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# **Using Numbas for online learning and e-assessment in a basic mathematical subject, a Norwegian approach**

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## Using Numbas for online learning and e-assessment in a basic mathematical subject, a Norwegian approach

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- This presentation will give a short backdrop to explain why we have been and are deeply interested in e-learning and blended learning at my faculty – Faculty of Engineering Science and Technology at campus Narvik
- Then I will give some examples on how we are implementing digital sources and tools in a basic mathematical subject.
- Finally, I will say a few words about the way forward - for us.



Norway  
and U.K. as  
part of the  
Northern  
Europe!



Northern  
Norway

and

UiT The  
Arctic  
University  
of Norway



## Northern Norway

**UiT The Arctic University of Norway** is a medium-sized research university that contributes to knowledge-based development at the regional, national and international level

Employees: 3 400

Students: 16 000

8 bigger and smaller campus

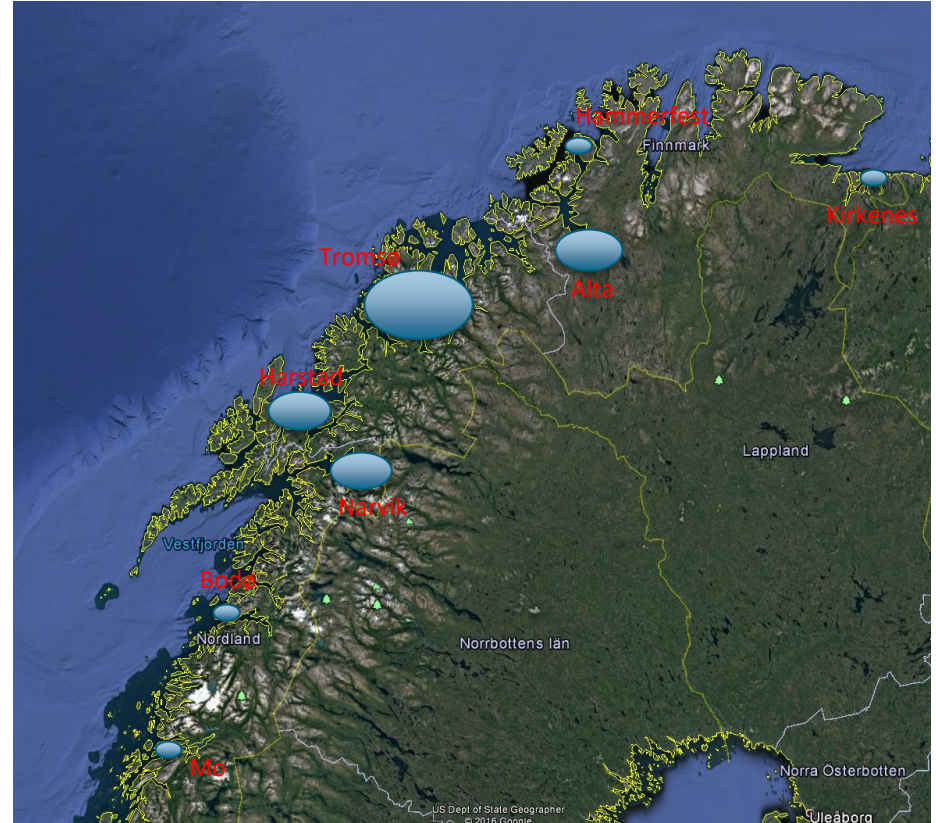
4 minor study spots

Region: 0,7 million people

Area: 113 000 km<sup>2</sup>

Distance Mo-Kirkenes:

1 390 km – 860 miles



## Why using digital sources and tools in education

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- 6-8 years ago we made most of our Campus-based bachelor programs in technology e-learning supported by starting streaming all campus lectures, using Mediasite and Adobe Connect. As an extra support, we added in minor online meetings to help the of-campus students with their progress in the different subject.
- Professional resources for each subject contained both student groups as a common group. It did set as a condition that campus students and off-campus students had to follow the same progression within the same period.
- About the same time, we got the first examples based on development and dissemination of subjects with digital sources and tools - primarily with the classroom as a learning arena.

## Why using digital sources and tools in education

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- Blended learning is a concept of an educational learning program involving:
  - one part through prepared online learning, with some element of student control over time and place
  - one part in a supervised brick-and-mortar location at a university campus
  - focus on if modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.
- The majority of blended-learning programs resemble one of four models: Rotation, Flex, A La Carte, and Enriched Virtual. The Rotation model includes four sub-models: Station Rotation, Lab Rotation, Flipped Classroom, and Individual Rotation.

## Why using digital sources and tools in education

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- Digital sources and tools being used in teaching and dissemination of knowledge is getting better. Those elements gives new opportunities at the intersection of pedagogical and didactic challenges around building up the content and dissemination of a subject.
- Our faculty's jump into full-scale e-learning teaching where we started streaming the traditional lecture, now face methodology built around the principle of blended learning.
- In a few years time we will notice that the shape of education will change its character, and we will get a mix of students, some on campus, some off-campus, some with normal progression and someone who takes part-time study and combine subjects to program over time.



## Some examples of using Numbas as source in mathematics

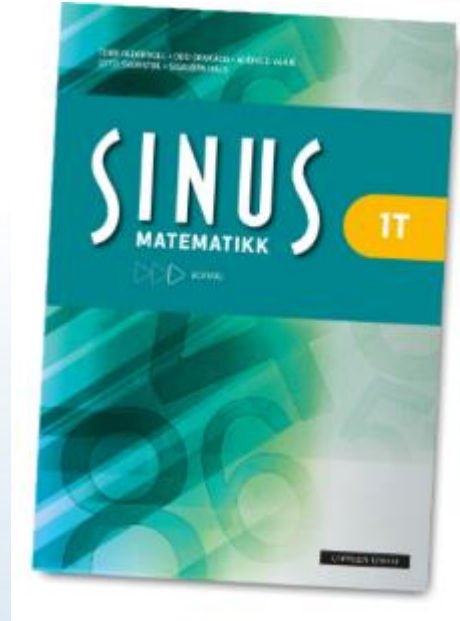
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- For some years we have been using [Numbas](#) as one of several sources for the development of a digital “compendium” and as a learning aid in a basic math subject. A student adviser binds the different theoretical modules together in a natural scientific context, and associated exercises show the candidate’s learning progress. The concept will function both as an introduction to, as appetizer and as a first individual online introduction to each theory module. Specialization, greater understanding and reflection develops when students meet in the study workshop with teacher-guided practice or projects.

## Some examples of using Numbas as source in mathematics

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- Campus Inkrement is a "partially open" service for professional development and sharing of resources within among subjects as math and physic. They have an agreement with the Norwegian publisher Capellendam.
- Here is an example of theory and exercises related to quadratic formula.
- <https://campus.inkrement.no/Course/Lectures/304230>



## Some examples of using Numbas as source in mathematics

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- One of my colleagues has put together an overview page of many digital support resources that can be used within mathematics:
  - Tore Gaupseth, Assistant Professor at Department of Computer Science and Computational Engineering
  - <http://kark.hin.no/numbas/>



## Some examples of using Numbas as source in mathematics

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- Numbas used in mathematics - A zero courses in basic math:
  - [https://dl.dropboxusercontent.com/u/2113110/Nullkurs\\_2014.html](https://dl.dropboxusercontent.com/u/2113110/Nullkurs_2014.html)
- How to write mathematical expressions as input to digital tools and applications - a “one-line” mathematical language:
  - [http://offon.neocities.org/public/Enlignet\\_matematikk.html](http://offon.neocities.org/public/Enlignet_matematikk.html)

$$\frac{\sqrt[3]{x^2}}{4y^5} = x^{(2/3)} / 4 / y^5$$

## The near future of education

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- The shift from the classic lecture in an auditorium - with one to many communications – and with the blackboard as the main tool outside the oral presentation – to new pedagogic methods based on digital packaging and digital sources and tools – has its challenges.
- Some of the success criteria will be:
  - prepared and committed students when they meet to the workshop
  - one must provide ongoing guidance as a support to the students' self-study and practice (individually and in minor groups)



## The near future of education

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- Changing to e-learning and streamed lessons and sessions, giving the students access to what they need from any place at any time might have “the unwanted effect” of “loosing students”. They do not meet to the session!
- Sometimes, I must drop programmed lectures due to meetings or conferences as this one. The I stream the lecture in advance, and gives the students access to it when the lecture should have been presented. I is not the best solution, but at least better than nothing!
- Then I order a streaming at our IT-support early in the morning or at late night (depending on who you talk with), I normally start at 05:00.
- It can be a bit boring to make a lecture in an empty auditorium, and when I mentioned that to our IT support, they had contributed creatively the night before ...

## The near future of education

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## The near future of education

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Thank you for the attention!