

SLATE
Centre for the Science
of Learning & Technology

Implementing LA & Adaptive AI in Education : Possibilities and Challenges

Barbara Wasson

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DIGITALISATION
&
DATAIFICATION

(OF EDUCATION)

“Digital education is based around different sets of values and agendas – many of these values, norms and understandings that underpin current dominant forms of digital education are fundamentally at odds with the values, norms and understandings what might be termed ‘traditional education’ (Neil Selwyn)

Neil Selwyn 2018, Keynote at the 8th International Conference on Learning Analytics & Knowledge, LAK`18, March 9 2018 The University of Sydney



VEIEN VIDERE?: Det investeres enorme summer i ulike typer læringsteknologi i den norske skolen. Men det er lite forskning som støtter opp om at dette har hatt tilsiktet resultat, altså bedre læring. (Foto: Istock)

Læringsteknologi – det store eksperimentet

Det har aldri vært brukt mer teknologi i utdanning. Men virker det?

Audun Aagre

PUBLISERT Torsdag 17. oktober 2019 - 12:12 SIST OPPDATERT Torsdag 17. oktober 2019 - 12:12

"Datafication in and of education is a fundamental paradigmatic shift based on a different set of values, norms and understandings.

Anja Salzmann
Postdoc, SLATE

Datafication as a phenomenon is not only linked to complex legal dilemmas and ethical issues around human autonomy, privacy, security, justice - but also to a larger paradigmatic shift with a "cybernetic gaze" on education and learning. Datafication of the education sector has **socio-political consequences**.

Anja Salzmann
Postdoc, SLATE

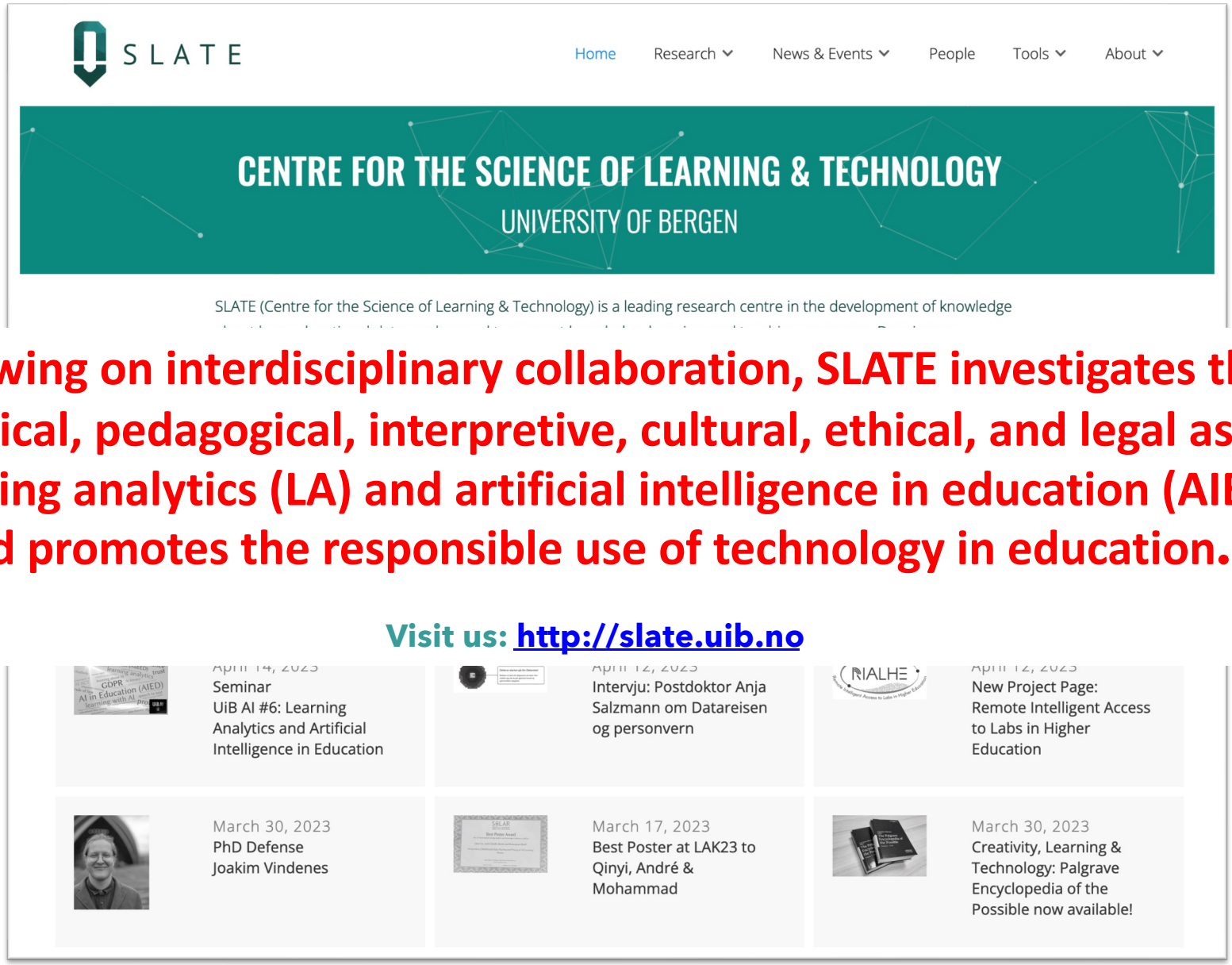
ACCELERATED ADOPTION OF AI IN EDUCATION

GenAI

What is knowledge?

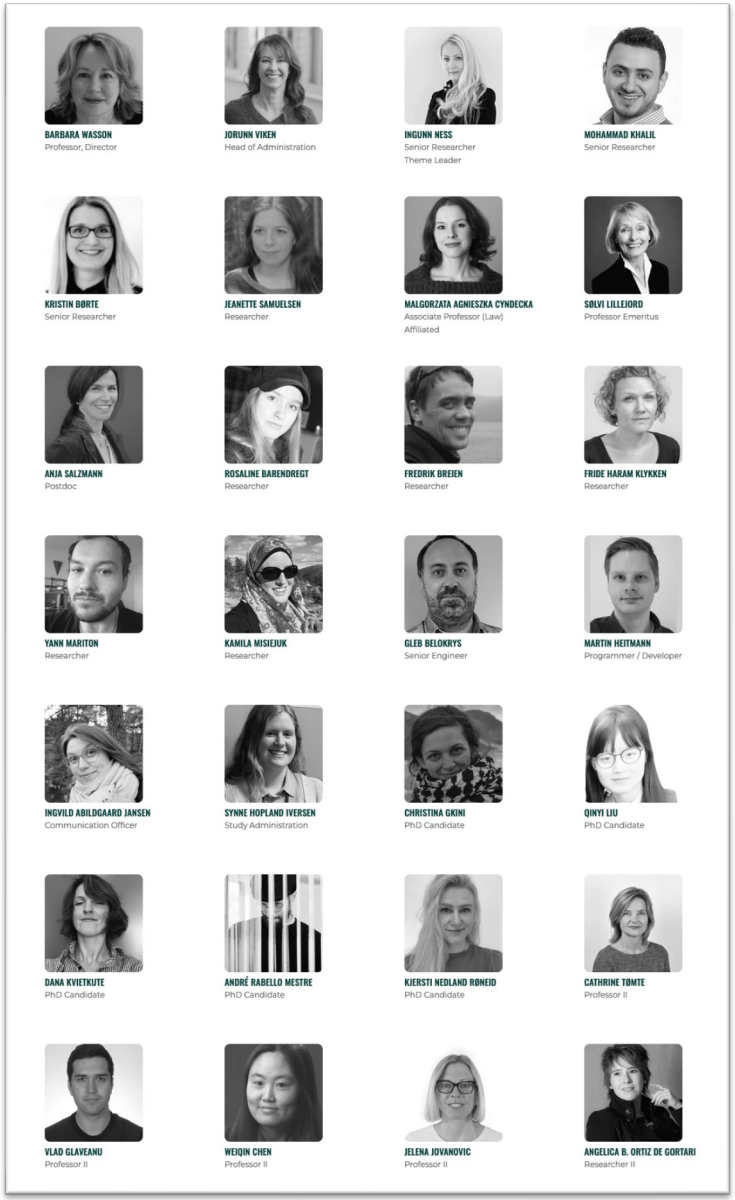
What is learning?

2016
Ministry
of
Education
& UiB



Drawing on interdisciplinary collaboration, SLATE investigates the technological, pedagogical, interpretive, cultural, ethical, and legal aspects of learning analytics (LA) and artificial intelligence in education (AIEd), and promotes the responsible use of technology in education.

Visit us: http://slate.uib.no

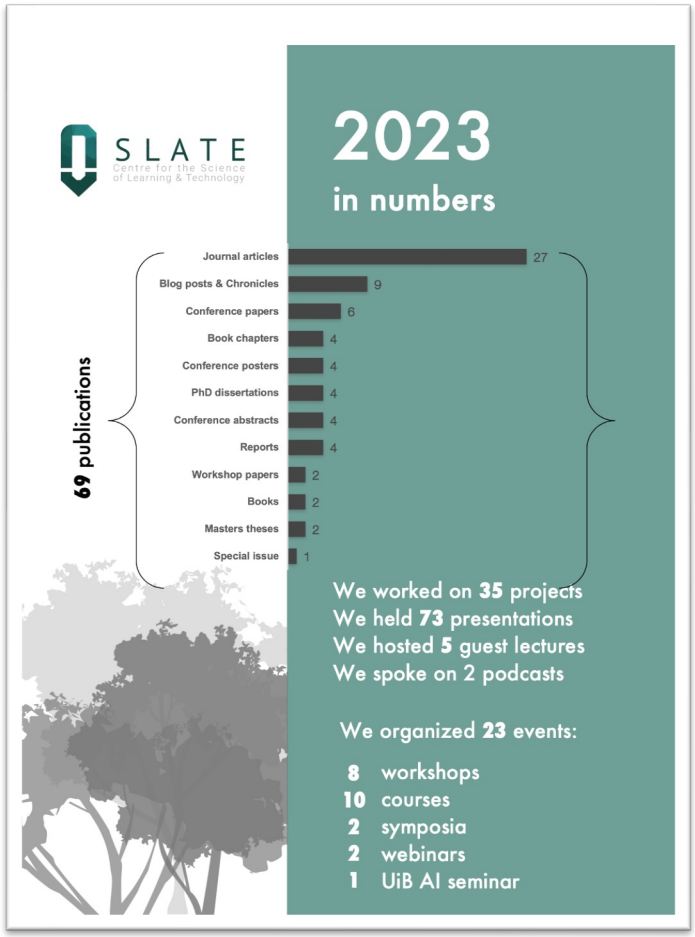


1 Professor + 1 Emeritus (hiring 1 professor)
8 Researchers
2 Postdocs (hiring 1)
1 Associate Professor (starts ca. 1 August)
5 PhD fellows (5 defended i 2023)
Admin leader
Study Administrator
2 Senior Developers
Communications (50%)
5 Professor II
Affiliated Faculty



SLATE





slate.uib.no (About)



LA & AI PROJECTS (SELECTED)

ACTIVITY DATA FOR ASSESSMENT AND ADAPTATION (AVT)

KS funded, with UDE Oslo Kommune – in Oslo schools

TEACHER'S TRUST IN AI-BASED EDUCATIONAL TECHNOLOGY

survey of high school teachers in 9 countries: **Sweden, Norway, Denmark, UK, Japan, Israel, USA, Brazil, Spain**

AI IN EDUCATION: LAYERS OF TRUST (EDUTRUST AI)

GENERATIVE AI IN LEARNING (GAILE)

Generative AI in higher education – biology, mathematics, programming, ...

SYNTHETIC DATA FOR LEARNING ANALYTICS (LASD)

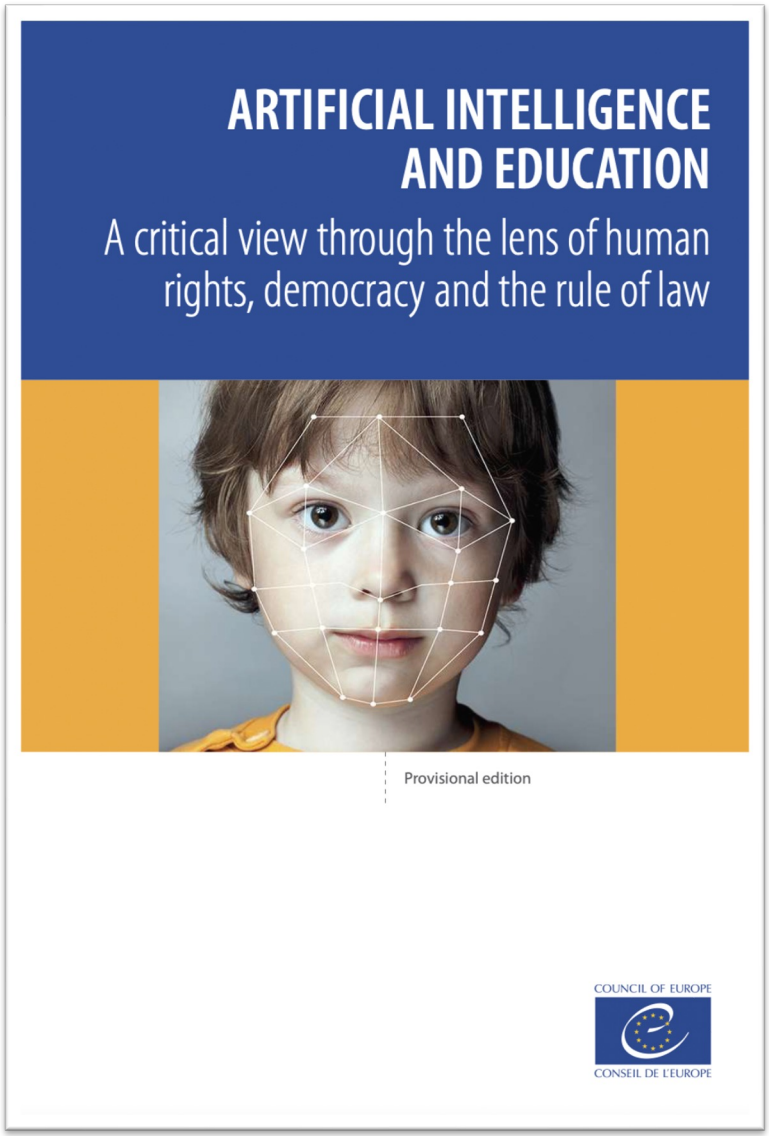
IMPLEMENTATION OF AI IN HIGH SCHOOLS IN VESTLAND FYLKESKOMMUNE

AI AND CREATIVITY IN SCHOOLS AND HIGHER EDUCATION

AI, LA, & EDUCATION

OPPORTUNITIES

SLATE



A thorough and critical overview of the use of artificial intelligence in education

HUMAN RIGHTS
DEMOCRACY
RULE OF LAW

Wayne Holmes,
Jen Persson,
Irene-Angelica Chounta,
Barbara Wasson &
Vania Dimitrova (2022)

https://rm.coe.int/artificial-intelligence-and-education-a-critical-view-through-the-lens/1680a886bd



Learning with AI



AI literacy:
technology dimension

Preparing for AI
(Literacy)

AI literacy:
social dimension

Learning about AI
(Literacy)



Learning Analytics

Using AI to learn
about learning



SLATE



Many technologies

Speech to Text

Text to Speech

Text to Animations

Machine Vision

Face Recognition

Searching

Planning

Scheduling

Generative AI

(text, images, animations ...)

etc.



Administrative systems
Admission Systems
Plagiarism detection
Summative assessment
Dropout prediction
Course recommendation
Support for well-being

For learners
Intelligent tutoring systems (adaptive…)
Dialogue-based tutoring
Exploratory Learning Environments

Essay generation
Essay critiquing

Chatbots
Learning Companions

Language learning apps
Collaborative Learning support

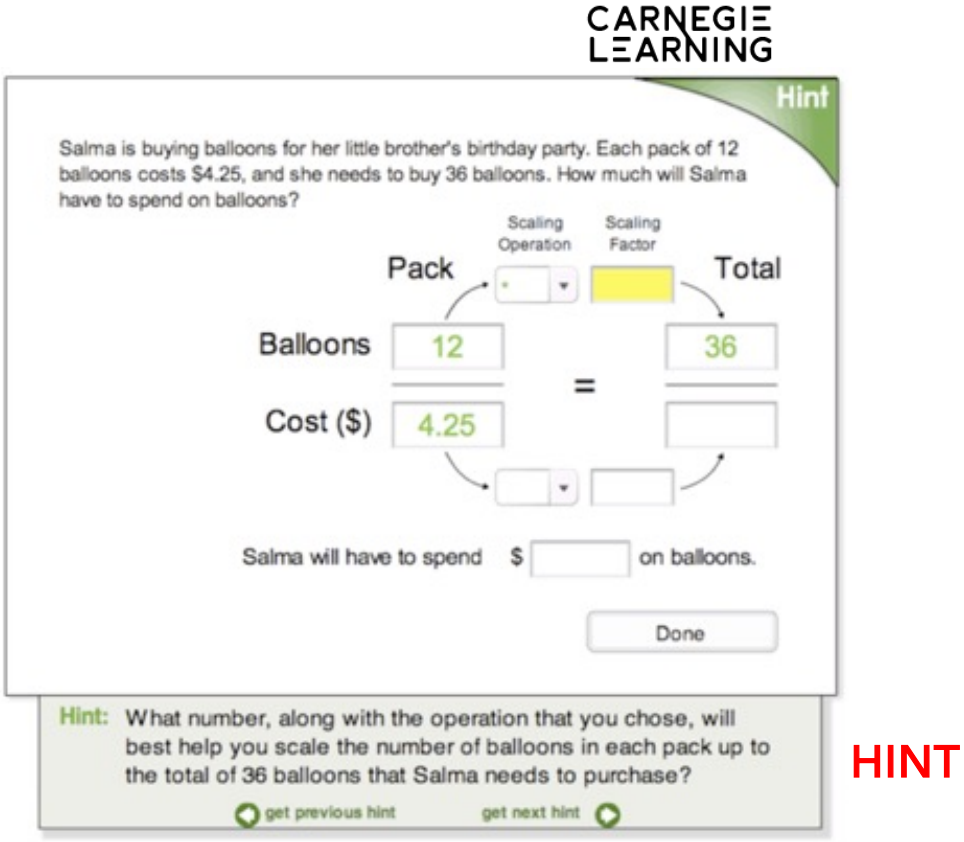
For teachers
Automatic feedback generation
Forum monitoring
Essay scoring
Quiz generation
Lesson planning
Rubric generation
Smart curation of learning materials

COGNITIVE TUTORS

(e.g., Anderson et al, 1985, 1995; Koedinger et al. 1997, 2016; Aleven et al. 2009)

- Pane et al. (2014) studied the effect of use of the ITS in high schools (16 800 students) in 7 states

- Increase of 8 percentiles for high school students in the **second year of use** (e.g., 56% → 64%)



HINT

ADAPTIVE MATH LEARNING IN SCHOOLS

188 000 pupils
9822 teachers



GYLDENDAL'S MULTI-SMART ØVING



Powered by KNEWTON

Kynigos, C. (2019)
Egelandsdal, K., Smith, M., Hansen, C.J.S., Ness, I.J. & Wasson, B. (2019)

ALMAT – ADAPTIVE LEARNING IN SCHOOLS



200 tasks / week
30 / 30 class / homework

- Teachers' experiences with the programme are **mainly positive** in terms of the **quality of the assignments**, **adaptability**, **competency overview** and **student learning**
- MSØ **contributes little to the student's conceptual understanding, creativity, or new ideas,** only to procedural practice adapted to the student's level
- MSØ has a role, **but cannot replace discussions and reflection** on mathematics in the classroom **(dialogue)**

Kynigos, C. (2019)

Egelandsdal, K., Smith, M., Hansen, C.J.S., Ness, I.J. & Wasson, B. (2019)

INQ-ITS: PERSONALISED ONLINE LABS

(e.g., Gobert et al, 2013 …; Dickler, R., Li, H., & Gobert, J. (2019)

complex,
patented algorithms
based on
machine learning
&
NLP



inqits.com

Scientific method

Interactive Simulation Lab

Realtime modelling

Automatic assessment of student's investigations

Process monitoring

Personalised feedback

INQ-ITS: PERSONALISED ONLINE LABS

(e.g., Gobert et al, 2013 …; Dickler, R., Li, H., & Gobert, J. (2019)

Recommended by

US Ministry of Education

50 states
12 countries

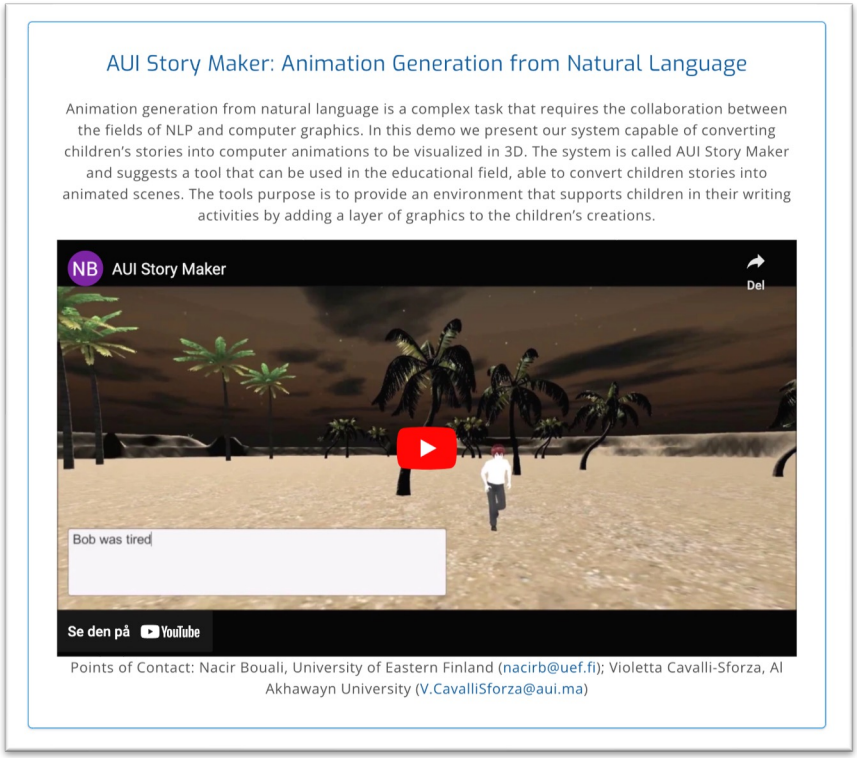


inqits.com

Inq-ITS assessment algorithm is validated with thousands of students and matches human assessment with approximately 95% accuracy

Generate animations from student texts

connect Natural Language Processing to computer graphics

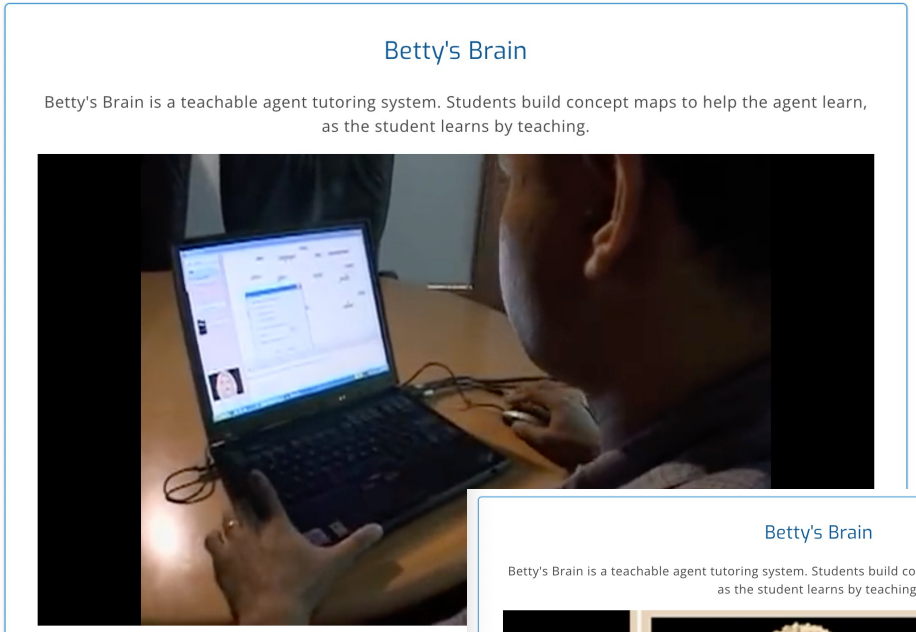


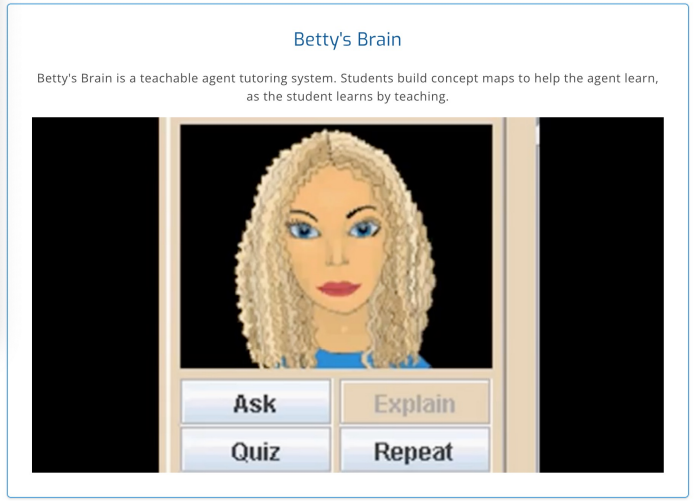
University of Eastern Finland

Akhawayn University

learning-by-teaching paradigm

Students learn by teaching BETTY





Vanderbildt

Stanford

University of Washington

VIRTUAL PEER SUPPORT FOR LEARNING



Really good results with children with autism



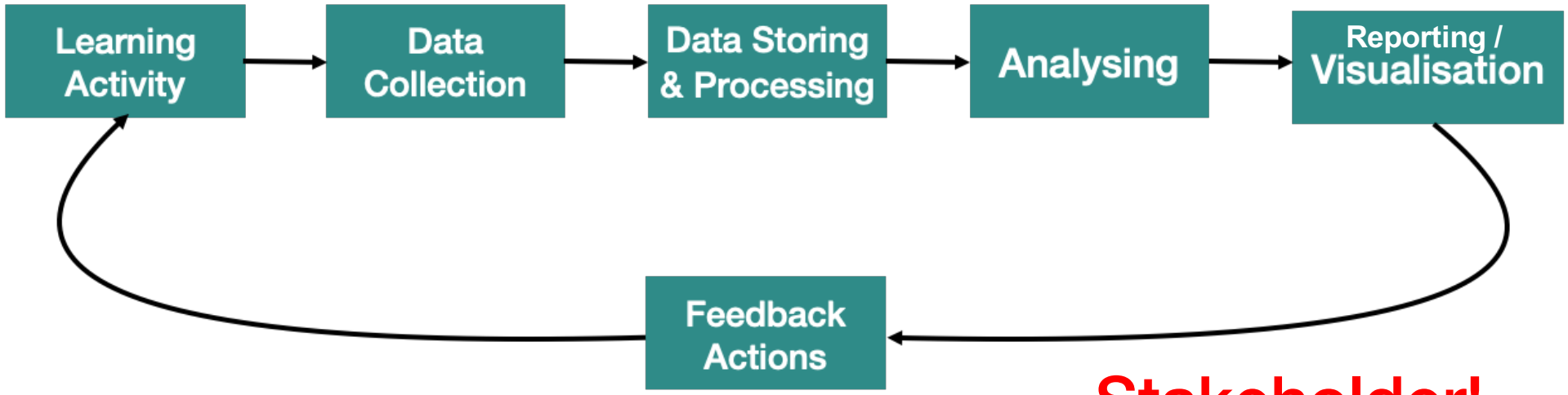
Tartaro, A., & Cassell, J. (2006)

Using AI to learn about learning

"LEARNING ANALYTICS IS THE MEASUREMENT, COLLECTION, ANALYSIS AND REPORTING OF DATA ABOUT LEARNERS AND THEIR CONTEXTS, FOR PURPOSES OF UNDERSTANDING AND OPTIMIZING LEARNING AND THE ENVIRONMENTS IN WHICH IT OCCURS"

1st International Conference on Learning Analytics & Knowledge (LAK11)

LA PROCESS (LIFECYCLE)



Stakeholder!

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STAKEHOLDERS

Learners

Educational Leaders

EdTech Developers

Tutors / Assistants

Parents / Guardians

Policy Makers

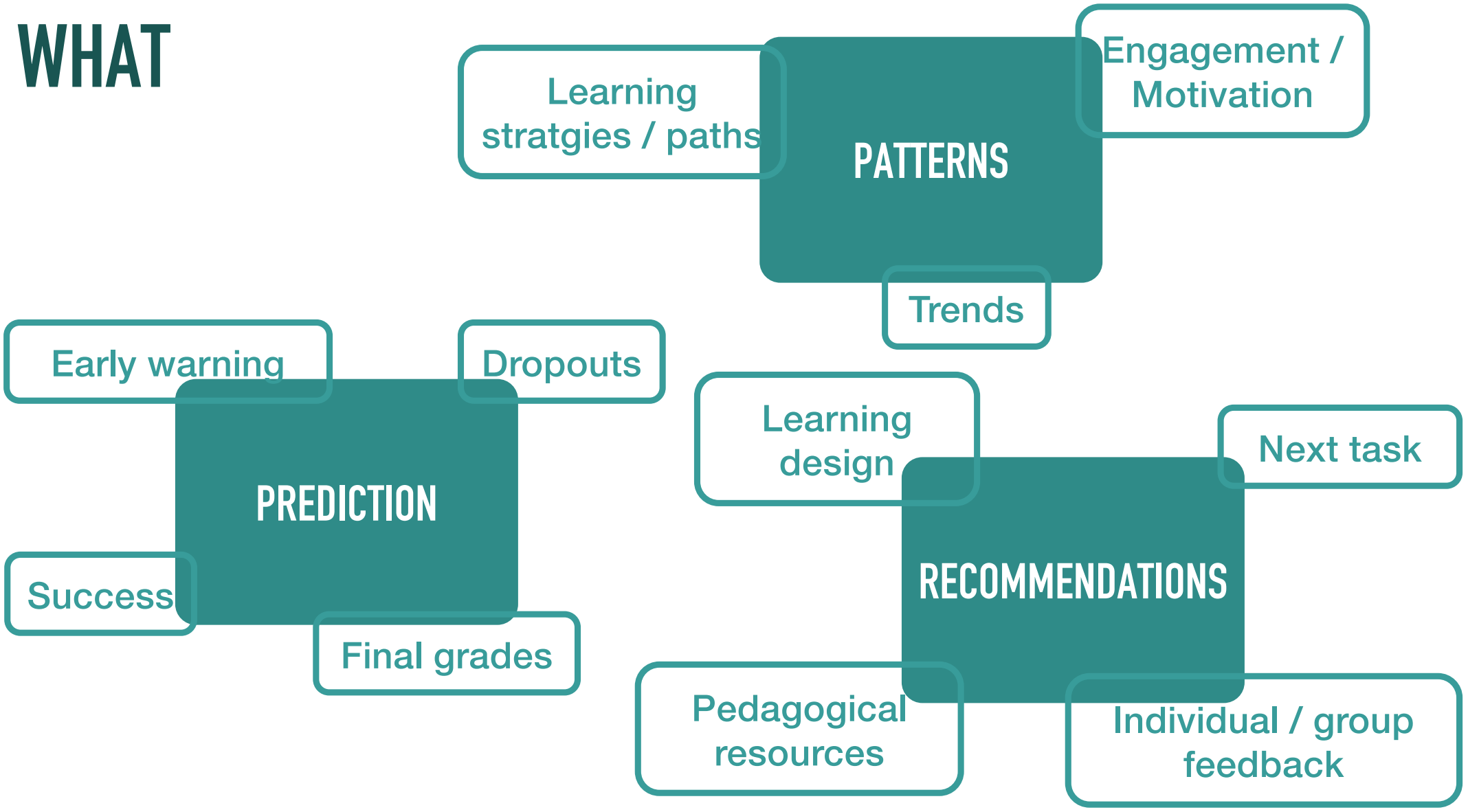
Teachers / Instructors

Schools / HE Institutions

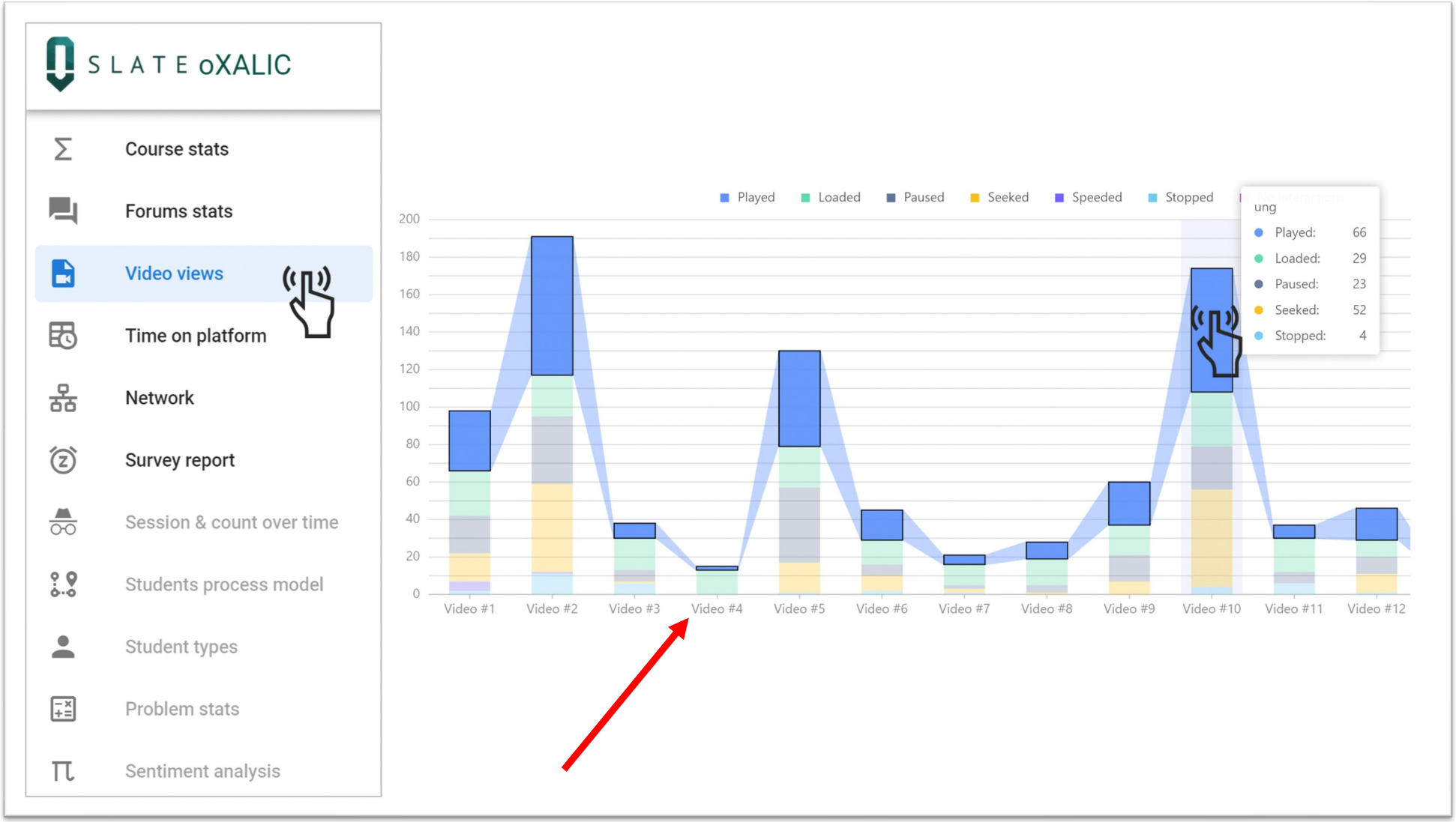
RESEARCHERS

SLATE

WHAT

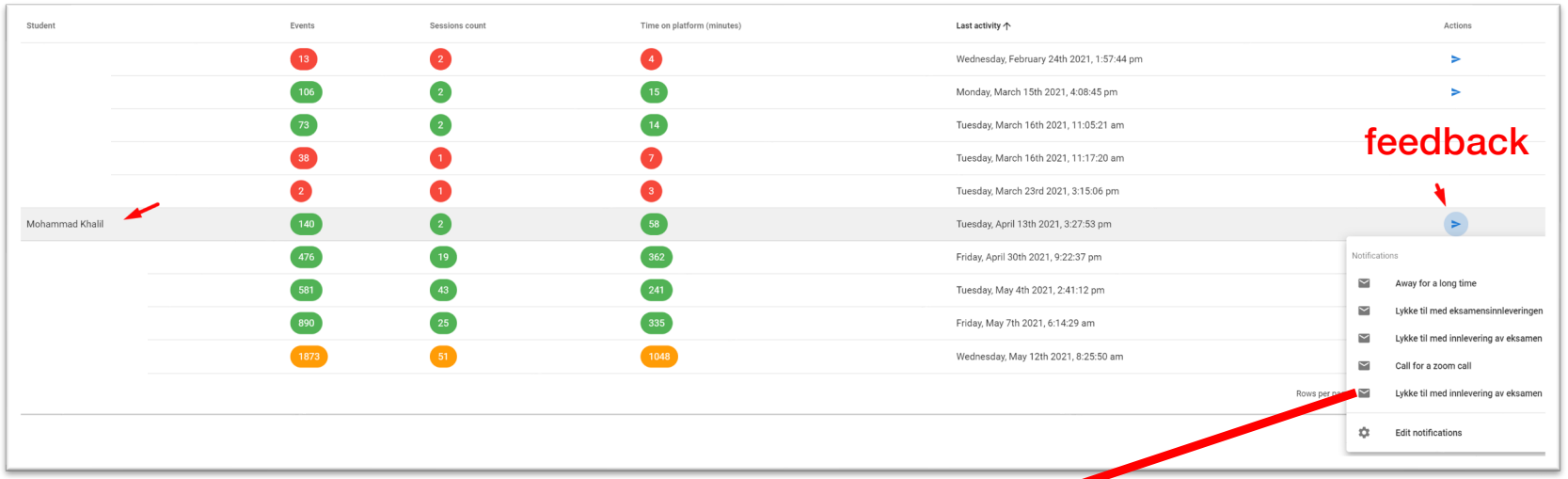

Learning stratgies / paths
PATTERNS
Engagement / Motivation
Trends
Early warning
Dropouts
PREDICTION
Success
Final grades
Learning design
Next task
RECOMMENDATIONS
Pedagogical resources
Individual / group feedback

Mohammad Khalil & Gleb Belokrys



OXALIC

Mohammad Khalil & Gleb Belokrys





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INQ-ITS: PERSONALISED ONLINE LABS

LA Dashboard (Teacher)

WPI

Science Assistments: Inquiry skill by class with at risk students

Class Performance | Student Performance

Class: Mr. Green – Section 3 Report as of: 25 SEP 2010

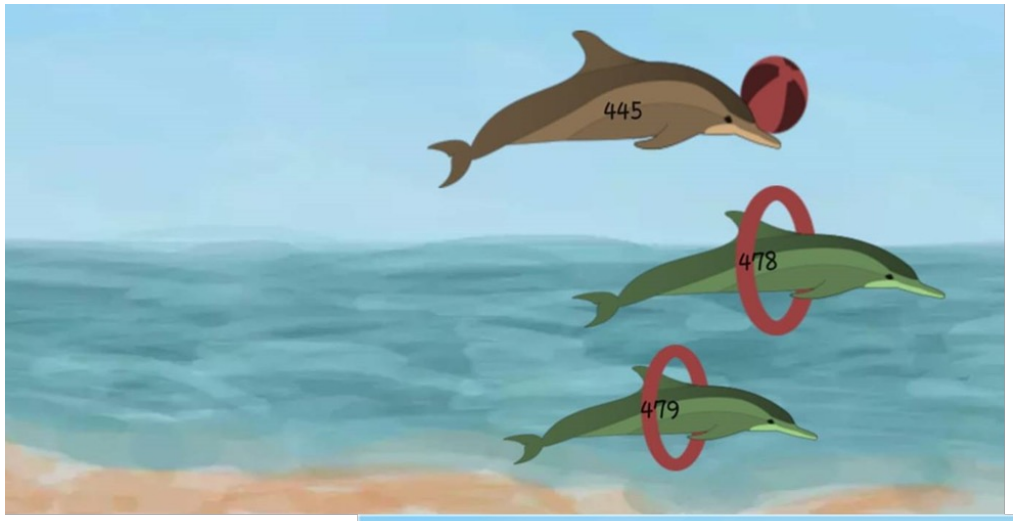
= High = Mid = Low

Hypothesis Formation	6	12	**12**
Identify Independent Variable			
Identify Dependent Variable			
Relationship between variables			
Design & Conduct Experiments	3	12	15
Control for Variables Strategy			
Targeting Independent variables			
Data Interpretation	3	12	15
Correct or incorrect claims			
Selecting trials to warrant claims			
Communicating Findings	15		15

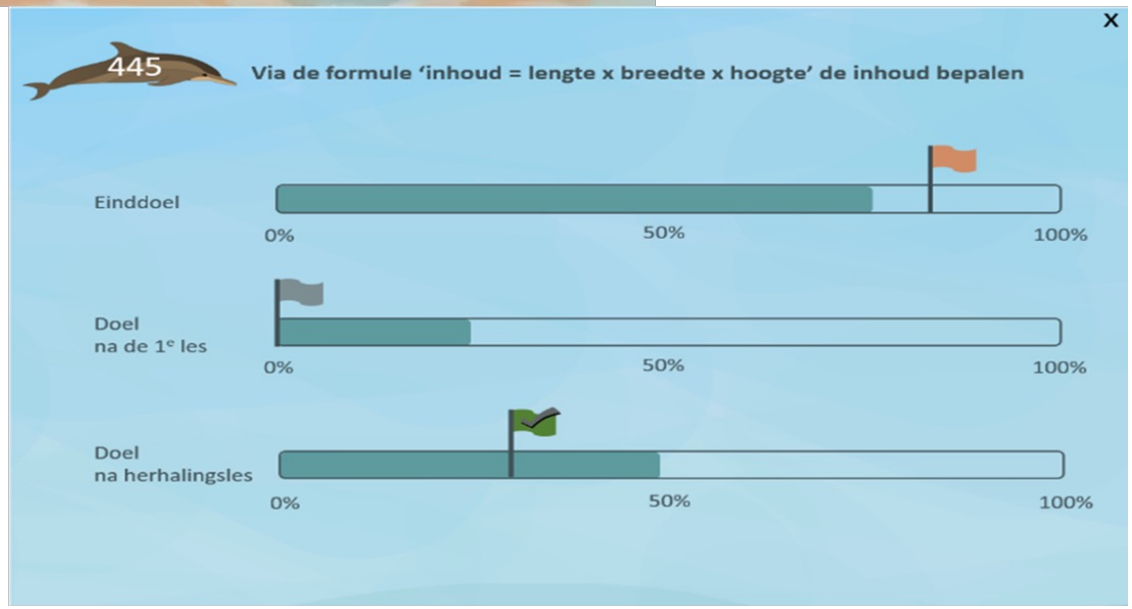
12 Hypothesis Formation - Low

May not understand the concept of variables

Student Name	Skill (%)
John Smith	4
Harry Grim	5
Sally Winn	14
Horace Black	14
Finn Turner	16
Jessica Foley	16
Rebecca Dale	19
Sam Stone	23
Eric Smith	26
Valerie Garibaldi	31
Philip Waters	32
Daniel Tsosei	32



LA Student Dashboard

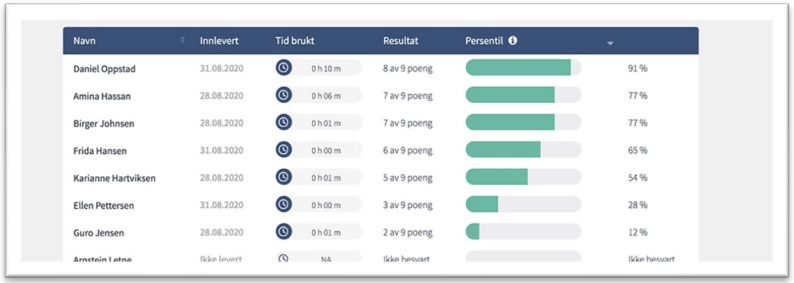


Molenaar, Horvers, Dijkstra, Baker (2020)

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CAMPUS MATTE

(4) What opportunities or challenges exist when using the learning analytics dashboard?



As a teacher, there are many things that take up your time, so ***getting a quick overview of exactly what the pupils need the most help with, who needs it most and what should be emphasised*** *-* ***being able to get data on that, it frees up time.****.. in addition, it is a* ***documentation of the individual work the pupil's*** *do, and in sum, it gives a pretty good picture of where the pupil stands.* ***But you have to remember that this is only part of the picture****.*

Teacher

Hinrichsen, R. (2023). Master's thesis, UiB

ARTIFICIAL INTELLIGENCE

&

LEARNING ANALYTICS

SLATE

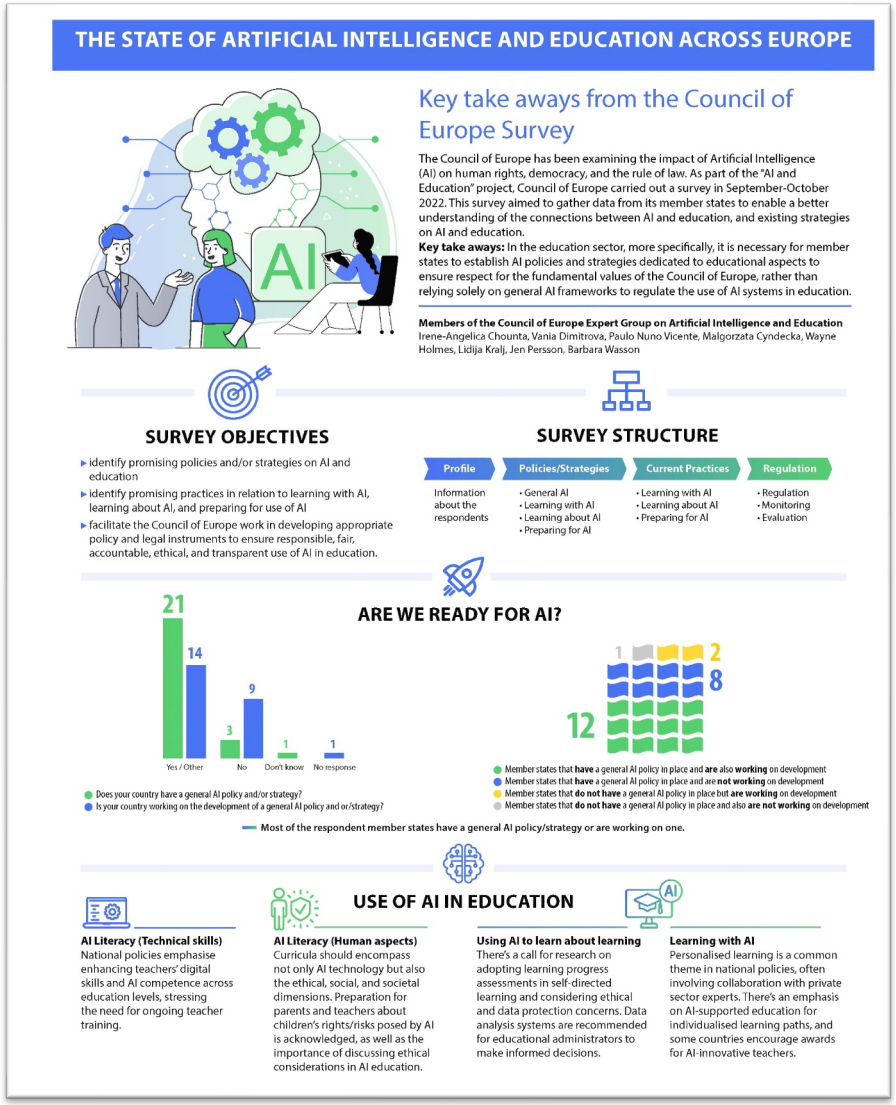
DATA + STATISTICS

DATA + ALGORITHMS

ARTIFICIAL INTELLIGENCE
(AUTOMATED SYSTEM)

&

LEARNING ANALYTICS
(INSIGHT INTO STUDENTS & LEARNING → STAKEHOLDER)



https://rm.coe.int/the-state-of-artificial-intelligence-in-education-infographic-/1680aef139

The State of Artificial Intelligence and Education Across Europe:
The results of A Survey of Council of Europe Member States

Irene-Angelica Chounta, Vania Dimitrova, Paulo Nuno Vicente, Malgorzata Cyndecka, Wayne Holmes, Lidija Kralj, Jen Persson, Barbara Wasson
Council of Europe, AI&ED Expert Group

SURVEY STRUCTURE

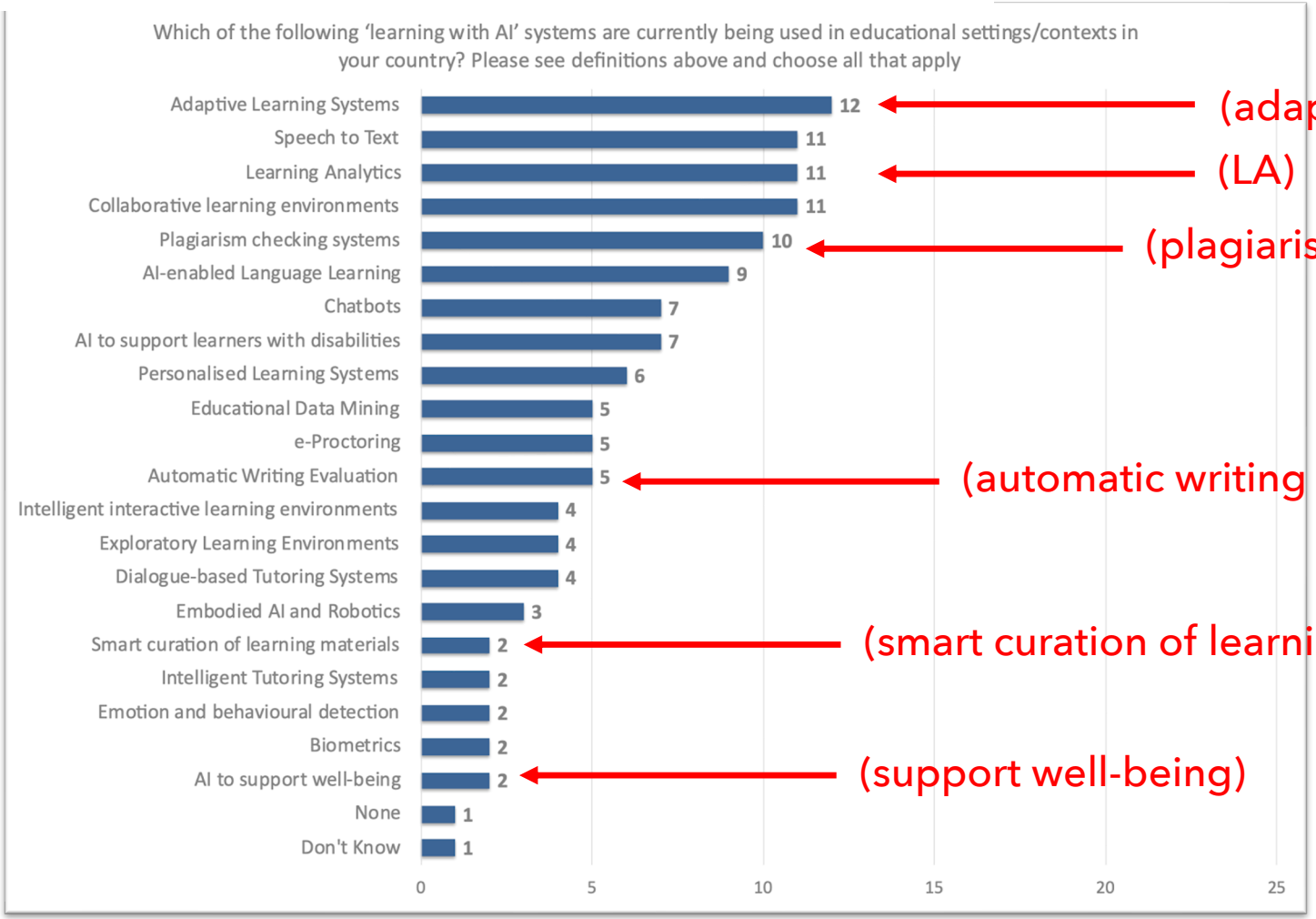
Profile	Policies/Strategies	Current Practices	Regulation
Information about the respondents	• General AI • Learning with AI • Learning about AI • Preparing for AI	• Learning with AI • Learning about AI • Preparing for AI	• Regulation • Monitoring • Evaluation

PRE- CHATGPT

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Adaptation, collaboration, language learning and learning analytics tend to be the most popular AI systems used in educational contexts.

n=25



(adaptive systems)

(LA)

(plagiarism checking)

(automatic writing evaluation)

(smart curation of learning materials)

(support well-being)

https://rm.coe.int/the-state-of-artificial-intelligence-in-education-infographic-/1680aef139

CHALLENGES

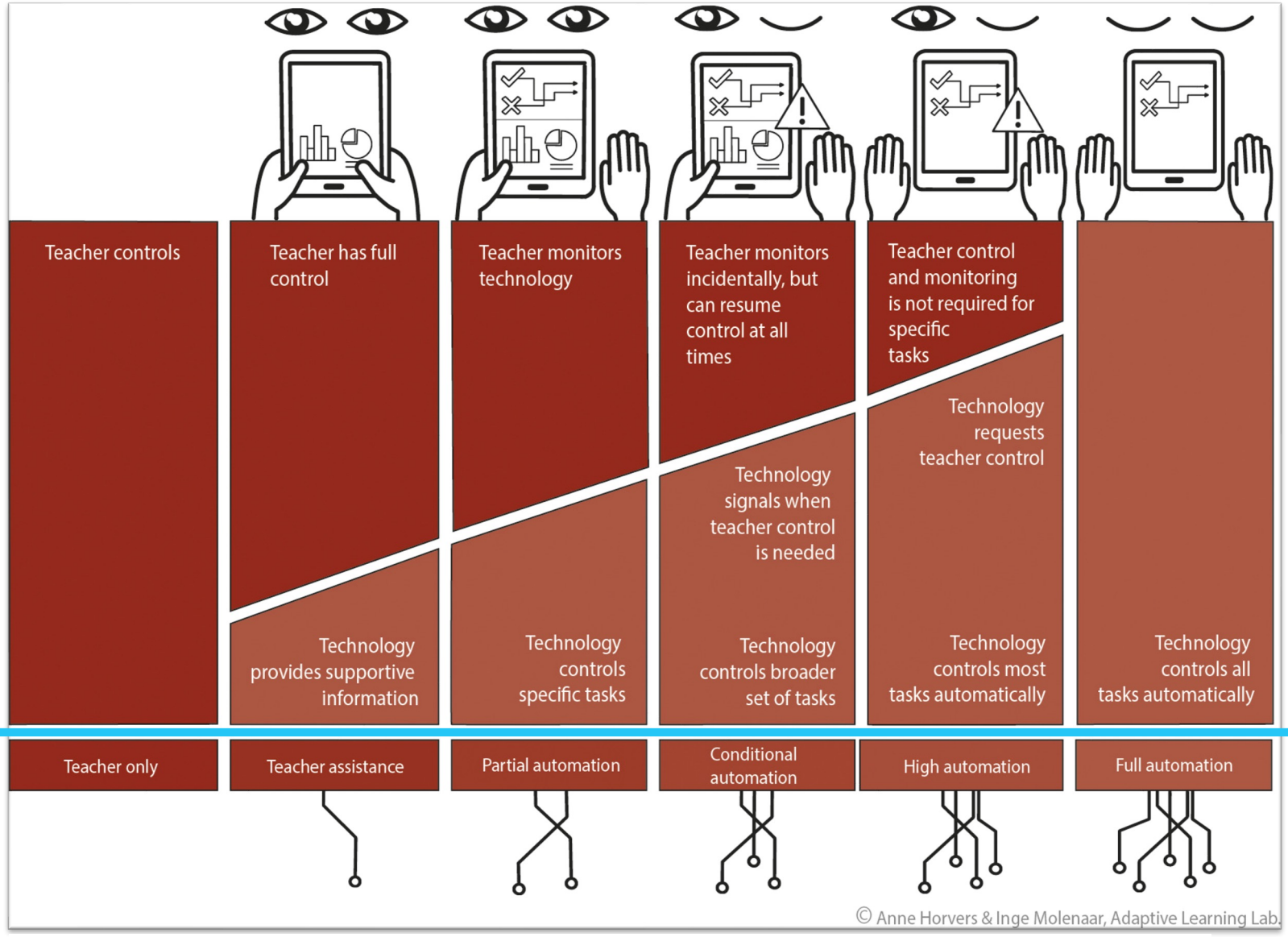
IMPACT
HIGH RISK
HUMAN RIGHTS, DEMOCRACY, RULE OF LAW
COMPETENCE
USE OF DATA
ENVIRONMENTAL

SLATE

How does AI impact teacher decisions in the classroom?

WHO IS IN CONTROL?

Decreasing amount of control for the teacher



Increasing automation

Data Streams
Increasing amounts of data

Molenaar, I. (2022). Towards hybrid human-AI learning technologies. European Journal of Education, 57(4), 632-645. DoI: 10.1111/ejed.12527

LACK OF EVIDENCE OF IMPACT IN CLASSROOM

- Misiejuk & Wasson (2017)
- Holmes et al. (2022)
- Ley et al. (2023)

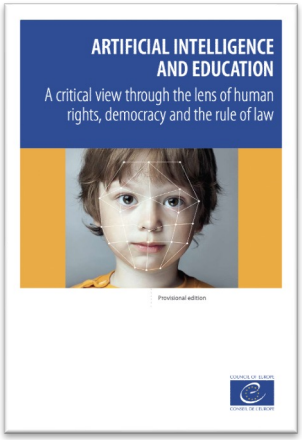
→ Theory poor or theory free

→ Little research in classroom

→ Research-developed AI in Education - small scale studies + few independent

→ Commercial systems are usually without evidence of impact & naïve approaches to pedagogy

A SIMPLIFIED AND REDUCED CONCEPT OF LEARNING



Many educational technologies are based on a new data-based version of **machine behaviorism** (Knox et al. 2020)

2.1.1. AI applications and pedagogy

Despite using state-of-the-art technologies and often being grounded in the cognitive sciences (Anderson et al. 1995), almost every existing commercial AI tool designed to support learners effectively embodies a naïve approach to teaching and learning. The dominant approach involves spoon-feeding pre-specified content, adapted to the individual's achievements, while aiming to avoid failure. In other words, despite suggestions to the contrary, the approach is effectively behaviourist or instructionist, and ignores more than 60 years of pedagogical research and development (in, for example, deep learning, Entwistle 2000; guided discovery learning, Gagné and Brown 1963; productive failure, Kapur 2008; project-based learning, Kokotsaki et al. 2016; and active learning, Matsushita 2018). This behaviourist approach, especially the spoon-feeding, prioritises remembering over thinking, and knowing facts over critical engagement, thus undermining learner agency and robust learning.

Holmes 2022, p. 34 (Artificial Intelligence and education. A critical view through the lens of human rights, democracy and the rule of law. Report. Council of Europe)

PARTNERSHIP OF TEACHERS & INTELLIGENT TECHNOLOGY

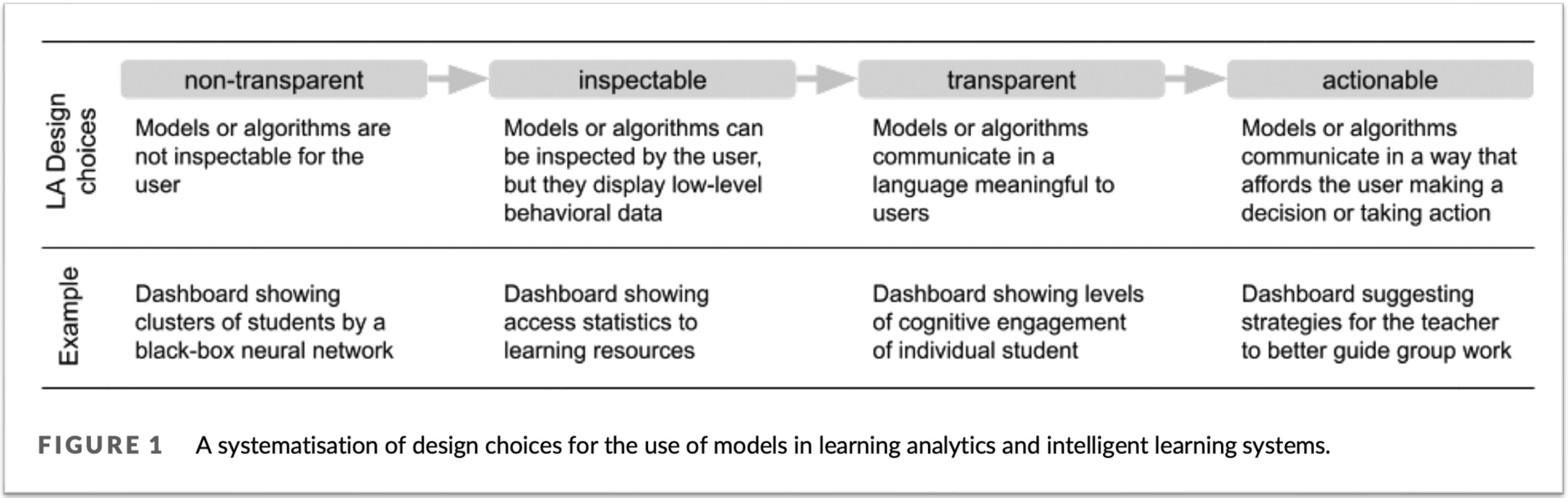
Model-based Learning Analytics → Intelligent learning technologies designed to make models of student learning and instruction transparent to teachers

Gain insight into the coupling between the **knowledge models** that underpin the intelligent system and the **knowledge used by teachers** in their classroom decision making

Systematic literature review: 42 papers (2013 – 2020)
(*intelligent tutoring systems – learning analytics dashboards*)

Ley, T, Tammets, K., Pishtari, G., Chejara, P., Kasepalu, R., Khalil, M., Saar, M., Tuvi, I., Väljataga, T. & Wasson, B. (2023). Towards a partnership of teachers and intelligent learning technology: A systematic literature review of model-based learning analytics. *Journal of Computer Assisted Learning*, 1-21. https://doi.org/10.1111/jcal.12844

BENEFITS FOR LEARNERS & EVIDENCE



LA Design choices	non-transparent →	inspectable →	transparent →	actionable
	Models or algorithms are not inspectable for the user	Models or algorithms can be inspected by the user, but they display low-level behavioral data	Models or algorithms communicate in a language meaningful to users	Models or algorithms communicate in a way that affords the user making a decision or taking action
Example	Dashboard showing clusters of students by a black-box neural network	Dashboard showing access statistics to learning resources	Dashboard showing levels of cognitive engagement of individual student	Dashboard suggesting strategies for the teacher to better guide group work

FIGURE 1 A systematisation of design choices for the use of models in learning analytics and intelligent learning systems.

Ley, T, Tammets, K., Pishtari, G., Chejara, P., Kasepalu, R., Khalil, M., Saar, M., Tuvi, I., Väljataga, T. & Wasson, B. (2023). Towards a partnership of teachers and intelligent learning technology: A systematic literature review of model-based learning analytics. *Journal of Computer Assisted Learning*, 1-21. https://doi.org/10.1111/jcal.12844

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BENEFITS FOR TEACHERS & EVIDENCE

TABLE 3 Claimed benefits for teachers and type of evidence reported in the papers under review ($N = 42$). Shaded cells give the total counts.

	Total number of papers reporting		Type of evidence provided				
Claimed benefits	**No evidence**	**Evidence**	**Interviews**	**Log data**	**Observations**	**Self-reports**	**Tests**
Learn about students needs	6	16	2	2	5	5	7
Reflect about learning design	5	7	0	0	4	4	4
Support individual students	3	5	1	1	2	2	2
Improve learning orchestration	4	4	1	1	4	2	0
Not specified	4	0	0	0	0	0	0
Total	22	32	4	4	15	13	13

22/54 claims are unsupported (approx. 41%)

cf. Holmes et al. (2022) no external evaluation

BENEFITS FOR TEACHERS & EVIDENCE

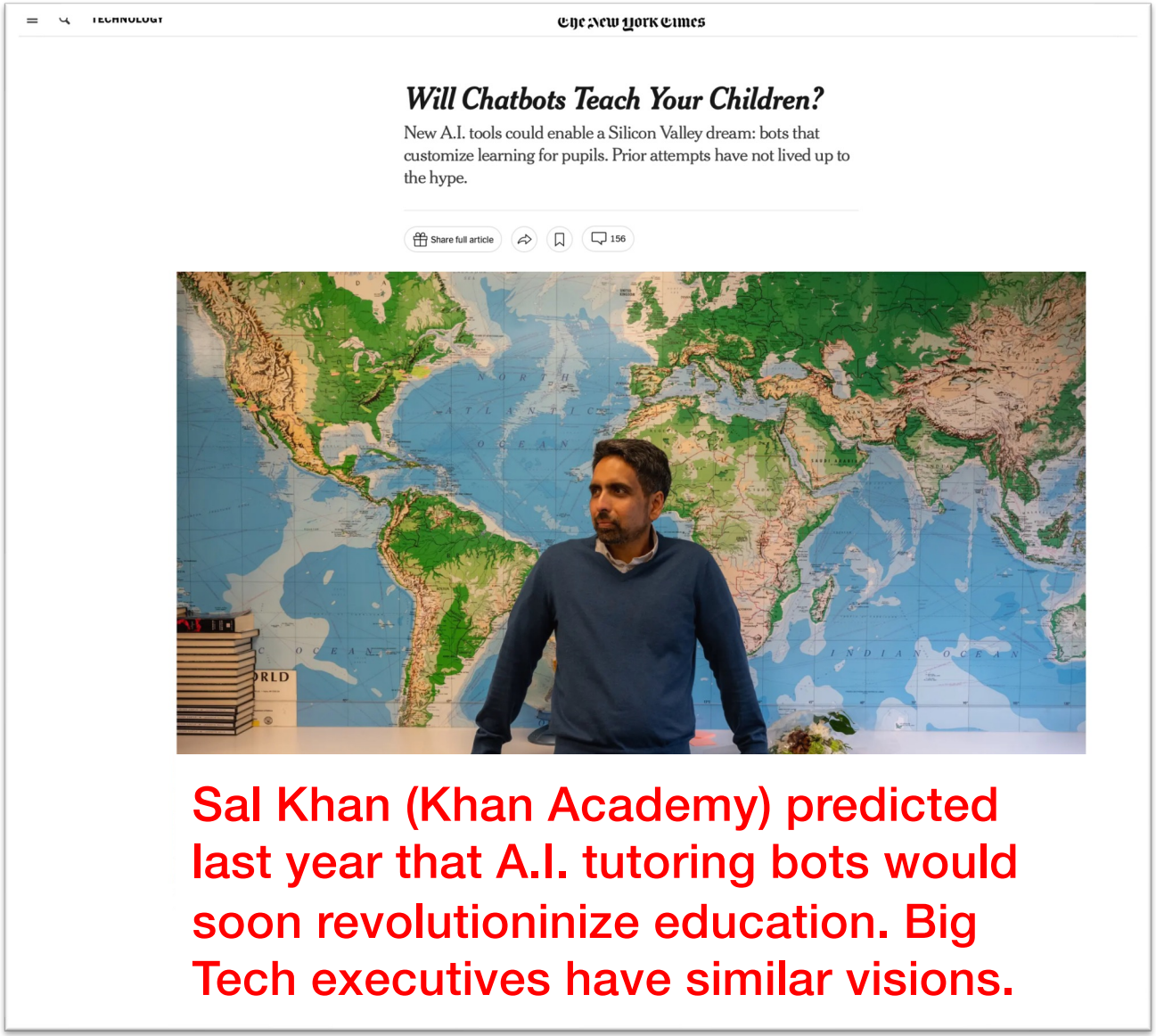
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Not specified	4	0	0	0	0	0	0
Total	22	32	4	4	15	13	13

Benefits for Learners

57% of claims were unsupported!

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"There's a **rush to proclaim the authority and the usefulness** of these kinds of chatbot interfaces and the underlying language models that power them,"

"**But the evidence that A.I. chatbots can deliver those effects does not yet exist**."

Professor Ben Williamson
University of Edinburgh

ARTIFICIAL INTELLIGENCE AND EDUCATION
WHAT IS SPECIAL?

CHILDREN

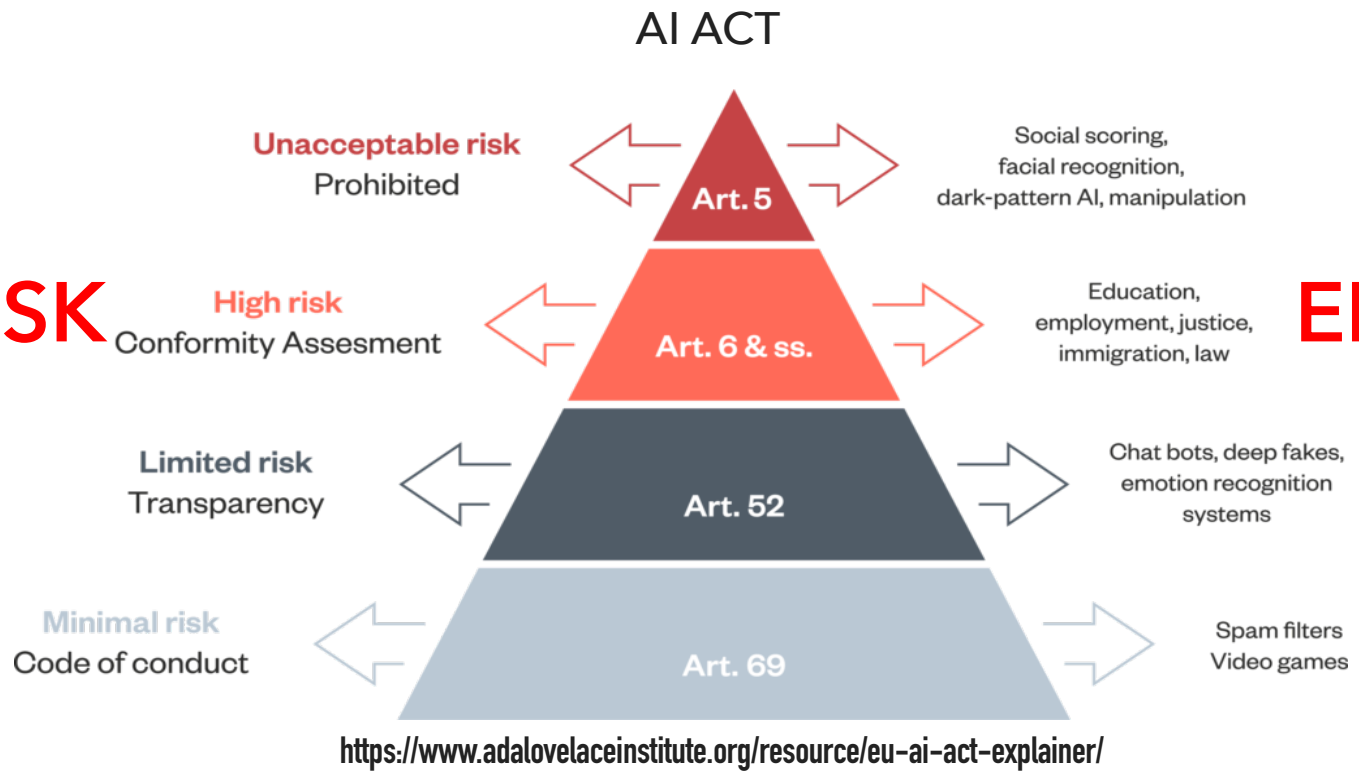


Colourbox: Syda Productions



Colourbox: #232319

HIGH RISK



EDUCATION

minimise the risk of erroneous or biased AI-assisted decisions

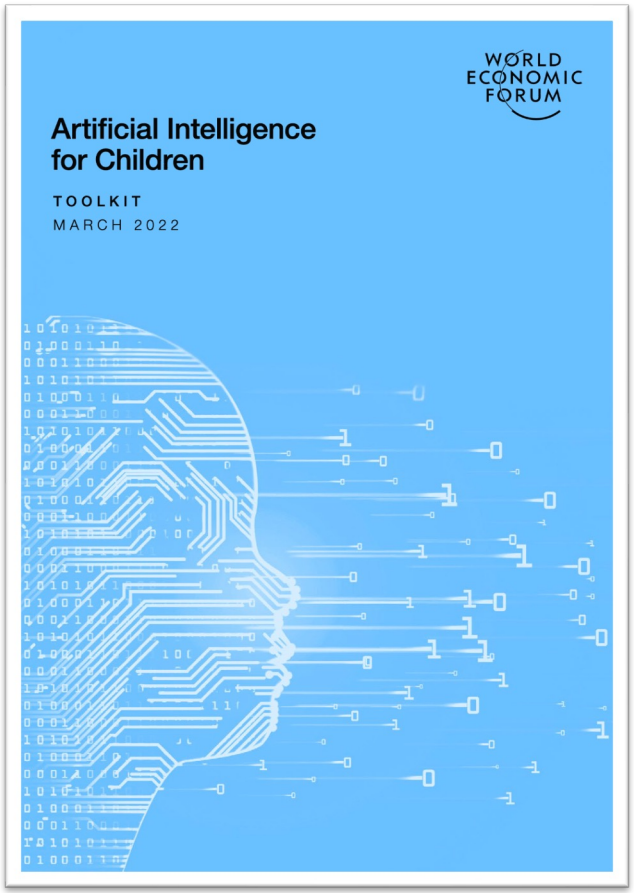
protect children's vulnerability

Educational data and algorithmic predictions can decide about students and young people`s life chances: their **potential access to jobs**, **future carrier paths** and can also have significant impact through **personalised education on their cognitive, emotional and personal development**.

ETHICS & POLICY



UNESCO



WORLD ECONOMIC FORUM



UNICEF



Children interact with or are affected by **AI systems that are not designed for them**, and current guidelines do not take this into account.

Moreover, what we know about how children interact with and are affected by AI is only the beginning. **The disruptive effects of AI will change children's lives in ways we cannot yet understand, for better or worse**.

What we do today is **critical** to creating a future that children deserve.

Ben Williamson talks about “precision learning” that will allow for the collection and production of 'intimate data' about students' psychological, neuroscience and genetic characteristics. The challenges of a growing convergence of, for example, digital technologies and neuroscience research are also receiving increasing attention, with a particular focus on the implications for education and learning (bio-digitalism).

https://media.ed.ac.uk/media/Intimate+analytics+in+precision+learningA+Dr+Ben+Williamson++Data+Controversies+2019/1_f7r4w6q1



HUMAN RIGHTS
DEMOCRACY
RULE OF LAW

Legal Instrument on Regulating the use of Artificial Intelligence Systems in Education

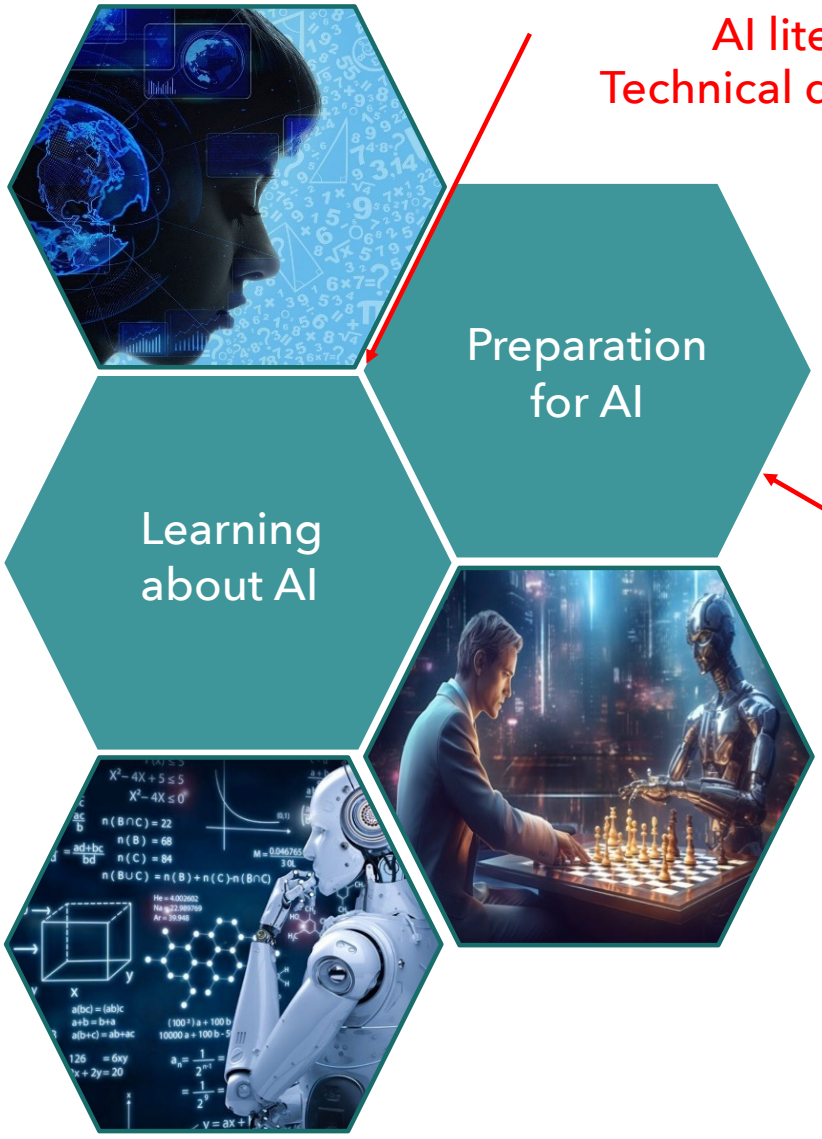
Preparatory Study

Policy Toolkit for Learning with and about Artificial Intelligence

Governance – Competences- Education

European Review Framework to assess AI systems used for educational purposes and/or in educational systems

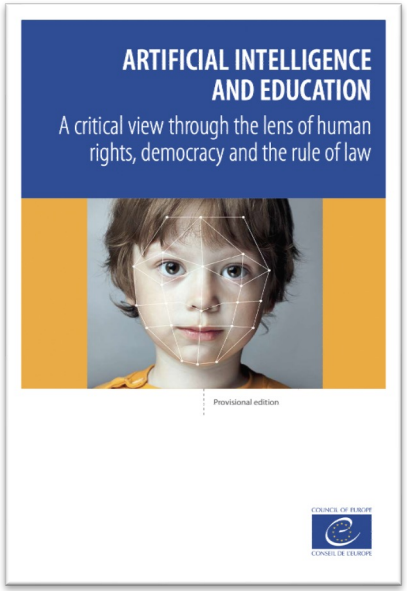
Competence



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Broad vision

Ensure that all citizens are prepared for how AI can impact their lives - and help them understand issues such as ethics, data bias, disinformation, surveillance and the potential impact on their work.



(Holmes et al., 2022)

SLATE

AI4K12.org

Home | What's Happening | Guidelines | Resources | About

The Artificial Intelligence (AI) for K-12 initiative (AI4K12) is jointly sponsored by AAAI and CSTA.

The initiative is developing (1) national guidelines for AI education for K-12, (2) an online, curated resource Directory to facilitate AI instruction, and (3) a community of practitioners, researchers, resource and tool developers focused on the AI for K-12 audience. Check out the following information to learn about this initiative.







5 Big Ideas in AI

A poster you can print, and an illustrative graphic. Click for copyright and licensing information. Short link: https://bit.ly/ai4k12-five-big-ideas. This poster is also available in multiple languages.

We have icons available for each of the Five Big Ideas on the poster page under Resources.

K-12 AI Guidelines

The AI for K-12 guidelines are organized around the 5 Big Ideas in AI. The guidelines will serve as a framework to assist standards writers and curricula developers on AI concepts, essential knowledge, and skills by grade band.

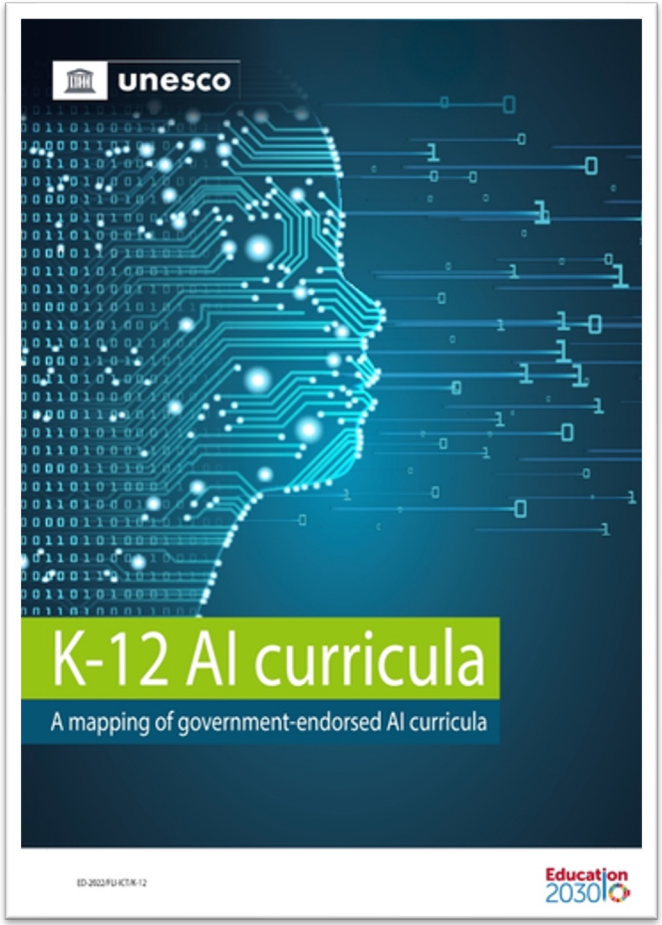
The AI4K12 draft guidelines are organized in K-12 grade band progression charts and are available in the Guidelines menu for Big Idea 1, Big Idea 2 , Big Idea 3, and Big Idea 4.

Resources

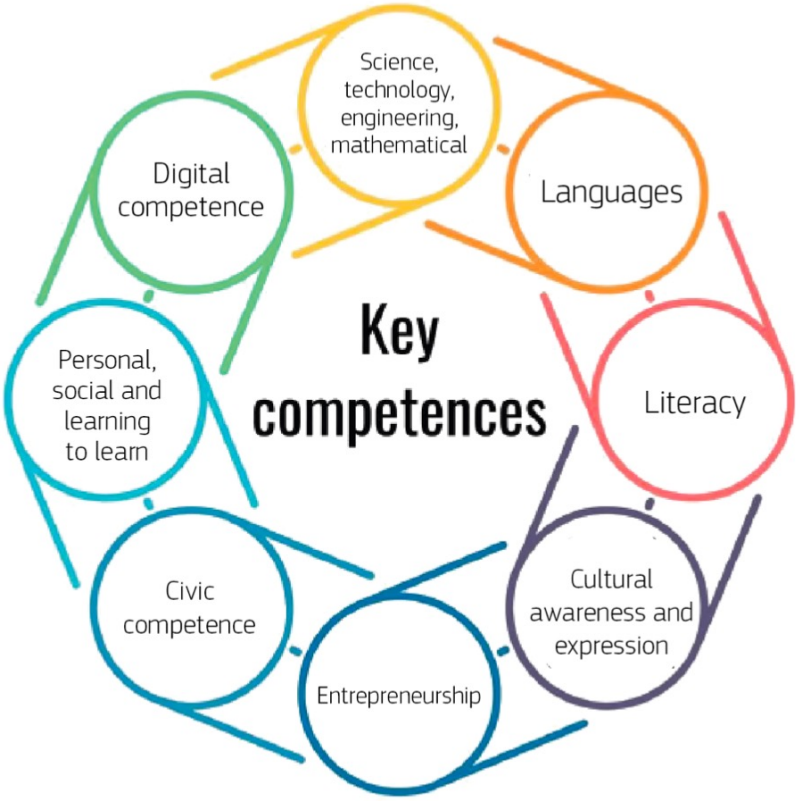
Looking for instructional resources to teach artificial intelligence?

Visit the Resources page for a curated list of books, curriculum materials, course outlines, software, videos, and more. The list includes professional development courses for educators to learn about AI.

NEW – AI4K12 and NEOM are excited to announce the launch of a new series of Activity Resource Guides for Teaching Artificial Intelligence in K-12.



DIGCOMP 2.2



European Commission, Joint Research Centre, Vuorikari, R., Kluzer, S., Punie, Y., *DigComp 2.2, The Digital Competence framework for citizens – With new examples of knowledge, skills and attitudes*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/115376

BOX 6. Requirements for citizens interacting with AI systems

Humans interacting with AI

As part of the update process focusing on citizens interacting with AI systems, the requirements gathering captured the following:

KNOWLEDGE

- To be aware of what AI systems do and what they do not do
- To understand the benefits, limitations and challenges of AI systems

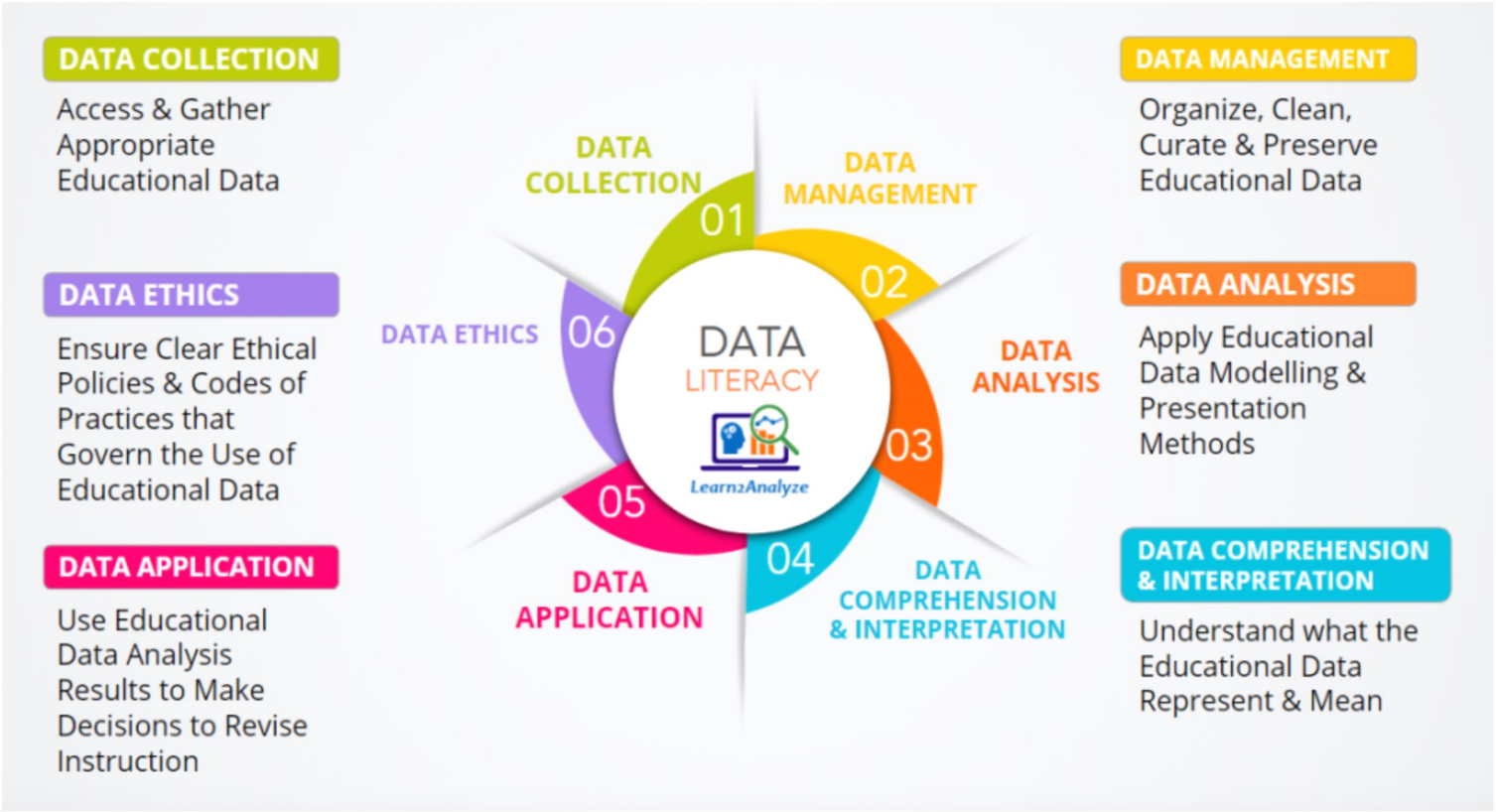
SKILLS

- To use, interact and give feedback to AI systems as an end-user
- To configure, supervise and adapt AI systems (e.g. overwrite, tweak)

ATTITUDES

- Human agency and control
- Critical yet open attitude
- Ethical considerations of usage

Competence Learn2Analyze Educational Data Literacy Competence Profile



Instructional designers
E-trainers
Teachers
School leaders

https://learn2analyse.eu

SLATE



Data Literacy for Citizenship

Project Reference: 2020-1-NO01-KA204-076492

January 2021 – December 2023

https://dalicitizens.eu/



DaLi

Data Literacy for Citizenship

UNIVERSITAS BERGENSIS

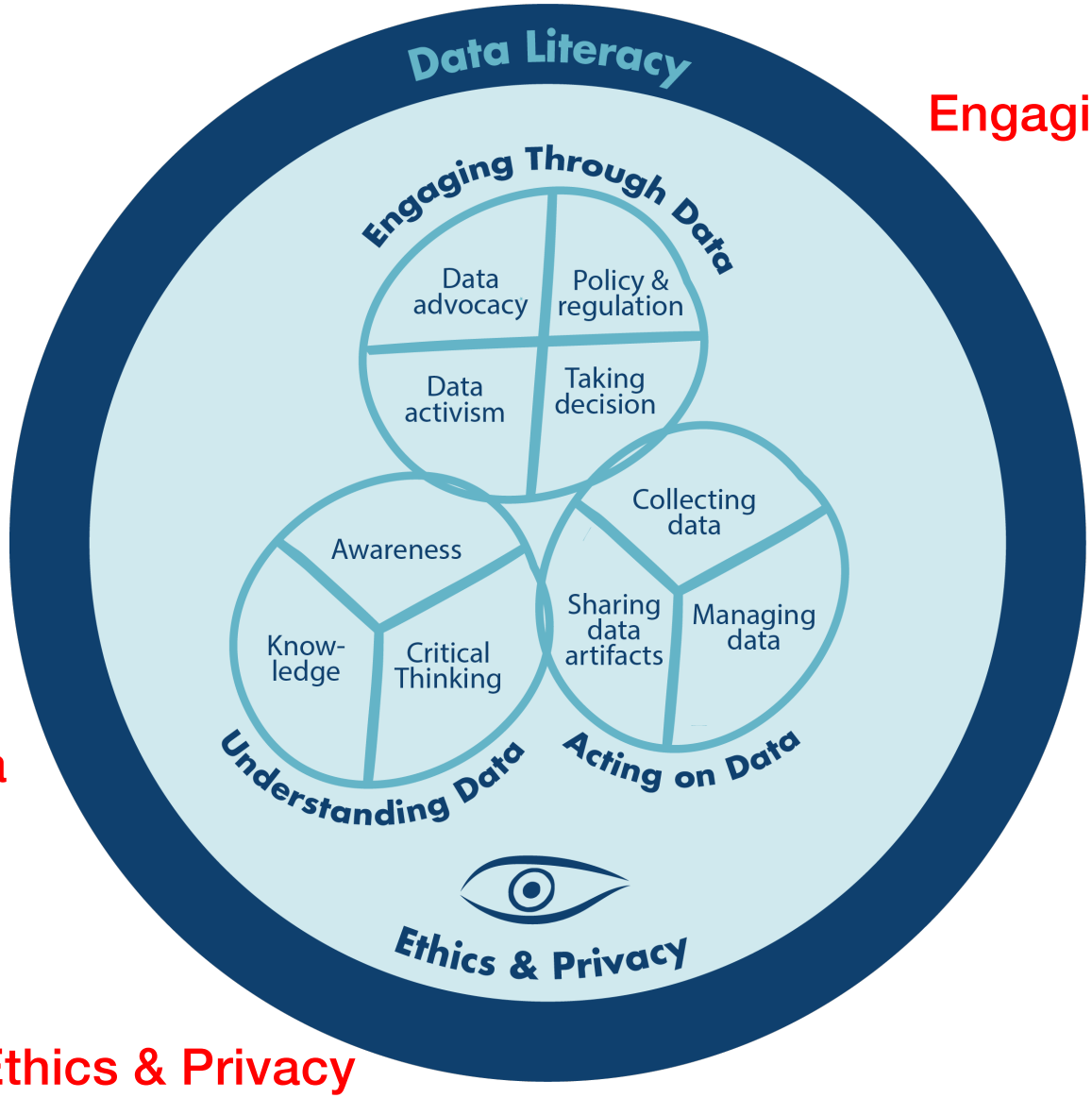
UNIVERSIDAD DE MURCIA

UIB Universitat de les Illes Balears

FAU FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG

Coventry University

Engaging through data

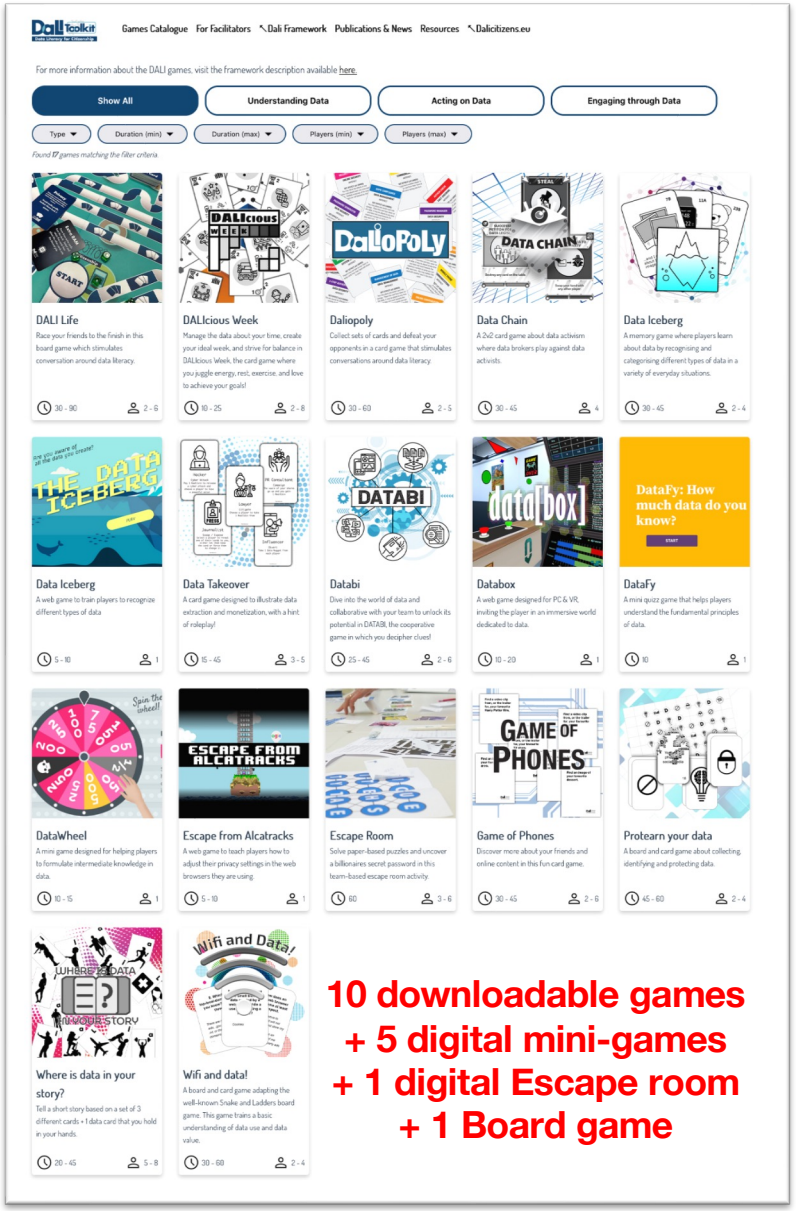


Acting on data

Understanding data

Ethics & Privacy

Data Literacy for Citizenship



10 downloadable games
+ 5 digital mini-games
+ 1 digital Escape room
+ 1 Board game

https://toolkit.dalicitizens.eu/







DIGI610 Fantastic Data





Games day –
Bergen Library

Kompetanse
Norge

SLATE &
Digital Norway

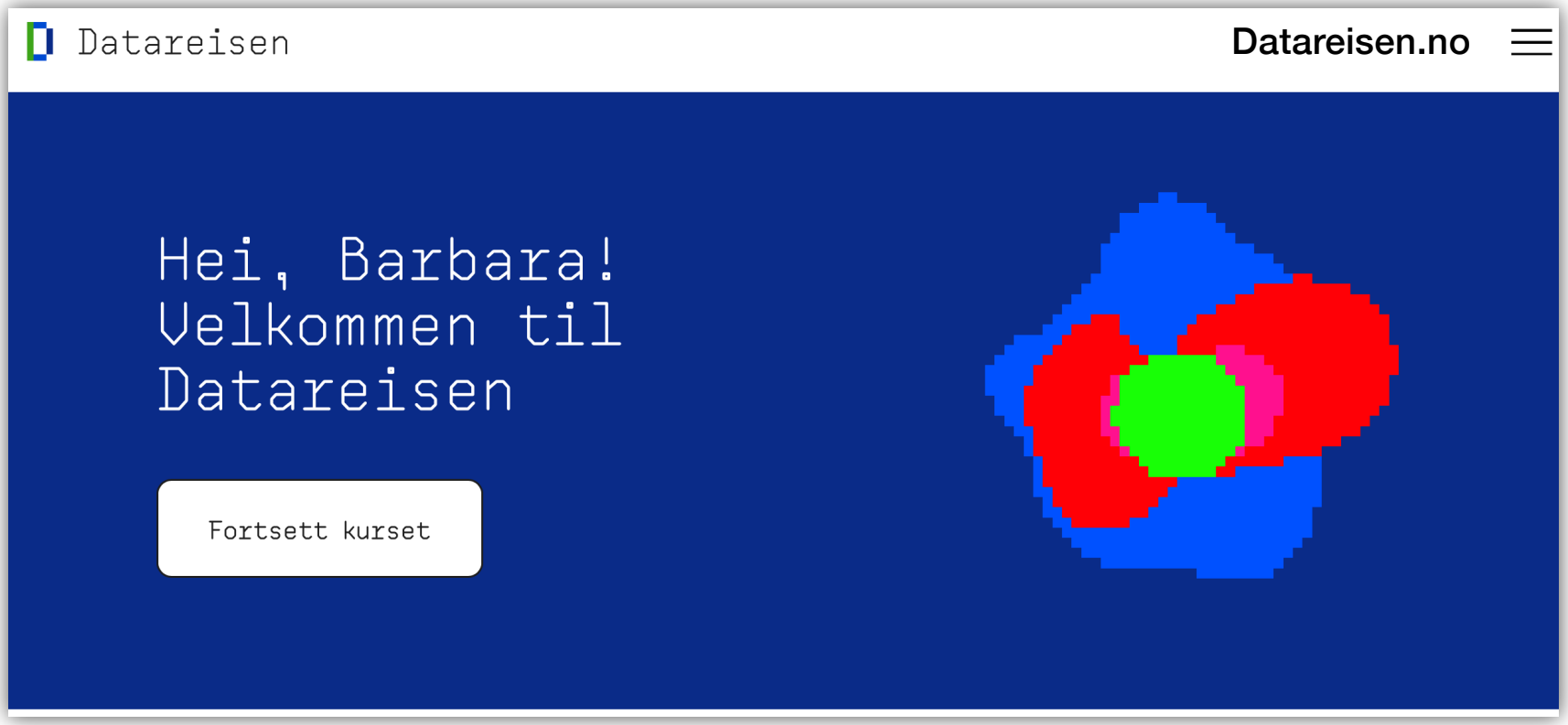
Datareisen.no



These have contributed content to DATAREISEN:
Professor Barbara Wasson, SLATE, UiB
Researcher Jeanette Samuelsen, SLATE, UiB
Researcher Fredrik Breien, SLATE, UiB
Postdoc Anja Salzmann, SLATE
Associate Professor Malgorzata Cyndeka, Law Faculty, UiB og SLATE (privacy & GDPR)
Associate Professor Leonora Onarheim Bergsjø, Høgskolen i Østfold (Digital ethics)
Text writer Mikael Lunde, NewsLab

Kompetanse Norge

SLATE & Digital Norway



UiB courses:

DIGI110 Fantastiske data (UiB students & staff – >200 each semester)

DIGI610 Fantastiske data (for workers – 500 Spring 2024)

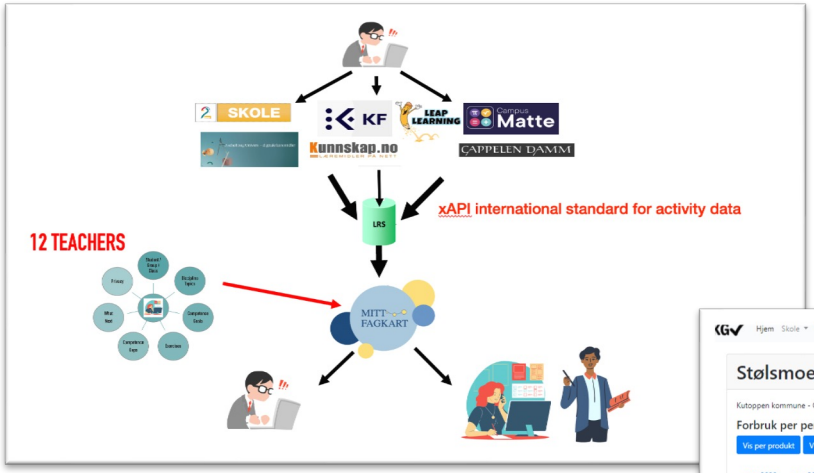
WHAT ABOUT THE DATA & ALGORITHMS

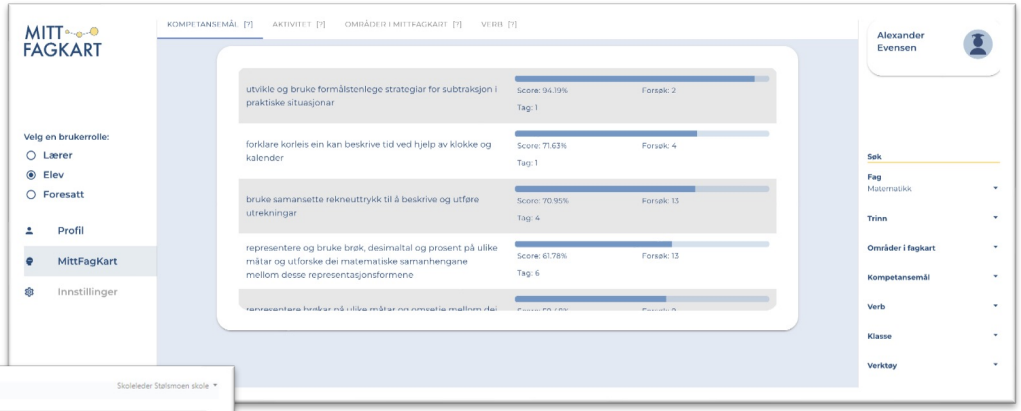
SLATE

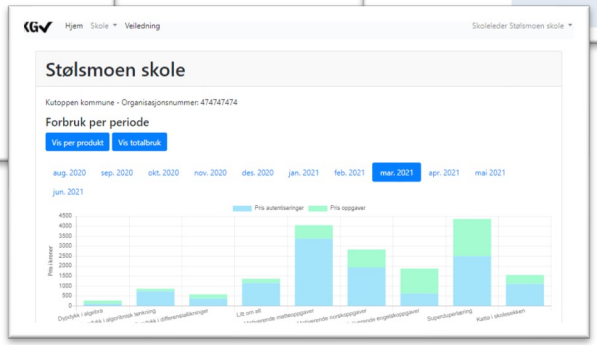
AVT: Activity Data for Assessment and Adaptation

AVT1 (2017 – 2019); AT2 (2019 - 2024)

AVT is an R&D project that identifies opportunities and highlights challenges that the education sector faces when it comes to the use of student activity data in learning analytics.







Oslo

KS

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CAN WE USE THE DATA – REGULATORY

WHO OWNS THE DATA?

PRIVACY REGULATIONS (PERSONAL DATA / SENSITIVE DATA)

GDPR – GENERAL DATA PROTECTION REGULATION + NATIONAL LAWS

CONSENT / OBLIGATION

SLATE

CAN WE USE THE DATA -- REGULATORY

DATA PROTECTION IMPACT ASSESSMENT (DPIA)

RISK ANALYSIS;

INPUT FROM ALL STAKEHOLDERS

- PARENTS, STUDENTS, TEACHERS, SCHOOL OWNERS, . . .

DATA HANDLING AGREEMENT

STORAGE;

DE-IDENTIFIED / PSEUDO-ANONYMOUS;

HOW LONG CAN IT BE STORED, ETC. . .

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Norwegian Data Protection Agency (Datatilysnet)

Sandbox for Artificial Intelligence

- Legal basis for data handling
- DPIA
- Transparency (explainability)
- Communication

Norwegian laws are not specific enough

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DO WE HAVE THE DATA -- TECHNICAL

CAN YOU ACCESS THE DATA?

REALTIME ; SCHEDULED

E.G., Vendors have to implement an API for us to access; Not so easy

DO YOU HAVE THE RIGHT DATA?

AT THE MERCY OF THE LEARNING TOOL DEVELOPERS!

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ANALYTICS

DO YOU HAVE THE DATA IN THE RIGHT FORMAT?

UNSTSTUCTURED, STRUCTURED, . . .

E.G., STANDARD -- xAPI

DESCRIPTIVE STATISTICS – ALGORITHMS

TAKES TIME TO FIND THE RIGHT ANALYSIS METHODS

VALIDITY, RELIABILITY

NOT TRANSFERABLE

SLATE

RESULTS

CERTAINTY

LEGAL REPERCUSSIONS

COMMUNICATION

TRANSPARENCY, EXPLAINABILITY

TO ALL STAKEHOLDERS

SLATE

ENVIRONMENTAL CONCERNS

It is a well-known phenomenon that digital technologies and especially AI based on the use of big data and advanced data analyses **require greater energy and environmental resources**. In other words, the climate impact of LA systems should be mapped and enter into discussions and questions about **participation, sustainability and ethically responsible development of LA systems**.

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Ekspertgruppen for digital læringsanalyse


Ekspertgruppen for digital læringsanalyse
Mandat
Møter
Innspill
Medlemmene
Sekretariatet
Delrapporten
Ekspertgruppen for digital læringsanalyse
Ekspertgruppen skal gi Kunnskapsdepartementet bedre grunnlag for beslutninger om digital læringsanalyse i grunnopplæringen, høyere utdanning og høyere yrkesfaglig utdanning. Gruppen skal vurdere pedagogiske, etiske, juridiske og personvernmessige spørsmål ved bruk av digital læringsanalyse, og gi råd om behov for utvikling av regelverket og innspill om god praksis.
Gruppen overleverte sin første delrapport 1. juni 2022. Denne redegjør for hva læringsanalyse er, og hvilke implikasjoner det kan ha for norsk utdanning i dag og i nær framtid. For å belyse disse spørsmålene har ekspertgruppen løftet fram fire dilemmaer, som synliggjør hvor det er behov for mer kunnskap, bevissthet og refleksjon. Les mer om rapporten under menyvalget "Delrapporten".
laringsanalyse.no

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MANDATE

The expert group shall provide the Ministry of Education with a **better basis for decisions about learning analytics and adaptive teaching and assessment tools** in *basic education, higher education and higher vocational education*, and **advise on the need for regulation** and **input for policy development and measures** from the Ministry of Education and underlying agencies (e.g., Directorates).

SLATE

EXPERT COMMISSION

Marte Blikstad-Balas, **Professor**	Department for Teacher Education and School Research, **University of Oslo** (*task force leader*)
Monica Andreassen, **Teacher**	Science & mathematics, **Langnes skole, Tromsø**
Einar Duenger Bøhn, **Professor**	Department of Religion, Philosophy and History, **University of Agder**
Ann-Tove Eriksen, **Dept. Director**	**Directorate for Higher Education & Competence**
Michail Giannakos, **Professor**	Department of Computer Science, **NTNU**
Hedda Huse, Dept. **Director**	**Directorate for Education and Training**
Malcolm Langford, **Professor & Director**	Department of Public and International Law, **University of Oslo** & Director, Centre for Experiential Legal Learning (CELL)
Eirin Oda Lauvset, **Lawyer**	Data Protection Officer, **Asker Municipality**
Per Henning Uppstad, **Professor**	Norwegian Centre for Reading Education and Research (national centre), **University of Stavanger**
Barbara Wasson, **Professor & Director**	Department of Information Science & Media Studies, **University of Bergen** & Director, Centre for the Science of Learning & Technology (national centre)

(*Ministry of Education, Secretariat: Hilde Hultin, Jon Lanestedt, Øystein Flø Baste*)

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Teacher organisations	Utdanningsforbundet, Norsk Lektorlag, Skolenes landsforbund, Skolelederforbundet
Pupil & Student organisations	Elevorganisasjonen, Norsk studentorganisasjon, Organisasjon for Norske Fagskolestudenter
Municipalities	Asker, Lillestrøm, Lørenskog, Oslo, Surnadal (IKT-ORKidé-samarbeidet), Voss, Møre og Romsdal, Vestfold og Telemark, Vestland og KS
Universities and Colleges	Norges miljø- og biovitenskapelige universitet (NMBU), Norges teknisk-naturvitenskapelige universitet (NTNU), Samisk høgskole, Universitetet i Bergen, Universitetet i Oslo, Universitetet i Stavanger, Universitetet i Sørøst-Norge og UiT Norges arktiske universitet
EdTech suppliers, sellers, and industry organisations	BS Undervisning, Cappelen Damm, Cyberbook, Conexus, Disputas, Fagbokforlaget, Gyldendal, Hypatia, Kikora, LearnLab og IKT-Norge
Legal group	Jon Christian Fløysvik Nordrum, Mona Naomi Lintvedt, Sebastian Schwemer, Emily Weitzenboeck, Malgorzata Cyndecka og Trude Haugli
Others	Sametinget

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https://laringsanalyse.no/

Learning Analytics - Some Central Dilemmas

Midway Report

1 June 2022

SLATE

FOUR DILEMMAS

Dilemma 1: The need for information vs The need for data protection

Dilemma 2: Learning as an Individualised process vs Social process

Dilemma 3: Centralisation vs Autonomy

Dilemma 4: Competence Needs vs Competence Reality

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LEARNING ANALYTICS – SOME CENTRAL DILEMMAS

Legal Issues (17 pages!)

GDPR +
National Education Laws

1. Anonymised data and personal information
2. Legal basis for processing personal data
3. The Constitution and the European Convention on Human Rights the convention (ECHR)
4. The Personal Data Protection Regulation and the main legal basis
5. The Personal Data Protection Regulation and other legal bases
6. Special categories of personal data and secondary use
7. Reuse of personal data for new purposes
8. Minimising risk
9. Built-in privacy protection
10. Development of certification and behavioural norms
11. Assessment of privacy consequences and reduction of high risk
12. Data subjects' rights and participation
13. Processing and storage of personal data in third countries
14. Regulation of individual automated decisions
15. The Procurement Act and the purchase of digital resources

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Learning, where did you go in all the hustle and bustle?

Use of pupil and student data to promote learning

NOU (Norwegian Public Report)

6 June 2023

- Pedagogical
- Legal
- Ethical
- Infrastructure & Support
- Competence needs

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THE POLITICS OF AI IN EDUCATION

Anja Salzmann, SLATE postdoc

Who decides which AI systems are implemented in educational contexts?

Who is responsible if systems do not work in a social context as imagined or are applied differently/if sensitive educational data is mis- or re-used?

How to **ensure, that data of risk groups are protected** from the ruling digital business model (ad-tech industry) and other third parties?

How **can we trust** complex technology that is poorly understood?

How do we ensure that highly complex and advanced systems are **safe, fair, robust** and most importantly: *desirable*?'

Who has access to educational data and who decides/owns the data infrastructures?

How do we ensure that strengths and weaknesses of AI are thoroughly **understood** by all stakeholders?

Under which circumstances and in which contexts does the use of AI or digital technology in education **improve or hinder learning**?

SUMMARY:
MY REFLECTIONS

IT IS COMPLICATED



AI is a **complex socio-technical artefact** that must be understood as something constructed through complex social processes.

(Eynon & Young, 2021)

humans – technology - in a context

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ARTIFICIAL INTELLIGENCE IS NOT JUST CHATGPT!

SLATE

6 **Plethora of AI techniques and tools used in education**

AI in Education is HIGH RISK (AI ACT)

Great need for appropriate, robust regulation, addressing human and children's rights

Need for national digital infrastructure, data management, standards & common solutions, environmental concerns

Demand for competence development

More research funding for impact of AI in education

NEED RESEARCH-BASED AI FOR EDUCATION

PEDAGOGICAL INNOVATION IS NECESSARY

ASSESSMENT INNOVATION IS NECESSARY

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We need multidisciplinary approaches, bringing together educators, learners and parents, learning scientists and philosophers, computer scientists and AI engineers, commercial developers and governments – to insure impactful, reliable, safe, and desired AI for education.

SLATE

THANK YOU!

SLATE

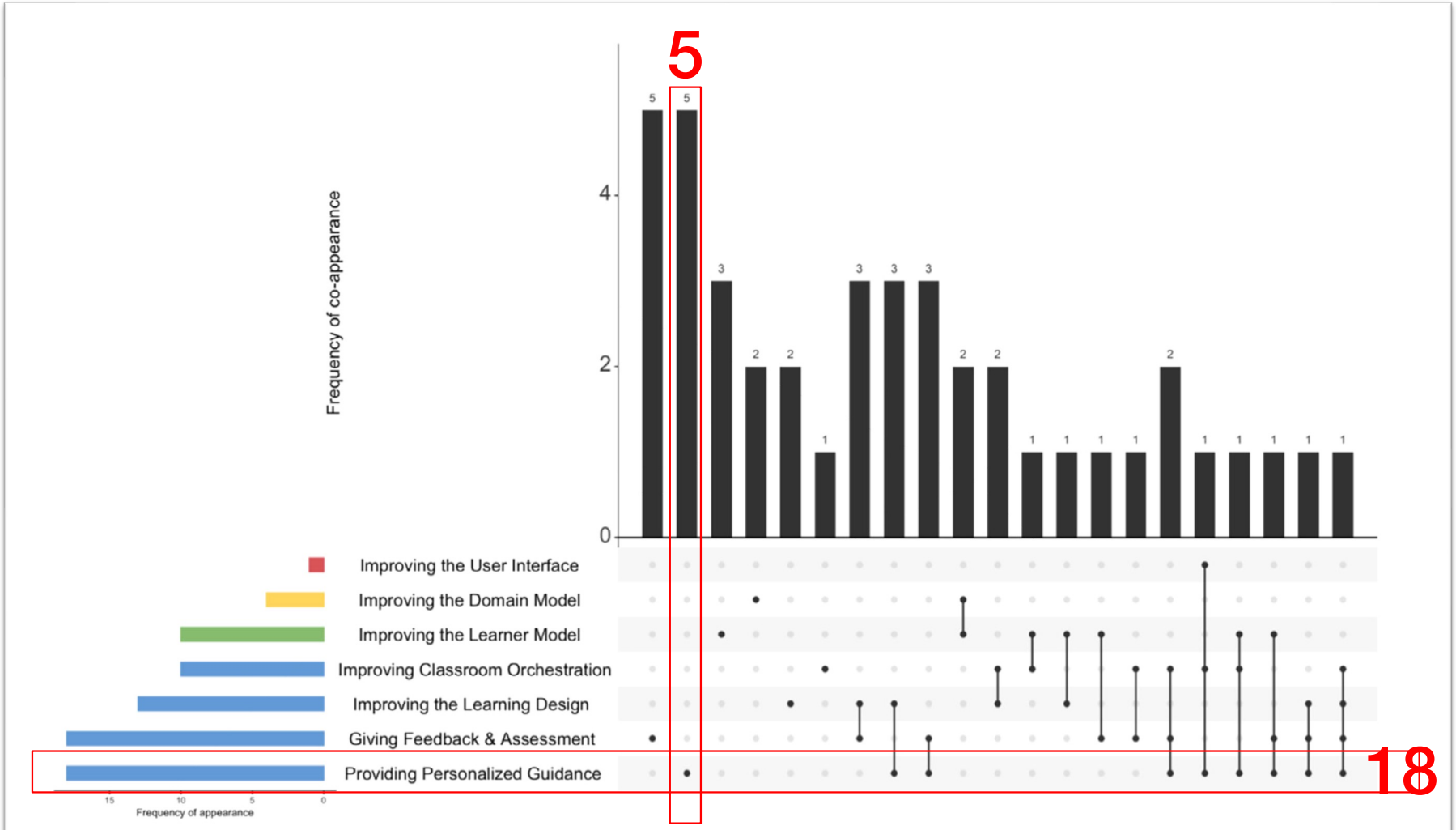


FIGURE 5 Purpose of displaying information to teachers. The left side shows the number of papers coded with a specific purpose, where the colours represent different purposes. Improving Instruction has several subcategories represented in blue. The right side shows the number of papers coded with a specific combination of purposes.