AVT
Aktivitetsdata for vurdering og tilpasning
(Activity data for assessment and adaptivity)

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AVT-project is a collaboration between

- KS (owner)
- Oslo Kommune (instigator)
- SLATE (leader)
Centre for the Science of Learning & Technology

- SLATE, created in 2016, is a national research and competence centre financed by the Norwegian Ministry of Education and the University of Bergen.

- SLATE will advance knowledge by exploring and clarifying concepts such as learning analytics, big and small data in education, assessment for learning, and creativity, learning & technology, in all facets of human learning.

- SLATE is hosted at the Faculty of Psychology, University of Bergen
The AVT-project is developing a **framework for learning analytics** for adaptive learning in school municipalities

Comprises 3 models:

1. **A model for appropriate structuring of learning objectives and for the structuring of content by vendors**
2. **A model for sharing of data between vendors for the purpose of learning analytics**
3. **A model for identifying student achievement level and linking to relevant learning resources**
Today’s challenges

**Vendor Silos:** activity data available only to vendor owning the application where the activity was created

**Activity data in different format:** activity data stored in the vendor’s internal formats

**National competence objectives (GREP):** objectives are not fine-grained enough for designing learning activities, schools break them down (adaptivity and learning analytics)
Framework for learning analytics

1. A model for appropriate structuring of learning objectives and for the structuring of content by vendors

→ Subject Map, a set of references where learning objectives & topics are structured.
Map of reality (the subject)
Individual adaptation
Why subject map?

Competence objectives after 4th grade (math)

Numbers

The student should be able to

• develop and use varied multiplication and division methods, use them in practical situations and use the the small multiplication table in mental arithmetic and task solving
Why subject map?

100 answers
Why subject map?

55 unique (commutative law)
Why subject map?

Use less time
Mostly correct answers

Use more time
Few correct answers
Framework for learning analytics

2. A model for sharing of data between vendors for the purpose of learning analytics

→ Activity data is delivered in the same format, xAPI
→ AVTHub controls the privileges of the entity approaching
→ Identification with Dataporten
Activity data sources - examples
Format

• Activity data is made available in xAPI format.
• Standards Norge (SN/K 186) defines a Norwegian translation of xAPI
• The xAPI main structure:
  
  **Actor:** Who is the activity data about (student-ID)?
  **Verb:** What action does the activity consist of (answered, ...)?
  **Object:** What is the activity related to (animation, video, item, test, ...)?
  **Context:** Other relevant metadata about the activity
  (area in subject map, school, municipality, supplier, competence objectives, complexity level)
Examples of x-API code

Example querying user and subject map

GET ~/statement?agent=
{"account":{"name":"76a7a061-3c55-430d-8ee0-6f82ec42501f","homepage":"https://docs.dataporten.no"}}
&activity=https://lmbase.no/avt/area-within-the-map/OFK10000
&https://lmbase.no/avt/pisa/mathematical-literacy/competence-level-2
&related_activities=true
Examples of x-API code

Example response
user and subject map

https://github.com/KS-AVT/avt/blob/master/eksempel1_overgangsprove.md
Currently: **Supplier centric activity data**
AVT: Student centric activity data
AVT: Student centric activity data

Lev. 1  Lev. 2  Lev. 3  Lev. 4  Lev. 5  Lev. 6  Lev. n

Subject Map

National competence objectives

xAPI

AVTHUB
Framework for learning analytics

3. A model for identifying student achievement level and linking to relevant learning resources

We identify where the student is lacking competence...

...and the user (student or teacher) receives recommendations for relevant learning resources, adapted to the student.
Do we get meaningful results?
Adaptive learning
Recommendation of relevant learning resources
Opportunities and areas of use

Teachers get better tools for
• developing learning activities adapted to the student\(^1\)
• obtaining more accurate information about individual student and class competence levels, for use in assessment\(^2\)

School leadership
• overview of the level of class, school

School owner
• school-based assessment and quality assurance

\(^1\) Grounded in the Education Act, § 1-3
\(^2\) Defined in the regulations to the Education Act, Chapter 3
Defined in the regulations to the Education Act § 2-1
SLATE

Project Management
- Chairing
- Coordinating
- Reporting

Developing of models
- Structuring of objectives
- Activity data coding
- Identify competence gaps
- Recommending learning resources

Research
- Knowledge base for research on learning analytics
Oslo Kommune (Municipality)

<table>
<thead>
<tr>
<th>Participating Schools</th>
<th>Subject Map</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>School A</td>
<td>- Implement a Subject Map for mathematics</td>
<td>- Implement a user interface (dashboard) for students and teachers to access student activity data</td>
</tr>
<tr>
<td>School B</td>
<td>- numbers and algebra, grades 8-10</td>
<td></td>
</tr>
<tr>
<td>School C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School ...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vendors

Participating suppliers
• Aschehoug
• Cappelen Damm
• Cerpus
• Conexus
• Cyberbook
• itslearning
• Kikora
• TV2 Skole / Studix
• Osloskolen (Osloprøver)

Connecting Resources
- Connecting own digital resources to areas in the Subject Map

xAPI
- Develop an API for delivering activity data in xAPI-format
- Make available the API in Dataporten
The road ahead
List of references

- **Slide 5**
  - [https://www.uninett.no/tjenester/dataporten](https://www.uninett.no/tjenester/dataporten)
  - [http://clipart-library.com/clipart/114649.htm](http://clipart-library.com/clipart/114649.htm)
  - [https://commons.wikimedia.org/wiki/File:DanishPhonePlugs.jpg](https://commons.wikimedia.org/wiki/File:DanishPhonePlugs.jpg)

- **Slide 6**
  - [https://commons.wikimedia.org/wiki/File:Math.svg](https://commons.wikimedia.org/wiki/File:Math.svg)
  - [https://pixabay.com/no/afrika-amerika-europe-globus-2029516/](https://pixabay.com/no/afrika-amerika-europe-globus-2029516/)

- **Slide 7**
  - [https://www.ut.no/kart/](https://www.ut.no/kart/)
  - [http://www.hemsedal.com/no/A/Skistar-Hemsedal/Loypekart](http://www.hemsedal.com/no/A/Skistar-Hemsedal/Loypekart)

- **Slide 8**
  - [https://www.pexels.com/photo/adventure-cold-cross-country-skiing-dawn-416728/](https://www.pexels.com/photo/adventure-cold-cross-country-skiing-dawn-416728/)
  - [https://pixabay.com/no/freerider-ski-sport-alpine-sn%C3%B8-498473/](https://pixabay.com/no/freerider-ski-sport-alpine-sn%C3%B8-498473/)

- **Slide 14**
  - Cyberbook, Osloskolens overgangsprøve
    - [https://nordseter.osloskolen.no/nyhetsarkiv/nasjonale-prover/](https://nordseter.osloskolen.no/nyhetsarkiv/nasjonale-prover/)
    - [https://www.yiten.no](https://www.yiten.no)

- **Slide 15**
  - [https://xapi.com/overview/](https://xapi.com/overview/)
  - [https://www.standard.no/](https://www.standard.no/)

- **Slide 18**
  - [https://pixabay.com/no/databasen-oppbevaring-datalagring-152091/](https://pixabay.com/no/databasen-oppbevaring-datalagring-152091/)

- **Slide 20**

- **Slide 22**
  - [https://commons.wikimedia.org/wiki/File:Force_Directed_Graph.png](https://commons.wikimedia.org/wiki/File:Force_Directed_Graph.png)

- **Slide 24**
  - [https://analyse.kmi.open.ac.uk](https://analyse.kmi.open.ac.uk)

- **Slide 25**
  - [https://commons.wikimedia.org/wiki/File:Force_Directed_Graph.png](https://commons.wikimedia.org/wiki/File:Force_Directed_Graph.png)

- **Slide 26**
  - [https://pixabay.com/no/sp%C3%B8rm%C3%A5l-svar-sp%C3%B8r-m%C3%A5lstegn-hjelp-1014060/](https://pixabay.com/no/sp%C3%B8rm%C3%A5l-svar-sp%C3%B8r-m%C3%A5lstegn-hjelp-1014060/)
  - [https://pixabay.com/no/setningsdelen-avsnitt-bok-h%C3%B8yre-192564/](https://pixabay.com/no/setningsdelen-avsnitt-bok-h%C3%B8yre-192564/)

- **Slide 30**
  - [http://www.winmagpro.nl/content/aanleg-glasvezel-op-platteland-in-gevaar](http://www.winmagpro.nl/content/aanleg-glasvezel-op-platteland-in-gevaar)