SLATE
Centre for the Science
of Learning & Technology

Implementing Learning Analytics

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Director, Centre for the Science of Learning & Technology

http://slate.uib.no

CELDA, 20 October 2023


THE WORLD
POLITICAL
ARCTIC OCEAN
NORTH ATLANTIC OCEAN
PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
INDIAN OCEAN
SOUTHERN OCEAN
CANADA
UNITED STATES
MEXICO
BRAZIL
RUSSIA
CHINA
INDIA
AUSTRALIA
INDONESIA
NEW ZEALAND
JAPAN
MONGOLIA
KAZAKHSTAN
ALGERIA
LIBYA
EGYPT
SAUDI ARABIA
IRAN
IRAQ
TURKEY
FRANCE
GERMANY
SPAIN
ITALY
UNITED KINGDOM
SWEDEN
NORWAY
FINLAND
POLAND
ARGENTINA
CHILE
PERU
COLOMBIA
VENEZUELA
SOUTH AFRICA
NIGERIA
ETHIOPIA
KENYA
SUDAN
CHAD
NIGER
MALI
MAURITANIA
MOROCCO
PHILIPPINES
MALAYSIA
THAILAND
VIETNAM
PAKISTAN
AFGHANISTAN
GREENLAND (KALAALLIT NUNAAT)
ICELAND
CUBA
JAMAICA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
GUATEMALA
EL SALVADOR
BOLIVIA
PARAGUAY
URUGUAY
ECUADOR
KIRIBATI
FIJI
TONGA
SAMOA
PAPUA NEW GUINEA
FEDERATED STATES OF MICRONESIA
MARSHALL ISLANDS
PALAU
TUVALU
VANUATU
SOLOMON ISLANDS
NEW CALEDONIA
SRI LANKA
MADAGASCAR
ANGOLA
ZAMBIA
ZIMBABWE
MOZAMBIQUE
NAMIBIA
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UGANDA
SOMALIA
YEMEN
OMAN
SYRIA
UKRAINE
BELARUS
ROMANIA
BULGARIA
GREECE
PORTUGAL
IRELAND
NETHERLANDS
BELGIUM
DENMARK
SWITZERLAND
AUSTRIA
HUNGARY
CZECH REPUBLIC
SLOVAKIA
SLOVENIA
CROATIA
SERBIA
BOSNIA
ALBANIA
MACEDONIA
GEORGIA
ARMENIA
AZERBAIJAN
UZBEKISTAN
TURKMENISTAN
KYRGYZSTAN
TAJIKISTAN
MYANMAR (BURMA)
LAOS
CAMBODIA
NORTH KOREA
SOUTH KOREA
TAIWAN
BRUNEI
SINGAPORE
EAST TIMOR
MAURITIUS
SEYCHELLES
COMOROS
SWAZILAND
LESOTHO
NAMIBIA
GABON
CAMEROON
CENTRAL AFRICAN REPUBLIC
DEMOCRATIC REPUBLIC OF THE CONGO
CONGO
GUINEA
SIERRA LEONE
LIBERIA
IVORY COAST
GHANA
TOGO
BENIN
BURKINA FASO
SENEGAL
THE GAMBIA
GUINEA-BISSAU
CAPE VERDE
SAO TOME AND PRINCIPE
EQUATORIAL GUINEA
BAHAMAS
DOMINICAN REPUBLIC
HAITI
ST KITTS & NEVIS
ANTIGUA & BARBUDA
DOMINICA
ST LUCIA
GRENADA
ST VINCENT & THE GRENADINES
BARBADOS
TRINIDAD & TOBAGO
GUYANA
SURINAME
FRENCH GUIANA
Mumbai
Istanbul
Toronto
Birmingham
Vigo
Cork
Tromsø
over 10m
5-10m
1-5m
250,000 - 1,000,000
100,000 - 250,000
Less than 100,000
National capitals are shown in CAPS.
Administered by or belonging to
International boundary
State boundary
Disputed/Undefined boundary
Major railway
Highest peak in continent
Highest peak in country
Other peak
Depth figure
International Date Line


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Bodo
Arctic Circle
FINLAND
SWEDEN
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NORWAY
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Bergen
Oslo
Helsinki
Stockholm
Tallinn
Stavanger
Kristiansand

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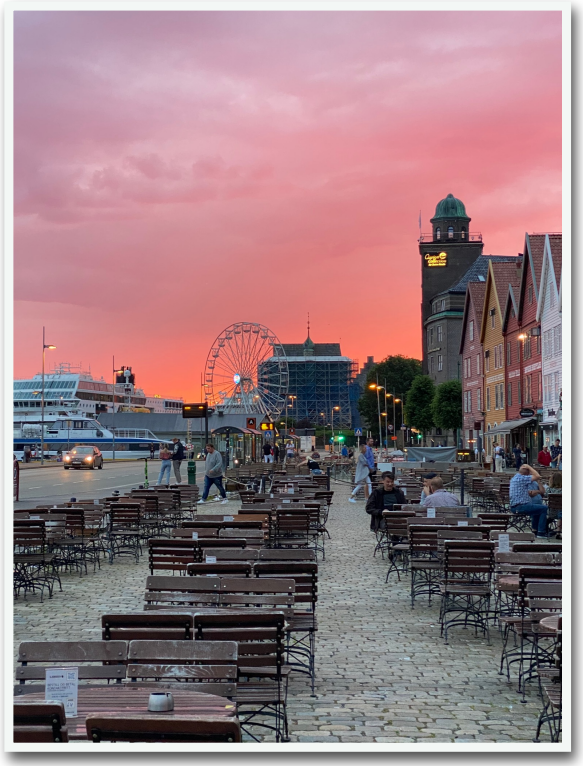
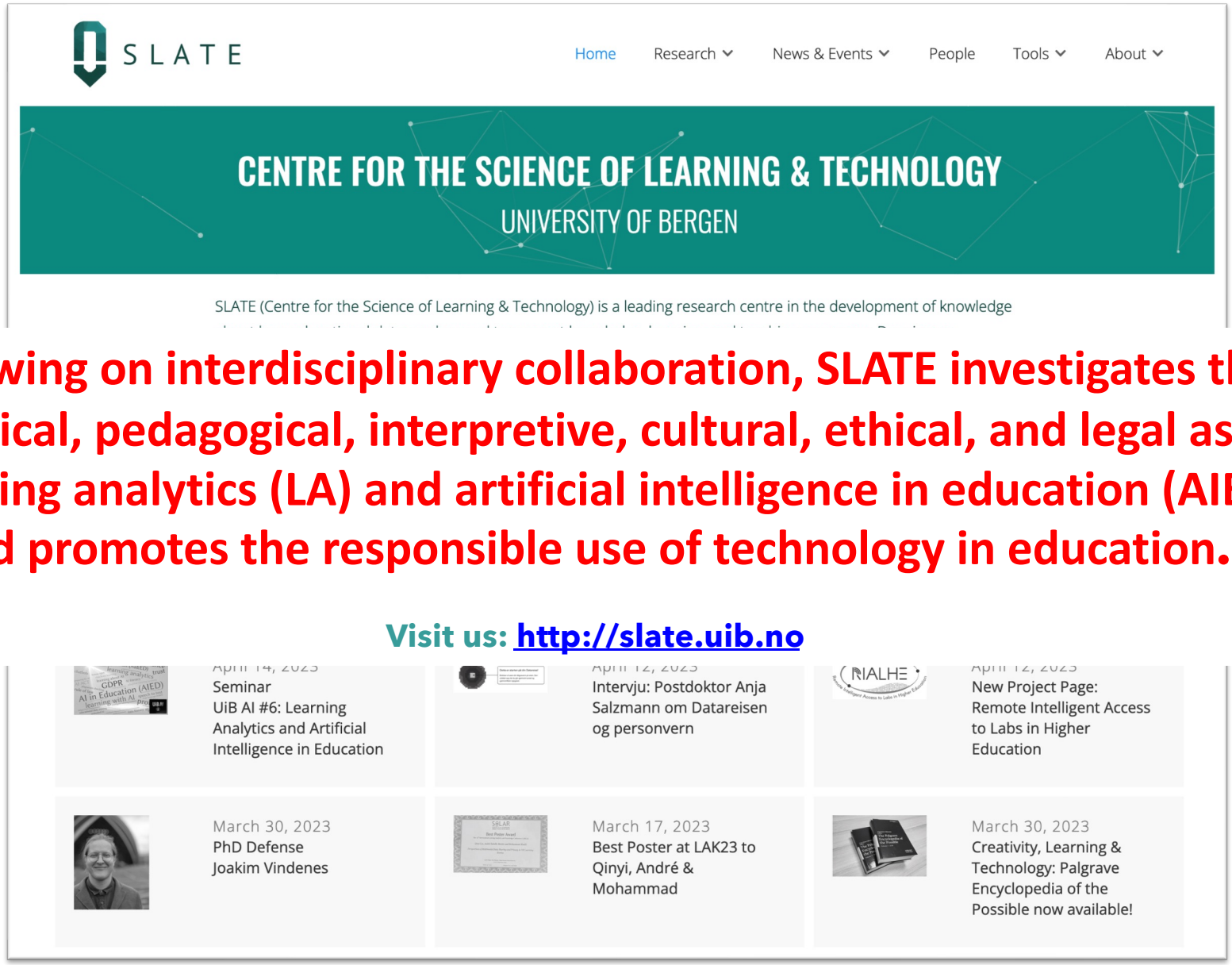


University of Bergen

PEPPERKAKEBYEN
(Gingerbread City)

2016
Ministry
of
Educaton
& 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.

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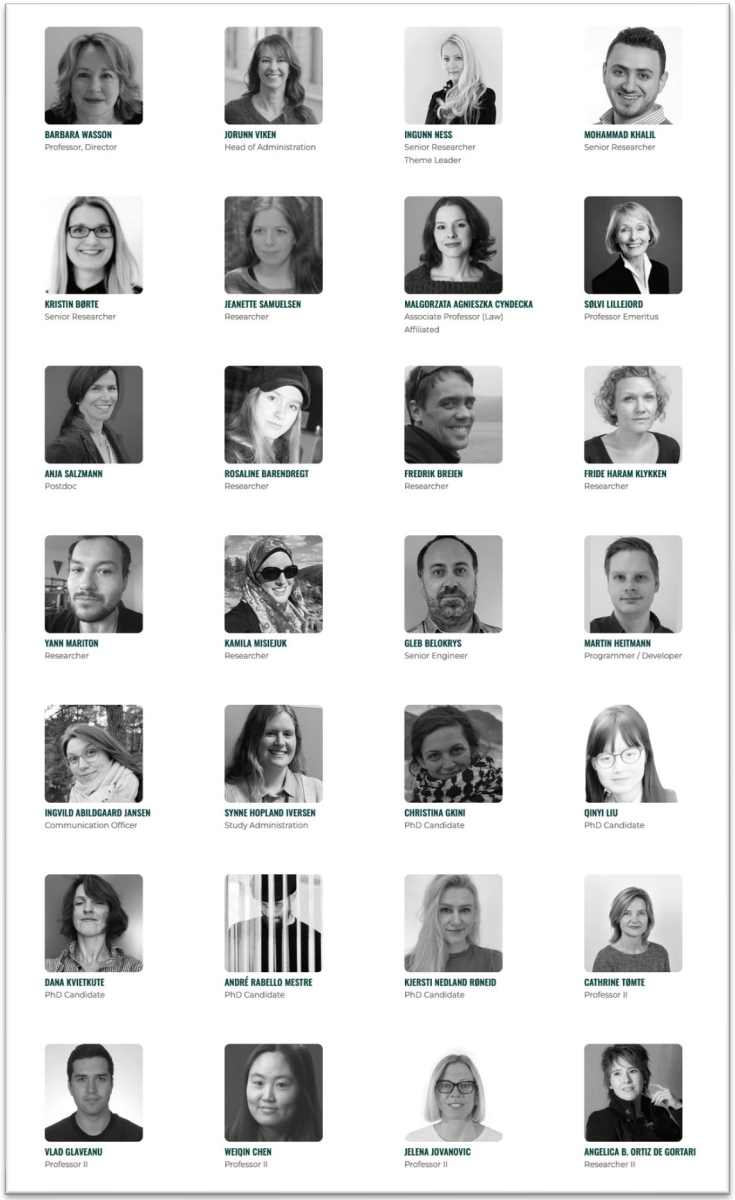

1 Professor + 1 Emeritus (hiring 1 professor)
8 Researchers
1 Postdoc (hiring 2)
1 Associate Professor (announcing soon)
5 PhD fellows (5 defended i 2023)
Admin leader
Study Administrator
2 Senior Developers
Communications (50%)
5 Professor II
Affiliated Faculty

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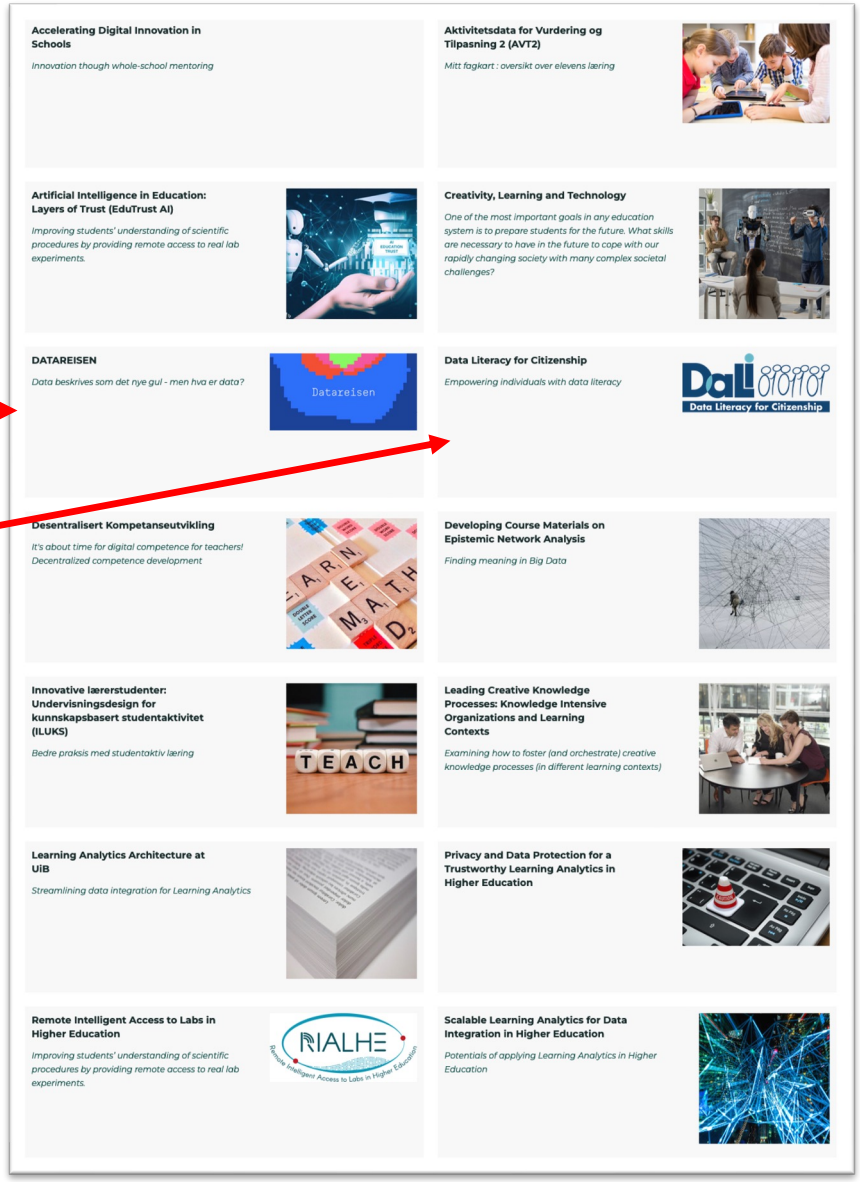
Artificial Intelligence in Education: Layers of Trust (EduTrust AI)

DATAREISEN (datareisen.no)

DALI (dalicitizens.eu)



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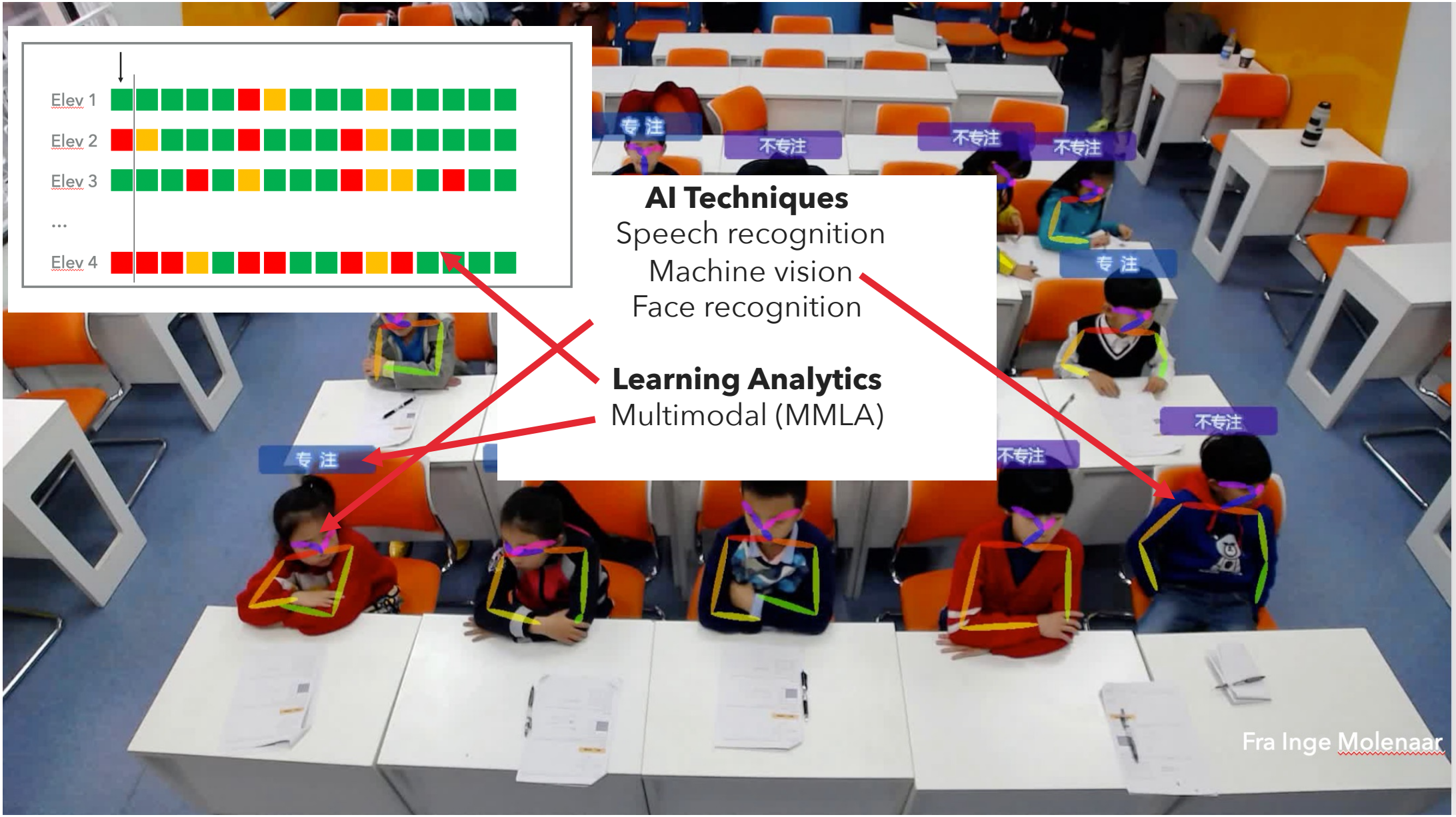
Enthusiastic children **calling out English words** at a screen where there is a space ship that moves towards overtaking another planet **IF the pronunciation is almost correct**. A **virtual English teacher** is leading them from the screen through this exciting game while a teacher in the classroom helps individual students who need more help. **In daily use in China!**



AI Techniques

Speech recognition

Machine vision

Face recognition

Learning Analytics

Multimodal (MMLA)

AR LUMILO GLASSES

https://kenholstein.myportfolio.com/the-lumilo-project

What data is being collected?

Surveillence?

Data protection?

Legal?

Ethical?

Cultural?

Responsible Use?

AGENDA

- Learning Analytics
- AVT project: Implementing LA in Norway
- Norwegian Expert Commission report
- Norwegian Expert Commission NOU

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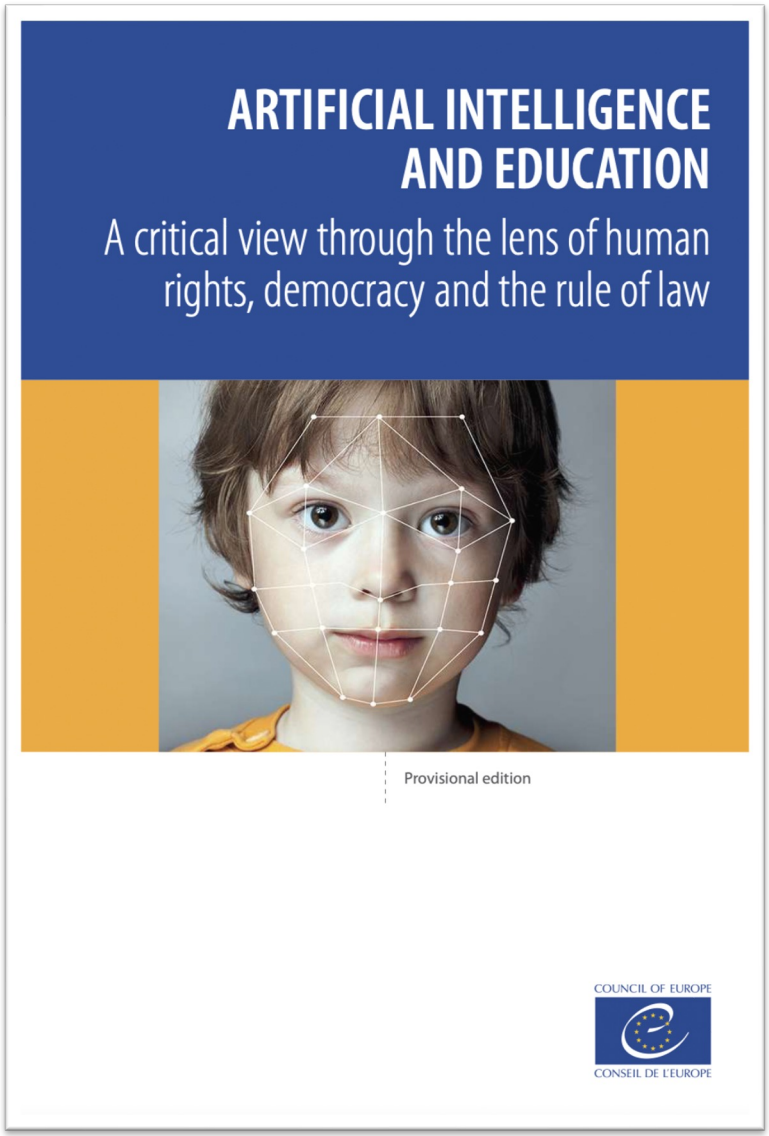
AI, LA, AND EDUCATION



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

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

AI Literacy:
Technical dimension

Learning with AI

Preparing for AI
(Literacy)

Learning about AI
(Literacy)

AI Literacy:
Human dimension

Learning Analytics

Using AI to learn
about learning

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"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)

"THE USE OF STATIC AND DYNAMIC INFORMATION ABOUT LEARNERS AND LEARNING ENVIRONMENTS, ASSESSING, ELICITING AND ANALYSING IT, FOR REAL-TIME MODELLING, PREDICTION AND OPTIMISATION OF LEARNING PROCESSES, LEARNING ENVIRONMENTS, AS WELL AS EDUCATIONAL DECISION-MAKING" 1ST INTERNATIONAL CONFERENCE ON LEARNING ANALYTICS & KNOWLEDGE

Dirk Ifenthaler (2015)

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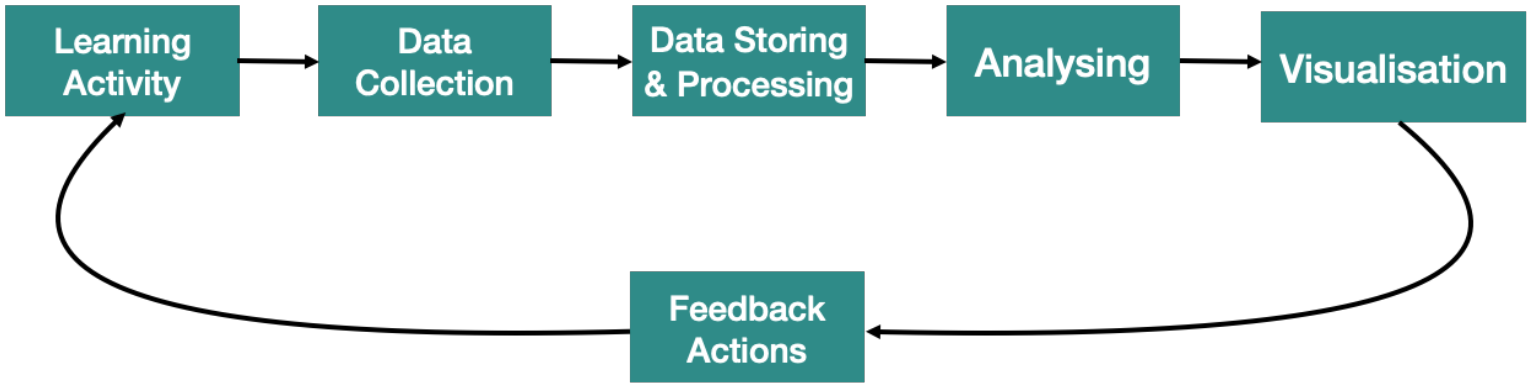
LA PROCESS (LIFECYCLE)



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STAKEHOLDERS

LEARNERS & TEACHERS / INSTRUCTORS / TUTORS / ASSISTANTS

EDUCATIONAL LEADERS

INSTITUTIONS / SCHOOLS

POLICY MAKERS

RESEARCHERS

PARENTS /GUARDIANS

EDTECH DEVELOPERS

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WHAT

Patterns

- Insights into trends (e.g., difficult concepts / courses)
- Engagement, motivation, interactions, networks
- Understanding learning strategies and paths

Prediction

- Trends (dropouts, success)
- Early warning > early interventions (failure/retention)
- Final grades

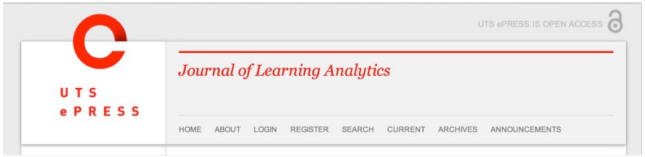
Recommendations

- Adaptive systems
- Individualised feedback / Group (cluster) feedback
- Pedagogical resourse / activities
- Courses / Curriculum redesign / Learning design

SOCIETY for LEARNING ANALYTICS RESEARCH

https://solaresearch.org/

2014



SIGS

LACE

LEARNING ANALYTICS COMMUNITY EUROPE

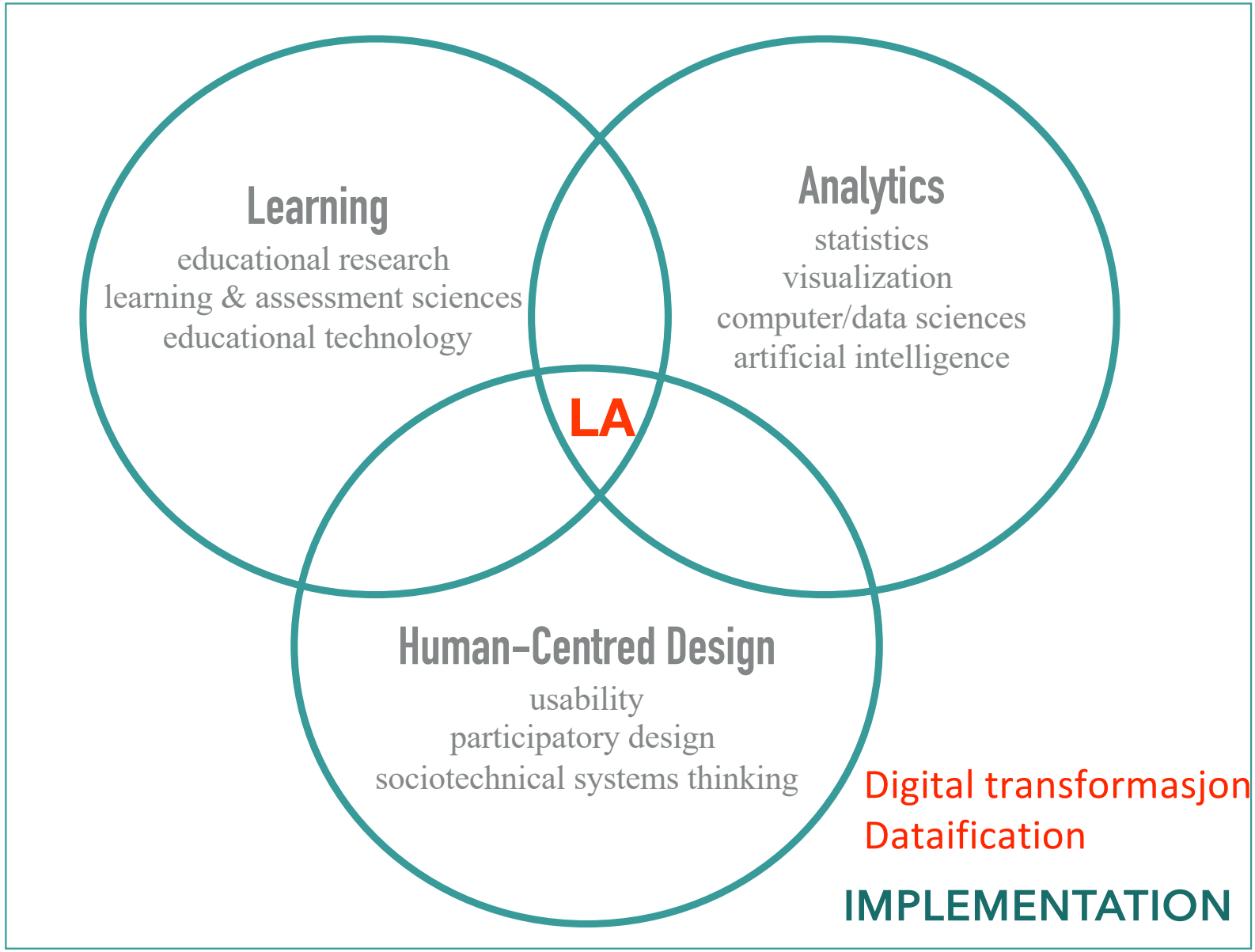
LOCAL LASIs

LASI Spain

Nordic LASI

LASI Germany

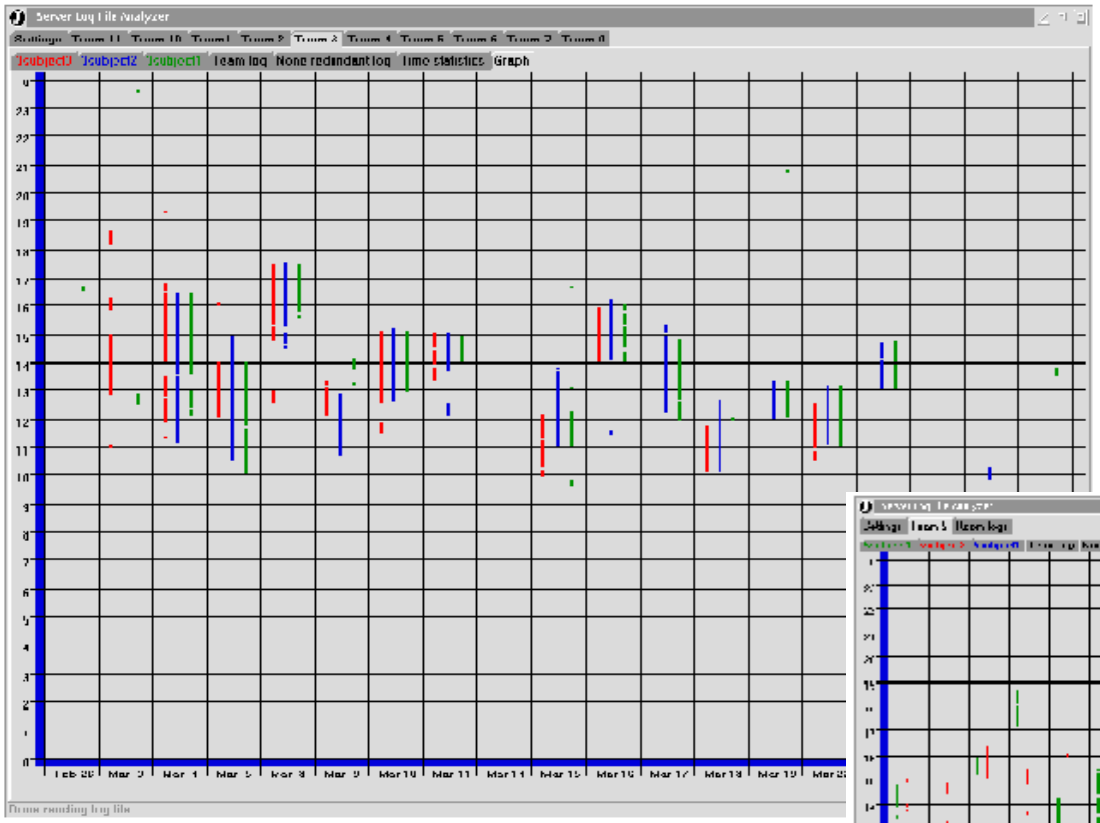
LASI EUROPE 23

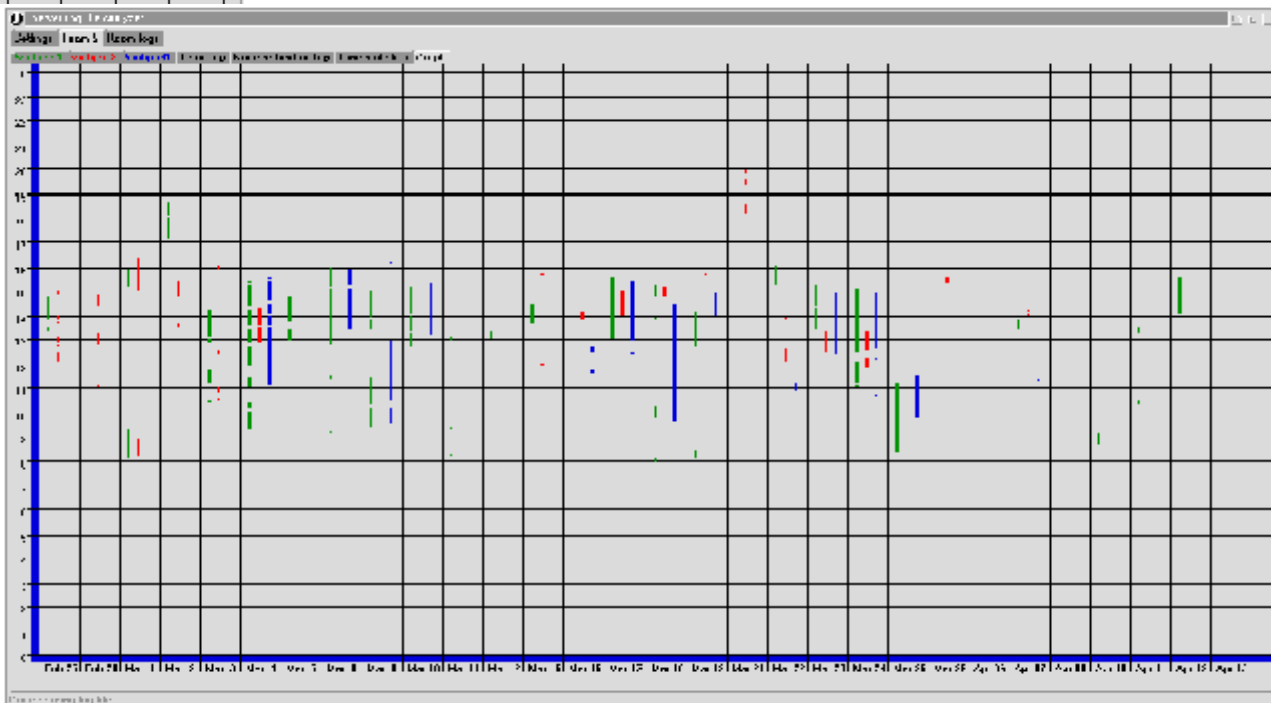


SOLAR
SOCIETY for LEARNING ANALYTICS RESEARCH

KEY USES OF LEARNING ANALYTICS (SOLAR)

1. Supporting student development of lifelong learning skills and strategies
2. Provision of personalised and timely feedback to students regarding their learning
3. Supporting development of important skills such as collaboration, critical thinking, communication and creativity
4. Develop student awareness by supporting self-reflection
5. Support quality learning and teaching by providing empirical evidence on the success of pedagogical innovations





LA Dashboard (Researchers)

Meistad, Ø. & Wasson, B. (2000). Supporting Collaborative **Telelearning** Research using **Server Logs**. In Proceedings of ED-MEDIA 2000--World Conference on Educational Multimedia, Hypermedia & Telecommunications (pp. 714-719). Montreal, Canada: AACE. BEST PAPER

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

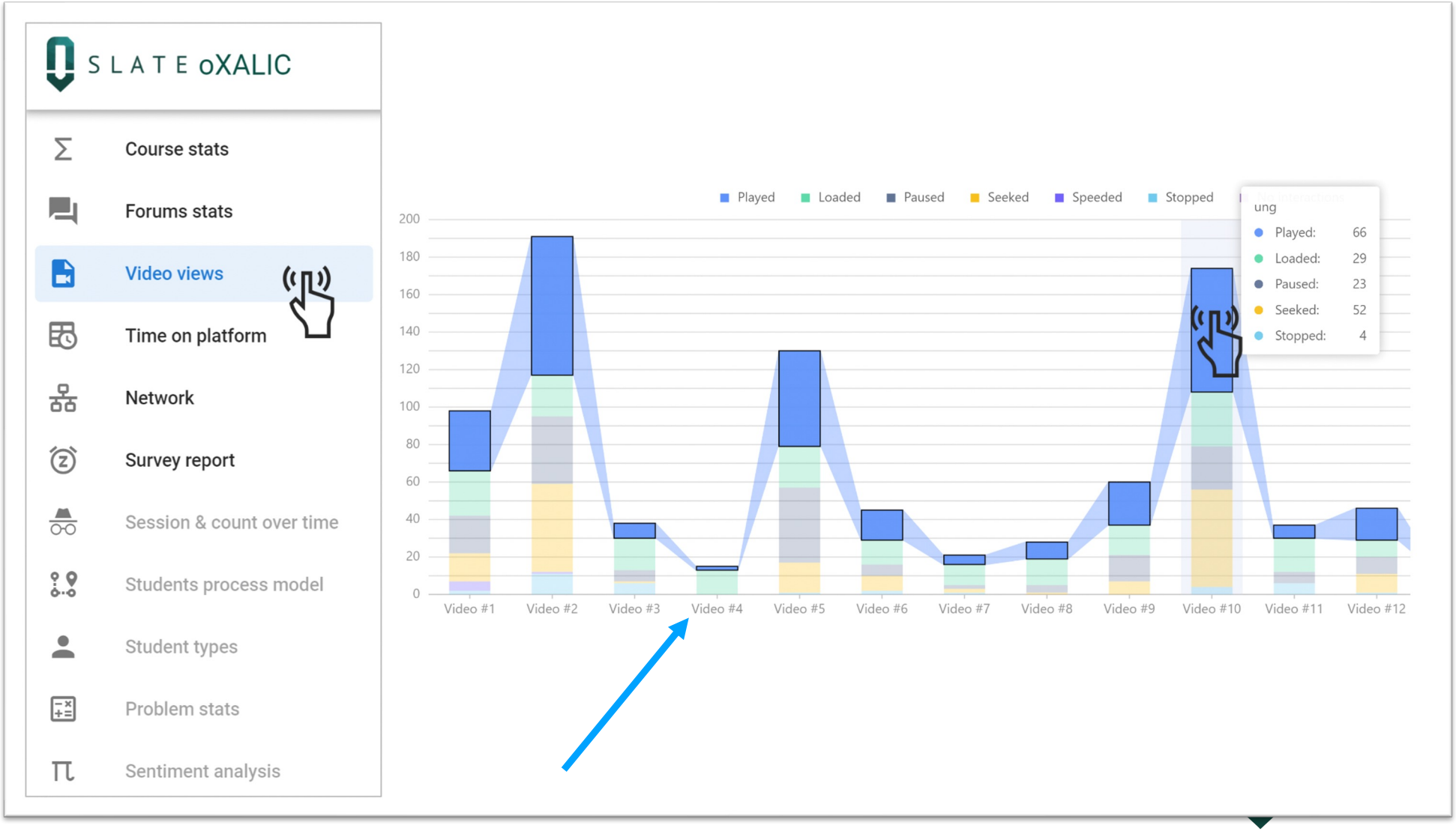
12 Hypothesis Formation - Low

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

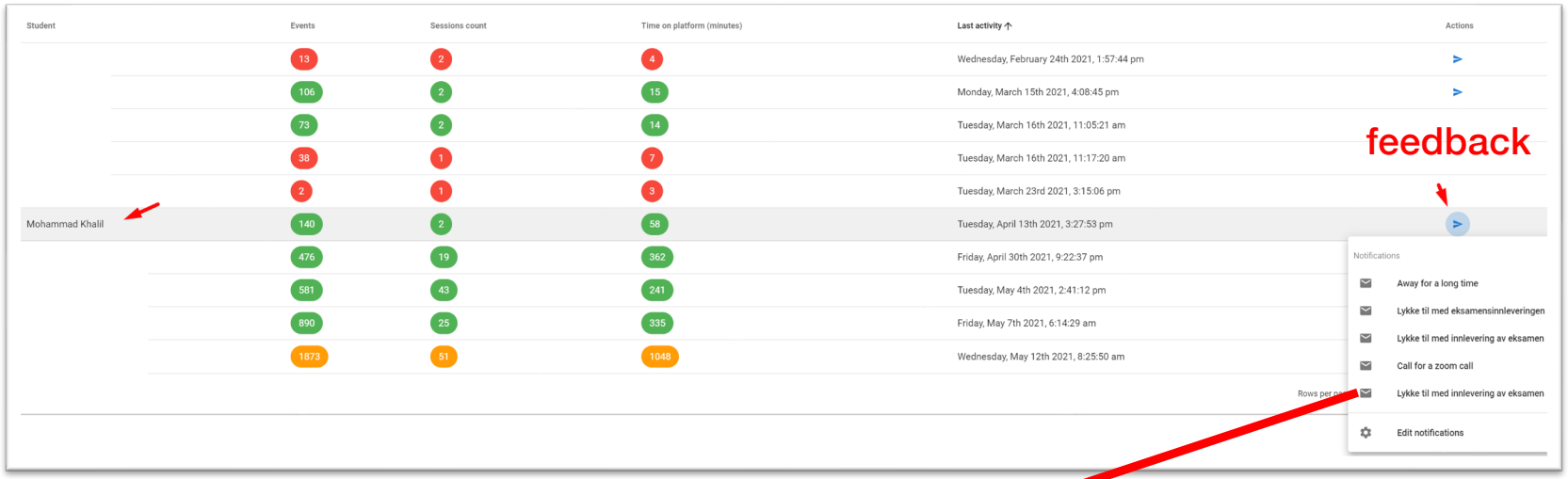
Teacher has full control

Mohammad Khalil & Gleb Belokrys



Partial automation

OXALIC



LA Feedback (Teacher --> Student)

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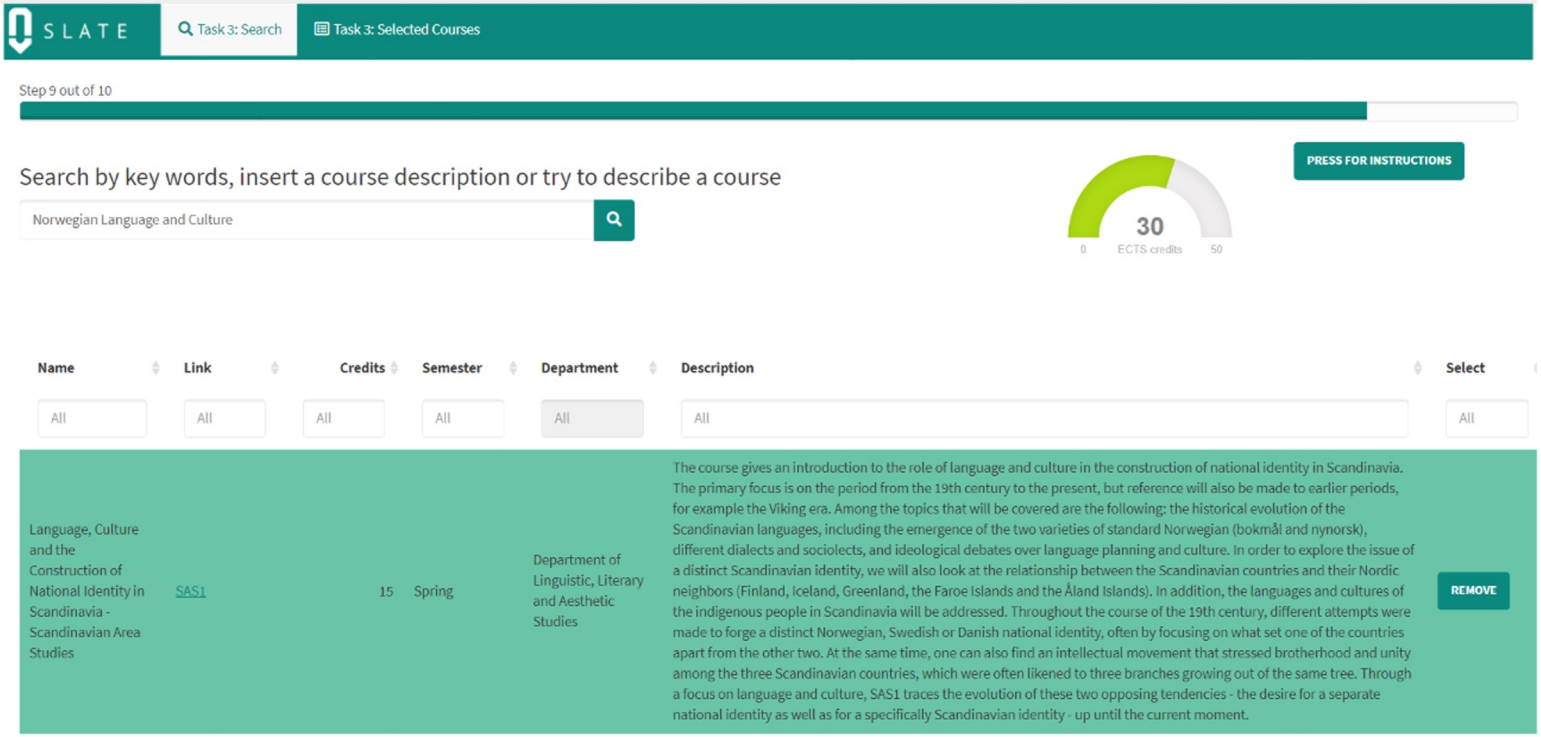
Course Recommendation System for Exchange Students



Suschevskiy & Khalil (2021)

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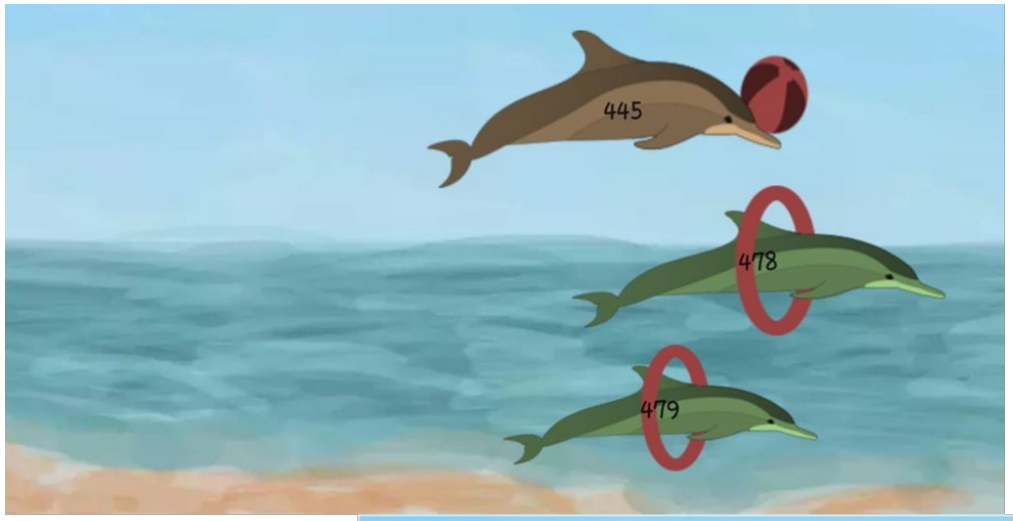
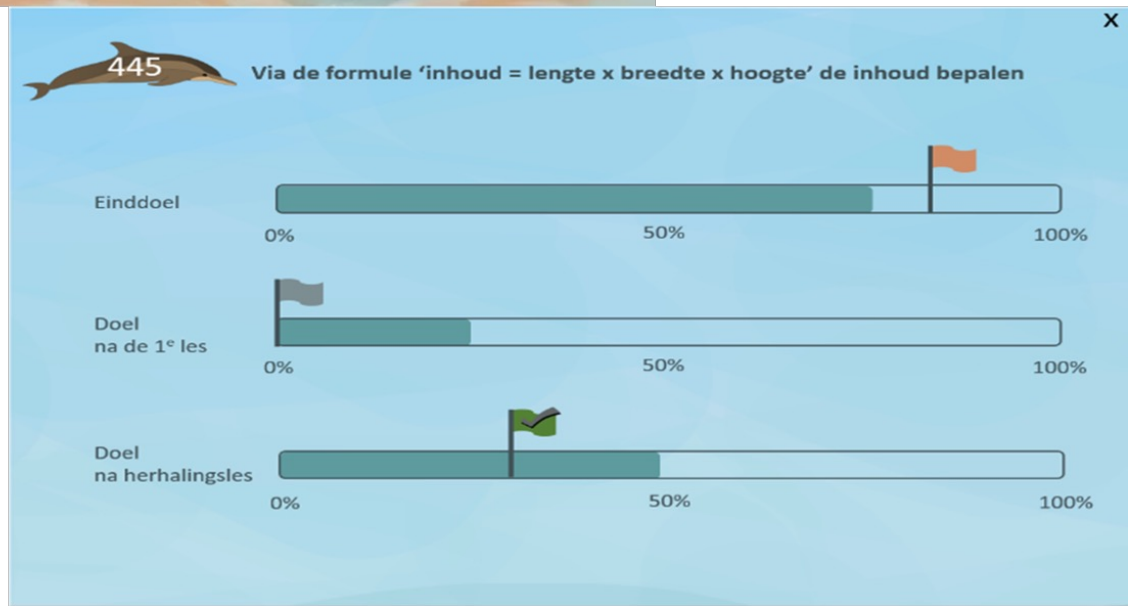


LA Dashboard (Student)



Molenaar, Horvers, Dijkstra, Baker (2020)

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CHINESE NATIONAL ASSESSMENT CENTRE FOR EDUCATION QUALITY
NATIONAL OVERVIEW

LA Dashboard (National)

CHINESE NATIONAL ASSESSMENT CENTRE FOR EDUCATION QUALITY
REGIONAL ZOOM

LA Dashboard (Regional)

AVT PROJECT

ACTIVITY DATA FOR ASSESSMENT & ADAPTATION

AVT: Activity Data for Assessment and Adaptation

AVT1 (2017 – 2019); AT2 (2019 - 2024)

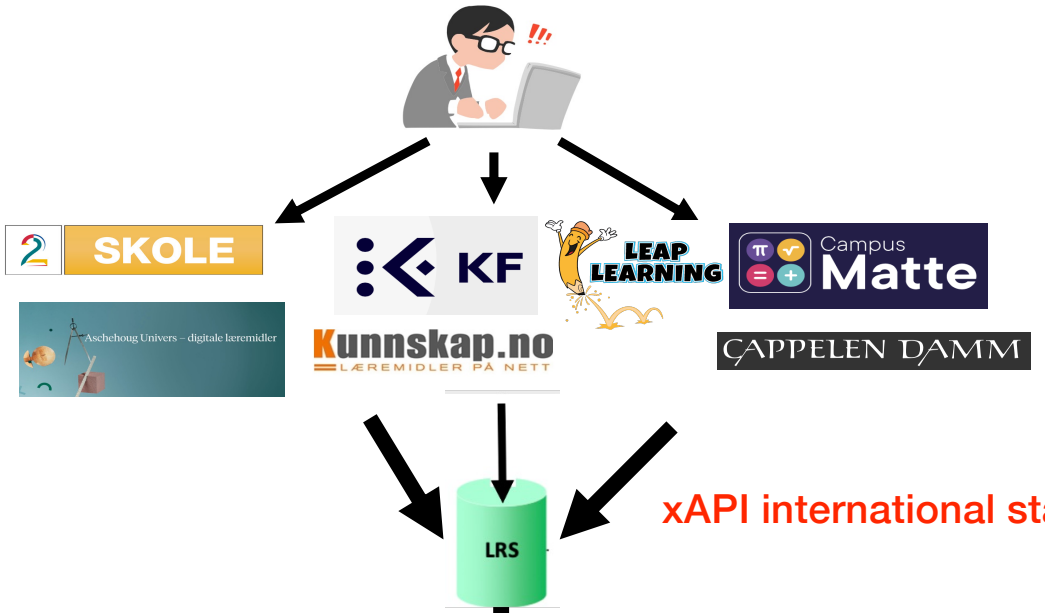
AVT is an R&D project that identifies opportunities and highlights challenges that the education sector faces when it comes to the use of student activity data in learning analytics.

The most important objectives:

- Analyse student activity data across different tools (i.e. various providers)
- Support teachers in adapting teaching and assessment work
- Suggest relevant content that the student can work on

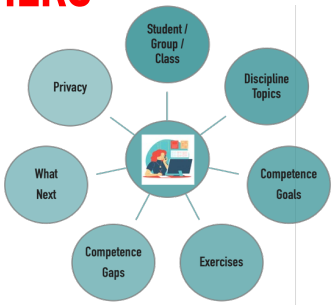
2022 35 schools
13 EdTech vendors

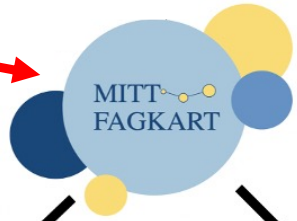
KS Oslo SLATE

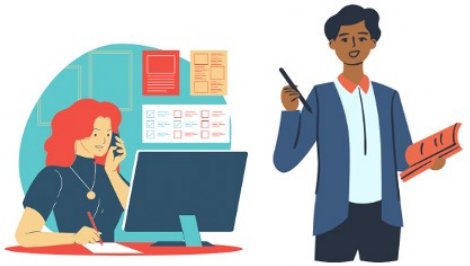


xAPI international standard for activity data

12 TEACHERS







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AVT ACTIVITY DATA (GITTHUB)

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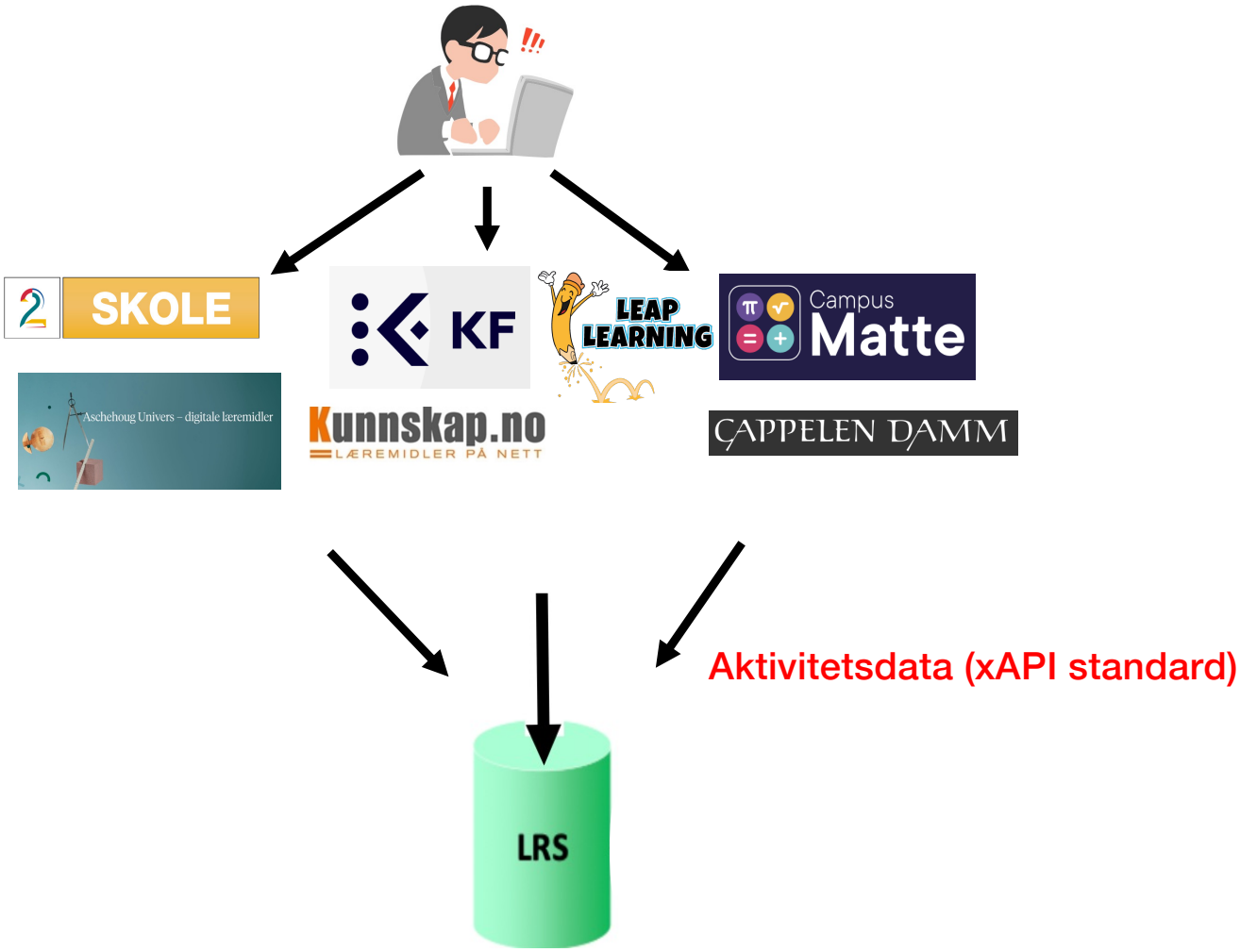
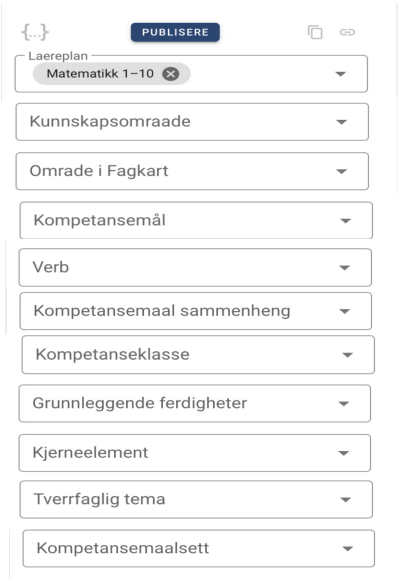

SKOLE
KF
LEAP LEARNING
Campus Matte
Aschehoug Univers – digitale læremidler
Kunnskap.no
LÆREMIDLER PÅ NETT
CAPPELEN DAMM
LRS
Aktivitetsdata (xAPI standard)

ACTIVITY DATA (xAPI)

- **Feideindikatoren** (used to tie a learning activity to a student)
- **Feideindikatoren** for school owner, school, client (vendor)
- **tag** that ties learning activity to a domain reference model (fagkart)
- **oppgave-id**
- **svar på oppgaver**
- **hints brukt**
- **success (**right or wrong answer)
- **score (min, max, raw, scaled)**
- **tidsstempel på startet oppgave**
- **tidsstempel på avsluttet oppgave**
- **oppgavetype**



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Towards Learning Analytics Scalability:
Enriching Context Descriptions Across Data Sources

Jeanette Samuelsen

Thesis for the degree of Philosophiae Doctor (PhD)
At the University of Bergen

2023

SCALABILITY, MULTIPLE DATA SOURCES

DATA INTEGRATION, INTEROPERABILITY

STANDARDS (XAPI)

Samuelsen, J., Chen, W., & Wasson, B. (submitted). Implementing enriched context descriptions for efficient scaling of Learning Analytics. *Journal of Learning Analytics*.

C1: Challenges identified related to LA core issues of scalability

C2: Gaps related to xAPI expressibility and conceptual solution

C3: Technical solution implemented and validated

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MITT FAGKART

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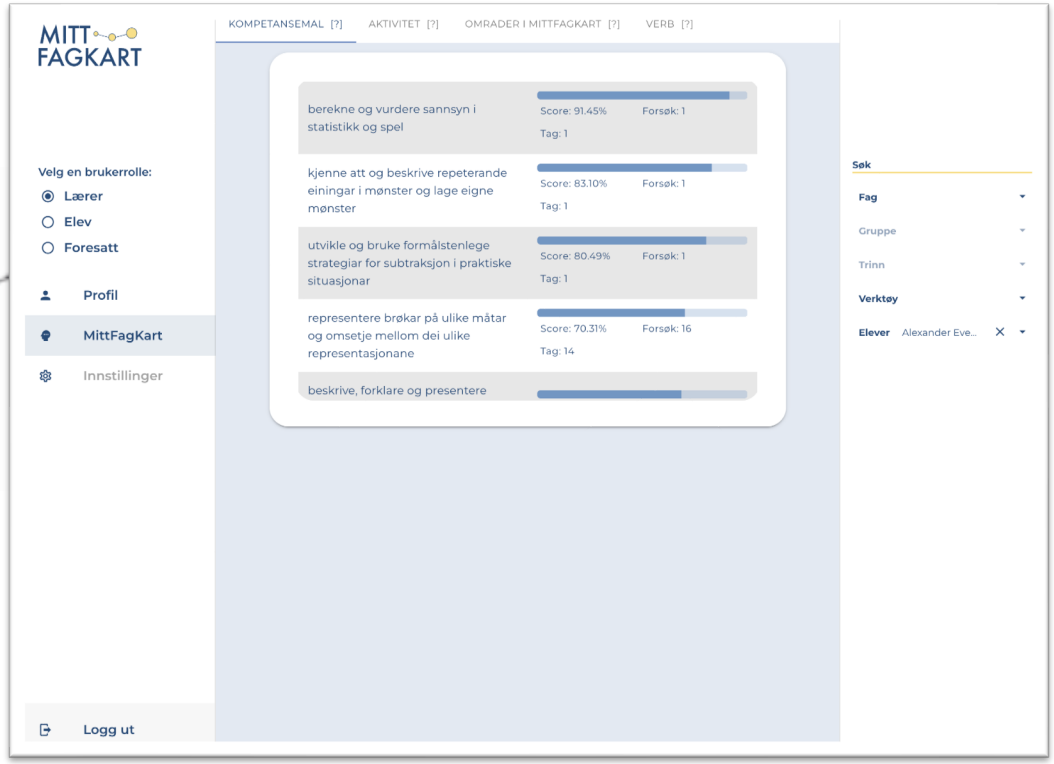
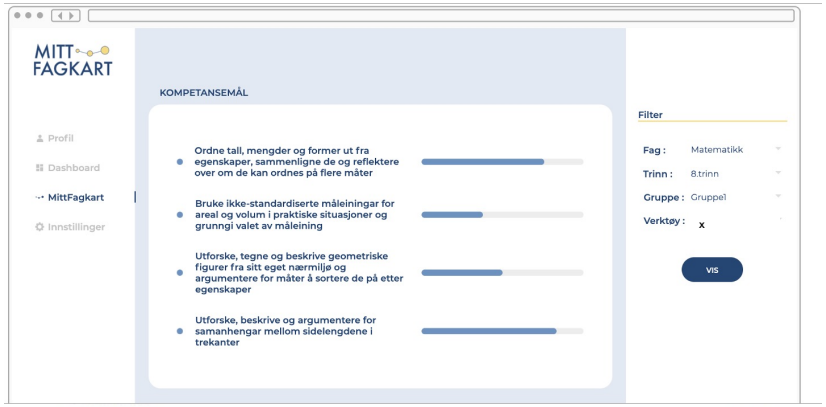
FEIDE Service: Secure login and data sharing in education and research

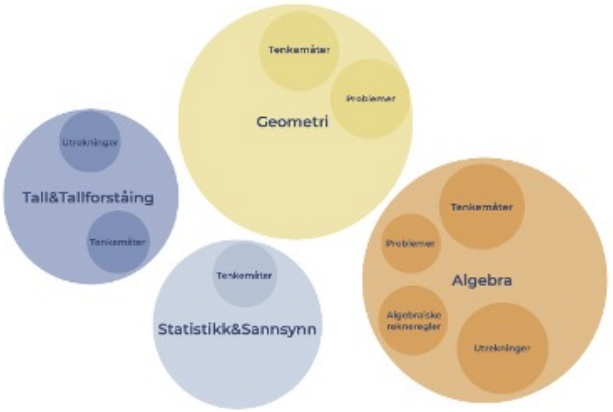
Teacher
Student
Parent



Competence goal



Knowledge area



An Open Learner Model Dashboard for Adaptive Learning

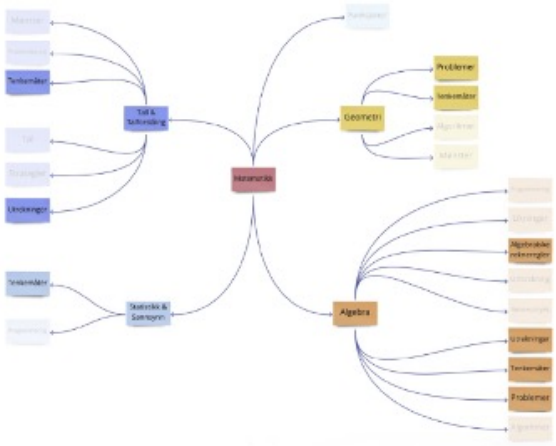
Maria Ovchinnikova
Under the advisement of Prof. Barbara Wasson

Master of Information Science
Social Science Faculty
University of Bergen

Delivery date: 01.06.2021

Verbs

Knowledge area



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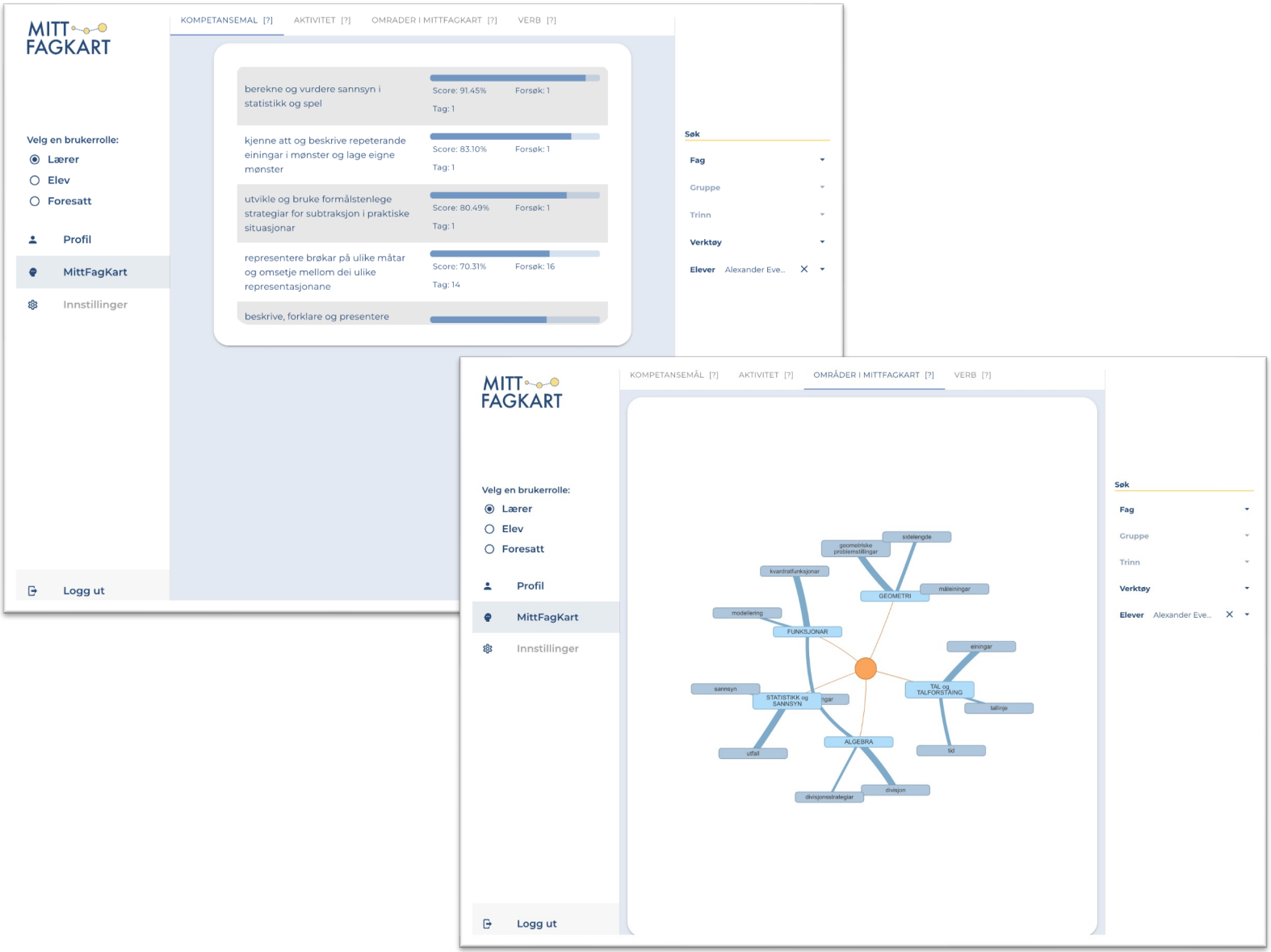
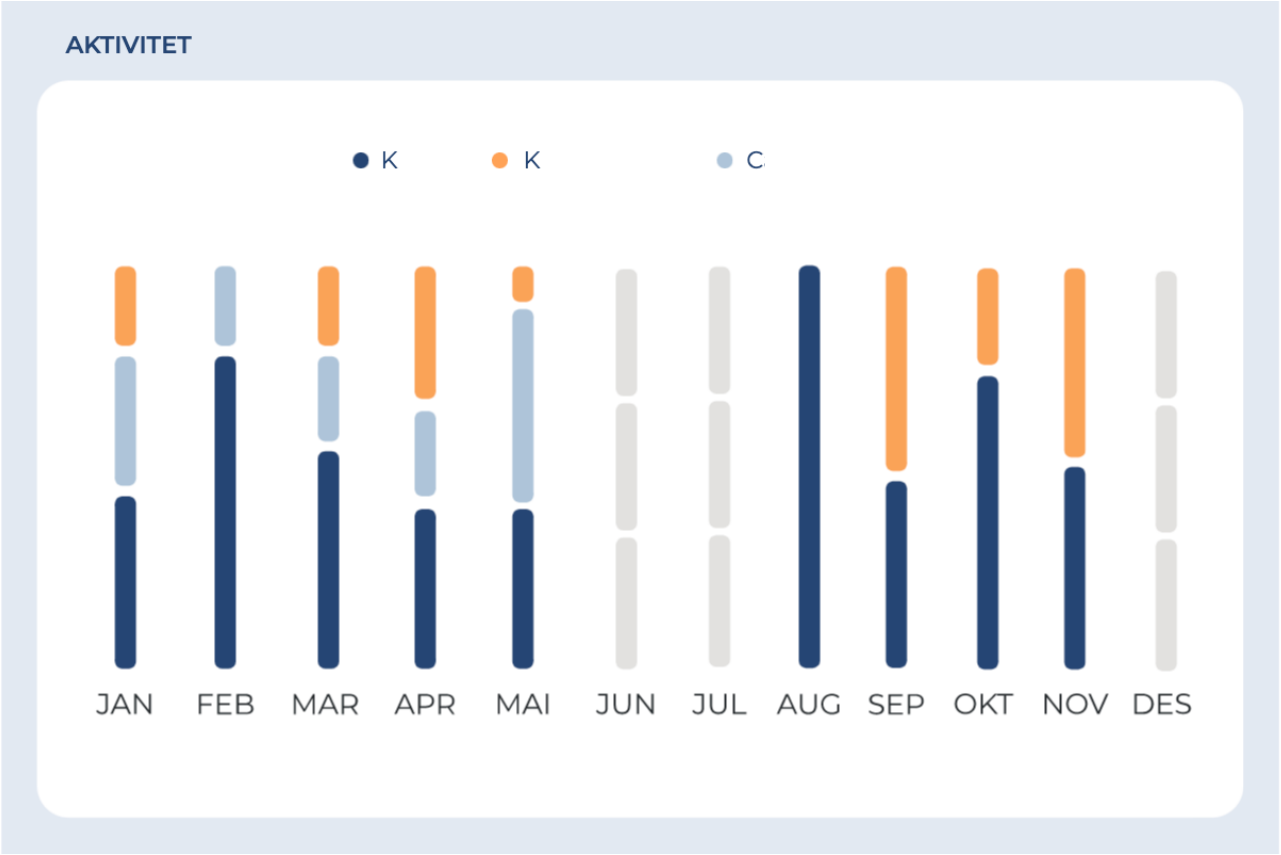

MITT FAGKART
KOMPETANSEMÅL [?]
AKTIVITET [?]
OMRÅDER I MITTFAGKART [?]
VERB [?]
berekne og vurdere sannsyn i statistikk og spel
Score: 91.45%
Forsøk: 1
Tag: 1
kjenne att og beskrive repeterande einingar i mønster og lage eigne mønster
Score: 83.10%
Forsøk: 1
Tag: 1
utvikle og bruke formålstenlege strategiar for subtraksjon i praktiske situasjonar
Score: 80.49%
Forsøk: 1
Tag: 1
representere brøkar på ulike måtar og omsetje mellom dei ulike representasjonane
Score: 70.31%
Forsøk: 16
Tag: 14
beskrive, forklare og presentere
Velg en brukerrolle:
Lærer
Elev
Foresatt
Profil
MittFagKart
Innstillinger
Logg ut
Søk
Fag
Gruppe
Trinn
Verktøy
Elever
Alexander Eve...
MITT FAGKART
KOMPETANSEMÅL [?]
AKTIVITET [?]
OMRÅDER I MITTFAGKART [?]
VERB [?]
Velg en brukerrolle:
Lærer
Elev
Foresatt
Profil
MittFagKart
Innstillinger
Logg ut
sidelengde
geometriske problemstillingar
kvadratfunksjonar
måleiningar
GEOMETRI
modellering
FUNKSJONAR
einingar
sannsyn
STATISTIKK og SANNSYN
TAL og TALFORSTÅING
tallinje
ALGEBRA
utfall
tid
divisjon
divisjonsstrategiar
Søk
Fag
Gruppe
Trinn
Verktøy
Elever
Alexander Eve...



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RECOMMENDATIONS

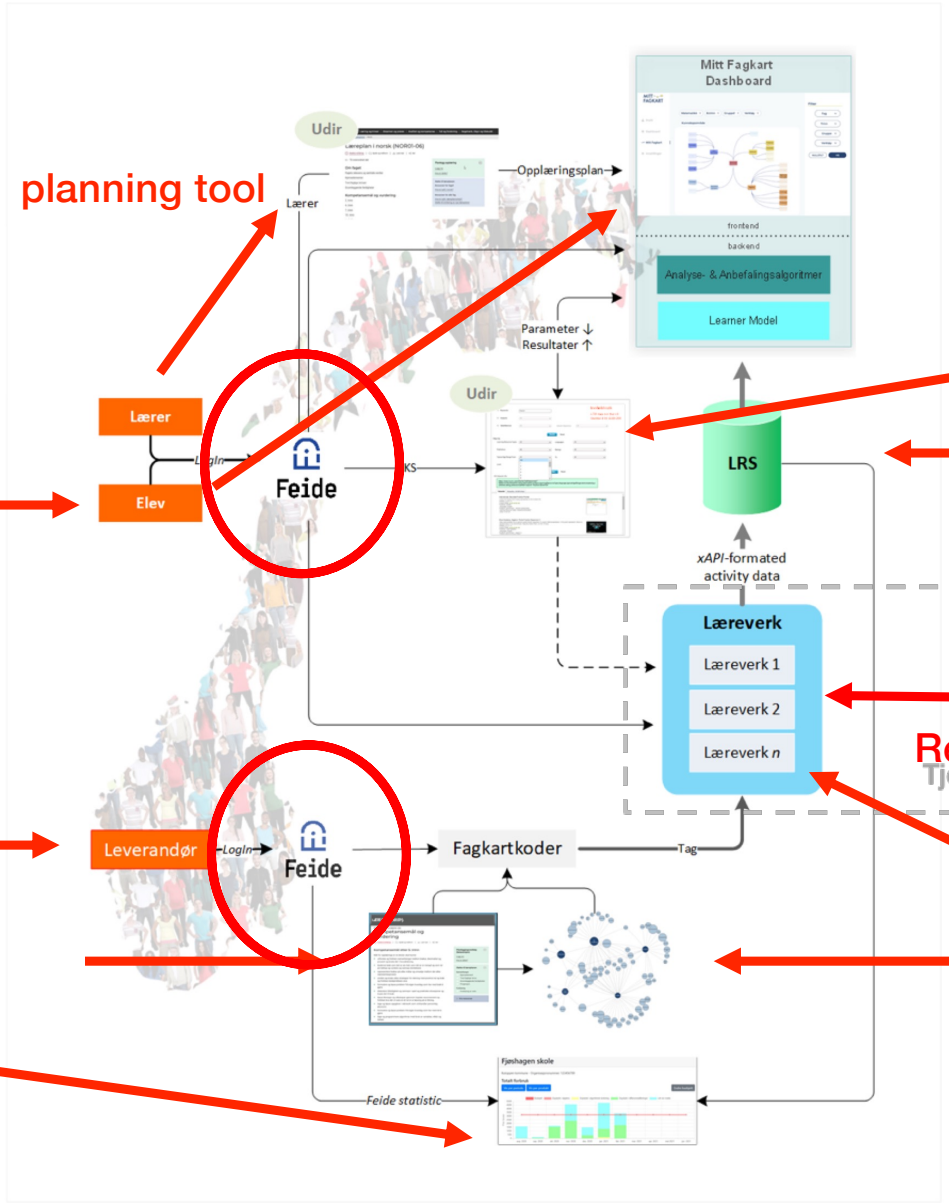
for teacher (individual / group / class level) or for a student

- Competence goal (for entire class / an individual / a group)
- Topic or theme (→ Fagkart)
- Difficult topics (e.g., 3D geometry)
- Misconceptions
- Types of tasks (f.eks. MC, video, text)
- Resources (tool x fra vendor y)
- Specific tool (Chapter 5 fra tool x from vendor y
  OR page 3 from tool xx from vendor yy)

ECO SYSTEM FOR LA

SLATE

Eco-System for Learning Analytics in the School Sector



planning tool

search tool

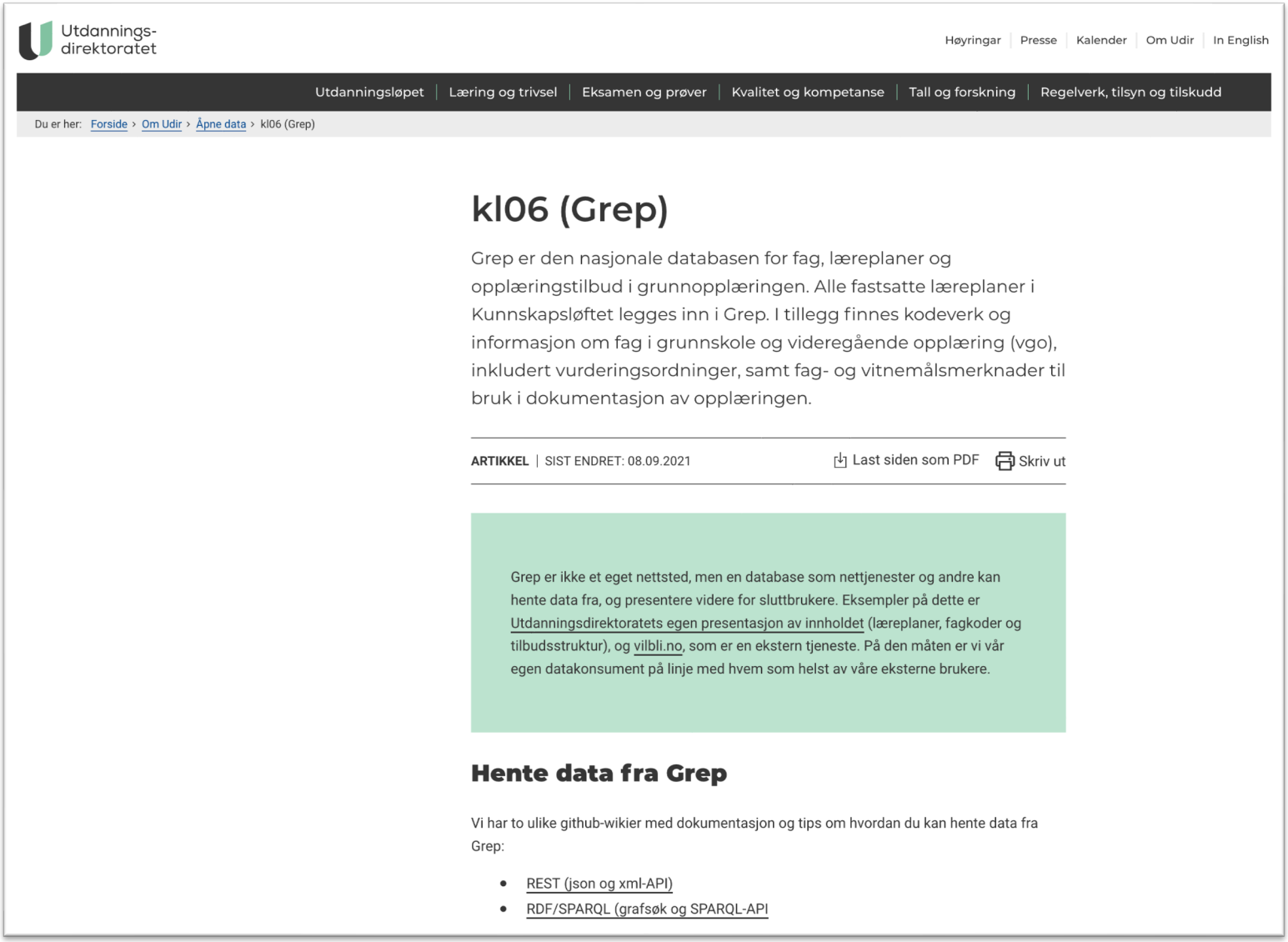
vendors

Resource catalogue
Tjenestekatalog

tags → vendor tool

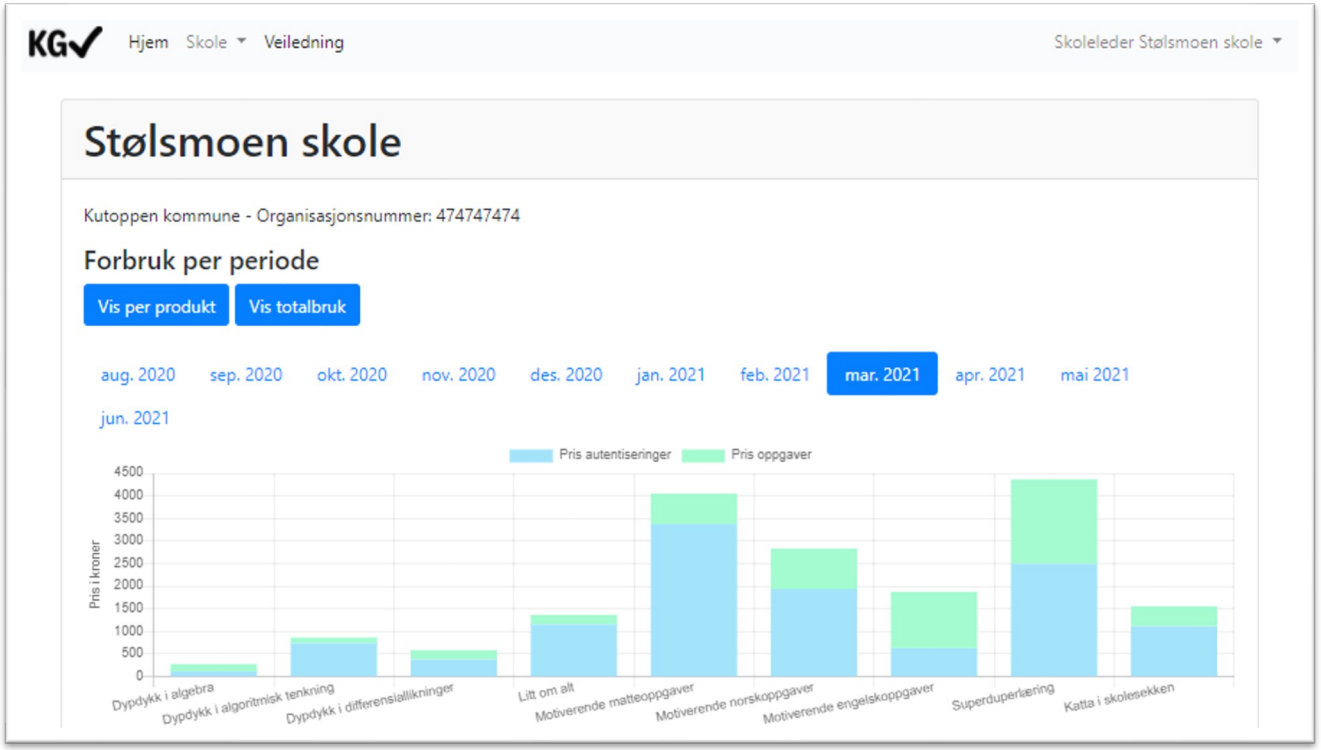
KGV: billing tool ("spotify" model)

SLATE



National database for disciplines, curriculum & educational offerings for schools.

KGV Payment Model (licencing of vendor tools)



WHAT ABOUT THE DATA & ALGOITHMS

SLATE

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. . .

SLATE

Norwegian Data Protection Agency (Datatilysnet)

Sandbox for Artificial Intelligence

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

Norwegian laws are not specific enough

SLATE

DO WE HAVE THE DATA -- TECHNICAL

CAN YOU ACCESS THE DATA?

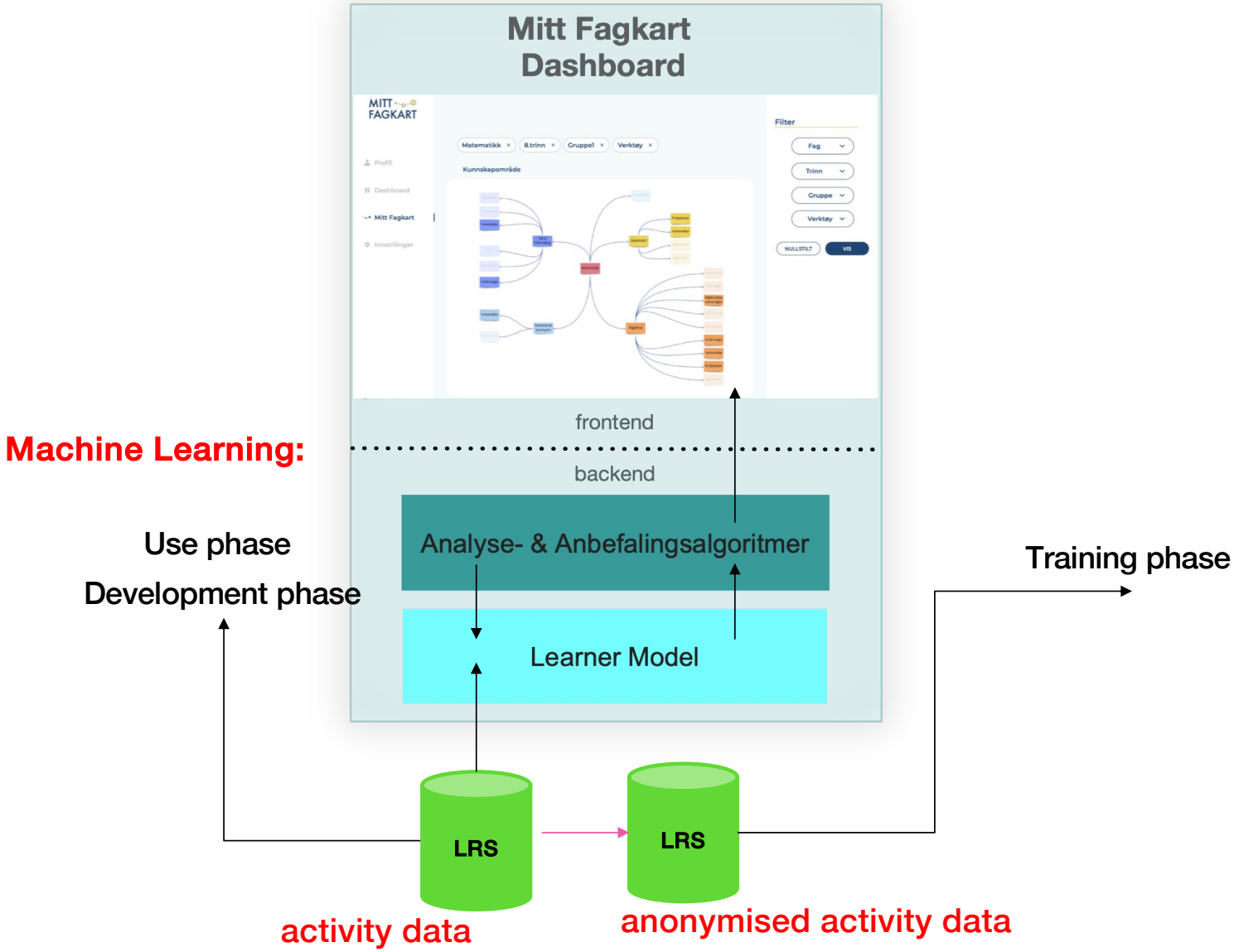
REALTIME ; SCHEDULED

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

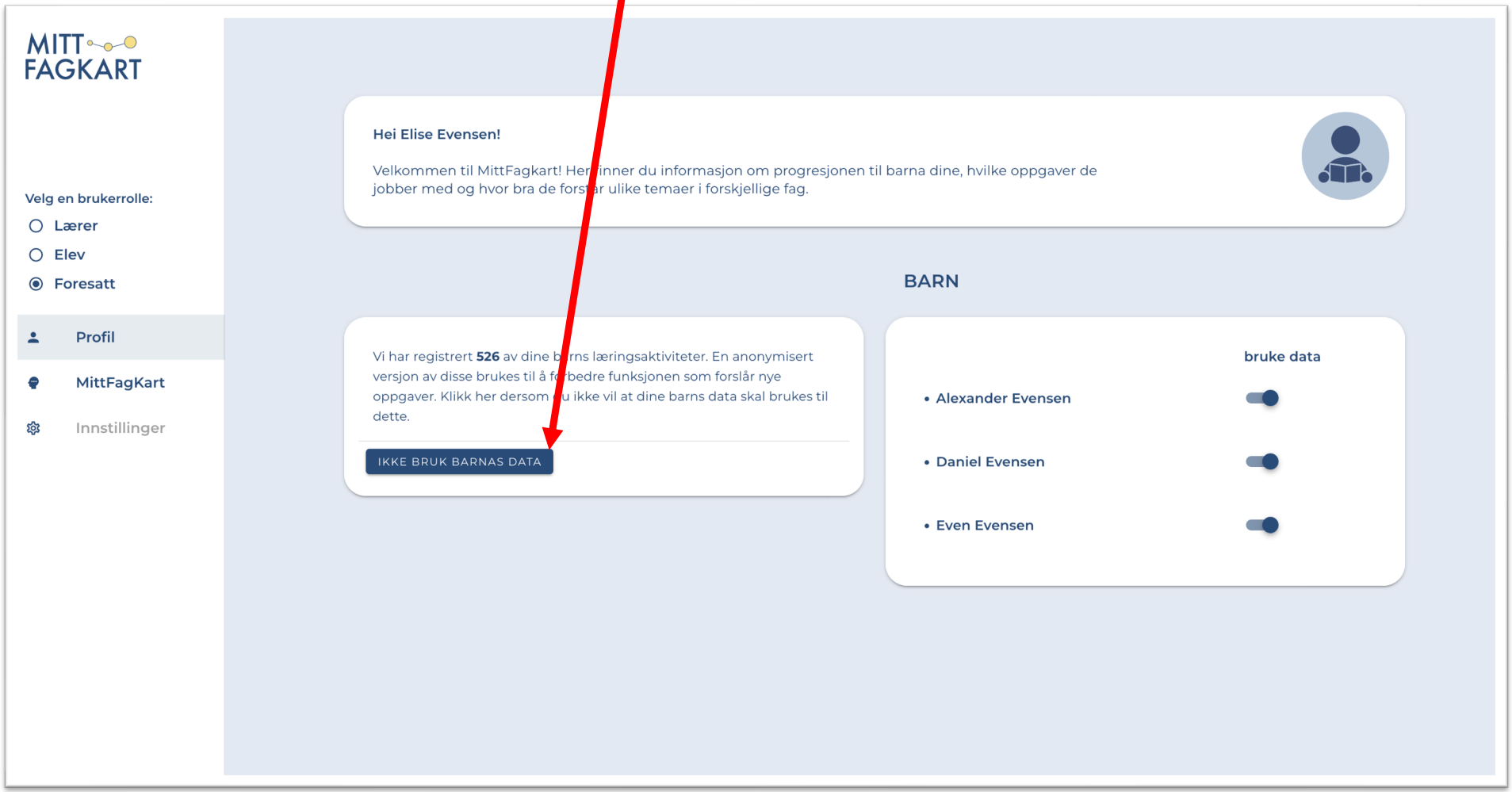
DO YOU HAVE THE RIGHT DATA?

AT THE MERCY OF THE LEARNING TOOL DEVELOPERS!

SLATE


Mitt Fagkart
Dashboard
frontend
backend
Machine Learning:
Use phase
Development phase
Analyse- & Anbefalingsalgoritmer
Learner Model
Training phase
LRS
LRS
activity data
anonymised activity data

Parent/Guardian (Foresatt) view on Mitt Fagkart – shows that parents can exclude their child's data from the "training" of the adaptive algorithm.



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

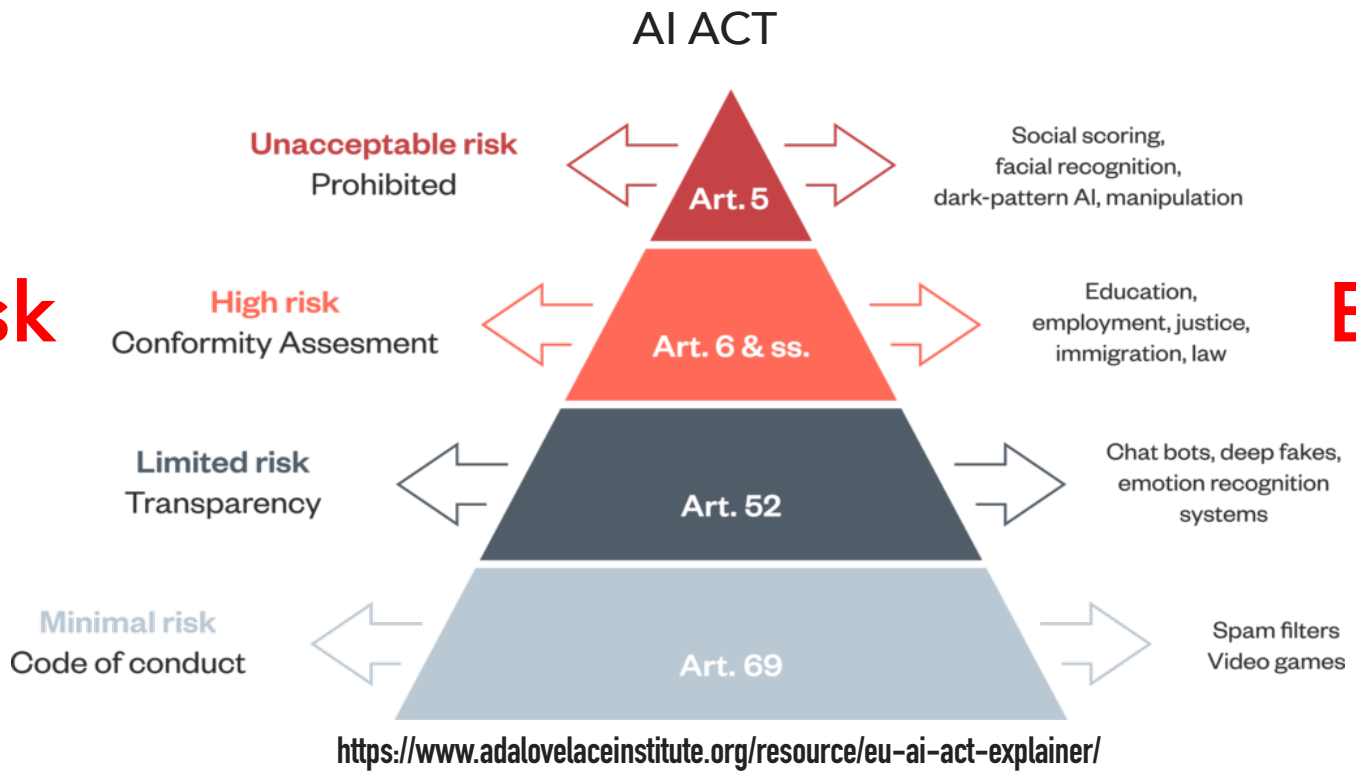
TRANSPARENCY, EXPLAINABILITY

TO ALL STAKEHOLDERS

SLATE

High Risk

EDUCATION



Minimise the risk for erroneous or biased AI-assisted decisions

Protect children's vulnerability

Ekspertgruppen for digital læringsanalyse

SLATE

laringsanalyse.no

SLATE

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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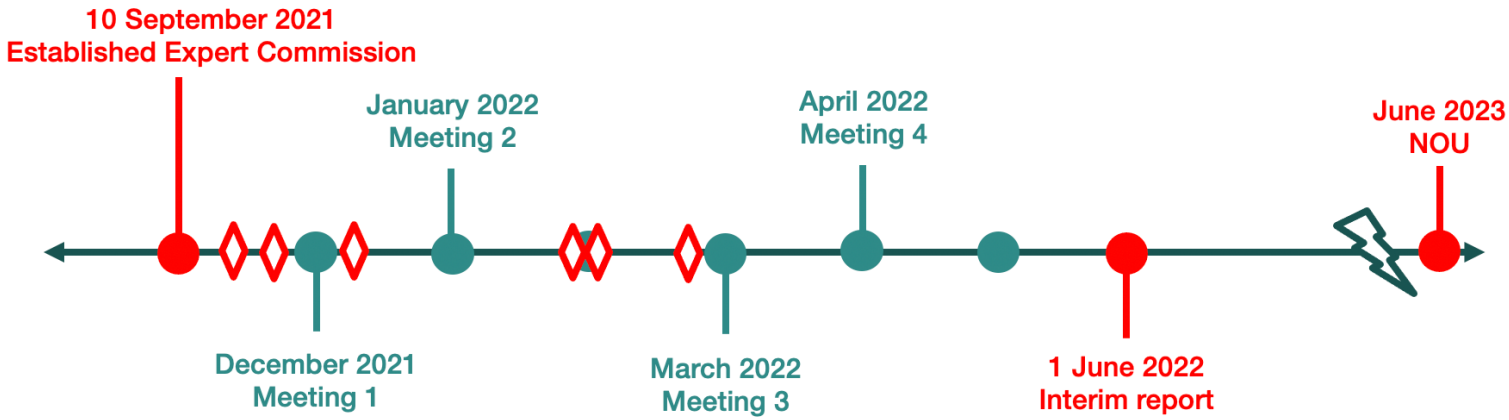
TIMELINE



Milestones

Task force meetings

Hearings

SLATE

Central Questions

How does learning analytics affect learning?

What are the challenges and potential of digital learning analytics?

How can the regulations provide the right support for the sector?

What skills does the education sector need
to make good judgments about learning analysis?

SLATE

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

SLATE

https://laringsanalyse.no/

Learning Analytics - Some Central Dilemmas

Midway Report

1 June 2022

SLATE

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

Key points:

1. **Information for quality development**
2. **Early intervention**
3. **When does information gathering become surveillance?**
4. **Where is the limit for privacy?** (school vs private)
5. **Does the information give a correct picture?**
6. **Is assessment influenced by information on learning behaviour?** (concern)

SLATE

Dilemma 2: Learning as an Individualised process vs Social process

Key points:

1. **Individual ways of working with digital resources** (concern)
2. **Active & exploratory learning in interaction with others** (more than drill & practice)
3. **Safety to try and fail** (concern)
4. **Can individual data be used to say something about interaction?** (social learning focus)

SLATE

Dilemma 3: Centralisation vs Autonomy

Key points:

1. **Where are the decisions made?** (actors & levels)

2. **Centralised = Approval?**
   - Clarity in the relationship between making central decisions about digital tools and a stamp of approval for the tool need to be addressed.

3. **Does centralisation hinder innovation?**
   - A digital ecosystem where systems, services and solutions interact is a national goal for digitalisation policy in the public sector, including formalised co-management of a digital ecosystem for primary and secondary education. Will this favour large resource developers (e.g., publishers) than smaller SMEs or research-based tools where innovation often takes place?

4. **Centralised standardisation work**
   - Well-functioning standards for data exchange within learning analytics (e.g., xAPI, secure data exchange portals) can serve as a driver for diversity in the EdTech market.

SLATE

Dilemma 4: Competence Needs vs Competence Reality

Key points:

1. **Vision and reality** (sufficient digital competences; this is currently lacking at all levels of education)

2. **Competence needs in connection with learning analysis.**
   - new demands including critical evaluation of use, opportunities/limitations, ethics/privacy protection, interpretative understanding of dashboards and visualisations, and most of all the effect it will have on student learning

3. **What do we risk if the gap between vision and reality is not closed?**
   - we do not have a solid Norwegian knowledge base about the potential of learning analytics to improve learning -- not closing the gap could lead to a missed opportunity to utilise a large amount of information that could have promoted learning

4. **Is competence development the only answer?**
   - there is a need to place responsibility on the technology providers to provide more transparency on how their technology works and how the information they produce aligns with the pedagogical theories commonly employed by teachers and educators.

SLATE

LEARNING ANALYTICS – SOME CENTRAL DILEMMAS

Legal Issues (17 pages!)

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

SLATE

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

SLATE

ABOUT LEARNING ANALTYICS

- a digital process where the results of LA are linked to the **data from the tools in use** (+ other data)
- **practical testing** on a small scale
- there is **little systematic research on learning analytics in actual pedagogical practice** at all levels of education
- **challenges with knowledge transfer** from research to practice

(large commercial actors are driving practice → socio-economic consequences)

SLATE

LEGAL QUESTIONS!

More than just learning analtyics

→ *tied to the use of student data & the digital tools being used*

→ the sector perceives the legal basis for learning analytics as unclear (input meeting & Langford et al., 2022 - see NOU p. 137)

SLATE

Four main recommendations

"Municipalities, county authorities, and training workplaces may process personal data about pupils and and apprentices by means of machine analytics and aggregation when it is ethically and pedagogically justifiable and necessary to carry out duties identified in the Education Law and its regulations.

Examples of such tasks and duties may include adapting education, work on quality development (§17-12) and formative assessment (§ 3-10) acdording to the regulations to of the Education Act. The degree of personalidentification shall not be greater than necessary for the purpose in question."

protection.

SLATE

Four main recommendations

To support good and sound learning analysis

3. The expert group recommends establishing **a framework for good learning analytics** in primary and lower secondary education. The purpose of this recommendation is to strengthen the freedom of choice for students and teachers and provide a better basis for pedagogical decisions on learning analytics to promote learning.

4. The expert group recommends developing overall **guidelines for good and responsible learning analytics** in higher education and higher vocational education. The purpose of this recommendation is to facilitate good privacy practices and sound learning analytics that promote student learning and increase the quality of education.

SLATE

Chapter 14
Framework for good learning analytics in basic education

The expert group's clear view is that teachers, school leaders and school owners are calling for a **better and more quality-assured overview of which resources are available, their characteristics and the extent to which they fulfil various pedagogical, legal and technical requirements**.

We recommend **subsidy programmes** for the purchase and development of digital learning resources as important drivers for **freedom of choice**, and that **financial measures should be established to test and develop resources with learning analytics functionality**.

SLATE

Recommendations for Basic Education

facilitate usage-based pricing models for tools

centrally defined quality criteria for tools with LA

national service catalogue

vendors must to provide info that justifies & explains how tool works

vendors must document that tech specs meet legal requirements

quality criteria that provide guidelines for product development

SLATE

Recommendations for Basic Education

grant scheme for purchase & development tools/ resources with LA

Funding:
1. innovation, R&D of tools w/ LA & AI
2. Evaluation of use of resources

stimulate innovative LA&AI that meet privacy regulations & Responsible AI

ensure that pupils receive customised & comprehensible information

measures for teachers, leaders, owners to develop expertise in LA

SLATE

10 Recommendations for Higher Education

15.8 Ekspertgruppens anbefalinger

- Ekspertgruppen anbefaler at det i samarbeid med sektorene utvikles overordnede nasjonale retningslinjer for god og forsvarlig læringsanalyse. De nasjonale retningslinjene må kunne tilpasses til lokale forhold. Retningslinjene bør minst omfatte disse tiltaksområdene:
  - personvern
  - medvirkning
  - åpenhet
  - valgfrihet
  - anskaffelser
- Ekspertgruppen anbefaler at en statlig aktør utvikler og forvalter de overordnede retningslinjene for god og forsvarlig læringsanalyse i tett samarbeid med sektoraktører som Universitets- og høgskolerådet og Nasjonalt fagskoleråd. Ekspertgruppen understreker at ansvaret for god og forsvarlig læringsanalyse ligger hos institusjonene.
- Ekspertgruppen anbefaler at de overordnede retningslinjene revideres jevnlig i lys av den raske teknologiutviklingen og minimum hvert femte år.
- Ekspertgruppen anbefaler at retningslinjene omfatter både fellesløsninger, lokale ressurser og ressurser som er fritt tilgjengelige på nett.
- Ekspertgruppen anbefaler at en statlig aktør bygger opp et støttesystem for å hjelpe lærestedene med å utarbeide risikoanalyser, personvernkonsekvensvurderinger (DPIA) og databehandleravtaler. Den statlige aktøren skal også hjelpe lærestedene i forbindelse med anskaffelsesprosesser og systemutviklingsprosjekter.
- Ekspertgruppen anbefaler at retningslinjene forklarer hva som utgjør god læringsanalyse som fremmer studentenes læring.
- Ekspertgruppen anbefaler at kompetanse i læringsanalyse inkluderes i opplæringstilbud for pedagogisk basiskompetanse i høyere utdanning og høyere yrkesfaglig utdanning. I tillegg anbefaler ekspertgruppen at læringsanalyse inngår i ulike kurstilbud rettet mot undervisere, ledere og støttepersonell som bistår undervisere, og som deltar i kvalitetsarbeid.
- Ekspertgruppen anbefaler at lærerutdanningen sikrer at nyutdannede lærere har nødvendig kompetanse i læringsanalyse og kunnskap om kunstig intelligens. Institusjonene må vurdere hvordan de kan ivareta slik kompetanse i undervisningen og i læringsutbyttebeskrivelser.
- Ekspertgruppen anbefaler at det utlyses midler til innovasjon, forskning og utvikling på digitale læringsressurser som har funksjonalitet for læringsanalyse og adaptivitet, og midler til å forske på bruken av slike ressurser i autentiske læringssituasjoner.
- Ekspertgruppen anbefaler at institusjonene sørger for at studentene får tilpasset og forståelig informasjon slik at de kan ta stilling til spørsmål om læringsanalyse. Videre er anbefalingen at institusjonene jevnlig evaluerer om studentene opplever at institusjonene ivaretar retten de har til medvirkning.

SLATE

Student Participation (influence) in learning analytics requires that students gain as thorough an insight as possible into which data and analysis methods are used and how they are used, so that they can benefit from the insight the analyses provide into their own learning and academic progression.

Guidelines:

- must ensure that educational institutions can **meet student's right to influence and their information needs**

SLATE

Transparency (necessary for student trust)

The Guidelines require educational institutions to provide information on:

- **which data** is collected from **which sources**
- **how** they may be combined with other data
- **what** the data is actually used for
- the extent to which the **individual student can be identified**
- **who** has access to this data
- **when** collection takes place
- **when** they can use digital resources without anything being tracked at an individual level

SLATE

Freedom of choice

The **decision on which resources with learning analytics functionality** should be available to all HE lecturers is within the institution's framework - and the student's freedom of choice.

Guidelines:

- It is important to ensure that teachers have access to various resources, but also to safeguard their freedom and responsibility to organise the content, working methods and teaching methods of their teaching
- **the scope of student's freedom of choice** with what learning analytics should be must also **be linked to whether information about them is actually anonymised**

  (**aggregated and pseudonymised data as a basis for quality work vs individual follow-up with individual students**)

SLATE

Procurement

Representatives from the sector confirm that **possibilities for learning analytics** have not been specifically considered when purchasing tools and services

Guidelines:

- should support the sector in **drawing up requirements for learning analytics in tender processes**, if relevant
- the requirements must be based on **local professional discussions** at educational institutions about the needs of teachers and educational institutions, the types of analyses they want, and how learning analytics are intended to support learning processes and quality work
- requirements for **inbuilt privacy and information security**

SLATE

Financial & Administrative Resources

Recommendations for HE:

- overall national guidelines are developed for good and sound learning analytics in higher education and higher vocational education and training
- a **support system** must be developed that assists higher education institutions
- **a training programme** for teachers, managers and support staff who assist teachers in quality assurance work
- ensuring that **newly qualified teachers** have the necessary expertise in learning analytics and knowledge of artificial intelligence

Building such a support system will require financial and administrative resources and needs to be analysed in more detail.

SLATE

SUMMARY:
MY REFLECTIONS

Learning Analytics has a lot of potential

Its implementation is not that straightforward!

SLATE

What should be addressed on a policy-making level or in legislative framework?

Legal & Regulatory **(safeguarding privacy when AI/LA is used)**

- **Update national laws and regulations** (together with the GDPR) to give permission to handle personal and/or sensitive data through machine algorithms in situations **when it is justifiable** and **necessary** to perform **obligations** set out in the law (e.g., quality work, adapted education, identification of dyslexia…)
- **EU AI Act** will give new insights
- Council of Europe's Ministers of Education meeting **(**September 2023) passed a **resolution to the start of work on a legal instrument on the use of artificial intelligence systems in education**

SLATE

What should be addressed on a policy-making level or in legislative framework?

Infrastructure & Support: national digital infrastructure, data processing, standards and common solutions

- Support work with identification of needs, procurement, and use of digital infrastructure
- GDPR: Data Protection Impact Assessment & Risk Analysis - carry out & share work at national level?
- Develop measures to ensure safe and secure handling of educational data (confidentiality, integrity, access)
- Consider standards and national common services for identity management and data sharing

SLATE

What should be addressed on a policy-making level or in legislative framework?

Competence (LA/AI-literacy: technical & social aspects)

- Provide good information and advice about safe digital environment (data/information security + privacy) for all
- Address the competence needs in how to integrate LA/AI into pedagogical practice, quality work in schools, etc..
- Address the necessity to prepare students for a future that includes LA/AI in all aspects of schooling, work, and life

SLATE

TAKK!

SLATE