

UNIVERSITY OF BERGEN

Centre for The Science of Learning and Technology (SLATE)

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uib.no

SLATE

What spurs creativity in a learner? Investigation and critical thinking ?

How can learning analysis inform educational practice ?

Can predictive analysis improve education ?

Why teach children programming ?

How do we assess for learning ?

How do we learn ?

Technology ?



AMBITION

SLATE will generate empirical knowledge with relevance for educational practice in the broadest sense, at the intersection of learning, learners, technology, and pedagogical practice

AND

advance the frontiers of all the sciences of learning and technology through integrated research.



BREADTH

SLATE research and development will address scientific, technological, educational, workforce, and leisure time challenges related to learning and technology in all facets of human learning throughout a lifetime.



Technological Advancements

Dating back to the Sumerians, tablets and slates have served as educational tools, and throughout history, **technological advancements have changed the conditions for human learning.**

Research is needed to strengthen and broaden our understanding of the impacts and potential of this technological influence on how we teach and learn in a knowledge society.



Learning Analysis Focus

In particular, we believe that decisions about the use of data approaches in Education must be informed by a scientific understanding of the impact of learning analysis on learner, teachers, institutions, and society.



Learning Analysis OR Learning Analytics ?

Learning Analysis

the role of data and data analysis for learning, teaching, and education

3 distinct, but overlapping fields that address the role of data and data analysis

- Educational data mining (EDM)
- Learning analytics and knowledge (LAK)
- Big Data



EDM, LAK & Big Data

Educational Data Mining (EDM)

- Intelligent data mining
- roots in Artificial Intelligence in Education & Intelligent Tutoring Systems research, as far back as the 1970s
- applies computational approaches such as data mining, machine learning classification, clustering, Bayesian modelling, relationship mining, discovery **with** models, statistics, and visualisation to information generated in educational settings to better understand students and the settings in which they learn



EDM, LAK & Big Data

Learning Analytics and Knowledge (LAK)

- Emerging research field and design discipline
- LA is a set of data generation and analysis techniques and tools that may be utilised to gain a deep understanding of profound questions for **research, policy and practice**, generated by 21st Century learning and skills development
- LAK facilitates a clear theoretical understanding of what is learning, how we assess it, how we foster it, and how we operationalise it in productive educational practices, teaching and learning environments



EDM, LAK & Big Data

Big Data in Education

- Refers to large amounts of data produced very quickly by a high number of diverse sources
- Data generated by people (e.g., computer logs, an essay) or generated by technology (e.g., sensor readings, photos, videos, GPS signals, etc.)
- The analysis of large data sets generated in educational context could identify and validate patterns cross institutions, regions and countries, which benefit the different levels of stakeholders in education systems (predictive analytics)

→ Is there “big data”, or rather just “small data” in the educational sector ???



Learner-centric vs Learning-centric analytics (Stein 2012)

Learner-centric analytics measures student behaviour in technological environments

- Learner engagement measured through the number of times a student visits learning materials, logs on an LMS, how long they view a flipped classroom video
- Give input on design of learning environments, learning material, etc.

→ Learner engagement \neq Learning



Learner-centric vs Learning-centric analytics (Stein 2012)

Learning-centric analytics has to do with conceptual growth and requires examining student artefacts to detect conceptual acquisition

- focus is on "learning", "learning outcomes"
- have to examine artefacts that students develop to identify if learning has taken place.
- **one's understanding of learning, impacts the analytics design**

Assessment for learning needs learning-centric analytics, but does it also need learner-centric analytics? For example, when does perseverance lead to learning?



Science of Learning & Pedagogical Knowledge

A key issue in **learning analysis** is to actually think through what data you need, and what you want to do with the data (in some big data cases, they just collect data blindly and then analyse it for patterns), and this is where the **sciences of learning** together with **pedagogical knowledge** might be able to help.

→ Learning Sciences



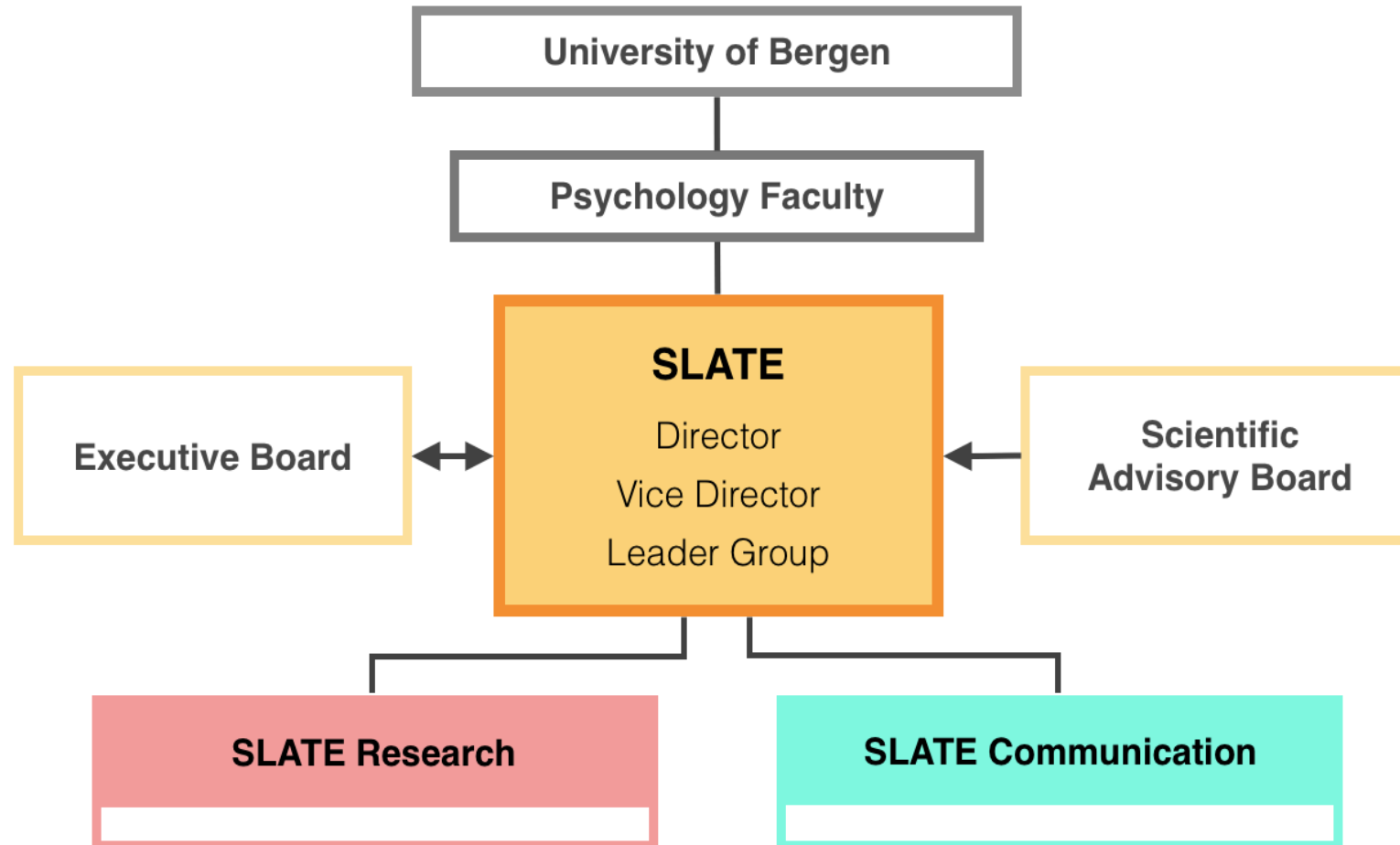
Learning Analysis Focus

Therefore, SLATE will

- 1) develop and deploy cutting-edge science where data and computing are marshalled to understand changes in educational provisions and learning,
 - 2) combine techniques for data analysis and visualisation with an understanding of the teaching and learning process, to develop, in addition to content mastery, also reflection, collaboration, creativity, literacy, problem-solving, etc., and
 - 3) establish an infrastructure to engage diverse stakeholders in conversations about solutions to current and future Educational challenges.
- 4) develop towards a centre of learning sciences



Organisation



SLATE Collaboration

Pedagogy, Information Science, Informatics, Cognitive Psychology, Developmental Psychology, Clinical Psychology, Neuroscience, Digital Culture, Law, MOFA, DigUiB, SFU

**Centre for the
Science of Learning
and Technology
(SLATE)**

University of Bergen

with

Uni Research Health

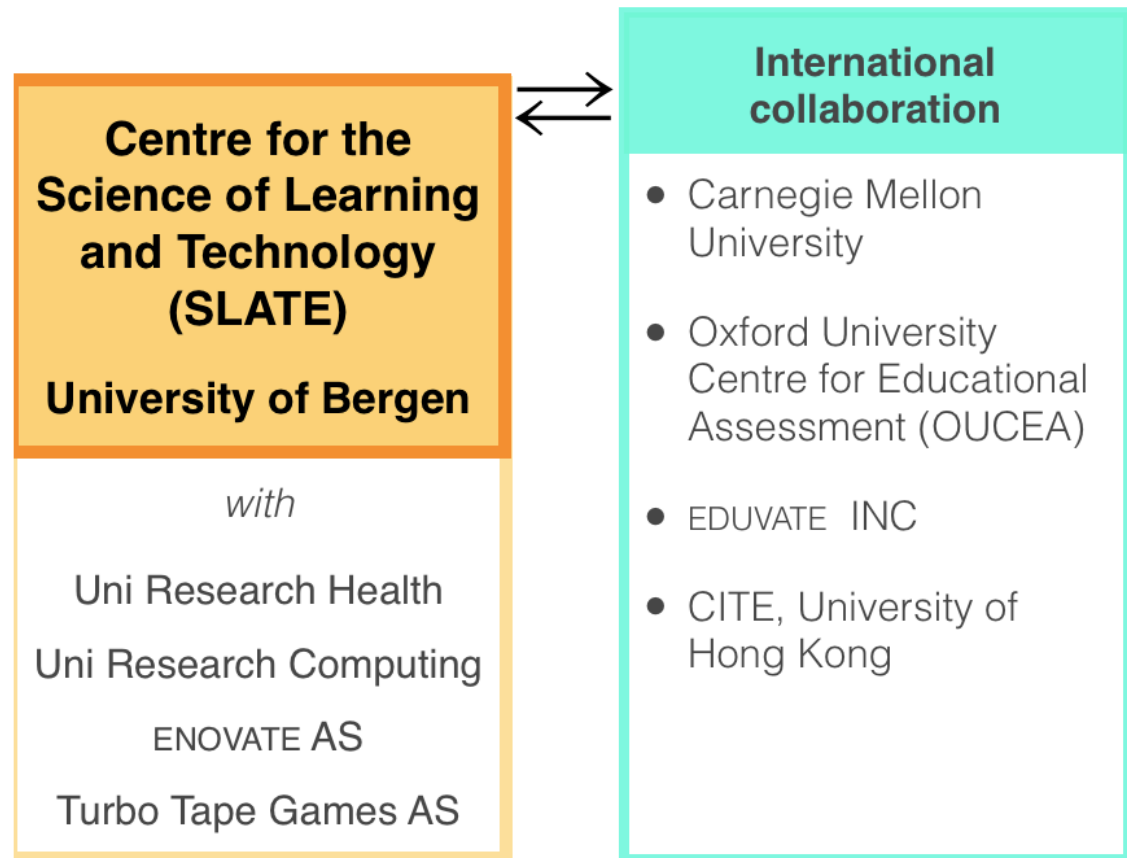
Uni Research Computing

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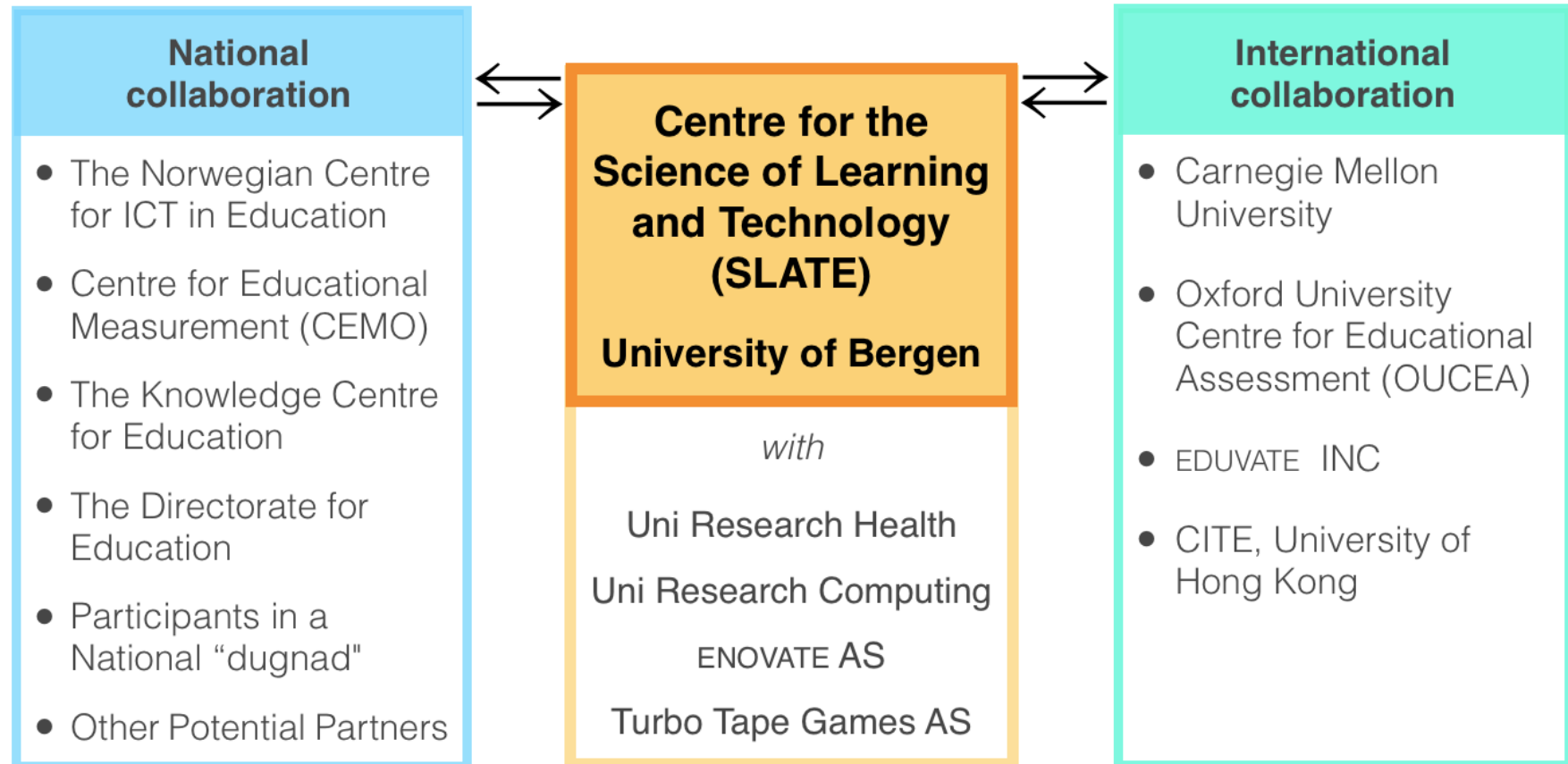
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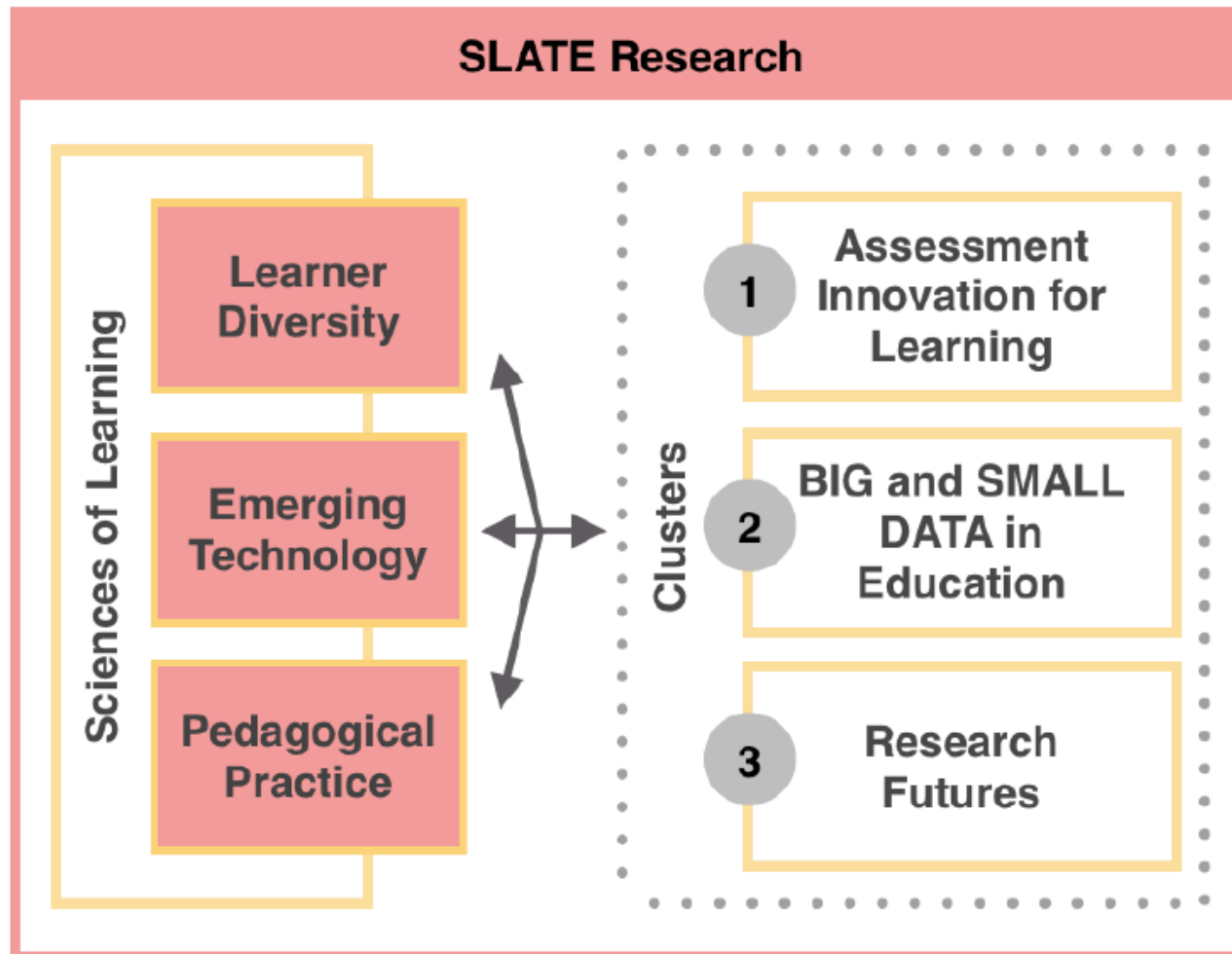
SLATE Collaboration



SLATE Collaboration

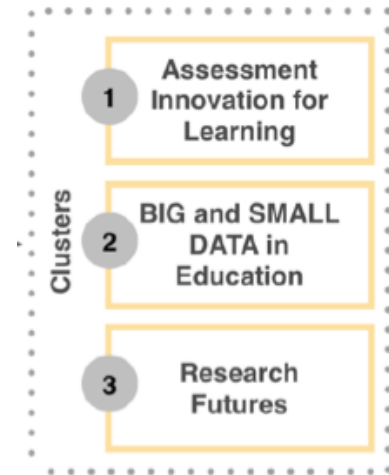


Research Organisation



Assessment Innovation for Learning

→ builds on our previous and on-going research on assessment for learning, and its implementation in the educational sector

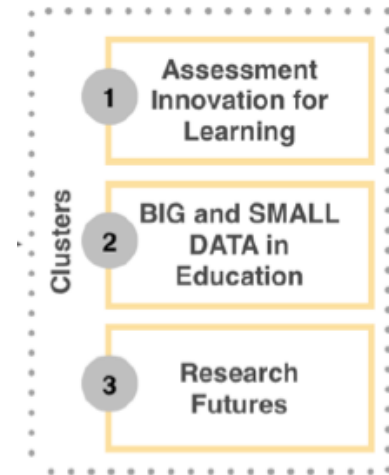


Project 1: Assessment for Learning, Pedagogical Practice, and Technology

Project 2: Formative Assessment Practices and Implementation in Education

BIG and SMALL DATA in Education

→ initiates new research in the emerging field of big (and small) data in education.



Project 1: Big Data e-Infrastructure for Educational Data

Project 2: Case study at the University of Bergen

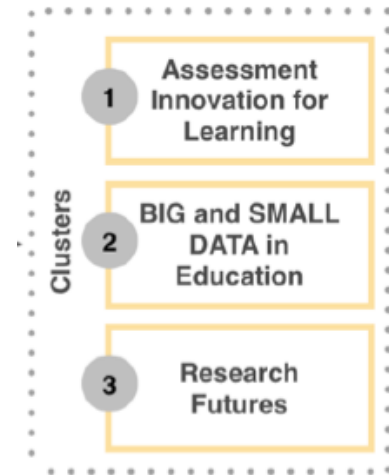
Project 3: National dugnad

Innovating Research Futures

→ engages an interdisciplinary assemblage of researchers from across UiB in a creative knowledge process to identify research ideas that can lead to proposals that are highly innovative and interdisciplinary and will further our understanding of how technology has changed the conditions for learning.

Project 1: Creative Knowledge Processes:
Facilitating creativity, innovation, and idea development

→ Neuroplasticity & Learning – Professor Karsten Specht



Node for Research Communication

As a node for research communication, SLATE will use the potential of technologies and knowledge generated through the projects for continuous feedback when developing new approaches to research use and outreach of results to various stakeholders.

SLATE regards teachers and other practitioners as knowledge producers, not simply as knowledge consumers.

SLATE will contribute to the education of Bachelors, Masters, PhDs, and further and continuing educational professionals ;in particular, teacher education and programmes educating school leaders will be targeted.



You will be hearing from us !



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