

Framtidens lärverktyg – Vart är vi på väg?

Pass 4

3 december 2025

Vi kan överbrygga dataklyftan i grundskolan, men vill [vi] det?



Italo Masiello



Rakotzbrücke, Tyskland

Vi kan överbrygga dataklyftan i
grundskolan - men vill [vi] det?

Italo Masiello, prof
Uppsala, 3 dec



Krävs stöd från EU för att skapa en stabil och användbar datainfrastruktur som kan visualisera data för pedagogisk beslutfattning

Hemskick

Forskningsprojekt - Utbildningsteknologi i grundskolan

2021-juni 2025

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Karolinska Institutet



Dean Fixsen
U. of Chapel Hill, USA

#EdTechLNU

lnu.se/edtechlnu

Mål

- Att utveckla digitala kompetenser hos elever, lärare och rektorer i grundskolan

- Genom att arbeta långsiktigt och hållbart med implementering av digitalt läromedel och datainformerad undervisning i matematik, svenska och svenska A

Projektet finansierades av
Forte och Växjö kommun
2021-2024

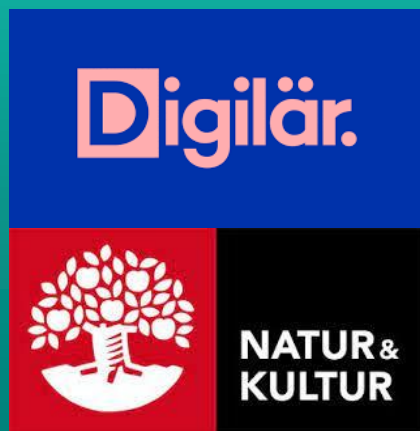
SKOLOR & LÄROMEDEL



Fagerslätsskolan 4-6



Skogshagaskolan 4-6



MÖNSTERÅS
KOMMUN

Tillingeskolan 4-6

Mölstadskolan 4-6



Centrumskolan 1-3

Centrumskolan 4-6



~29 lärare, 4 rektorer

Vad...i projektet?

- Lärarnas digital kompetens
- Fidelity - användandet av digitalt läromedel
- Dataanalyser - Dashboards

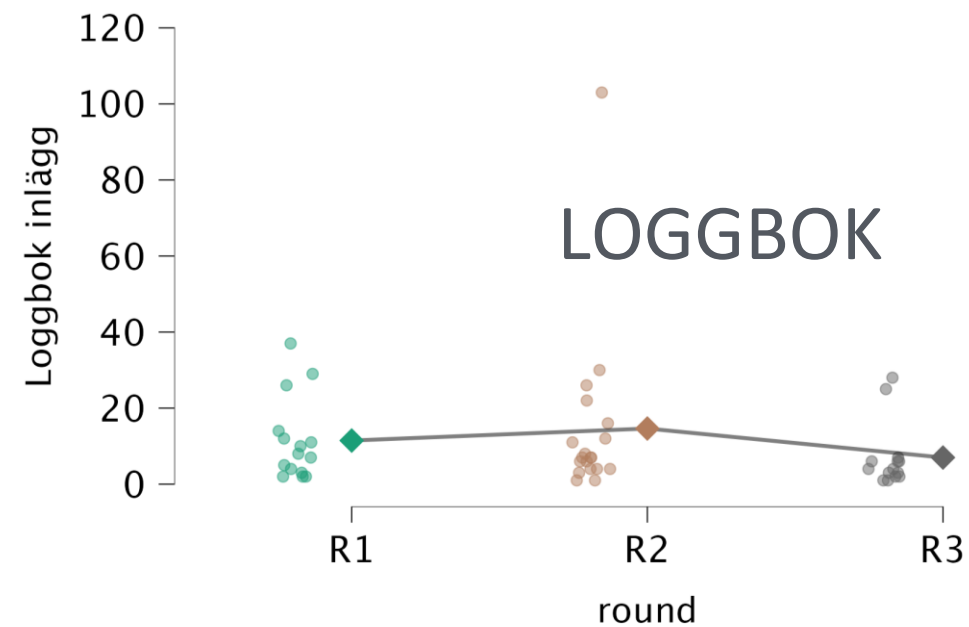
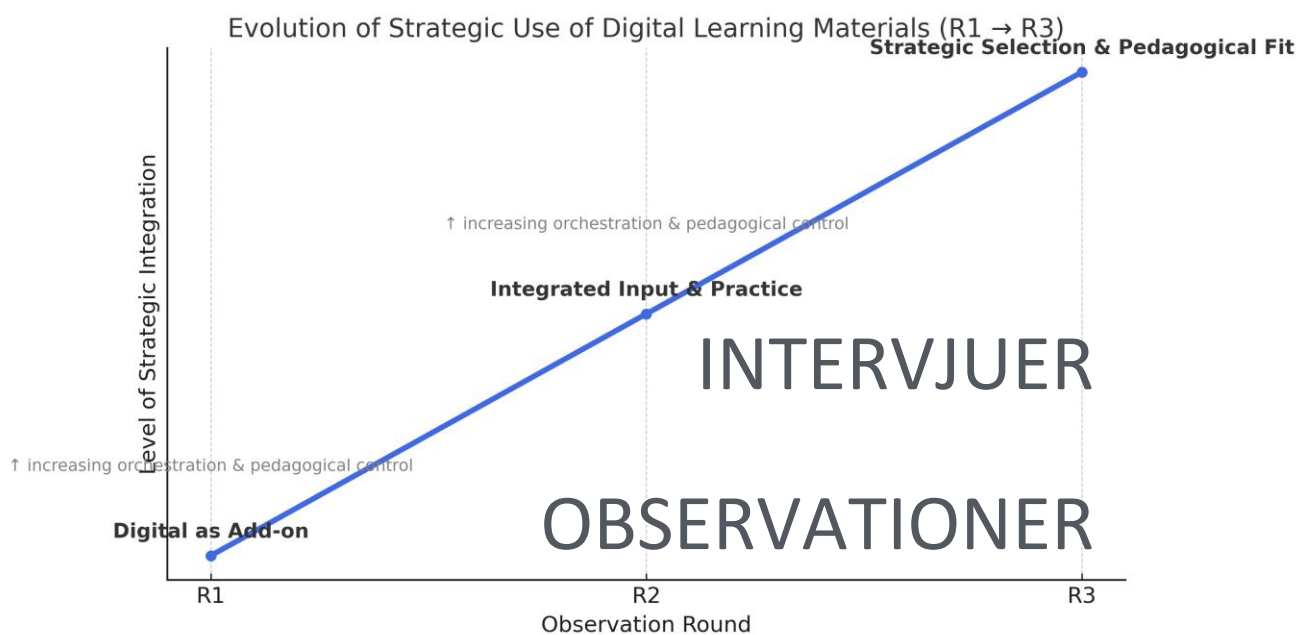
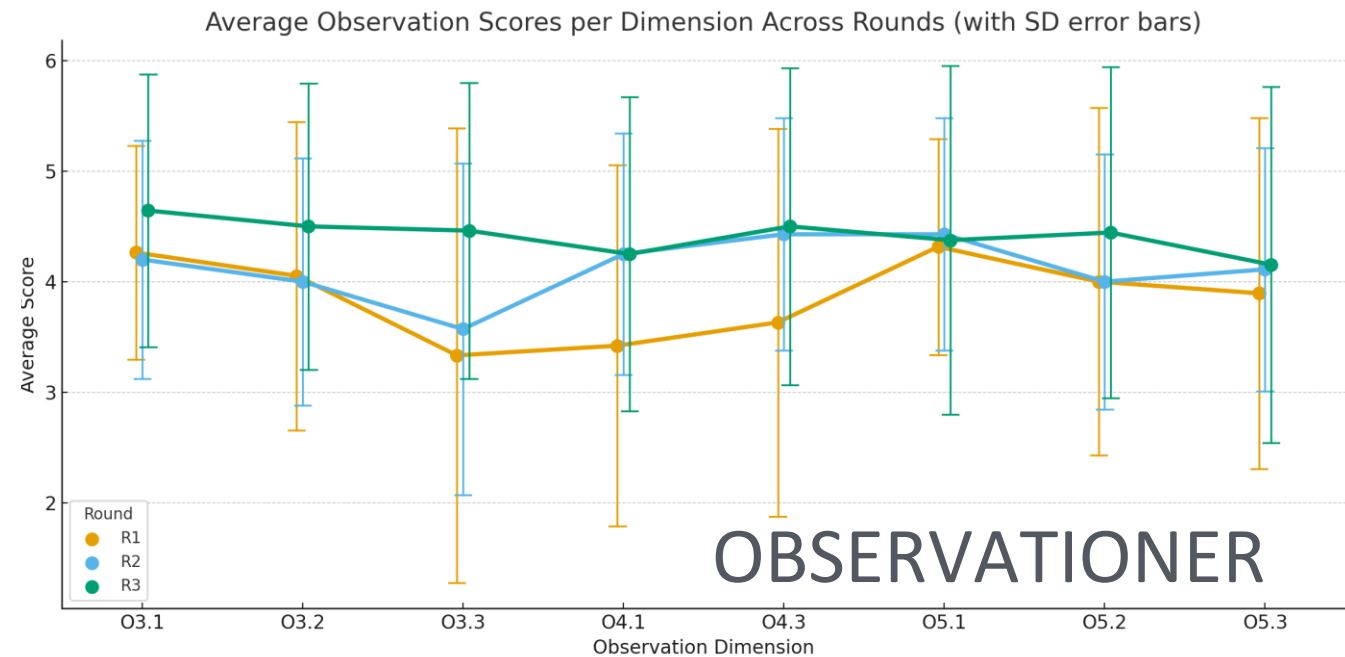
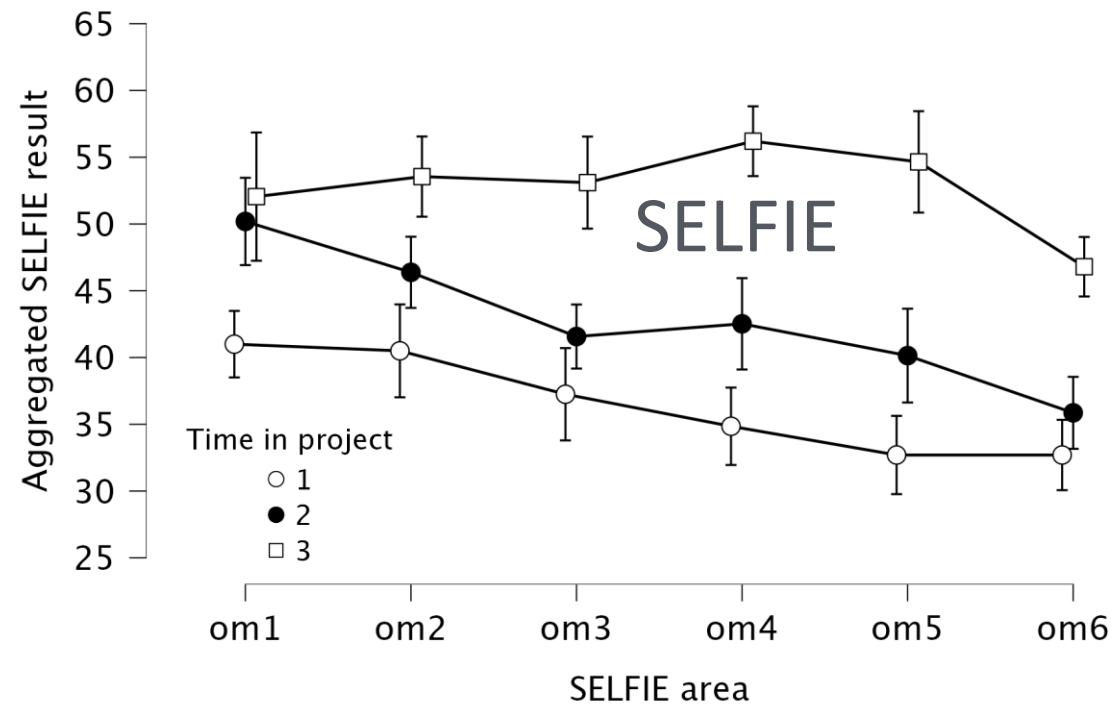
Hur...i projektet?

- ❑ Intervjuer med lärare, rektorer, leverantörer och samtal med andra aktörer inom kommuner och skolor.
- ❑ Enkäter, loggböcker, och dokumentanalys
- ❑ Systematiska observationer i klassrummen (kopplat till DigiCompEdu).
- ❑ Workshop och scenarier.
- ❑ Dataanalyser.
- ❑ Triangulering av analysmetoder.

Slutsatser

- Höjt lärarnas digital kompetens (över SELFIE, observation, loggböcker och intervjuer)
- Fidelity minskade, dvs användandet av digitalt läromedel minskade bl.a. för att de inte uppfyller lärarnas undervisningspraktik





Långsiktig scaffolding och tillit

krävs för att stärka lärarnas digital kompetens



Vad...i projektet?

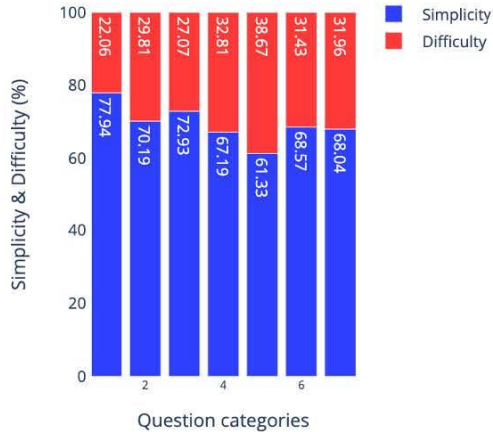
- Lärarnas digital kompetens
- Fidelity - användandet av digitalt läromedel
- Dataanalyser - Dashboards

C Detail

Student ID	Date Week	Question category	User answer	Correct answer	Result	Answer duration
filter data...						
S5011	2019-05 W19	6	a	c	Incorrect	0.25
S7531	2019-05 W19	6	a	a	Correct	0.388
S7126	2019-11 W45	7	a	b	Incorrect	1.12
S6694	2019-09 W35	5	a	a	Correct	0.4
S1773	2019-10 W42	1	c	c	Correct	0.333
S7269	2019-08 W32	3	c	b	Incorrect	0.428
S5001	2019-10 W42	6	a	b	Incorrect	0.85
S1479	2019-07 W28	5	a	a	Correct	0.333
S6183	2019-10 W42	5	c	c	Correct	0.55
S6753	2019-09 W36	6	c	b	Incorrect	0.696

<< < 1 / 1000 > >>

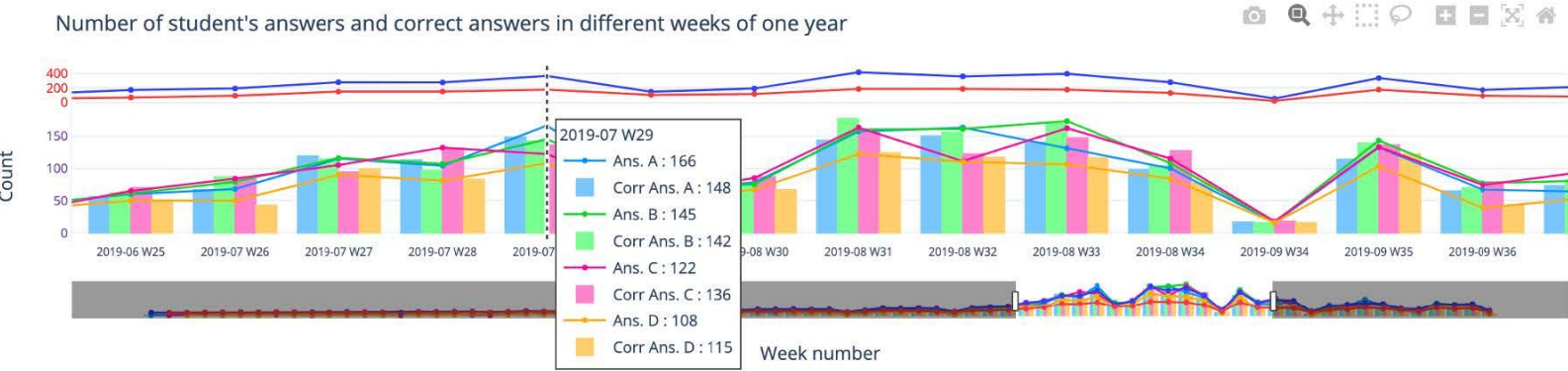
Difficulty of different question categories (%)



Key Metrics



Overview



Detail: similarity levels + extra information

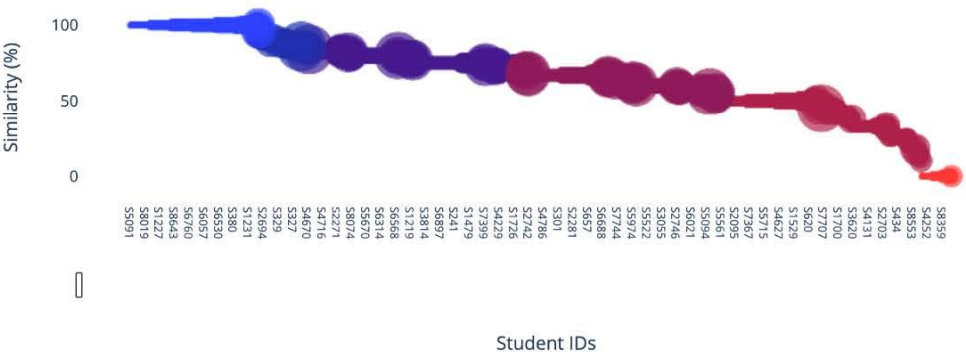
Detail: comparing students' performance

Detail: students' similarity

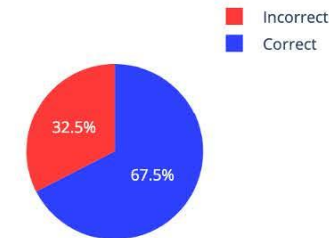
Select a feature:

☒ Student ID ☐ Date ☐ Day ☐ Hour ☐ Answer duration ☐ Question category

Similarity level between students' answers and correct answers



Users answers (%):



A

B

C

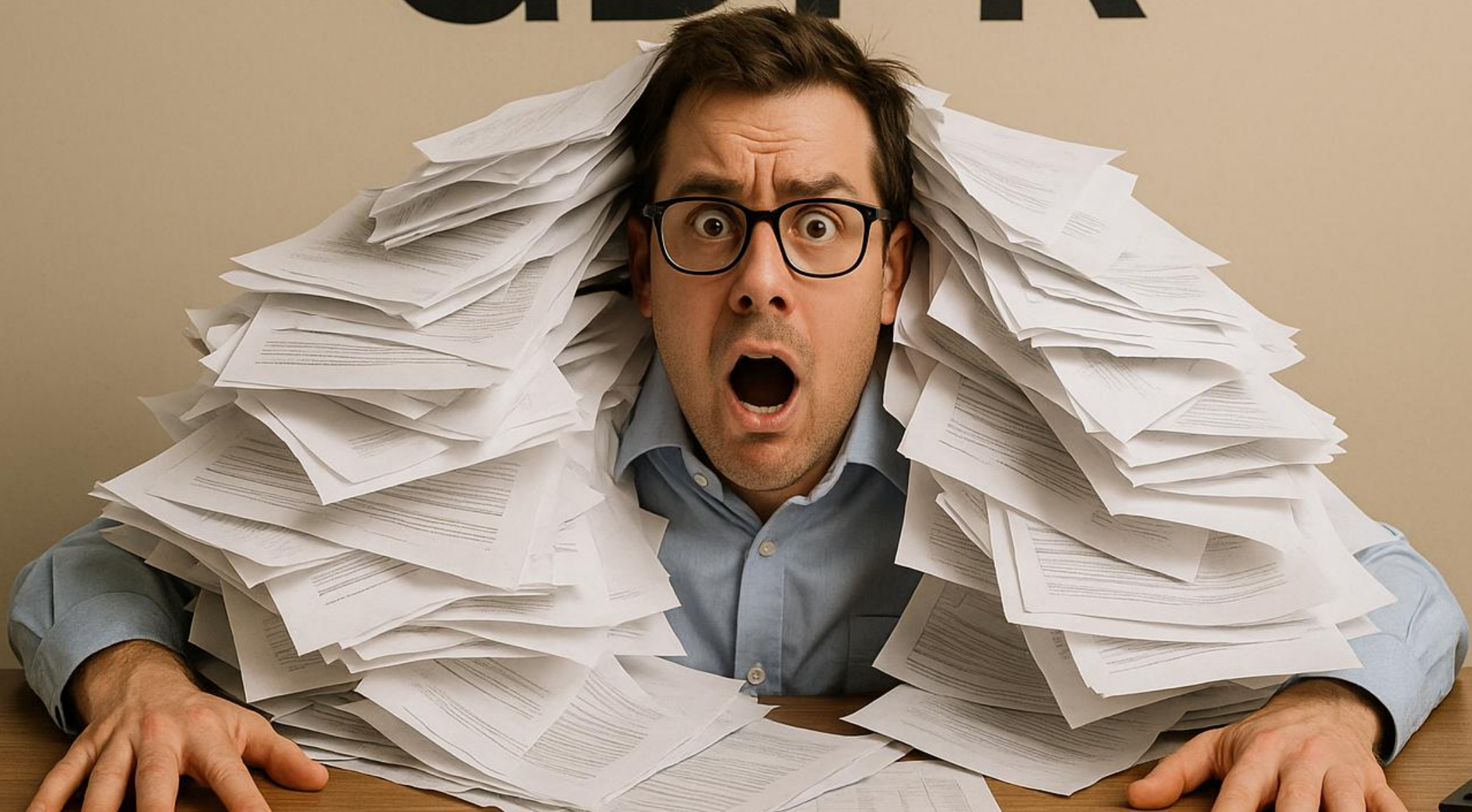


Slutsatser

- Datachaos och ett absolut behov av standarder



GDPR



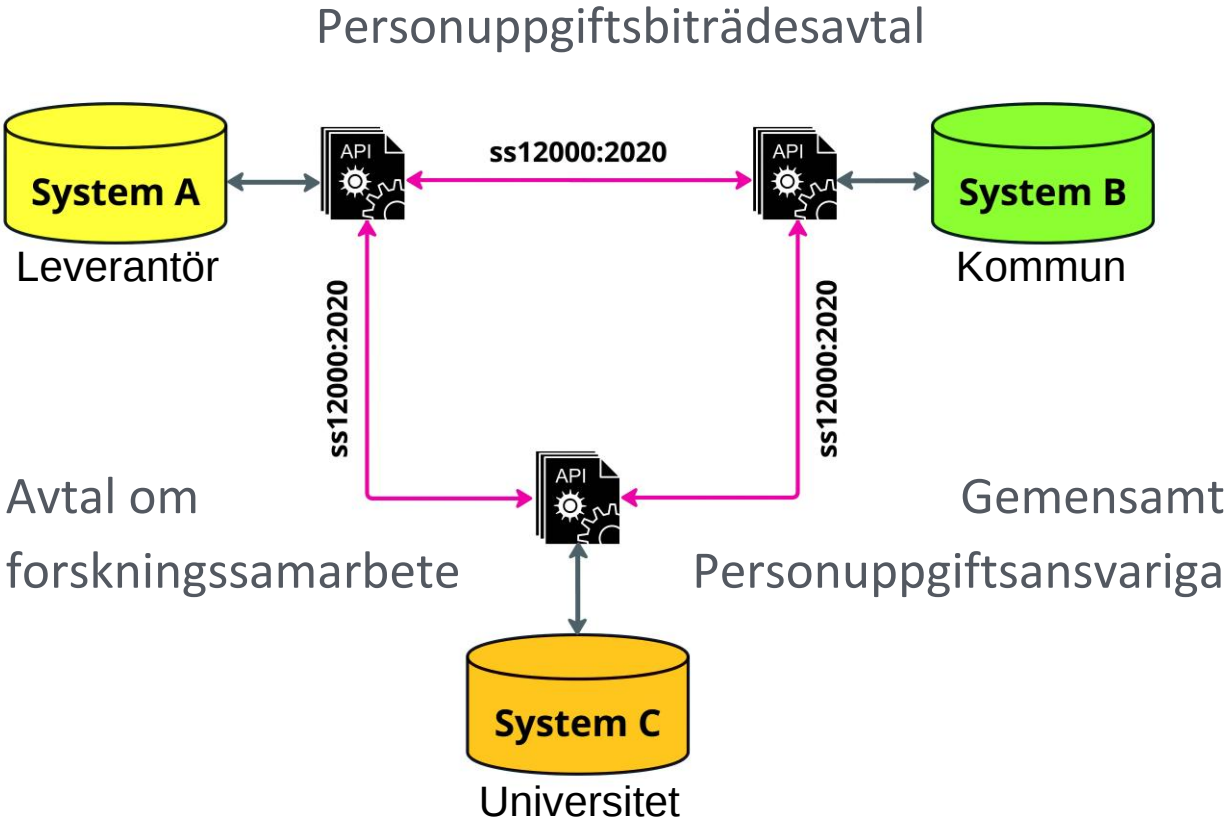
DATADELNINGSAVTAL

Daterat

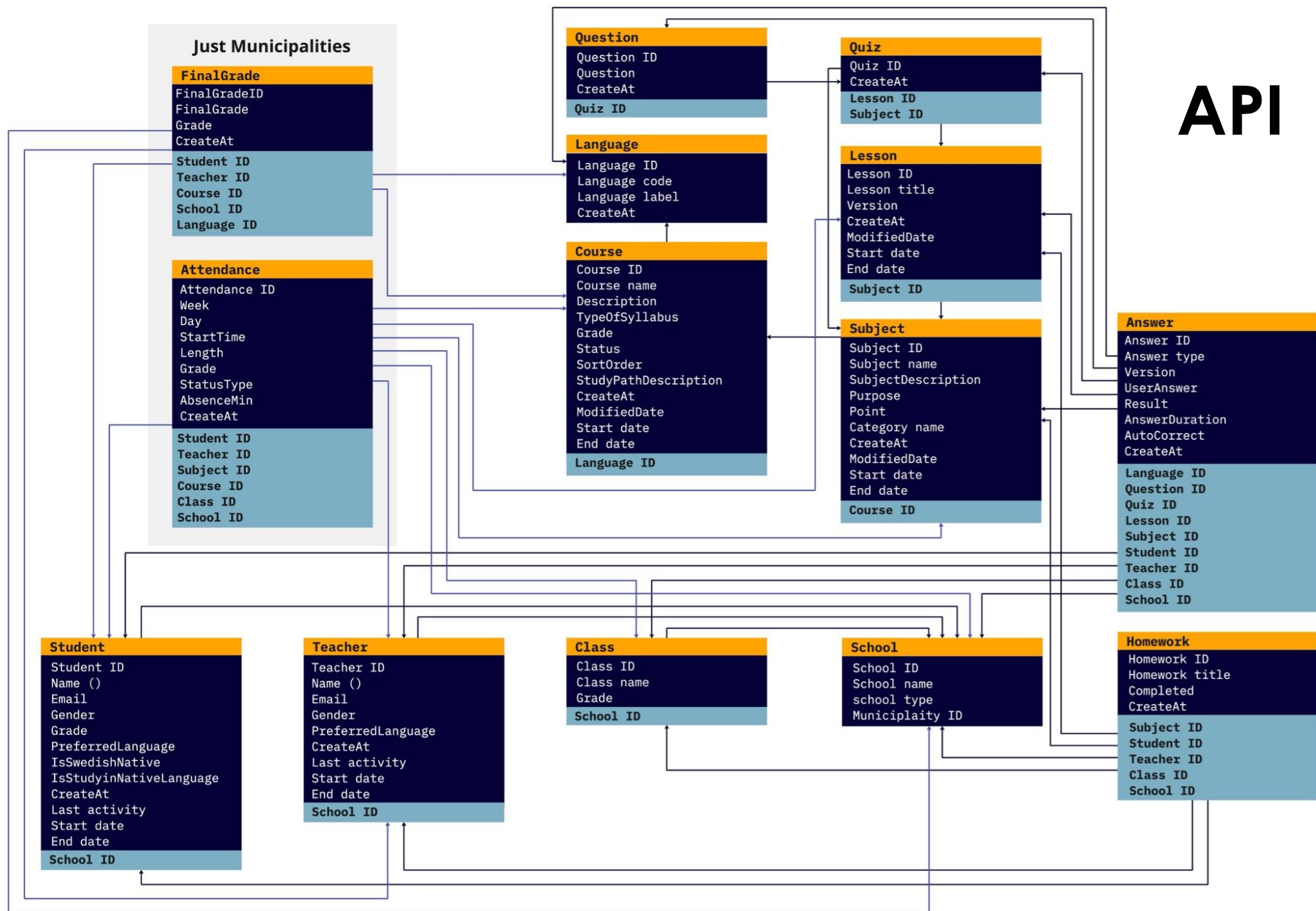
Institutionen för datavetenskap och medieteknik, Linnéuniversitetet

Gällande personuppgiftsbehandling inom ramen för genomförande av
forskningsprojektet Utbildningsteknologi i grundskolan.
Detta avtal reglerar endast behandlingen av personuppgifter.

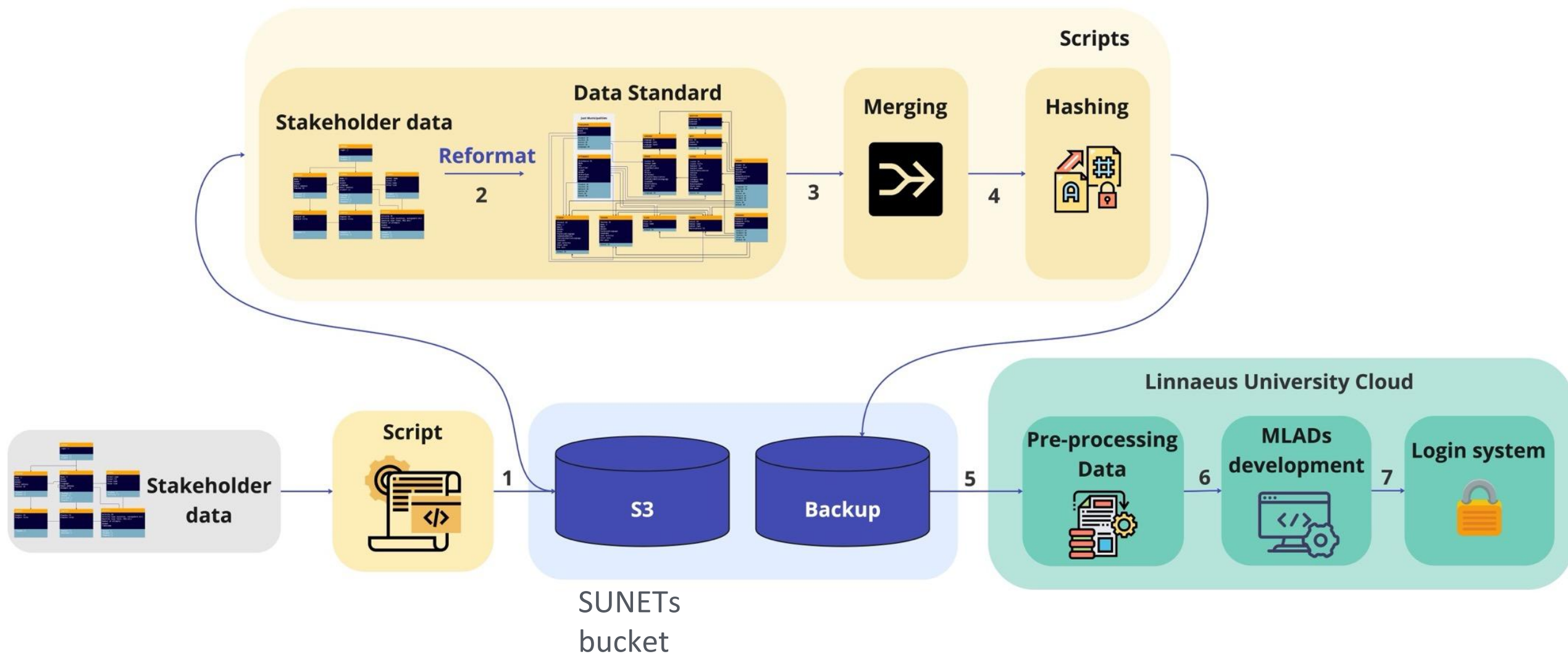
Avtal



API

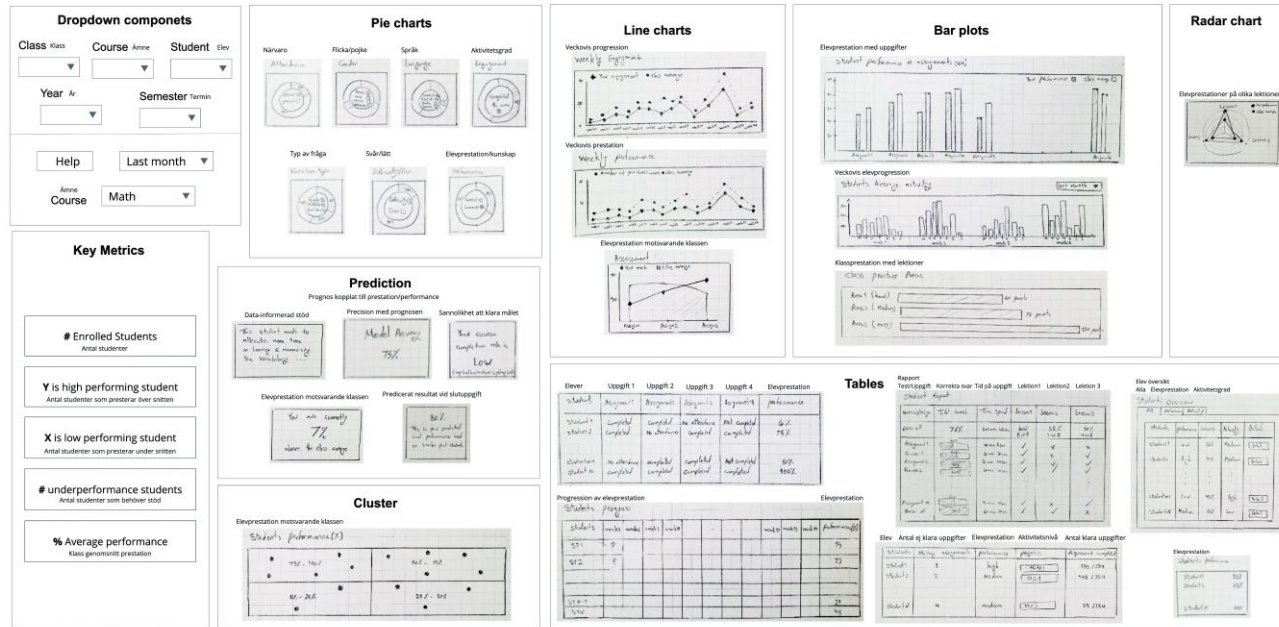


Data pipeline



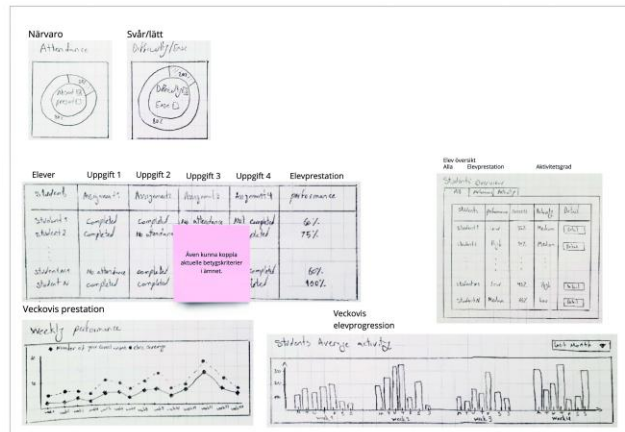
Tidiga prototyper

Various Components

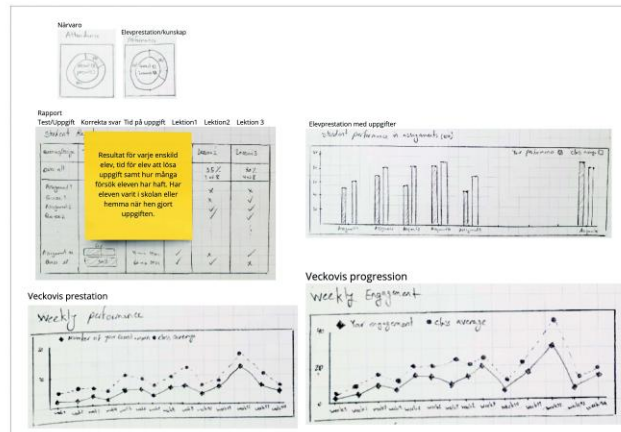


Customize your prototypes based on the provided components by copying a component, choosing the desired area for its display, and then pasting it. You can also add a note if you want to have different components

Class Level



Student Level



Teachers side

Select Class:
2A

Select Student:
ST1225

Select Discipline:
English

Select Year:
2021

Select Semester:
Spring



Teacher side

Select Class:
2A

Select Student:
ST1225

Select Discipline:
English

Select Year:
2021

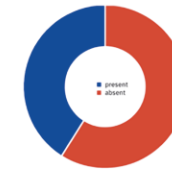
Select Semester:
Spring



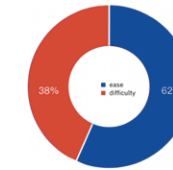
Class Student Discipline

Select Subject:

Attendance



Difficulty



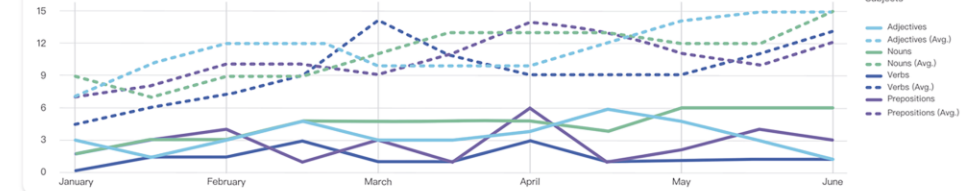
Motivation



Satisfaction



Student's performance in different subjects over time



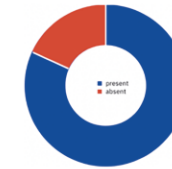
Analysis and Recommendations:

The student's performance in all English subjects is lower than the average classroom performance. Because the student's attendance rate is only 40%, it is preferable to discuss the issue with the student's parents in order to find a solution. The student has 38% difficulty answering the English questions, thus it is essential to determine whether this is due to the questions' complexity or the student's knowledge. This student is 38% unsatisfied. Keep track of the student who is losing motivation.

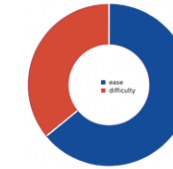
Class Student Discipline

Select Subject:

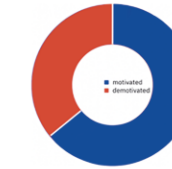
Attendance



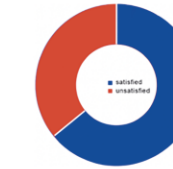
Difficulty



Motivation



Satisfaction



Student's performance in "Nouns" over time



Analysis and Recommendations:

The student's performance in Noun subject is below average in the classroom. The student's attendance rate is 82%, indicating that he or she enjoys the subject. The student had 29% difficulty answering the questions. This student is 29% unsatisfied and unmotivated. Keep an eye on the student and include him or her in group activities.

Select school name:

Selected School

Select course name:

T_Swedish

students

16

High performing

ST-f29df8344d

(extra info.)

Low performing

ST-265362dcc9

(extra info.)

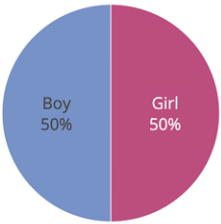
Prediction

ST-b0e360a6de: Course completion risk is low

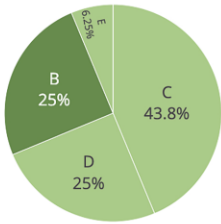
(extra info.)

Overview of students' data

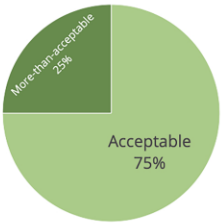
Gender



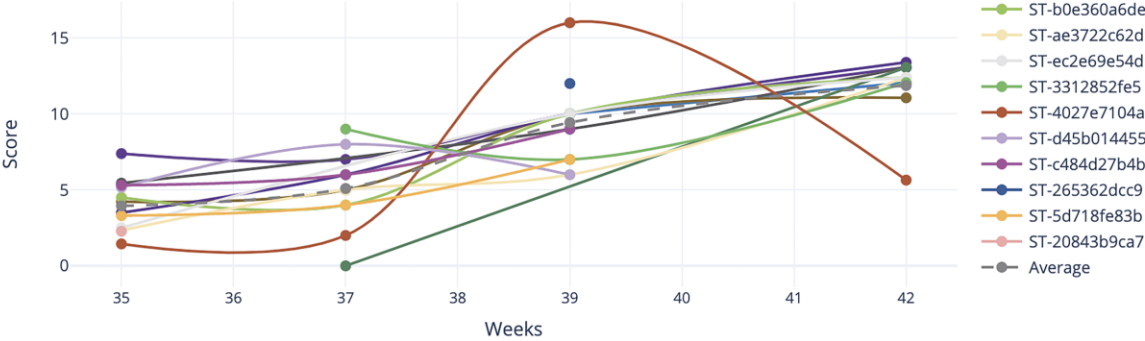
Last grade



Last registered assessment (omdöme)



Students' weekly performance at Selected School in T_Swedish



Detail

Beta prototyp

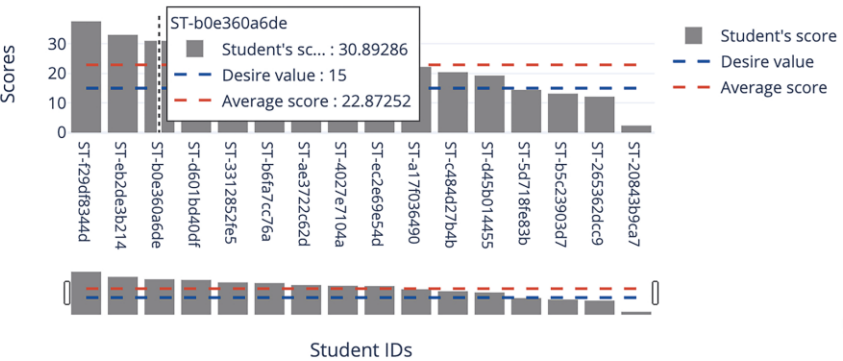
Students' absence in various weeks and their performance

user_id	W35	W37	W39	W42	gender	Last_assessment
ST-f29df8344d	0	0	0	0	Boy	More-than-acceptable
ST-d601bd40df	0	0	0	0	Girl	More-than-acceptable
ST-d45b014455	0	25	0	0	Boy	More-than-acceptable
ST-a17f036490	0	0	95	0	Girl	More-than-acceptable
ST-ec2e69e54d	210	0	0	0	Girl	Acceptable
ST-eb2de3b214	0	95	0	0	Boy	Acceptable
ST-c484d27b4b	0	0	0	0	Girl	Acceptable
ST-b6fa7cc76a	0	0	0	0	Girl	Acceptable
ST-b5c23903d7	0	0	0	0	Boy	Acceptable

Enter desire value:

15

Students' score at Selected School in T_Swedish



Select school name:

Selected School

Select course name:

T_Swedish

Select student ID:

ST-5d718fe83b

Overview of students' data

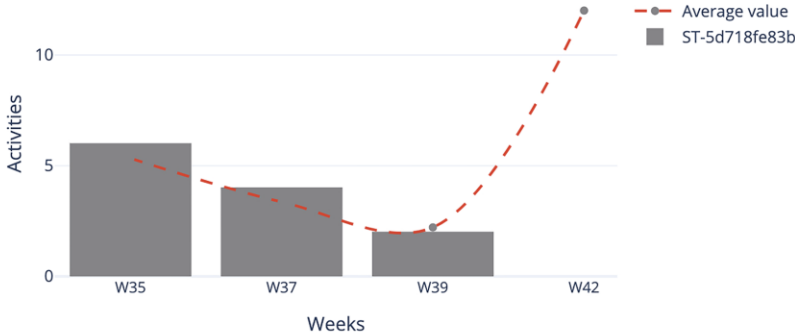
Gender



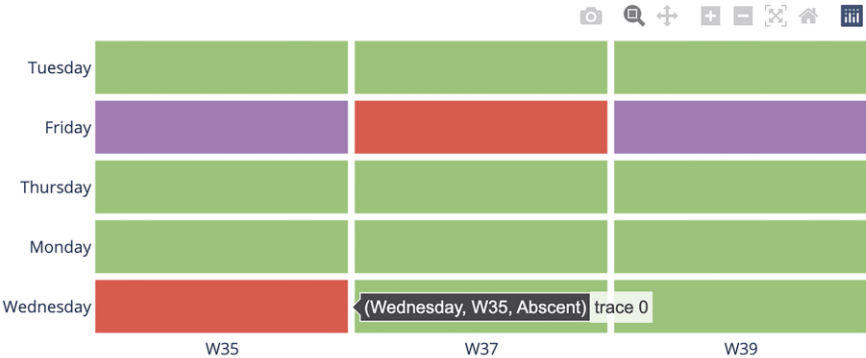
Last assessment



Student's engagements



Student's attendance



Detail

Students'/Student's engagements and performance

user_id	gender	school_name	grade_semester	course_name	question_type	activity_date	week	day	score
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Cloze with text	2023-08-28	W35	Monday	1
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Cloze with text	2023-08-28	W35	Monday	3
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Cloze with text	2023-08-28	W35	Monday	2
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Cloze with text	2023-08-28	W35	Monday	4
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Cloze with text	2023-08-28	W35	Monday	6
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Cloze with text	2023-08-28	W35	Monday	8
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Token highlight	2023-09-11	W37	Monday	0
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Token highlight	2023-09-11	W37	Monday	0
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Token highlight	2023-09-11	W37	Monday	0
ST-5d718fe83b	Girl	Selected School	6 HT-23	T_Swedish	Token highlight	2023-09-11	W37	Monday	0

Select table columns:

- ☒ user_id
- ☒ gender
- ☒ school_name
- ☒ grade_semester
- ☒ course_name
- ☒ question_type
- ☒ activity_date
- ☒ week
- ☒ day
- ☐ answer
- ☒ score

Beta prototyp



Den tekniska delen

- **Interactive visualizations:** Pie Charts, Histograms, Scatter plots
- **Interactive features:** Brushing, Zooming, Filtering
- **Python** for programming; **Panda** for data processing and analysis; **NumPy** for handling arrays and matrices with mathematical functions; **Plotly** for generating interactive graphs; **Dash** for building web applications; **Joblib** for lightweight pipelining in Python; **Pathlib** for managing filesystem paths; **Sklearn**, a Python library for ML; **Dask** for parallel computing; **SciPy** for scientific and technical computing; and **Imblearn**, a Python package for re-sampling techniques in imbalanced datasets

Erasmus+

- Topic 8-ERASMUS-EDU-2025-PI-FORWARD-DIGITAL-DM: Digital education: Innovative data collection and exchange approaches in primary, secondary education (including vocational education and training) for data-informed decision-making

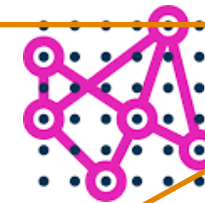


enneuniversitetet

Herasmus+



Model
Data In
Decision-M
and Se



EUROPEAN
EDTECH
ALLIANCE



RSITY OF BERGEN



Varför är det viktigt att vi utgår från att EU stödjer byggandet av en datainfrastruktur och visar en politisk riktning?

1. **Rörlighet/mobility:** en digital portfölj som gör livslångt lärande möjligt.
2. **Innovation:** svensk EdTech kan växa och bli ledande.
3. **Demokratiskt** samhälle



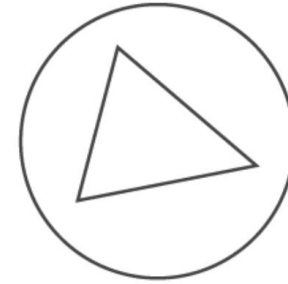


Vi har bevisat att det är möjligt

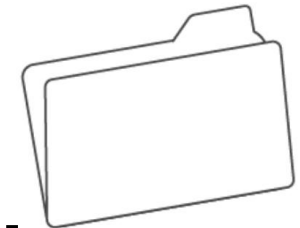
Vi har lagt grunden för en bra datainfrastruktur

Vi ska tänka hållbart och för det krävs stöd från EU

Utbildningsteknologi i grundskolan

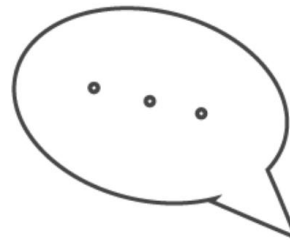


italo.masiello@lnu.se



Tack

!



Lnu.se

Pannelsamtal - Framtidens Lärverktyg - vart är vi på väg?



Daniel Eskilsson



Marcus Billström



Lene Karin Wiberg



Italo Masiello

Tack till alla er alla för ert engagerade deltagare!

- Vi analyserar och summerar – nästa steg
- Vill ni samverka - hör av er!

