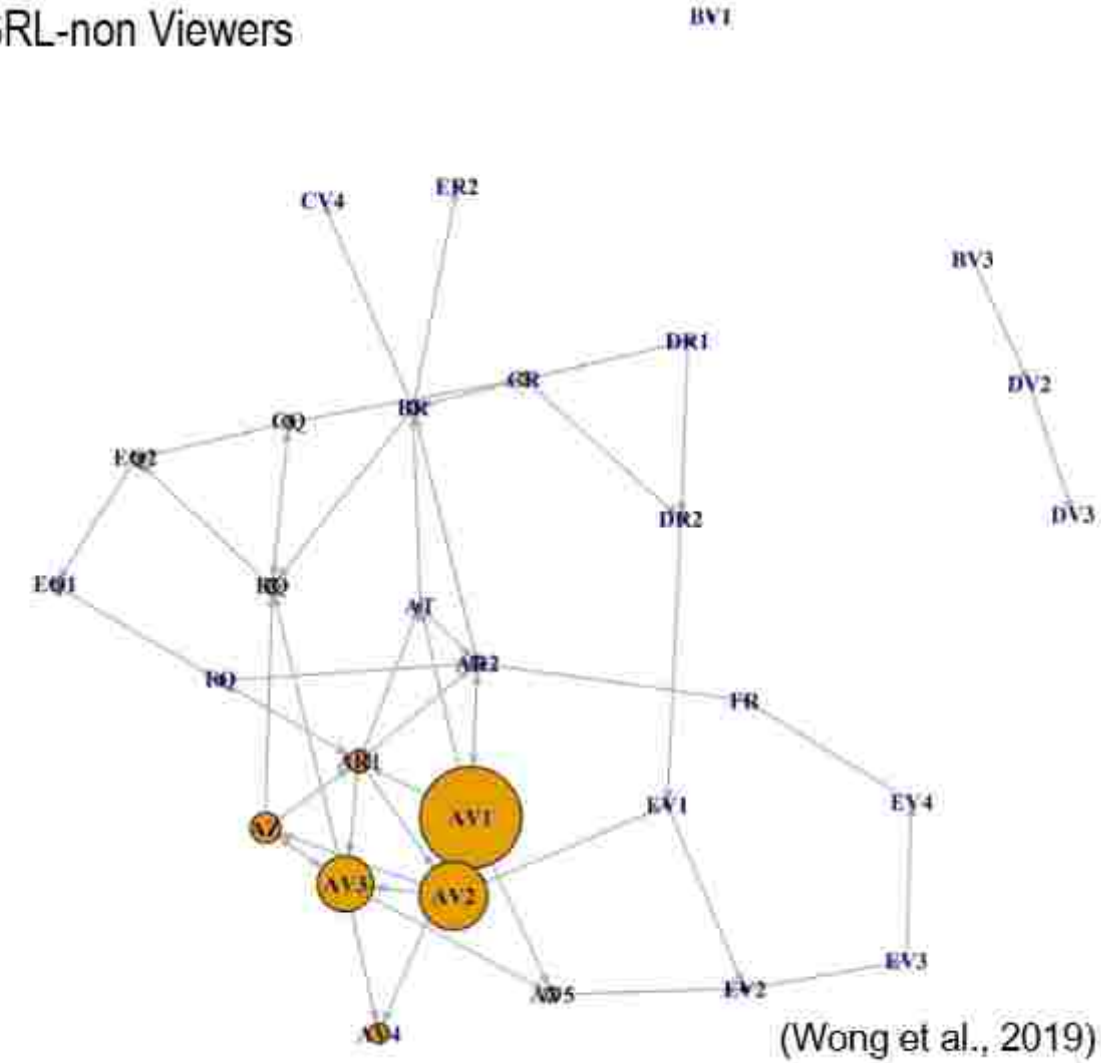


Table 1. Frequent sequential patterns of learner activities for SRL-prompt viewers and

SRL-non Viewers



(Wong et al., 2019)

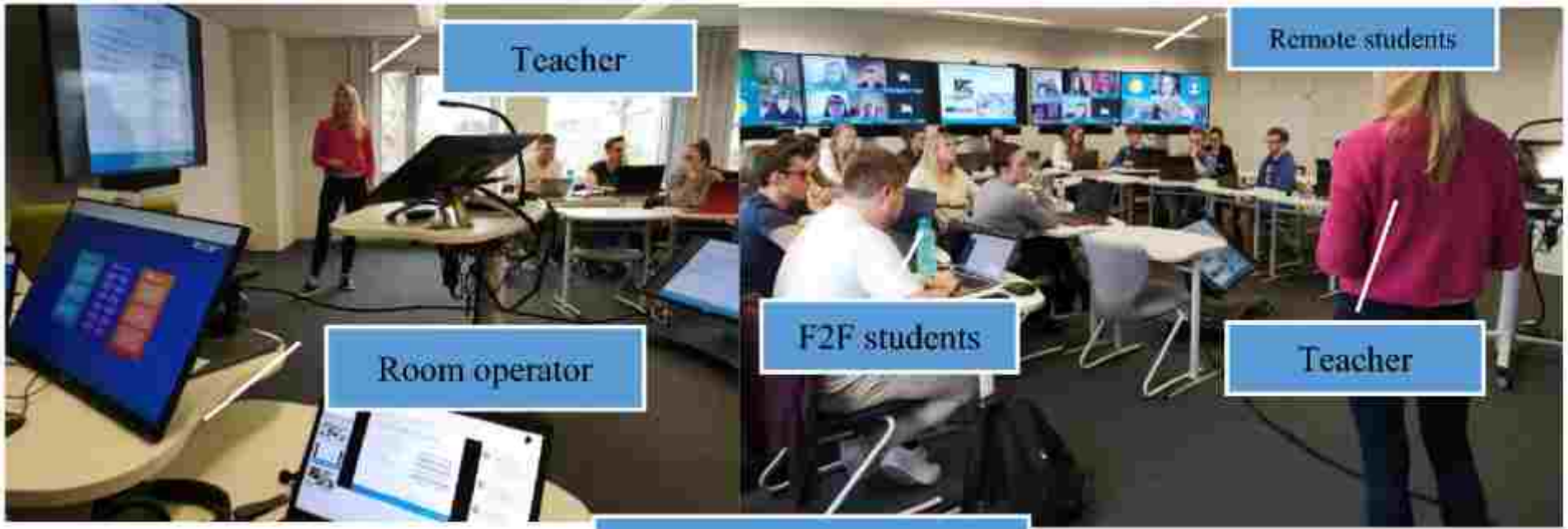
Utopia 2:

Datafication enables new forms of and for learning spaces

Old fashioned distance education?

1

Future hybrid classes?



Interactive platform

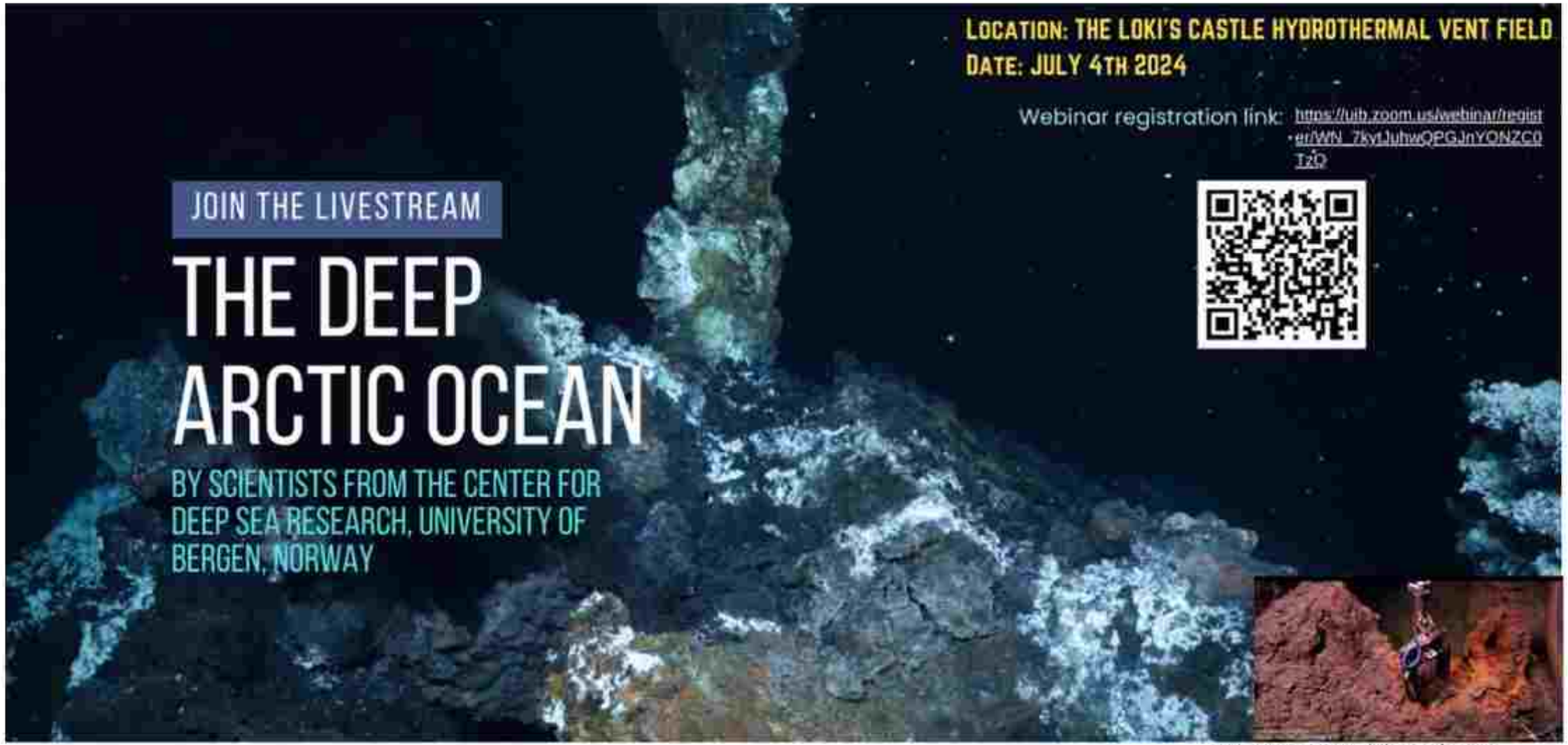
Raes, A., Detienne, L., Windey, I., & Depaepe, F. (2020). A systematic literature review on synchronous hybrid learning: gaps identified. Learning Environments Research, 23, 269-290.

Watch the recording of our live-streamed remotely-operated dive at Loki's castle hydrothermal vent field in the A 300 meters below sea level.

3

Remote Laboratories

Watch the recording of our live-streamed remotely-operated dive at Loki's castle hydrothermal vent field in the Arctic, 2300 meters below sea level.



Remote Labs: Datafiying

enriched and tagged

Recorded live sessions

Synchronous live sessions

students watch an experiment and interact with the researchers

Asynchronous sessions

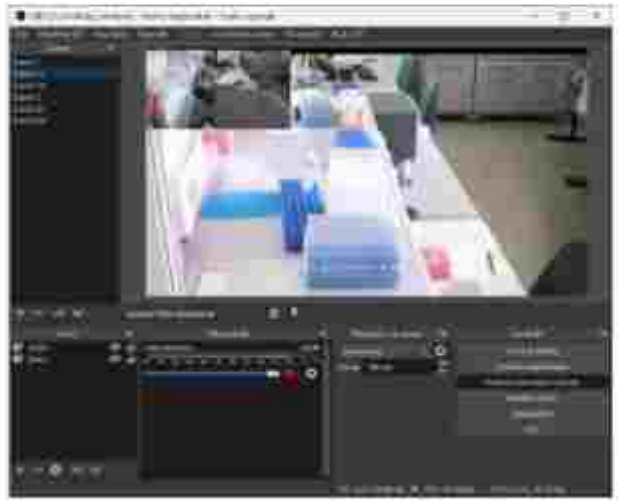
collaborative work guided by teachers
+ drills
+ self-evaluation

www.rialhe.eu

Remote Labs: Setup

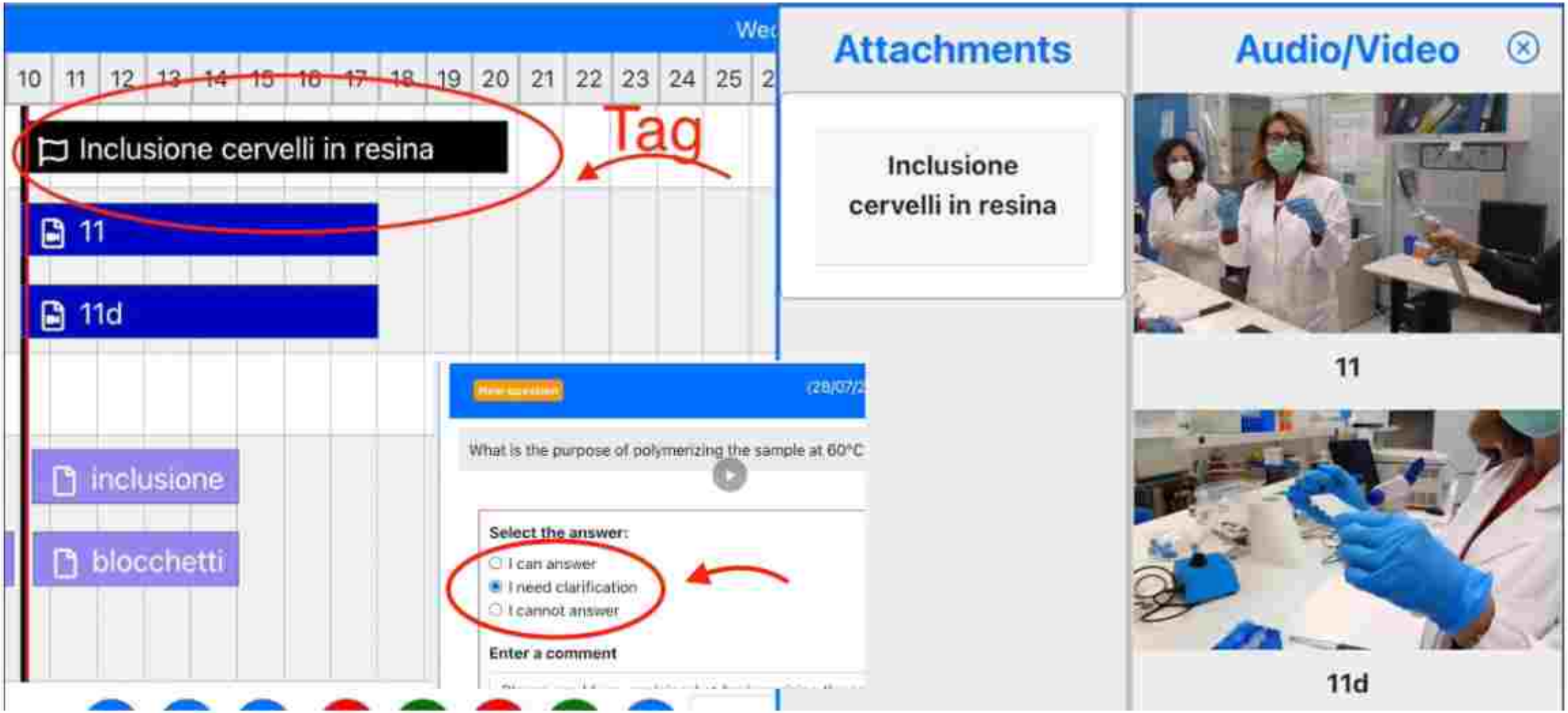
Fixed setup

Flexible setup



www.rialhe.eu

Remote Labs: Timeline and Tags



Remote Labs: Collaborations

RIALHE

utc
Université de Technologie
Compiègne

- Audio/video capture

- Digital prints (logs)

Console de mixage YAMAHA MG06X

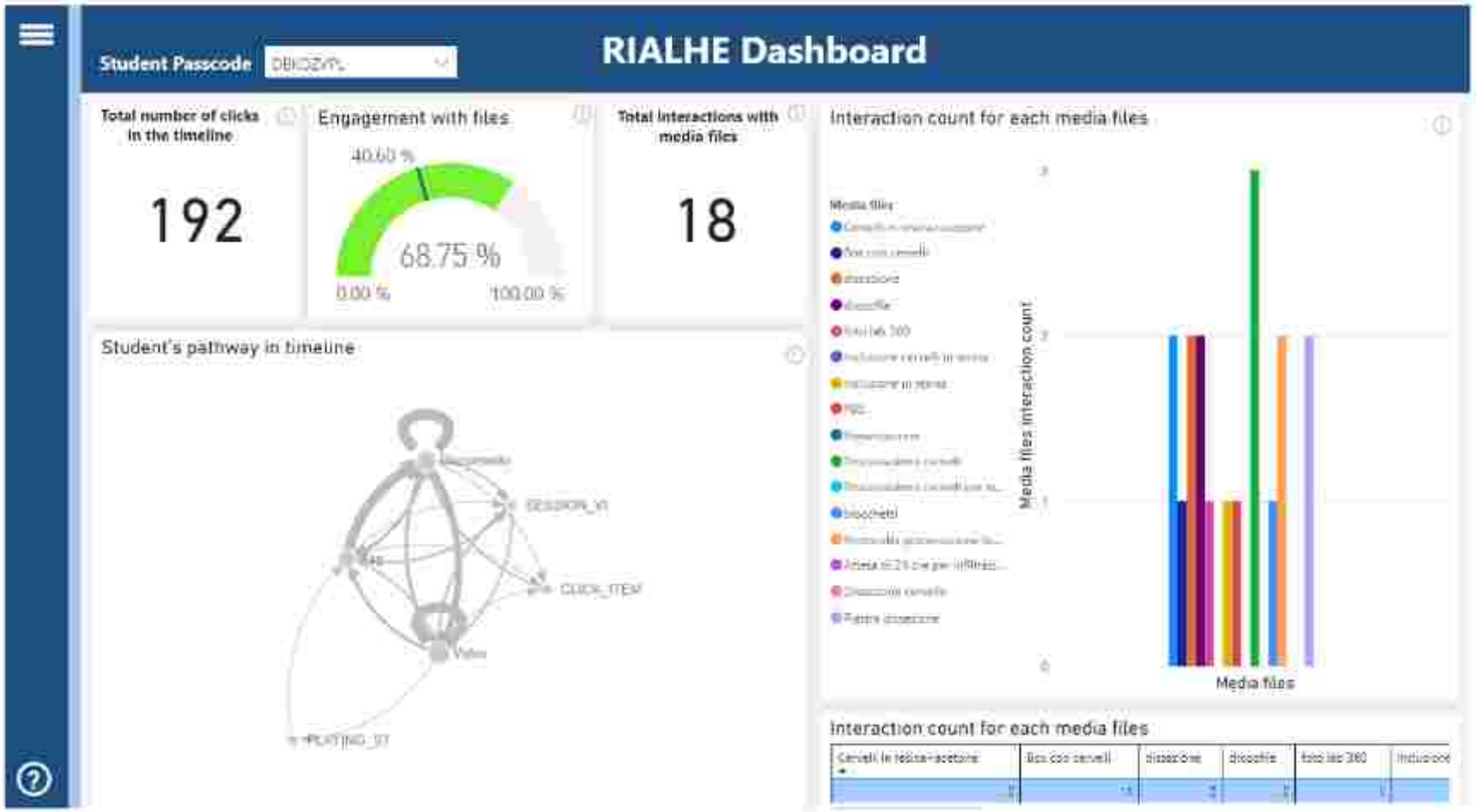
Moniteur Blackmagic Multiview 4

Processeur de streaming multimédia Extron SMP 111

RIALHE

utc
Université de Technologie
Compiègne

Remote Labs: Learning Analytics Dashboard



www.rialhe.eu

Remote Labs: Learning Analytics Dashboard

www.rialhe.eu

Utopia 3:

Datafication as catalysers for education

Monitoring and Personalised feedback

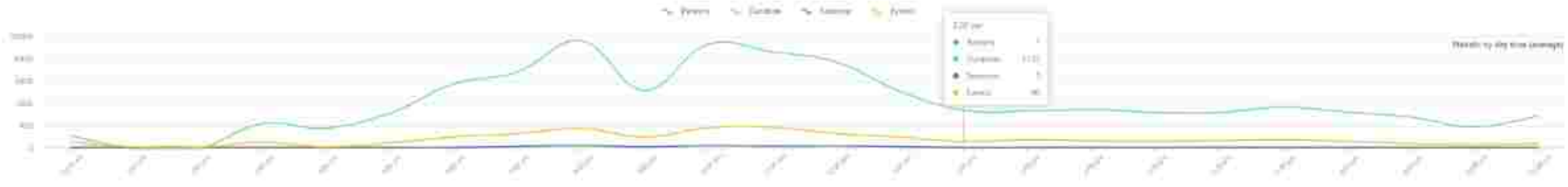
Issue Identified: Many students struggle to stay on track with their learning progress due to a lack of timely feedback

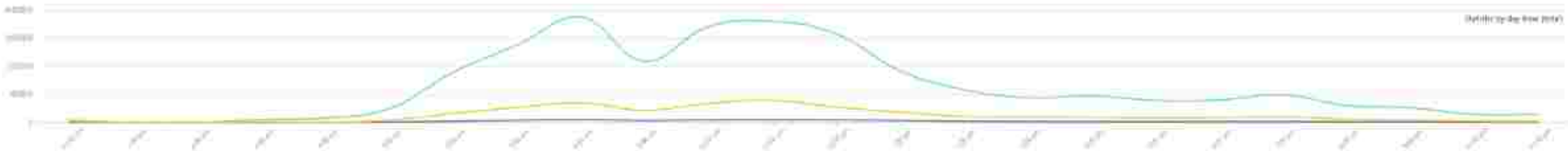
Question: How can we leverage learning analytics to provide real-time monitoring and personalized feedback?

Intervention: Monitor students' activities and provide personalized feedback that is timely, and actionable.

Open edX Advanced Learning Analytics

1





Khalil, M., & Belokrys, G. (2020). OXALIC: an Open edX Advanced Learning Analytics Tool. In *2020 IEEE Learning With MOOCS (LWMOOCS)* (pp. 185-190). IEEE.

Open edX Advanced Learning Analytics

SLATE

Student	Events	Sessions count	Time on platform (minutes)	Last activity ↑	Actions
[redacted]	13	2	4	Wednesday, February 24th 2021, 1:57:44 pm	>
[redacted]	106	2	15	Monday, March 15th 2021, 4:08:45 pm	>
[redacted]	73	2	14	Tuesday, March 16th 2021, 11:05:21 am	
[redacted]	38	1	7	Tuesday, March 16th 2021, 11:17:20 am	
[redacted]	2	1	3	Tuesday, March 23rd 2021, 3:15:06 pm	
Mohammad Khalil	140	2	58	Tuesday, April 13th 2021, 3:27:53 pm	>
[redacted]	437	14	112	Wednesday, April 21st 2021, 9:01:53 am	
[redacted]	766	27	306	Thursday, April 22nd 2021, 1:12:51 pm	
[redacted]	1512	39	936	Thursday, April 29th 2021, 2:14:42 pm	
[redacted]	579	42	241	Thursday, April 29th 2021, 9:22:18 pm	

1

Notifications

- Away for a long time
- Grades are too low
- Discussion forum low engagement
- Call for a zoom call
- Follow up incentive

2

- Edit notifications

color referenced by a matrix

Khalil, M., & Belokrys, G. (2020). OXALIC: an Open edX Advanced Learning Analytics Tool. In *2020 IEEE Learning With MOOCS (LWMOOCS)* (pp. 185-190). IEEE.

nTask.

University of South Australia

QUESTION

Has the student accessed the learning management system in the last 2 weeks?

YES

NO

Pardo et al., (2018)

University of South Australia

If This

Then That

QUESTION

Has the student accessed the learning management system in the last 2 weeks?

YES

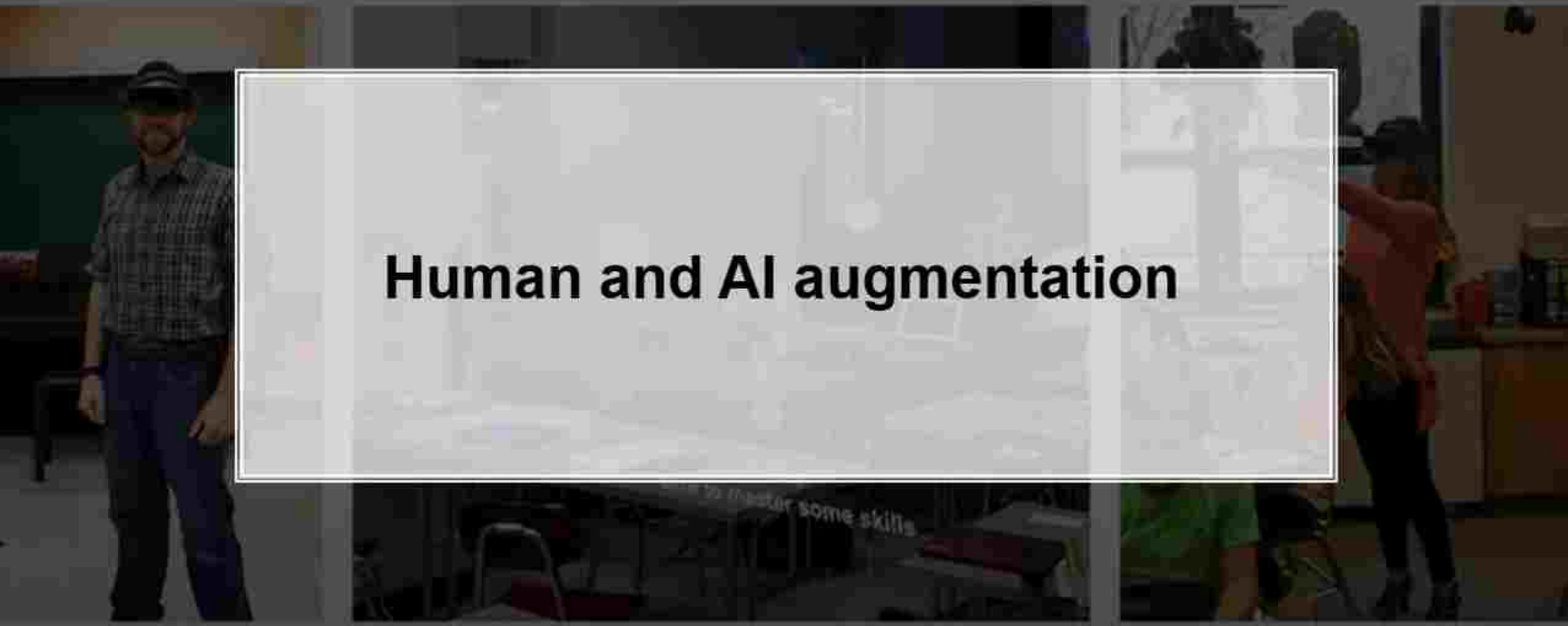
You've made a great start to this subject. Don't forget your Pre-lecture reading.

NO

Let me know if you are having issues accessing your lecture notes and assignments

Pardo et al., (2018)

nilo: a mixed-reality teacher awareness t



Human and AI augmentation

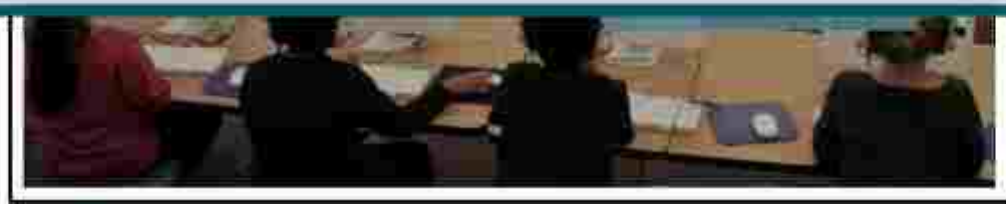
K., Hong, G., Tegene, M., McLaren, B. M., & Aleven, V. (2018). The classroom as a dashboard: Co-designin

Lumilo: a mixed-reality teacher awareness tool

1

Dashboard for teachers

- **"Misusing" the software**
  (e.g., abusing hints, gaming-the-system)
- **"Unproductively" struggling**
  (e.g., wheel-spinning)
- ***High* recent error rate**
- ***Low* recent error rate**
- **Idle**



Holstein,

2


Concentration
Concentration
distracted
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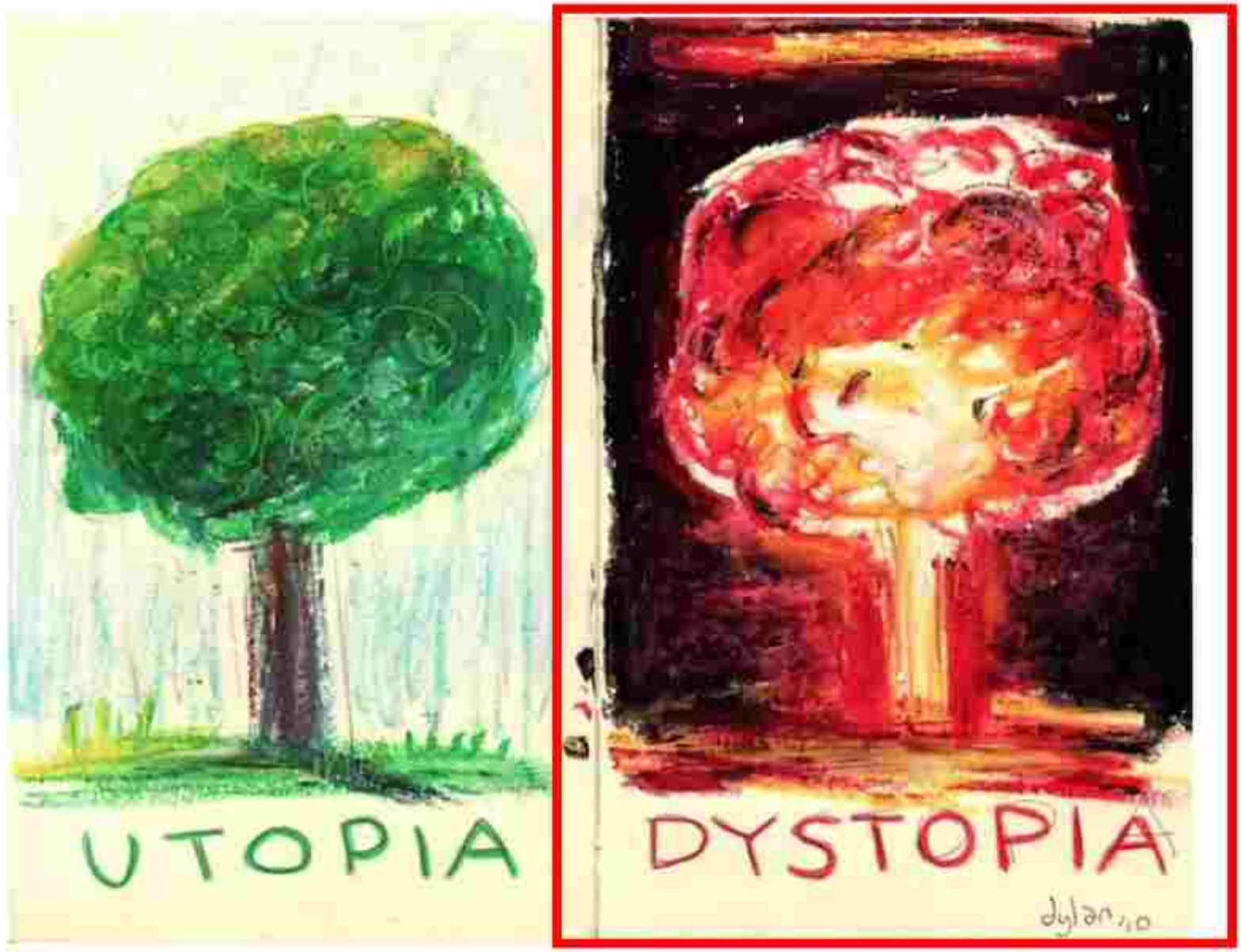


Image by Veronica Sicoe

Ethical Dystopia 1:

Privacy & Data Protection issues

Universities are tracking their students. Is it clever or creepy?

Learning analytics are becoming increasingly popular for improving learning and cutting drop-out rates – but critics question the impact on privacy

▲ 'Some students are concerned about us continuously monitoring in a Big Brother fashion.' Photograph: Alamy

GDPR Portal: Site Overview

This website is a resource to educate the public about the main elements of the General Data Protection Regulation (GDPR). It is NOT an official EU Commission website. For the official website please see here.

After four years of preparation and debate the GDPR was **finally approved** by the EU Parliament on 14

Quick Links

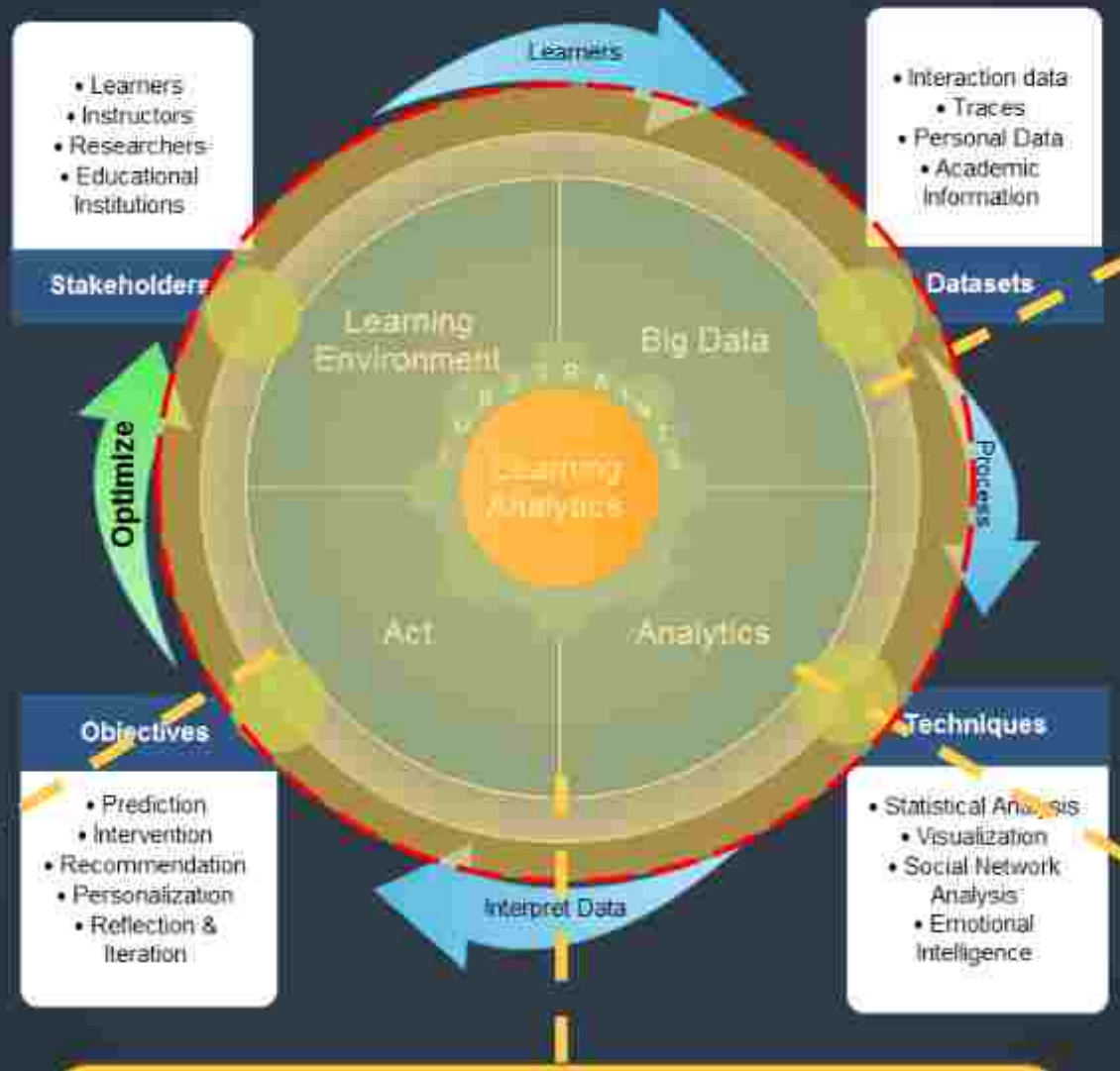
GDPR Key Changes
Summary of key changes

FAQs
How to prepare?
Is my organization affected?

Credit: Niall Sclater

Khalil & Ebner (2015)
Liu & Khalil (2023)

Privacy and data protection issues



Data Collection

- Collecting sensitive data
- Collecting too much data

Data Reporting

- Data misuse
- Anonymisation
- Statistical fallacies

Data Analytics

- Anonymisation
- Sensitive data storage
- Statistical fallacies

Whole Process:

- Transparency, Power relationships, lack of quality, legislation-related issues

What data do we already have of students in higher ed?

Library

Finance

Study centres

Examinations

Admissions & registration

Learning Management System

Student support

Student records

Faculty

Alumni

Data surveillance

Library

Finance

Study centre

Examinations

Admissions & registration

Learning Management System

Student support

Student records

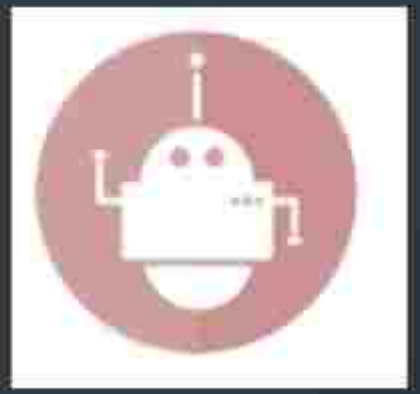
Faculty

Alumni

Who has access to it, **under what circumstances**?
How is it used, by **whom**?
Who governs its use?

- Demographic data
- Past learning experiences data
- Login data, engagement data, download data (automated)
- Assessment data
- Study center data,
- Survey data
- Intervention response data

Example: Students register for Physics 101



Ethical Dystopia 2:

Reducing people and T/L to data

Ethical Dystopia 3:

Platformisation

Institutional governance practice

5 Principles to guide the collection, analysis and use of student data? (2)

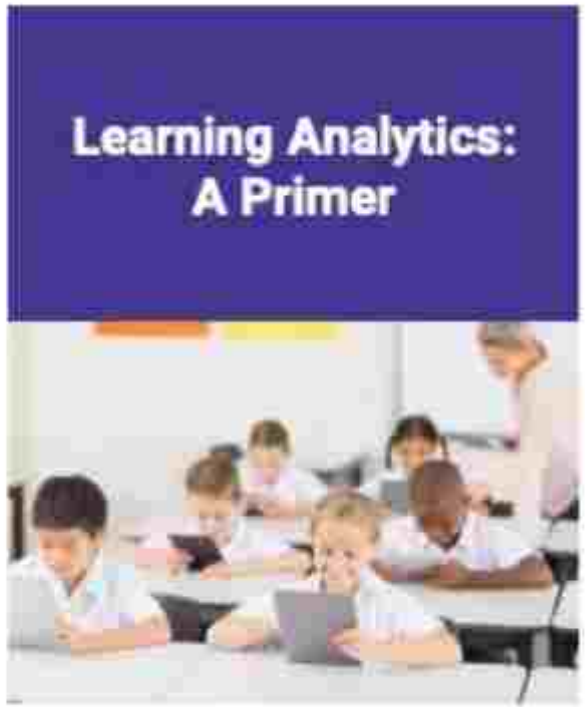
1. If students don't know that you collect their data, as well as the **scope** of data collection, information about **who has access** to the data and under what conditions, **what the data will be used** for, and for **how long** the data will be stored, **you cannot call this caring.**
2. Student behavioral data are **invitations for conversations** about what it means, *not* judgments about we think it means.

Credit: Prinsloo

5 Principles to guide the collection, analysis and use of student data? (2)

3. Just because we have access to their data **does not mean that we must collect**, analyse and use their data.
4. Depending on institutional and regulatory environments, student age and context, students should have the opportunity **to opt-out** of having their data collected and analysed albeit knowing and accepting the implications.
5. There need to be **safe student learning spaces** where we will not collect, analyse and use their data

Credit: Prinsloo



Link:
https://colcommons.org/

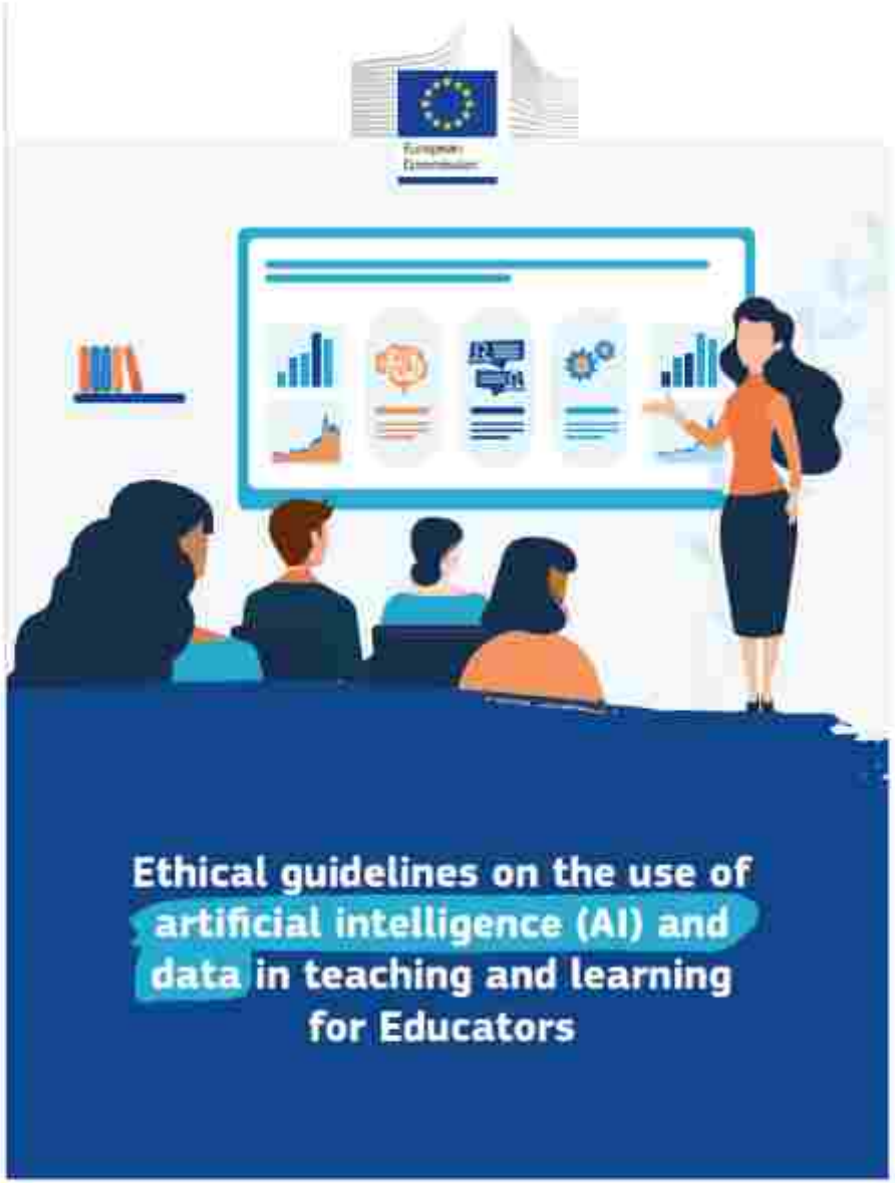
Prinsloo, Slade, & Khalil (2021)

Learning Analytics: A Primer

Course Overview

The course will cover all the aspects of Learning Analytics(LA), how it is a surface-level or first-layer introduction to the complex world of learning analytics. It will also demonstrate all the levels of education, from pre-primary to post-secondary and how teachers have a contractual and moral duty to facilitate learning.

Link: https://openbooks.col.org/learninganalyticsaprimer/front-matter_introduction.html



Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2766/153756

4 key ethical considerations for AI in Education

Ethical Considerations

In developing these guidelines, four key considerations have been identified that underpin the ethical use of AI and data in teaching, learning, and assessment. These are human agency, fairness, humanity, and justified choice.

Human agency relates to an individual's capability to become a competent member of society. A person with agency can determine their life choices and be responsible for their actions. Agency underpins widely used concepts such as autonomy, self-determination, and responsibility.

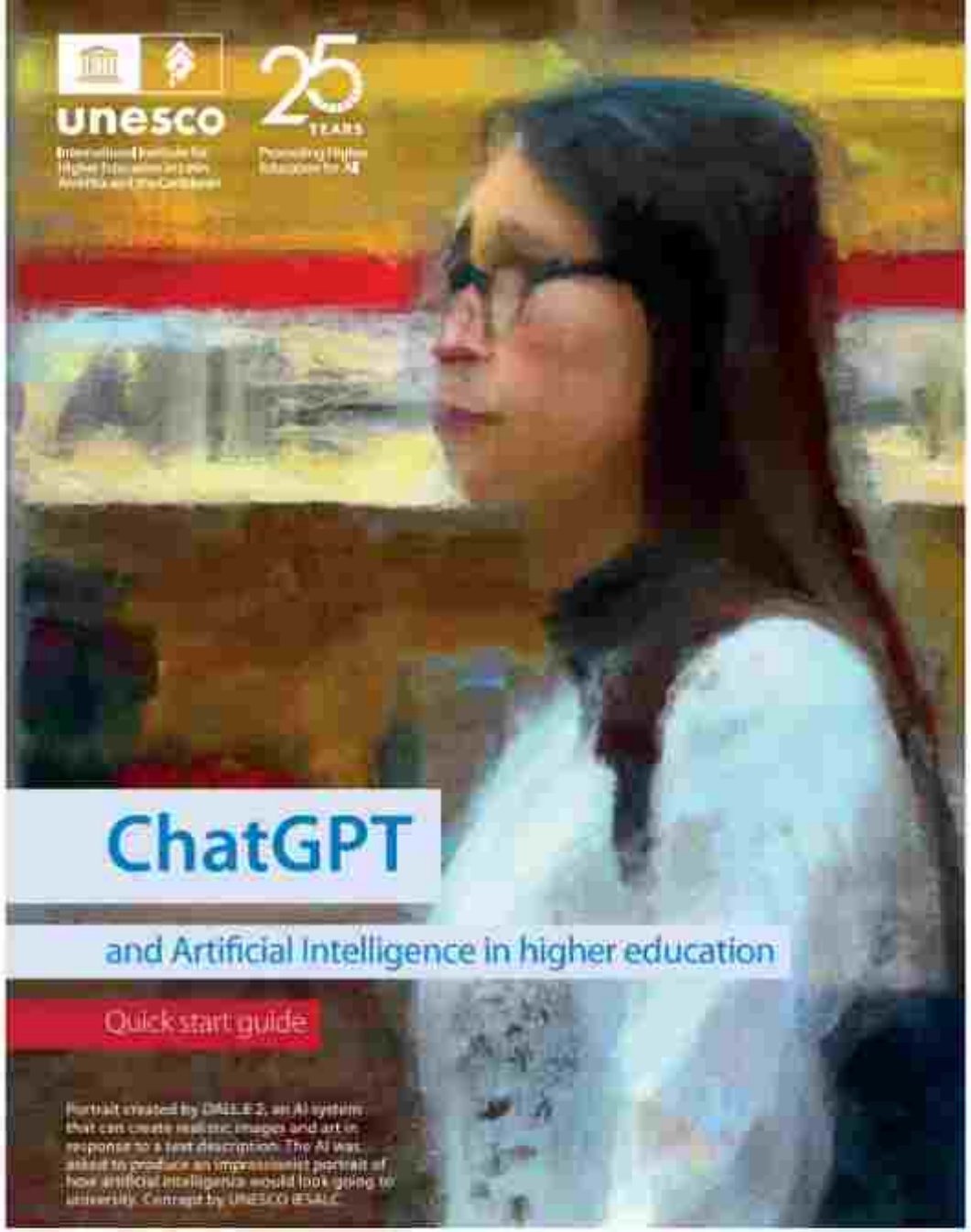
Fairness relates to everyone being treated fairly in the social organisation. Clear processes are required so that all users have equal access to opportunity. These include equity, inclusion, non-discrimination, and fair distribution of rights and responsibilities.

Humanity addresses consideration for the people, their identity, integrity, and dignity. We need to consider the well-being, safety, social cohesion, meaningful contact, and respect that is necessary for a meaningful human connection. That connection implies, for example, that we approach people with respect of their intrinsic value and not as a data object or a means-to-an-end. It is at the essence of the human-centric approach to AI.

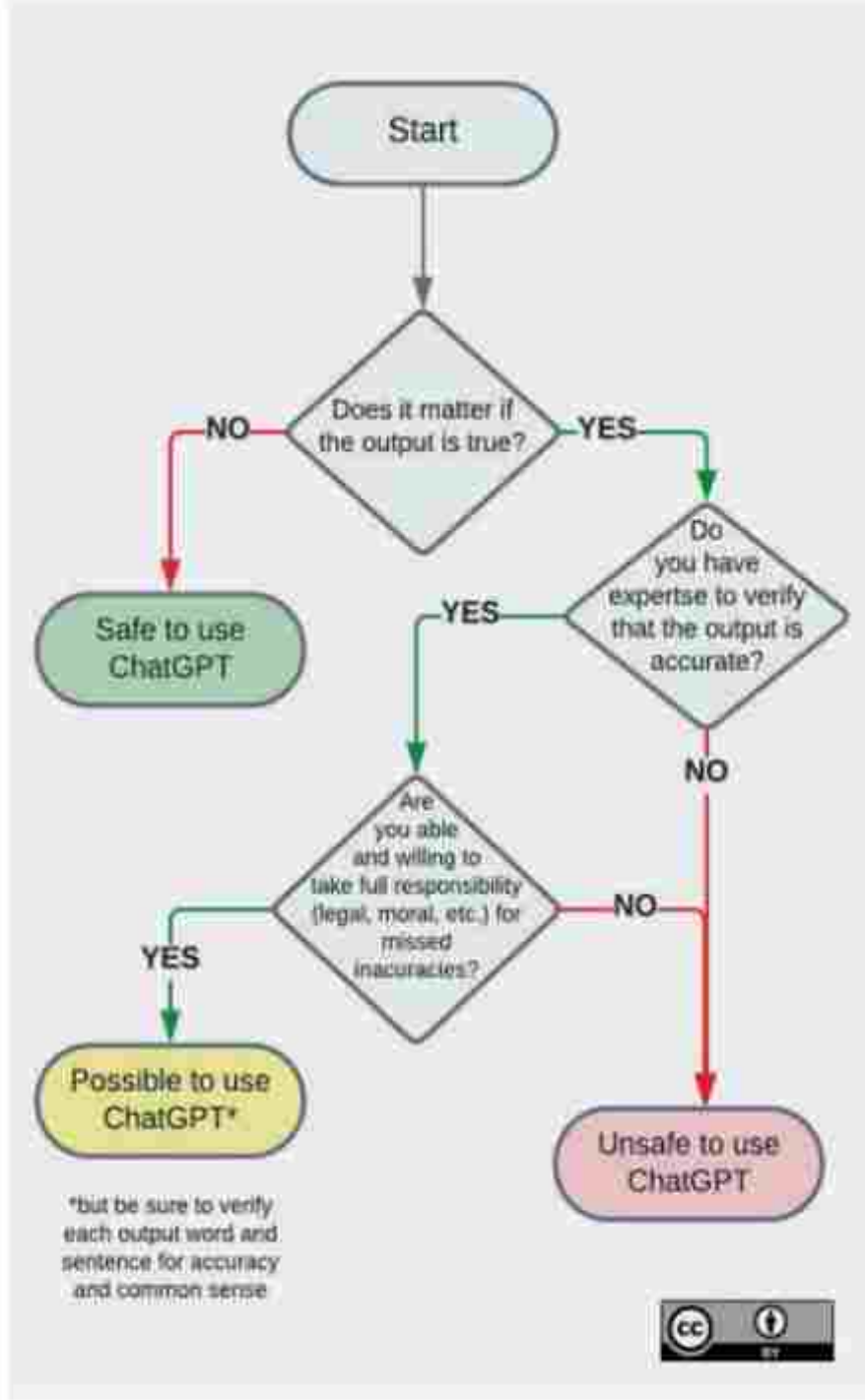
Justified choice relates to the use of knowledge, facts, and data to justify necessary or appropriate collective choices by multiple stakeholders in the school environment. It requires transparency and is based on participatory and collaborative models of decision-making as well as explainability.

These ethical considerations are intrinsically valuable and worth striving for in education. They guide educators and school leaders in their decisions about the use of AI systems in education. The key ethical requirements introduced below can help ensure that AI systems used in education and training are trustworthy and address relevant concerns.

Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2766/153756



Education 2030



https://futurium.ec.europa.eu/system/files/2025-03/UNESCO%2D%20ChatGPT-and-Artificial-Intelligence-in-higher-education.pdf

The Institute for Ethical AI in Education

The Ethical Framework for AI in Education

The Institute for Ethical AI in Education has been kindly funded by:

The Institute for Ethical AI in Education

The Ethical Framework for AI in Education

The Institute for Ethical AI in Education has been kindly funded by:

Mc Graw Hill

NORD ANGLIA EDUCATION

Microsoft

Pearson

- Achieving educational goals
- Assessment
- Administration and workload
- Equity
- Autonomy
- Privacy
- Transparency
- Informed participation
- Ethical Design

https://futurium.ec.europa.eu/system/files/2025-03/IEAE%20-%20The-Ethical-Framework-for-AI-in-Education.pdf

Other valuable resources

EU Commission's AI Act

(2.46 MB - PDF) Download

EU Commission's AI for Europe

(480.1 KB - PDF) Download

EU Commission's DEAP

(2.05 MB - PDF) Download

EU Commission's DEAP Ethical Guidelines on the use of AI

(9.87 MB - PDF) Download

EU EDEH - AI Report

(7.32 MB - PDF) Download

EU EDEH - Understanding AI in Education

(4.25 MB - PDF) Download

EUA Guidelines on AI in Higher Education

(66.95 KB - PDF) Download

UNESCO's Guidelines on AI in Education

(1.76 MB - PDF) Download

IEAE - Ethical Framework

(1.75 MB - PDF) Download

Source: https://futurium.ec.europa.eu/en/european-ai-alliance/community-content/ai-higher-education-mapping-key-guidelines-recommendations

Final Remarks

The need to apply ethical principles to AI in education and Learning Analytics will keep growing

But how can we enforce the ethics?

We need governments and civil society actively to take steps to ensure that learners, educators and all members of society have a strong understanding of AI and its ethical implications.

Credit: The Institute for Ethical AI in Education

AI in Education: Learning Analytics, Data Privacy, and Data Surveillance

Mohammad Khalil

Fostering Digital Ethics in Higher Education: Ethical Technologies, Responsibility, and Rights in the Digital Age

Thank you!

Online, Kyrgyzstan

mohammad.khalil@uib.no

@TUMohdKhalil

SLATE

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