CCSE

Center for Computing in Science Education

Status CCSE T3-2019

Develop materials and methods

Build educational research group

CCSE Centre for Computing in Science Education

Vision "an international hub for research-based integration of computational methods in education"

Build culture for teaching and learning

Disseminate nationally and internationally

Personell

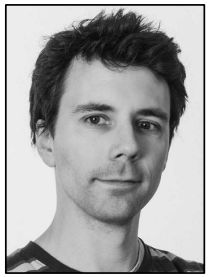
Finansiert over CCSE

Skramstad,
Kontorsjef

Caballero,
Prof. II (20%)

Odden,
Post. Doc.

Lockwood,
Prof. II (20%)



Sand,
PhD-student

Aiken,
PhD-student

Ledergruppe CCSE (20%)

Malthe-Sørenssen,
FI

Mørken,
MI

Tellefsen,
MN/KURT

Nederbragt,
IBV

Sølna,
MN

Sandve,
IFI

Hjorth-Jensen,
FI

Henriksen,
FI

ProFag

Haraldsrud,
Univ. Lektor (40%)

Løvold,
Univ. Lektor (50%)

Honours-programmet/FI

Sveinsson,
Post-doc

S-ASSESS (NFR, FInnUt)

Winther-Larsen,
PhD-student

Marin,
Sci. Programmer

Ten-year progress plan

Present state (2016)	*Progress*
Existing culture with some excellent practices, student engagement	
Math and programming in first semester	
Full CSE integration in 2 of 6 courses, partial in others	
2 textbooks published	
Research basis is sparse	

Five-year-goal (2021)	*Progress*
Initiated research-based approach to curriculum change with students	Ok
Pilot extension to biology	Ok
Pilot adaptation at external partner	Ok
Pilot school program	Ok
Full CSE integration in 4 of 6 courses	Ok
4 textbooks published	3 of 4
Pilot studies of learning outcomes and teaching methods in 3 courses	Ok-

Ten-year-goal (2026)	*Progress*
Internationally leading hub	
Extension to 3 other disciplines at UiO	
Adaptation at 2 external partners	
Running school program	
Full CSE integration in 6 of 6 and 2 advanced courses.	
4 textooks published	
Internationally recognized - computational science education	

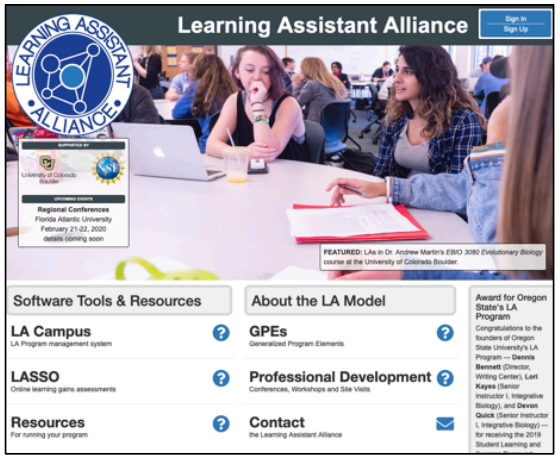
Overview - status

- Høydepunkter 2019
- Aktiviteter 2019
- Økonomi – 2019
- Budsjett – 2020
- Planer 2020

Highlights 2019

Summer Institute

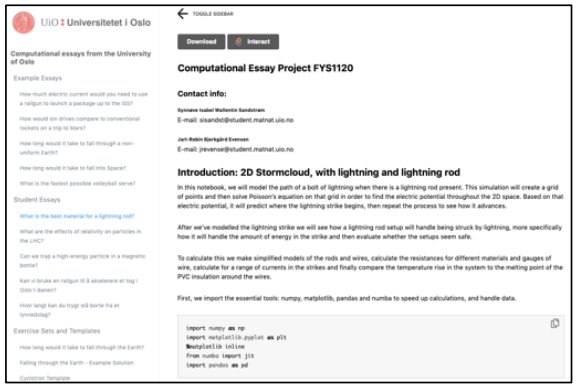
ProFag / Moving in



Learning assistants

Sabbaticals: John Burk, Elise Lockwood

Learning analytics



Computational essays

INTPART

Seminar series

UTVIKLING

Utvikling: Summer institutes

2018: Bioscience (University of Minnesota)

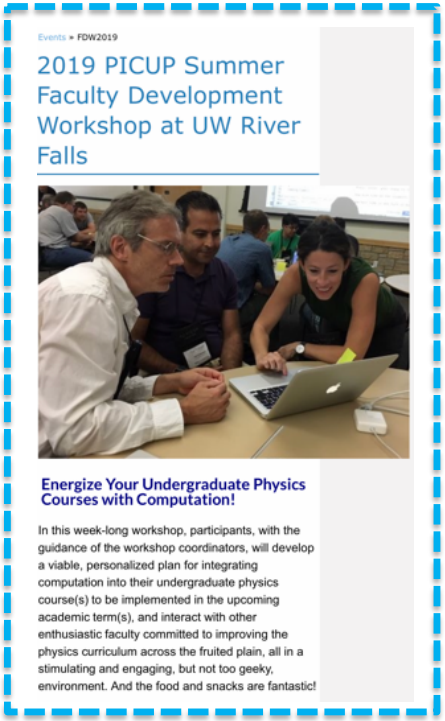
2019: Computing in physics (MSU)

Pedagogisk fokus (50%)

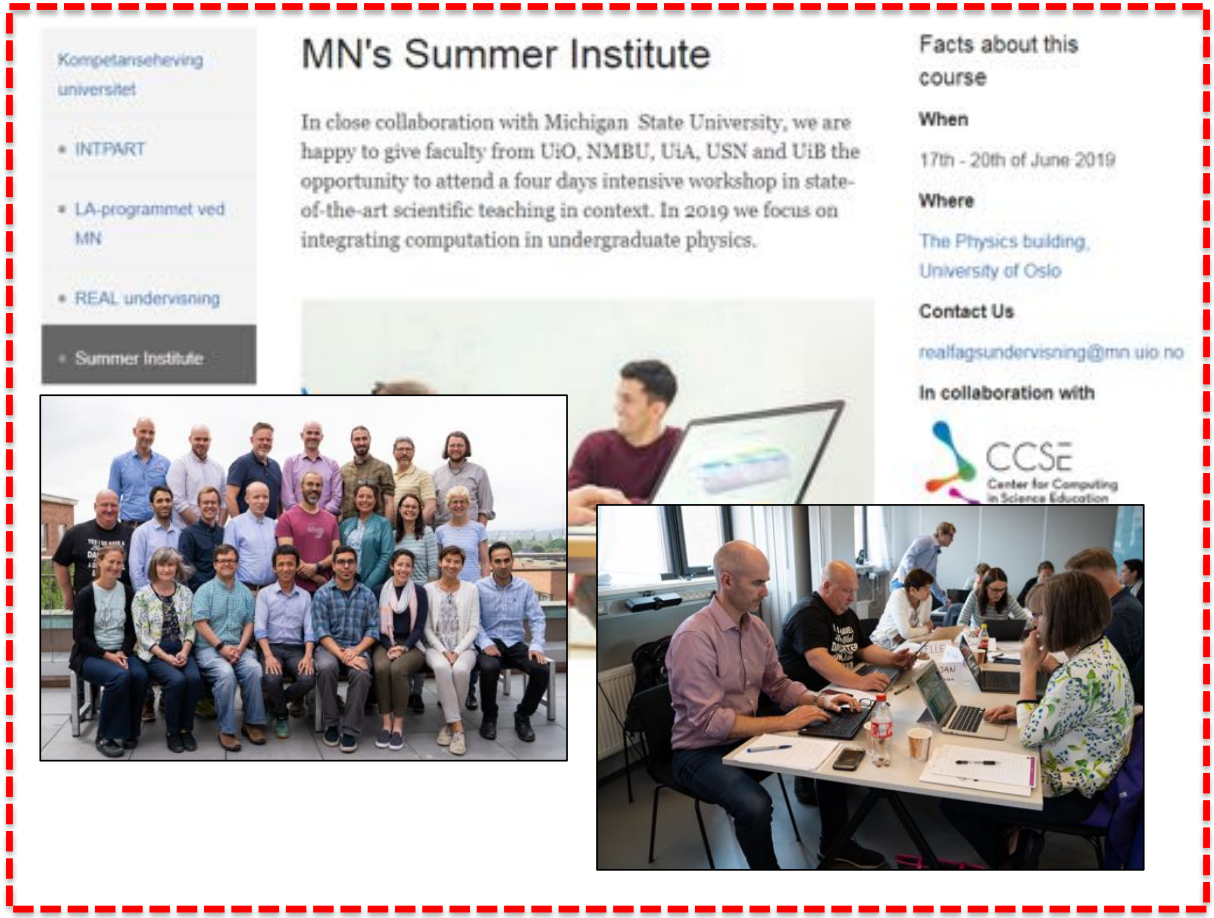
Integrasjon av programmering (50%)

IKKE et kurs i programmering

Nasjonal og lokal deltagelse i 2019



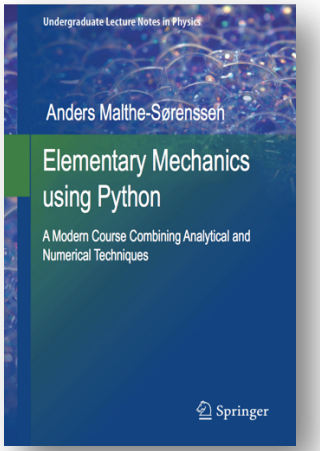
Michigan State University (since 2015)



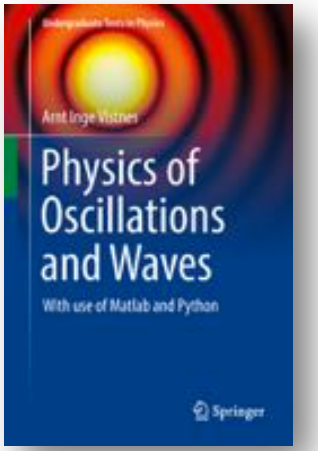
University of Oslo (since 2018)

Utvikling: Lærebøker

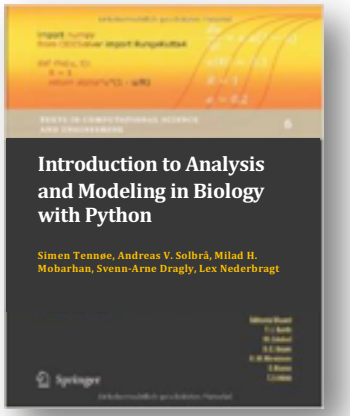
2007



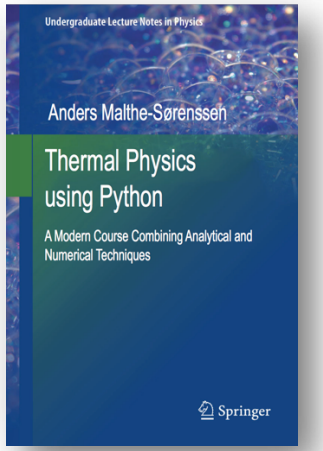
2015



2017



2020



2021

QM

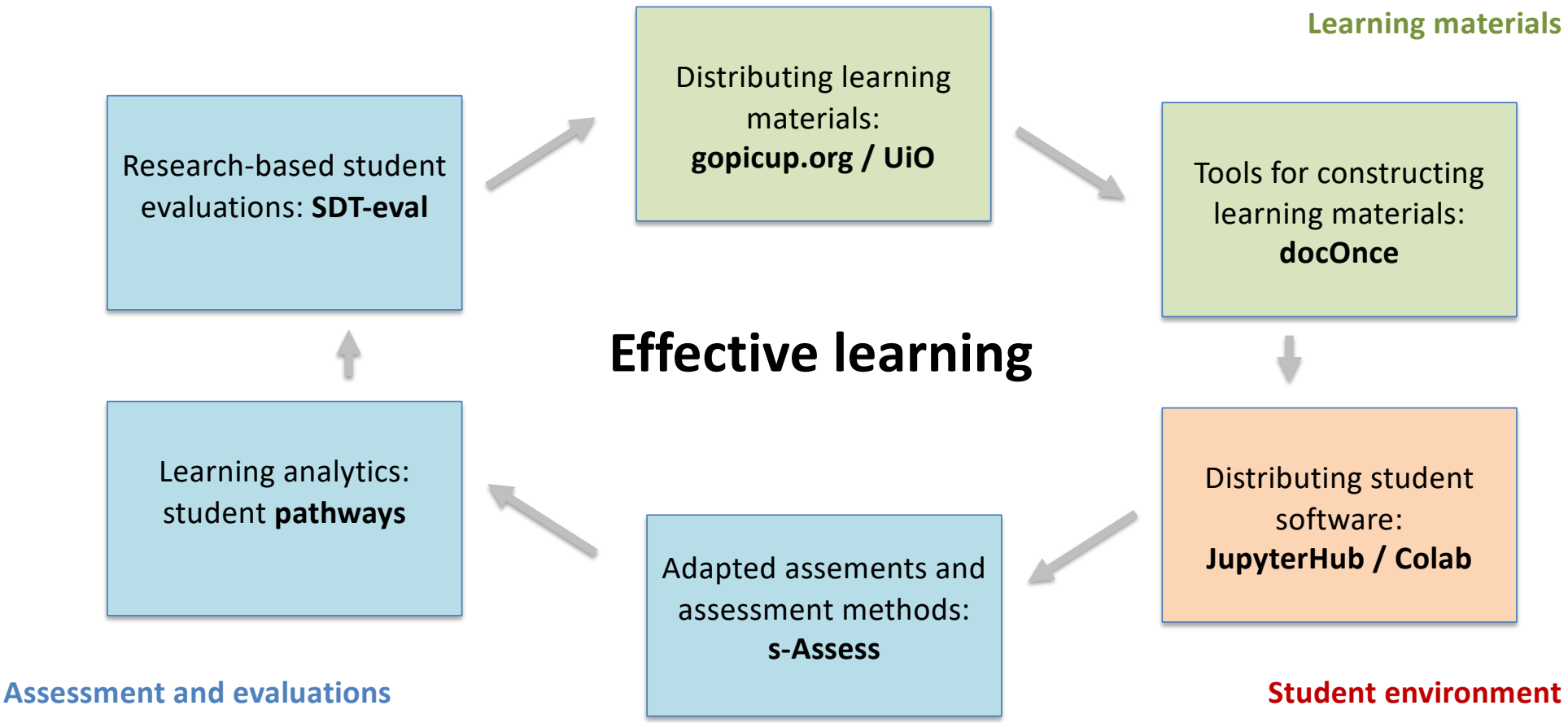
EM

2023

Avtale om lærebokserie i fysikk med Springer

Verktøy: Doconce – fullstendig løsning for læringsmateriale

Developing the underlying tools for change



Utvikling/Forskning: Computational essays

Pilotstudie Fys1120 2018 (20 studenter)

Obligatorisk Fys1120 2019 (160 studenter)

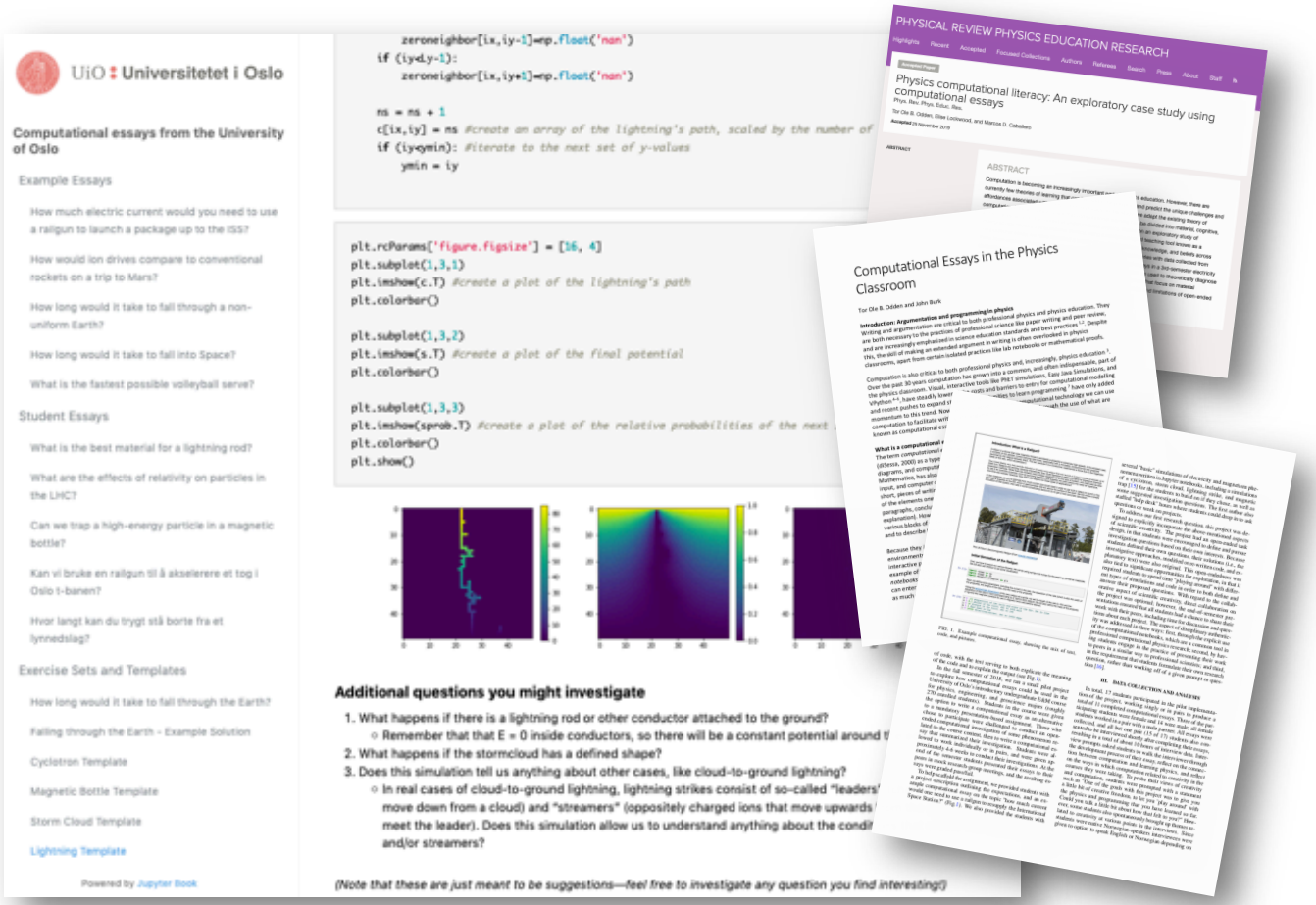
Obligatorisk Fys2130 2020 (80 studenter)

Gode tilbakemeldinger

Følgeforskning: 3 artikler i 2019

Utvidelse/samarbeid: MSU, UC-Boulder

Andre programmer?




Odden, Post. Doc.


Caballero


Lockwood

Utvikling/Forskning: Learning Assistants

2017: Pilotstudie Fys-mek1110

2018: Innført Fys-mek1110, Fys1120, Mat-inf1100

2019: Innført Fys2130, Fys2140

2020: Bred innføring på UiO?

Pedagogisk opplæring av gruppelærere

Basert på internasjonalt utprøvd program

Student-aktive metoder II (DIKU)

Læringsprogresjoner

Odden, Post-doc.

Caballero

Bøe, Assoc. Prof. FI

Lauvland, PhD-stud

Følgeforskning

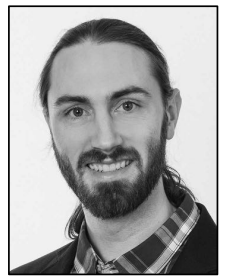
Utvikling/Forskning: Assessments

Standardiserte tester

Utvikling av lokale løsninger

Tilpasning til beregningsmessige problemer

Spredning til flere emner



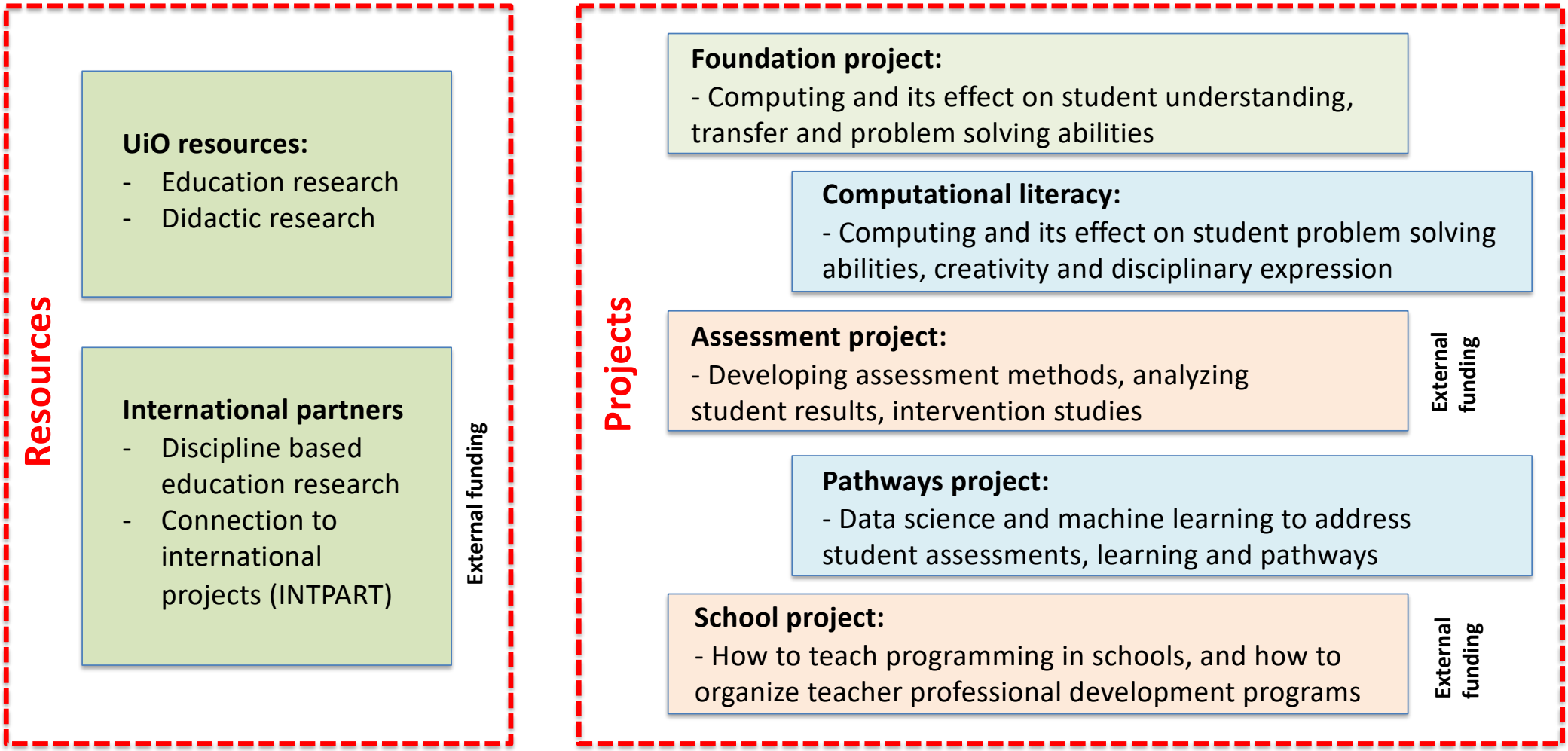
Odden, Post. Doc.

Caballero

Winther-Larsen, PhD-student

FORSKNING

Developing a discipline-based education research activity



Forskning: Learning analytics

Student pathways: basert på MSU data

Thon-prosjekt: Sommer-studenter 2018, 2019, 2020

Solid vitenskapelig impact
(3 Phys Rev 2019, 1 Phys Rev 2018)

Utfordring: lokale data og lokal involvering
(Assessment-prosjektet)

Aiken,
PhD-student

Caballero

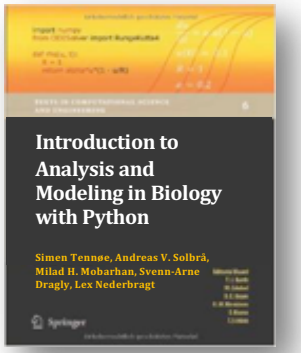
SPREDNING

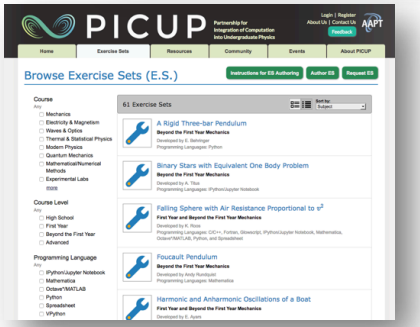
Research-based dissemination strategy

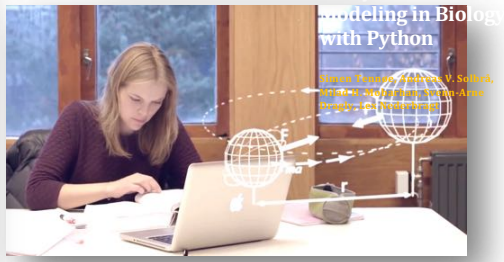
Research shows: Dissemination must be based on the same principles as student-active teaching

- Flexible material
- Workshops and instruction
- Partner with teachers
- Adapt to situation
- Monitor and improve!

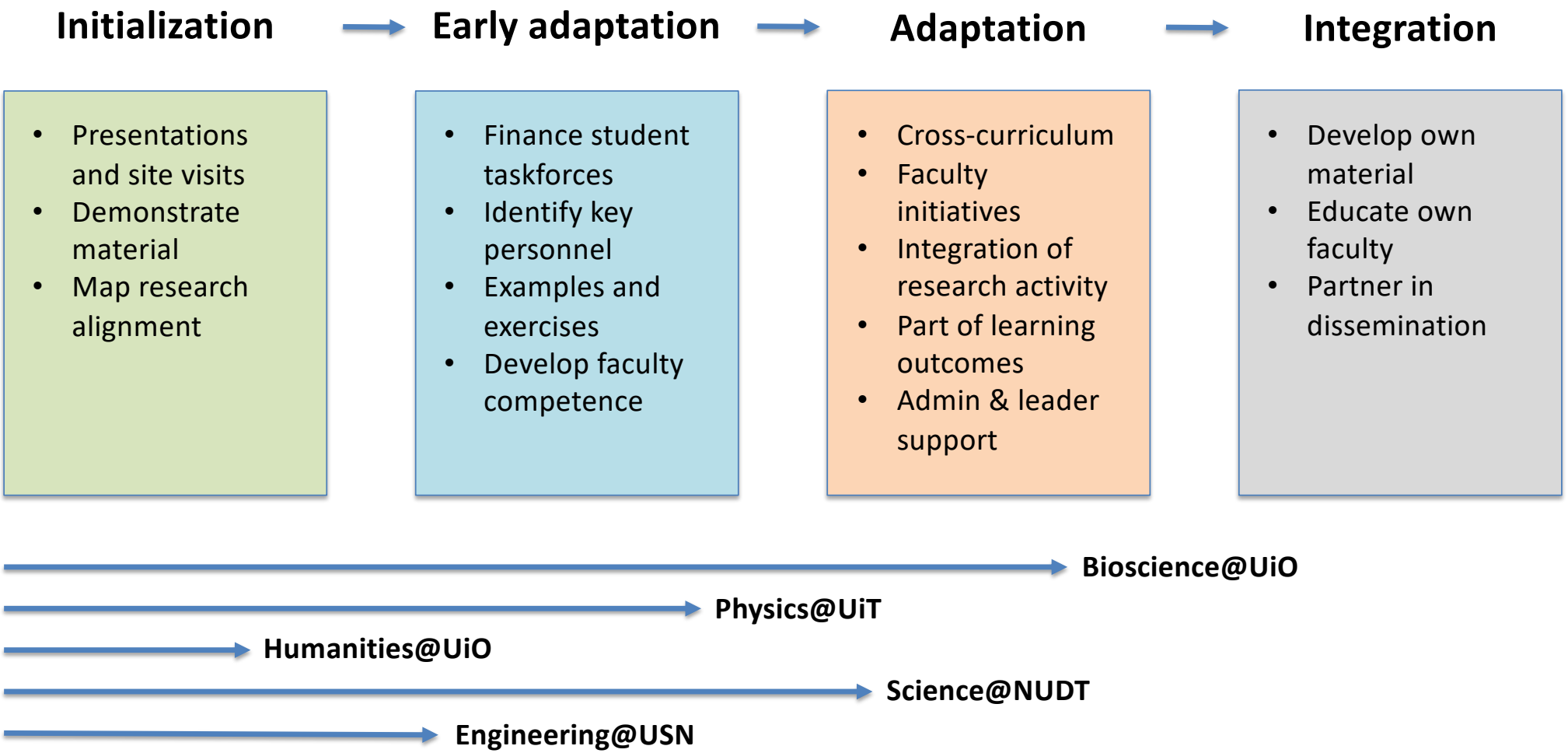
- Students play active role!



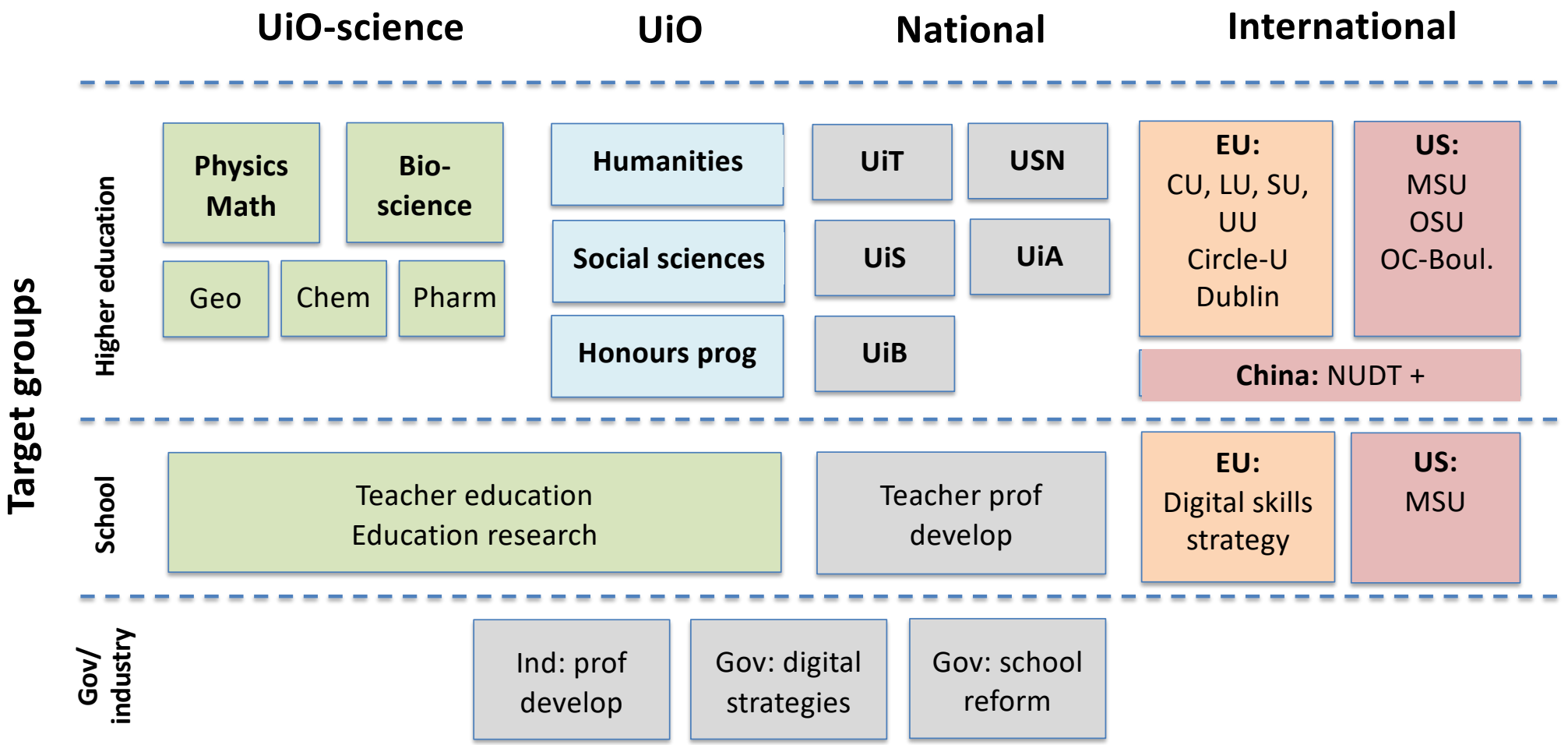




Dissemination: Playbook



Dissemination: Partners and collaborators



UiO : Det matematisk-naturvitenskapelige fakultet

ProFag – Realfaglig Programmering

ProFag er etterutdanning for lærere i PROgrammering for FAGenes skyld. Tittelen signaliserer at vi setter faget i sentrum. Programmeringen skal bidra til styrking og utvikling av realfagene.

- Programmering i Python – basisopplæring
- Algoritmisk tenkning
- Didaktiske utfordringer
- Programmering for fagets skyld
- Programmering endrer fagene

Foto: Simen Kjellin

ProFag: Skole- og kompetanseutvikling

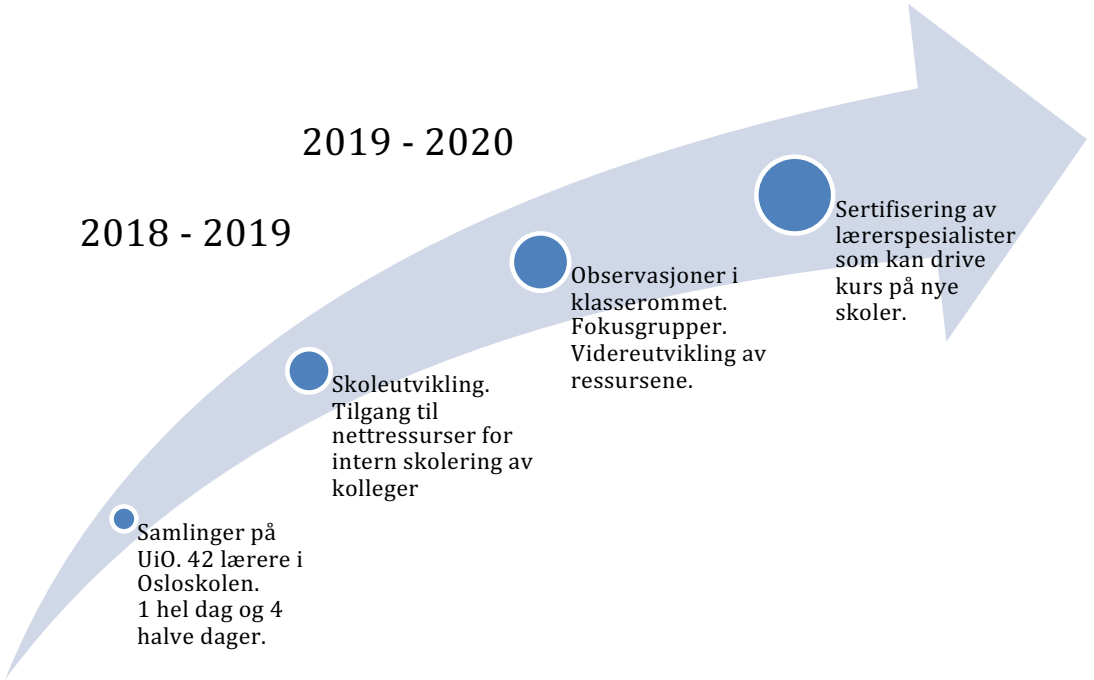
Dypt involvert i
Fagfornyelsen 2020

ProFag: Etablert merkevare

Nasjonal rolle

Dekomp:
- 3 mill 2018-2019
- 4 mill. 2019-2020

Utfordring:
- Følgeforskning
- Riktig skalering



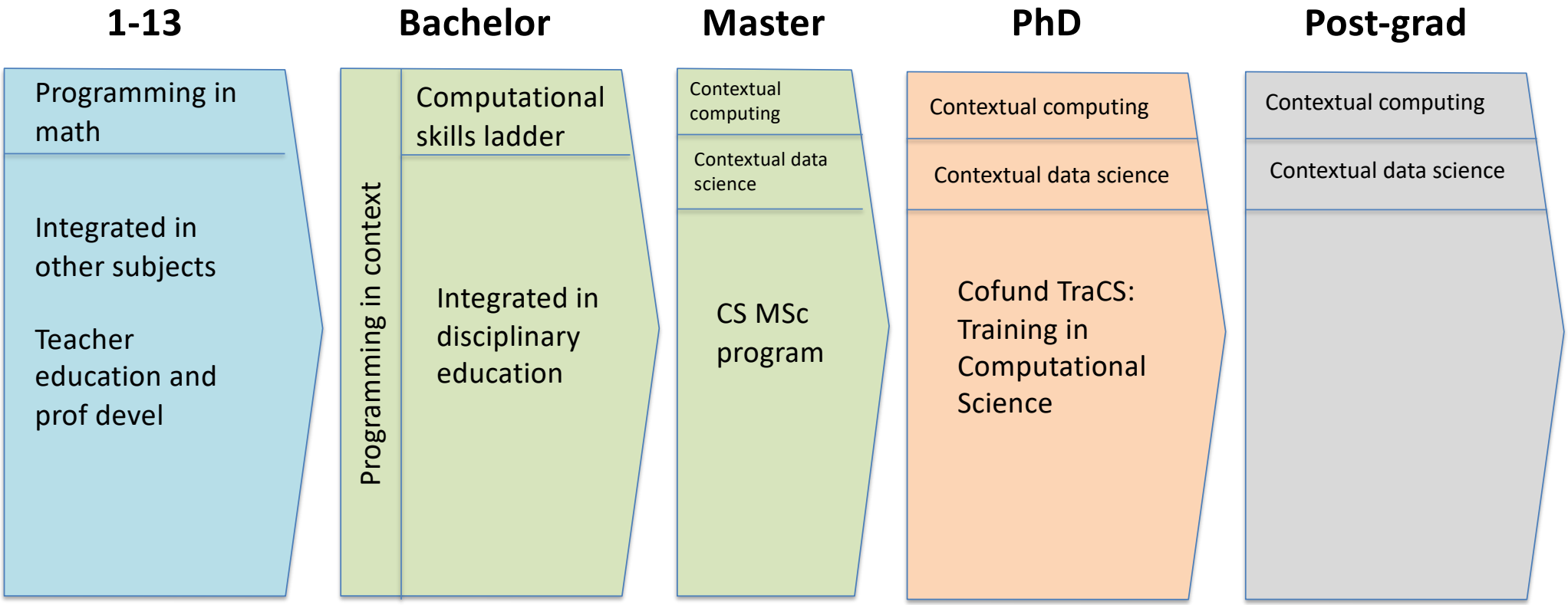
Hvem	Nivå	Kurs	Samlinger	Antall kursdager	Deltakere
UDE	Ungdomskole	4	6	24	55
UDE	VGS	2	4	8	34
Akershus	VGS	2	4	8	70
Totalt	-	8	-	40	159

Tellefsen,
MN/KURT

Haraldsrud,
Univ. Lektor (40%)

Løvold,
Univ. Lektor (50%)

Integration across the educational timeline



Økonomi – Regnskap 2019

Egenandel

Hvordan sikre tilstrekkelig med ressurser til utvikling og forskning?

		2018	2019	2020	2021
Pls					
FI		0,75	0,75	0,75	0,75
MI		0,2	0,2	0,2	0,2
IBV		0,2	0,2	0,2	0,2
IFI		0,2	0,2	0,2	0,2
MN		0,4	0,4	0,4	0,4
Sum		**1,75**	**1,75**	**1,75**	**1,75**
Budsjett 2016		**1,15**	**1,15**	**1,15**	**1,15**
FVA					
FI		1	1	1	1
MI		0,2	0,2	0,2	0,2
Sum		**1,2**	**1,2**	**1,2**	**1,2**
Budsjett 2016		**1,2**	**1,2**	**1,2**	**1,2**
MVA					
FI		0,6	0,2	0	0
MI		0	0	0	0
IBV		0,4	0,2	0,2	0,2
IFI		0,4	0,2	0	0
Sum		**1,4**	**0,6**	**0,2**	**0,2**
Budsjett 2016		**1,2**	**1,2**	**1,2**	**1,2**
Sum		**4,35**	**3,55**	**3,15**	**3,15**
Budsjett 2016		**3,55**	**3,55**	**3,55**	**3,55**