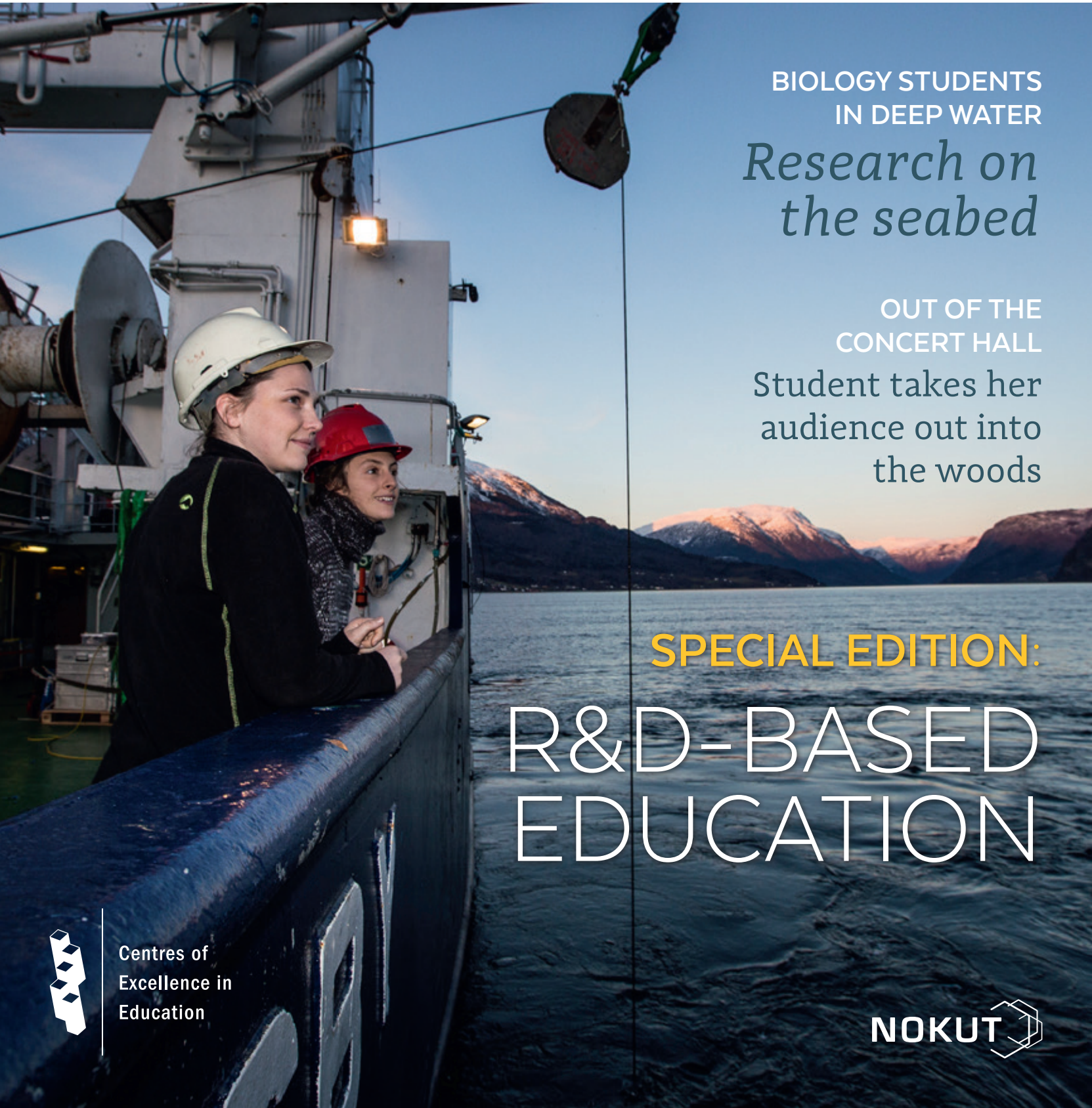
SFU MAGAZINE

NEWS FROM NORWAY'S FOREMOST EDUCATIONAL COMMUNITIES

SPRING/SUMMER 2016



BIOLOGY STUDENTS IN DEEP WATER

Research on the seabed

OUT OF THE CONCERT HALL

Student takes her audience out into the woods

SPECIAL EDITION:

R&D-BASED EDUCATION

Centres of Excellence in Education

NOKUT

About the Centres of Excellence in Higher Education (SFU)

THE CENTRES OF EXCELLENCE IN HIGHER EDUCATION ARRANGEMENT IS

a national national prestige arrangement for higher education established in 2010.

THE CENTRES OF EXCELLENCE IN HIGHER EDUCATION SHALL

develop quality initiatives relating to higher education and teaching and highlight the equal value of education and research.

THE CENTRES OF EXCELLENCE IN HIGHER EDUCATION HAVE

given universities and university colleges a new arena for competing in quality in higher education.

Centres of Excellence in Education

SOME QUICK FACTS ABOUT SFU:

- SFU status is awarded to educational communities that offer excellent quality of higher education and that are connected to a university or a university college
- The centres are granted NOK 4 million each year
- SFU status is awarded for a period of five years with possibility of an extension for five more years
- As of 2015, there are four centres
- The SFU arrangement is administered by NOKUT

CENTRES ARE TASKED WITH:

- Disseminating knowledge and research about education and teaching
- Inspiring other communities
- Promoting and using R&D-based teaching
- Testing new and innovative methods in teaching and education
- Involving students

Today, there are four Centres of Excellence in Education: **bioCEED, CEMPE, MatRIC and ProTed.**

Read more at **www.nokut.no/sfu**

CONTENT SPRING/SUMMER 2016

Terje Mørland
Director General, NOKUT

SFU + excellent R&D-based education = perfect match

In this edition of the SFU magazine, we devote particular attention to one abbreviation: R&D. Why?

A statutory requirement applies in Norwegian higher education that all study programmes should be based on the very best of research, academic and artistic development work and experience-based knowledge – better known under the abbreviation 'R&D-based education'. This abbreviation also represents a key basis for the existence of the SFU arrangement, as it is an important element of the arrangement to stimulate excellent and innovative R&D-based education.

The R&D concept deserves more than an abbreviation. It must also be given special attention, particularly due to the many dimensions and challenges covered by this concept. For example, R&D-based education could mean that students are taught by academic staff with research competence. Another example is that students are given the opportunity to immerse themselves in the best and newest research literature in the field.

But it is when the plus sign is placed between SFU and R&D-based education that things really become interesting. The centres have been charged with the demanding and important task of being beacons of innovation in the development and testing of different forms of R&D-based education.

One way of doing this is to promote student-active research already at bachelor's degree level. An example of this is a MatRIC project headed by Associate Professor of Mathematics Kjellrun Hiis Hauge at Bergen University College, who entered into a research collaboration with her students. In addition, she conducted formative research to find out what students learn from being active participants in research. Read more about the research collaboration between Kjellrun and her students on page 12.

Another example of SFU + R&D-based education is when students are included in an academic community and learning becomes a partnership between staff and students. The research-based teaching methods used by the winner of the 2015 Thon award, Christian Jørgensen of bioCEED, are an excellent case in point. Be inspired by Associate Professor Jørgensen's lectures on page 18.

Professor Philippa Levy of the University of Adelaide in Australia is another scholar who has done a lot of research on R&D-based education. Professor Levy, who is a member of the expert committee for the appointment of new Centres of Excellence in Higher Education, shares some of her research in the area of inquiry-based learning with us in this edition of the SFU magazine. Find out why she believes this helps to improve students' learning outcomes and what advice she has for Norwegian teaching staff on page 22.

Enjoy the magazine!

PS: We have borrowed the headline from the Norwegian Association of Higher Education Institutions' report *Utdanning + FoU = sant* ('Education + R&D = perfect match')
> http://www.uhr.no/documents/utdanningogfou_ferdigrapport_260810.pdf

PHOTO: NOKUT

Learn more from engaging in research during studies

Centre directors join forces to promote R&D-based education. From left to right: Simon Goodchild, Tone M. Eriksen, Vigdis Vandvik, Jon Helge Sætre and Hilde Sollid.

Four institutions can boast with title Centre of Excellence in Higher Education (SFU). They represent very different fields, but agree that higher education must not just be based on up-to-date research, but must also strive for students to actively engage in research throughout their studies. **WRITTEN BY**: Gro Strømsheim

In connection with a seminar for potential SFU applicants held on 8 March, we gathered the heads of the four existing centres (bioCEED, MatRIC, ProTed and CEMPE) for a chat about R&D-based education.

Hilde Sollid is director of the Centre for Professional Learning in Teacher Education, ProTed, which is a collaboration between the University of Oslo (UiO) and the University of Tromsø (UiT). The centre's main goal is to develop integrated five-year teacher education programmes. This entails a comprehensive study programme design that unifies academic disciplines, profession-oriented subjects, school subjects, theory and practice.

'I consider the most important characteristic of R&D-based education in teacher education to be that the students develop their R&D competence. It must be developed throughout the five years of the programme,' says Sollid.

Vigdis Vandvik is the director of the Centre of Excellence in Biology Education, bioCEED, which is a collaboration between the University of Bergen (UiB), the University Centre in Svalbard (UNIS) and the Institute of Marine Research. The vision behind bioCEED is that the new and increasingly important roles played by biology and biologists in society demand change, not only to the content of biology education, but also to the methods used to teach future biologists.

Vandvik points out that 'research-based education' is a multifaceted concept.

'Firstly, the content of the education must be based on new research in the discipline. Secondly, it is important to use teaching methods that work, which means that the choice of teaching methods must also be based on research. Finally, the research process is a goal in itself; students shall research their way through the programmes and learn research methods throughout their course of studies.'

Sollid agrees with Vandvik that teaching staff must be aware of the importance of communicating both research results and research methodology.

'While teaching staff must keep abreast of new research, they must also be aware of what is actually relevant to students. Students must learn to assess research and research literature and reflect on what is most relevant to them.'

The recent emphasis on research-based education is a change of strategy in teacher education.

'We work to ensure that students develop research competence that they can bring with them into their professional career. This will help them to analyse their own practice in light of research,' says Senior Adviser Tone M. Eriksen of ProTed.

Director Simon Goodchild of the Centre for Research, Innovation and Coordination of Mathematics Teaching (MatRIC) states that research is fundamental to all education.

'When the students themselves use research methods, they create their own learning. As a result, they remember what they have learnt better, they understand it better, and this motivates

R&D-based education in the SFU arrangement

'R&D-based education is about more than the content of the teaching and who is doing the teaching. It is just as much about learning processes and about how the students themselves take part in shaping these processes,' says Helen Bråten, Project Manager of Centres of Excellence in Education (SFU).

One example is students doing research on authentic issues that businesses, industry or society need answers to, with the teaching staff facilitating processes.

'Here, teachers and students are partners learning together, and the differences between the them fade away. This is what we often call integrated models, and it means that, through R&D-based teaching, students learn not only sound discipline knowledge, but also methodology, cooperation, communication and other generic skills', says Bråten.

All the centre directors find it challenging to ensure that all the institution's students and teaching staff engage in R&D-based education at all levels. But the rewards are great. From left to right: Jon Helge Sætre, Hilde Sollid and Simon Goodchild.

them. It is important that students use research methods in order to ensure that they understand their own education,' says Goodchild.

CREATIVITY IN RESEARCH

As director of the Centre of Excellence in Music Performance Education (CEMPE), Jon Helge Sætre can be said to represent the art education programmes. CEMPE wants to develop proactive musicians through seven development projects that involve testing innovative forms of teaching and learning in music performance and entail broad student and staff participation.

'For me, there are three criteria for R&D-based education: that teachers are up to date on research in the field, that students are involved in research work, and that the education is based on research. That means having a research-based knowledge base underlying the teaching activities,' says Sætre.

He believes that art education programmes challenge the definition of research because they use research in a different way from subjects such as biology and mathematics.

'Will a performing musician use research when interpreting a new piece?' wonders Goodchild.

'A performer's interpretation of a piece of music is not simply a spontaneous process. It involves a lot of knowledge. The process combines historical research, interpretive research and practical research. It is very much an academic exercise, but the extent to which research is used will vary,' says Sætre.

Vandvik points out that creativity is also important in the field of biology research and education.

'Of course a researcher has to possess the technical skills, but those individuals who go far in their field must also possess creativity and inspiration to be able to advance the field.'

EASIER TO FIND TIME TO TEACH

All the centre directors find that the interaction between research and R&D-based education poses challenges. The division of working hours and resources between research and teaching duties is a familiar problem for everyone working in higher education. Achieving SFU status helps to reduce this problem.

'In teacher education, a lot of the work to develop teaching has been based too much on voluntary efforts. We now have greater freedom to work in a systematic and thorough manner,' states Eriksen.

'The SFU status heralds great opportunities for developing the study programme.'

Vandvik would like to see a broader understanding of what teaching is. Friction is prone to arise, along with a feeling that teaching steals time from research.

'Teaching is not only what takes place in the auditorium or laboratory. Analysis of teaching activities, evaluations, publishing teaching materials, supervising student assistants – all of this also constitutes teaching. It is crucial to R&D-based education that we have the time for all of these things. This requires us to have fewer hours of lectures to ensure good analysis and development of our study programmes,' she says.

They all agree that keeping a researcher perspective on education requires its content to develop continuously.

'It is also important that the whole institution is R&D-based in order to ensure consistency,' says Sætre.

All the centre directors find it challenging to ensure that all the institution's students and teaching staff engage in R&D-based education at all levels. But the rewards are great, and it is possible to achieve through systematic work and a lot of personal contact. The SFU status has given them all resources, knowledge and new contacts that have contributed to considerable development in their institutions and study programmes.

More Centres of Excellence in Higher Education will be created this year, and the four who have led the way so far welcome the new centres to challenges, development and cooperation.

PHOTO: Håvard Nesbø

DREAM OF THE SEA: 'I grew up by the sea. After spending countless hours and days at the water's edge looking down into the sea, it was not difficult to choose marine biology,' says Susanne Tonheim.

Practical training with RESEARCHERS

Biology students at the University of Bergen get a chance to experience what it is like to be a real biologist. Susanne Tonheim had the opportunity to try her hand as a researcher during a research cruise on the Sognefjord.

bioCEED

'Work experience is worth its weight in gold, and it is a refreshing change from the lecture halls and reading rooms,' says Susanne.

As part of course number BIO298 last autumn, she did practical training at the Norwegian Biodiversity Information Centre and the Sognefjord Project. The project maps the fauna at the bottom of the Sognefjord.

WENT ON A RESEARCH CRUISE

The work experience course has been offered the last three semesters for students at the Department of Biology at the University of Bergen (UiB). This semester, student Susanne Tonheim (21) took part in a research cruise on the Sognefjord on board the research vessel Håkon Mosby. She mapped seabed species together with researchers from the University of Bergen and the Institute of Marine Research.

'I was lucky enough to be able to spend a week on a video research cruise on the Sognefjord during which we identified species observed via a live video feed from the seabed. I then spent a week at the Norwegian Biodiversity Information Centre in Trondheim, where we processed some of the information collected by the Sognefjord project,' she says.

'The research cruise on the Sognefjord was a highlight and a very enjoyable part of my studies,' says Tonheim. As part of the practical training, she also blogged about her experiences (www.biopraksis.b.uib.no).

'It's great to work alongside researchers from the department, but also to have the opportunity to contribute to a concrete research project. The course has given me insight into the different jobs a biologist can do, I have learnt new work methods, and it has given me ideas for my master's thesis,' she says.

MORE MOTIVATED BY PRACTICAL WORK

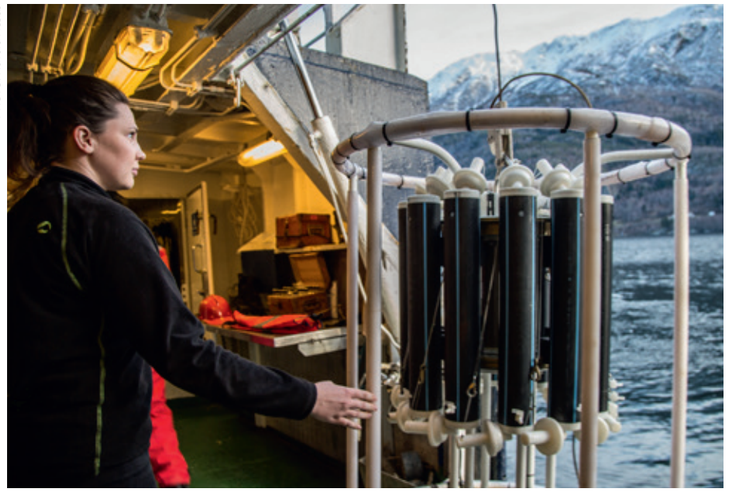
For Tonheim, the practical training that formed part of her bachelor's degree programme was a very positive experience.

'It's important to get the opportunity to try your hand at different jobs you could end up doing after graduating. It's an excellent way of finding out whether biology is really right for you, so that you don't "waste" years of your life taking a degree in a field that you won't want to work in later,' she says.

The bachelor's student now wants to go on to take a master's degree, and then a PhD. Her goal is to work in marine research. The practical work and skills will therefore be important to her.

'A lot of my practical training consisted of laboratory work where I carried out preliminary sorting of samples from the seabed, and I quickly realised that it's important to be orderly and structured when you work in a lab,' she says.

PHOTO: Håvard Nesbø



ON A RESEARCH CRUISE: Susanne Tonheim took part in practical training at the Norwegian Biodiversity Information Centre and the Sognefjord Project, and participated in a research cruise on the Sognefjord.

In the lab, she studied starfish, foraminifera, molluscs and mussels.

'I learn from practical work in a completely different way than from listening to a lecture. The practical training period made me more motivated to continue my studies.'

BETTER WITH PRACTICAL TRAINING

Gaute Velle is head of the research project PRIME, which examines the relevance of practical training in biology education at UiB.

'Biology students get some practical training through field and laboratory work, but the link to the professional field has been somewhat unclear. It seems that few study programmes in theoretical disciplines take into account the fact that students can also learn a lot from practical work experience,' says Velle.

'We feel that a theoretical education can make students good biologists, but that some practical training can make them even better.'

Practical training gives biology students a better understanding of society's needs and a realistic perception of the subject they are studying.

'Moreover, there is no doubt that students learn a lot from practical activities,' Velle emphasises.

WANT TO FIND OUT IF IT WORKS

'It's not usual to conduct research on the courses we offer in our programmes the way we do in PRIME: Normally, the students complete a final evaluation of the course and changes are made accordingly. We take it one step further. By studying the blogs, statements from business and industry and interviews with students, we really want to find out whether this works,' says Velle.

'Research on practical training makes the students research subjects. We want to keep improving,' he says.

Velle believes that the need for practical training in study programmes, also in what are considered theoretical disciplines, is greater than ever.

'More students than before are taking a theoretical education, which means that the proportion that goes on to an academic career is decreasing. But although students' needs have changed, the universities haven't quite managed to keep up,' he feels.

Velle has only received positive feedback from students who are given work experience opportunities.

'Students are very happy to have the chance to get a bird's eye view of the subject area with the benefit of theory. They say that they become more motivated and learn more,' says Velle.

WORK EXPERIENCE IN BIOLOGY

- Introduced in spring 2015 as part of bioCEED's work. The bioCEED project PRIME conducts research into the scheme's effect.
- Three-week period of relevant work experience with external enterprises (10 credits).
- Ten students took part in practical training in spring 2015, and six in autumn 2015. In spring 2016, 20 students are on training placements.
- Potential tasks during practical training vary widely, from practical tasks in research, business, industry and public administration to dissemination work and teaching.
- Practical training enterprises and institutions include Uni Research, Friends of the Earth Norway, the Centre for Science Education, the Heathland Centre at Lygra, the Norwegian Institute for Water Research, Nordahl Grieg upper secondary school, Runde Environmental Centre, Bioforsk, the Norwegian Biodiversity Information Centre and the City of Bergen's Agency for Landscape Design and Agriculture.

bioCEED - Centre of Excellence in Biology Education

Affiliated to the University of Bergen (UiB), the University Centre in Svalbard (UNIS) and the Institute of Marine Research (HI)

bioCEED aims to strengthen biology education to ensure that the biologists of tomorrow are highly qualified and well prepared for a professional career.

> www.bioceed.no

PHOTO: Tabita Berglund

PHOTO: Thea Hermansen

Invited the audience to moonlight concerts in the woods

As a master's degree student at the Norwegian Academy of Music, Tabita Berglund wanted to challenge the classical, conventional concert form. She invited her audience into the woods for a series of moonlight concerts. **WRITTEN BY**: Marie Strand Skånland

Many unwritten rules and norms can easily make you feel uneasy as a member of the audience at a classical concert event.

'I feel that the classical concert form creates an unnatural and artificial barrier between the musicians and the audience. It is a rigid form where we do not meet. I like to know who I'm playing for, to be able to look them in the eyes, and I want them to feel welcome,' says Tabita.

To Tabita, who is a classically trained cellist, it became important to meet her audience in an arena where she could communicate something personal through the music and it's context.

'I wouldn't really call it concerts,' says Tabita about her moonlight series. *'It was more of a space where I could communicate something that was important to me.'*

SUPERVISION ON A TREE STUMP

'It was important to me that my master's project was personal. It took a long time to develop an idea. I talked to my supervisor about how much the silence of the woods meant to me, and he once brought a tree stump to one of our meetings and told me to sit on it. From there, we developed the idea of organising concerts in the woods.'

The result was a series of concerts in the woodland area Nordmarka outside Oslo, three evenings in the winter of 2015, during the full moon.

'I talked to my supervisor about how much the silence of the woods meant to me, and he once brought a tree stump to one of our meetings and told me to sit on it.'

Tabita Berglund

CLOSENESS TO THE AUDIENCE

Tabita wanted to create a connection with her audience, and therefore spent a lot of time writing personal invitations that she sent by mail to the people she wanted to invite. Each invitation was hand-made and hand-written in ink.

'I didn't want this to be an "open event" on Facebook,' she says. *'My fellow students often advertise their concerts on Facebook, and their experience is that they reach a lot of people, but their invitations get lost among hundreds of other invitations, and not that many people end up at the concert after all. Putting so much work into the invitations was also based on a wish for another kind of intimacy with my audience. I wanted each person to feel that I wanted them to be at the concert. I also hoped to be able to create a sense of community in the woods.'*

The people who accepted her invitation received a personal confirmation, also by mail. They then had to put their skis on and walk three and a half kilometres

PHOTO: Thea Hermansen

Tabita Berglund's master's project forms part of CEMPE's development project Independent Music Careers which is part of Kjell-Tore Innervik's work to develop the master's programme in Music Performance. The intention is for students to develop innovative ideas and create new artistic performance concepts, thereby preparing for a professional career.

See more at:
> cempe.no/en/projects/

along an uphill forest ski track, in the dark, to reach the venue, which was a cabin in the woodland areas around Oslo. When the audience arrived, they were served moose soup, blueberry pie and coffee.

TO ACKNOWLEDGE EACH OTHERS' EFFORTS

In Tabita's opinion, it does something to your senses to move through the woods. She found the audience much more receptive to the music after having skied in the moonlight to reach the concert venue. In her project description, Tabita writes: 'My project demands a lot of effort on the part of the audience. They have to reply to invitations sent by mail, and then travel far and ski to the venue late in the evening, uphill. It is a lot to ask, but I want people to make an effort, to be out of breath and have cold noses, and maybe be just a little bit afraid of the dark. That makes it all the better to arrive at Finnerud, to warmth the people and the music. This also means that I, who haven't skied, have to make an effort to give them a musical experience that makes it worth the effort. To acknowledge each others' efforts is important.'

A PERSONAL DEVELOPMENT PROJECT

The series of concerts in the woods gave Tabita the experience of meeting her audience in a shared arena. It gave her a new sense that it was possible to play in ways that she had previously never dared to try.

'The audience's attention didn't drift. I thought "Can I play like this?" It has made me begin to trust myself more, and made me dare to be more personal. This has been incredibly important to me as a musician.'

For Tabita, it has been an important development project.

'It has changed the way I relate to my audience, the way I interact with them – and thus the way I play.'

CHALLENGES RIGID FORMS

The perceived exclusionary attitude in the classical music scene and the longing to feel at home formed the background to Tabita's innovative project. She hopes that more musicians will follow her example and challenge the classical recipe.

In Tabita's opinion, the Norwegian Academy of Music is the scene of some tension between the old and the new, between the conservative and the innovative. Students are trained to become excellent musicians and at the same time be capable of carrying out independent artistic projects. This could result in students being met with different expectations and requirements from different members of the teaching staff – on the one hand those who are enthusiastic about a renewal of the master's degree programme, and on the other those who believe that the that the primary objective of the master's programme is for students to become excellent musicians.

'I feel that the classical concert form creates an unnatural and artificial barrier between the musicians and the audience. It is a rigid form where we do not meet.

Tabita Berglund

EDUCATING INNOVATIVE MUSICIANS

It is an explicit goal of the master's degree programme in Music Performance at the Norwegian Academy of Music that students shall be capable of contributing to new ideas and innovation in their role as musicians. They are also expected to demonstrate the ability to participate in a music scene and a music industry in constant change.

'In addition to developing Tabita's instrumental skills, we wanted to challenge her in relation to how she wanted to present her music and create musical experiences in encounters with people,' says Kjell Tore Innervik, who was Tabita's academic supervisor during her master's project.

The new director of CEMPE, Jon Helge Sætre, points out that it is an important objective for CEMPE to to contribute to the education of innovative musicians who are qualified for a competitive international music scene. This means that the students themselves have to create new professional arenas. As a classically trained cellist, Tabita will have to compete with other excellent cellists from all over the world for a very small number of orchestra positions. But she can also be innovative and create new arenas for performing music for an audience that may want an alternative arena where musician and audience can meet.

CEMPE - Centre of Excellence in Music Performance Education

Affiliated to the Norwegian Academy of Music (NAM)

CEMPE's goal is to develop knowledge and experience that can support performance students in their search for artistic excellence. CEMPE also aims to qualify the students for a career in a rapidly changing globalised music community.

> www.cempe.no

DID RESEARCH BOTH *WITH* AND *ON* HER STUDENTS

Associate Professor of Mathematics Kjellrun Hiis Hauge at Bergen University College has engaged in research together with five master's degree students, and has also carried out formative research into what students learn from active participation in research.

WRITTEN BY: Morten Rosenvinge

MatRIC

The project receives MatRIC research funds and is intended to familiarise students with research and ensure good R&D-based education.

The student teachers worked together with Hauge on a mathematics didactics research project relating to mathematical modelling. A graph illustrating expected climate change formed the starting point for a discussion followed up by a lecture where the students and Hauge together drew parallels between relevant literature and their own discussion.

The sessions were recorded, and the students were invited to write an academic article containing an analysis of the discussion in cooperation with Hauge.

'We used an analysis tool from the course syllabus so that the research was in fact application of something they were to learn as part of the course. In addition, the cooperation provided an opportunity to look into the learning potential of such a project,' says Hauge.

Nine students took part in the discussion, and five of them participated in the analysis and in writing the article – work that came in addition to the ordinary student activities. The students who worked with Hauge were given the opportunity to present their findings at two conferences, including the first annual MatRIC conference.

HIGH DEGREE OF STUDENT FREEDOM

The students were given the freedom to choose how they wanted to contribute, for example in the analysis and text work. To begin with, Hauge asked the students to transcribe five minutes each, but they ended up doing it all.

'A couple of the students thought it was so much fun that they wanted to transcribe more. I had envisaged doing most of the work myself, but they ended up working together and inviting me to meetings as necessary. In this way, they also decided the form of collaboration. So far, we have two manuscripts with slightly different approaches, one where they took control and one where I did.'

WHAT ARE THE MOST POSITIVE ASPECTS OF INVOLVING STUDENTS IN THIS WAY?

'The way in which the students inspired me, learning about my own teaching through the students' reflections, and how the students introduced perspectives that hadn't crossed my mind.'

Hauge believes that it is important to the success of such projects that students can take ownership of the research collaboration.

'It is important that the issue is interesting and important to all parties, and that the students themselves can choose how much effort they want to put into the project,' she says.

IS COOPERATING WITH STUDENTS DIFFERENT FROM COOPERATING WITH COLLEAGUES?

'Yes, it is a bit different because you have to take on the role of supervisor in some contexts – but not all the time. I feel that it is important to listen to the students and take the good input they provide on board.'

WHAT SURPRISED YOU MOST ABOUT THIS PROJECT?

'How the students took over much of the responsibility for the cooperation and all the work they put into the project,' says Hauge.

Kjellrun Hiis Hauge
ASSOCIATE PROFESSOR OF MATHEMATICS

THERE ARE TWO SIDES TO THE PROJECT:

- The analysis of the discussion as a mathematics didactics research project
- Formative research into the students' learning resulting from their participation in the project

Kjellrun Hiis Hauge and her students presented their research at MatRIC's conference.

MatRIC - Centre for Research, Innovation and Coordination of Mathematics Teaching

Affiliated to the University of Agder

MatRIC's vision is to be a national resource centre that encourages and supports excellence in teaching and learning mathematics in natural sciences, engineering, economics, teacher education and other higher education programmes with significant mathematical content.

> www.matric.no

INSPIRED MOTIVATION AND INTEREST

Master's students Terje André Bringeland and Tor Inge Vethe took part in the project. They worked on data collection, source criticism, analysis and presentation. The students were just starting the master's degree programme and say that the project was both educational and motivating, and that it provided a good introduction to research.

WHAT DID YOU THINK WHEN KJELLRUN LAUNCHED THE IDEA OF DOING RESEARCH IN PARTNERSHIP WITH HER?

Vethe: *'When Kjellrun invited us to take part in this study, I saw it as a form of preparation for writing the master's thesis. Not just when it comes to research on a specific topic, but also in terms of both oral and written presentation. Doing this in cooperation with Kjellrun, who has broad competence and an open teaching style, made it feel safe and exciting. Another advantage of a project like this is the insight we gain into the syllabus. Reading the syllabus and using it are two quite different things.'*

Bringeland: *'I felt privileged to be part of it. It was a new approach to student participation where our lecturer Kjellrun invited us to join her on a voyage of discovery into what seemed like exciting new territory to us students.'*

WHAT DOES IT MEAN FOR YOU AS STUDENTS TO TAKE ACTIVE PART IN RESEARCH IN THIS WAY?

Vethe: *'We gain an insight into the big picture of research. We had a chance to practise presenting project outlines, discussing ideas, discussing design, cutting and critical work with our own text. Kjellrun's participation made the process safer in that she could provide guidance and find relevant syllabus.'*

Bringeland: *'It gave me personally greater motivation for the master's degree programme and a greater interest in research. At the same time, we worked with the subject matter in relation to an example, our own lecture, where things were put into even more concrete terms.'*

WHAT WERE THE MOST IMPORTANT THINGS YOU LEARNT FROM THIS PROJECT?

Vethe: *'What I am most grateful for, is the experience of and insight into the application of theory. Not just in relation to the master's thesis, but also in relation to research in my own classroom. A lot of literature, for example, would seem far more abstract were it not for this project.'*

Bringeland: *'The most important thing I learnt from this project was how to write a scientific research article and be part of a research community. In addition, her method was in itself an (unusual) example to be copied when it comes to research methods in the classroom. I gained a better understanding of the subject matter by working with it in this manner.'*

BUILDING EXPERTISE TOGETHER:

The Lesson Study method in schools and teacher education

Collaborative research and development work is a key dimension of ProTed's cooperation with university schools. In cooperation with the university schools, the University of Oslo (UiO) is now exploring the use of Lesson Study as a professional development method for teachers and students. **WRITTEN BY**: Tone Malmstedt Eriksen

ProTed

Lesson Study is a method where teachers cooperate on looking at their pupils' learning from a researcher perspective.

The cooperation between university schools and the teacher education programmes provides an opportunity to explore how practice-based and science-based knowledge can work together in the development and practice of the teaching profession. The schools' work on research questions opens up for new ways of framing challenges encountered in the classroom, one where active use can be made of knowledge gained from research.

DEVELOPMENT OF THE SCHOOLS AND STUDENTS' PRACTICE

'The goal of the project is school development and developing the practical dimension for student teachers, both on campus and in schools,' says project manager Tove Seiness Hunskaar.

'During the initial phase of the project, we work to build competence both in the teacher education programmes and in the schools. Then we test different ways of applying the method together with students.'

The university collects data during the project. This provides an opportunity to document important issues relating to collaborative learning in communities of practice in general, and the interaction between experience-based and research-based knowledge in particular.

RESEARCHER PERSPECTIVE ON TEACHING PRACTICE

Taking a researcher perspective on one's own teaching practice is well in keeping with the goals of the R&D-based teacher education. At the same time, it challenges common everyday school practices. Teachers who have tried the method find it very useful to have an opportunity to really immerse themselves in challenges they encounter in their everyday work at school.

Tone Brun, teacher at Mailand upper secondary school.

'We tend to find answers and solutions without spending enough time reflecting on the issues that teachers face every day,' says Tone Brun, who is a teacher at Mailand upper secondary school. Mailand is one of the university schools affiliated to UiO.

'At Mailand, the whole staff regularly uses this method. We find it valuable to have the time to observe and ask good questions. The Lesson Study cycles provide an opportunity to learn together and find inspiration in new ways across classrooms and subject teams.'

Focusing on pupils' learning is a key dimension of the Lesson Study method.

'Research tells us that it takes student teachers and newly qualified teachers a while to shift their focus from themselves and their teaching plan to the pupils,' says project manager Hunskaar.

'We work a lot on developing the practical dimension of the five-year integrated teacher education programmes at master's degree level here at UiO, and the Lesson Study method provides training in looking for signs that the pupils are learning. In this way, we lay the foundations for continuous, research-based professional development of future teachers.'

Lesson Study

Lesson Study is a systematic collaborative learning method used by teaching staff. The method involves teachers cooperating to:

1. **Formulate a research question**
2. **Carry out observation/ collect data**
3. **Discuss the consequences of choices made during the planning phase**
4. **Document and report experience**

A key element of the method is its focus on the pupils' learning rather than on the teachers' work and approach.

University schools

- Involving the professional field in the education through close collaboration with university schools is a key element in ProTed's work.
- University schools are selected schools that are closely involved in:
  - teacher education development
  - development of student teachers' practical training
  - R&D work that benefits both the schools and the university
  - sharing and dissemination
- UiO has 20 university schools, and UiT has 11 (eight in Tromsø and three in Alta).

ProTed - Centre for Professional Learning in Teacher Education

Affiliated to the University of Tromsø - The Arctic University of Norway (UiT)

ProTed's vision is to educate professional, knowledgeable, confident and internationally oriented teachers for a multicultural society.

> www.uv.uio.no/proted/

Five voices from CEMPE:

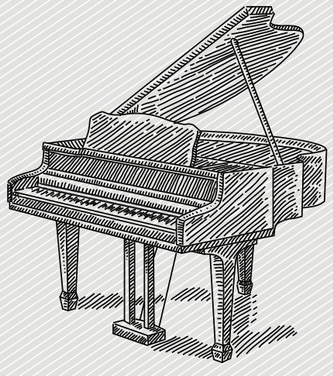
What are the characteristics of R&D?

WRITTEN BY: Aslaug Louise Slette **PHOTO**: NMH

At the Norwegian Academy of Music (NMH), R&D can mean a lot of things. Some members of the teaching staff work on 'conventional research', where they study something and write scholarly articles and books. Most of them work in the disciplines of music education, music therapy and music theory.

The staff members who teach music performance disciplines engage in artistic research – artistic processes that result in a publicly accessible artistic product, and can also involve explicit reflection on the development and presentation of an artistic product.

Many are also engaged in educational development work, such as developing textbooks or new teaching methods.



Øivind Varkøy

HEAD OF RESEARCH AT NMH

'The purpose of CEMPE is to develop knowledge that can help to raise quality in higher music education. In this connection, CEMPE seeks to improve learning related to the principal instrument and own practise, and to develop proactive musicians. These development projects have a natural connection to NMH's research activities. Their connection and relevance to NMH's research activities (and vice versa), and the fact that CEMPE employs a postdoctoral fellow, help to shape and develop NMH's overall R&D portfolio.'

Bjørg J Bjøntegaard

VICE-PRINCIPAL FOR EDUCATION AT NMH AND CHAIR OF CEMPE'S STEERING COMMITTEE

'The R&D work carried out in CEMPE is closely related to existing teaching and entails new perspectives on instrument teaching. The management is keeping a close eye on everything that is going on, and the intention is to implement successful results in our programme descriptions. This is an exciting development that lifts the organisation as a whole.'

Tanja Orning

POSTDOCTORAL FELLOW, CEMPE

'My postdoctoral project under CEMPE deals with the role of the musician in the future, a role that links the artistic core activity with innovative thinking. As a performer-researcher, it is interesting for me to engage in research at the interface between performative, theoretical and educational perspectives.

Peter Tornquist

PRINCIPAL OF NMH

'Artistic research is about asking new artistic questions and systematically exploring them through artistic practice. CEMPE will help us to educate reflective students who are good at both.'

Jon Helge Sætre

CENTRE DIRECTOR, CEMPE

'In the current research policy landscape, it is important not to forget educational development work. For a Centre of Excellence in Higher Education, this type of R&D is crucial in order to test and assess new (and forgotten) approaches to teaching, academic supervision and learning.'

Adds on with math reasearch

There is a strong probability that pupils do better in mathematics if their teachers know more about mathematics research. Minister of Education and Research Torbjørn Røe Isaksen completely agrees.

WRITTEN BY: Yvonne Kerlefsen **PHOTO**: Jan Arve Olsen

MatRIC

Student teachers Anne Kolstø and Marie Kylland wrote enthusiastically on the blackboard when they took a mathematics didactics course under the auspices of the University of Agder (UiA). The course is taught in the autumn semester and is offered to second-year students who choose in-depth studies in mathematics.

One arithmetic problem after another is solved, followed immediately by explanations of what to do and what to look out for when trying to do similar problems. There is no doubt that they feel comfortable in front of a class.

WE ARE HAVING FUN!

'This is what we like and want to do, so it's great to feel confident that our work is as good as possible, both from a mathematical and from a mathematical-didactical point of view,' says Kolstø, as Kylland nods encouragingly.

Through this course, students gain an insight into the most widely used scientific methods in mathematics didactics research today. During a three-week teaching practice period, students teach pupils in schools while at the same time examining teaching-related mathematics challenges that they encounter in the classroom. After completing the course, they write a brief research report in which they present their findings.

IMPROVES STUDENTS' INSIGHT

The course is organised by Associate Professor Claire Vaugelade Berg at UiA, who is the coordinator for MatRIC's Teacher Education Working Group. The course was first taught in autumn 2011.

'By engaging in research, the teacher students gain insight into how pupils think when they work with mathematics,' says Vaugelade Berg.

'The general idea is that knowing more about how mathematics research is conducted makes them better mathematics teachers. As qualified teachers, they will be able to see the big picture in mathematical didactical issues, from research to pupils' learning in school, and they will have experience of using scientific methods to resolve challenges they encounter in their professional practice,' she says.

KNOWLEDGEABLE TEACHERS

Minister of Education and Research Torbjørn Røe Isaksen shares the opinion that mathematics teachers who know more about research make a positive contribution to the work to improve pupils' mathematics performance. In a speech at a NOKUT seminar on mathematics education and the introduction of a five-year practice-based master's degree level teacher education programme, the minister made this very point:

'The new practice-based master's programmes are intended to strengthen teachers' qualifications and their ability to use research-based knowledge in school development. The master's thesis shall focus on the teaching profession and be based on issues relating to school and classroom practice,' he said in his speech.

'A practice-based master's programme will give us knowledgeable teachers capable of analysing their own practice and reflecting on it in a scientific manner, and who are qualified to understand and use new research,' Røe Isaksen emphasised.

Claire Vaugelade Berg made the following comments on the minister's speech:

'The minister's threefold focus on teachers, research on one's own practice and improved pupil performance resonates strongly with us who work in the field of mathematics didactics here at UiA. Better understanding and improved pupil performance in mathematics is precisely the focus of our work. The important thing is for mathematics teachers to gain a better understanding of how pupils think,' she says.

'This course is an excellent example of how we work in MatRIC to promote and develop R&D-based education where students play a key role in the research process,' says Centre Director Simon Goodchild.

Associate Professor Claire Vaugelade Berg.

Minister of Education and Research Torbjørn Røe Isaksen. Photo: The Ministry of Education and Research.

MatRIC's goals for teacher education:

- Students shall become motivated mathematics teachers with a sound academic background that enables them to teach mathematics in a relevant, varied and adapted manner.
- Students shall become capable of demonstrating how important mathematics is to other subjects, such as natural sciences, economics, medicine etc.
- Students shall develop a strong professional identity as mathematics teachers and be proud of their profession. Students are given the opportunity to continue to develop throughout their career by keeping up to date on recent mathematics didactics research.

ProTed

R&D competence in five-year integrated master's degree programmes

Students on the five-year integrated teacher education programme at master's degree level at the University of Oslo (UiO) work actively to develop their R&D competence. As part of the work on their master's theses, candidates engage in research and development work in the field in a way that enhances its position in the Norwegian school system.

Camilla's research question and thesis topic

How do teachers in Bethlehem feel about teaching citizenship? The overall perspective of the thesis is to understand education as an instrument for citizenship formation.

MY MASTER'S THESIS:

Teaching citizenship in occupied territory

As a member of a global society and a future teacher to pupils with refugee backgrounds, and because of the increased tension in the Middle East, Camilla Bruu Næsmo wants to explore how citizenship education is understood in a non-Norwegian context. Here she tells us about her master's thesis.

WRITTEN BY/PHOTO: Camilla Bruu Næsmo

I wonder how citizenship is taught in an area that has been characterised by religious, cultural and geographical conflict for more than 70 years. Taking this as the starting point for my master's thesis, I will study how teachers at Palestinian schools in Bethlehem teach citizenship.

The information I obtain can be useful in social studies teaching as empirical examples of how citizenship is taught in an unrecognised state and of teachers' remit in a conflict situation. By taking examples from school life, I can trigger curiosity among Norwegian pupils because teaching is something they have experience with, and it highlights the importance of and challenges associated with the school system's social mission.

When I graduate, I want to apply for a job at a receiving school for pupils who do not speak Norwegian or at a school with a high proportion of immigrant pupils. I believe that an understanding of how citizenship is taught in a conflict situation can help me to adapt the citizenship lessons I will teach. Among other things, I hope that the findings of my thesis can give me an understanding of extreme statements relating to 'the other', and teach me something about what I need to take into consideration when teaching Norwegian citizenship. Thus, the findings of the thesis will also be instrumental in my own professional practice.

In order to gather data and identify potential answers to my research question, I went to Bethlehem in autumn 2015 and interviewed teachers, teacher students and teacher educators at Bethlehem University. I came into contact with teachers from different religious backgrounds working at both state and private schools. The informants expressed a wide range of understanding of what citizenship actually means – and about what type of society pupils are educated for: Will the Palestine of the future be a secular or an Islamist state? Will the pupils grow up to be part of a deliberative or communitarian society? Despite the differences in their replies, all the teachers had something in common: professional pride and optimism about the future. Schools were crowded and resources were scarce, but all my informants agreed that they were educating the generation that would end the occupation and liberate their people. Teachers also took the psychosocial aspects of their role seriously, as many of their pupils struggle with trauma and have a difficult home situation. Several of the pupils have parents or siblings in prison, and some may even have been imprisoned themselves. Therefore, being a teacher in Palestine is also about teaching pupils how to live.

Master's student Camilla Bruu Næsmo

HOW TO PREVENT ***STUDENTS FALLING ASLEEP***

It is not easy to take a nap during Christian Jørgensen's lectures. With mobile phone quizzes and popular literature, he shows nearly 200 new students that biology is fun.

PHOTO: Paul Sigve Amundsen/Forskerforum

bioCEED

WANT TO LEARN MORE: 'Jørgensen's methods demand a lot from us students, but we can see that engagement and repetition works. We remember the material better,' says Hedda Barfod Ørbæk. Here she is with fellow student Jessica Anne Hough (middle of photo).

'It's always pleasant to be entertained.. Students may be more tired after my lectures, but they also learn more,' says Christian Jørgensen, Associate Professor at the Department of Biology at the University of Bergen (UiB).

Jørgensen started teaching the introductory biology course BIO100 three years ago, and has worked hard to make his lectures interesting and educational, among other things by looking to research on what creates good learning. As a result, he has won UiB's Learning Environment Award and recently also the Olav Thon Foundation's award for excellence in education. In his acceptance speech, he particularly emphasised bioCEED's work to create a culture for learning at the department.

DOESN'T LIKE TO TEACH

'I have to admit that I find teaching uncomfortable, but since I have to do it, I want to do it properly. I don't want to waste my students' time,' says Jørgensen.

Therefore, he brings his researcher hat into his teaching.

'Research shows that students lose focus after about 15 minutes of talking, and the brain needs rebooting. I have started using quizzes where students use their mobile phones to answer questions as a break, but also as a way of including the whole student group,' says Jørgensen.

The mobile phone multiple-choice quiz means that he includes the vast majority of students in his lecture, and that he can continuously adapt his teaching to suit the students' level of knowledge.

'We discuss answers both in plenary sessions and in groups, thereby maximising the learning outcomes,' he says.

INSPIRES ENTHUSIASM AMONG STUDENTS: 'I am not passionate about teaching, but I am about my subject. That is why I put on my researcher hat to determine what form of teaching students learn the most from,' says Associate Professor Christian Jørgensen. Here the results of a mobile phone quiz are displayed behind him.

EXCELLENCE IN EDUCATION: Vigdis Vandvik is the centre director of bioCEED and works a lot on teacher culture.

GETS YOU THINKING

Hedda Barfod Ørbæk took Jørgensen's course last autumn. She was very pleasantly surprised by the course and the teaching.

'Christian is an excellent lecturer, and the course has really inspired me to continue studying biology. His teaching methods make us students more active during lectures. We get more repetition, and he gets us thinking about the different topics in a fun manner, which is useful to both him and us,' she says.

In addition to mobile phone quizzes, Jørgensen has also involved persons from the outside world and used popular science books.

'My goal is for the students to get in touch with their inner nerd. Several have told me that they have started reading other popular science books on the same topics. That makes me very happy.'

RESEARCH ON TEACHING AND LEARNING FROM EACH OTHER

'There has been a lot of international research on what students actually learn from. We try to encourage a culture where the teaching staff familiarise themselves with which teaching methods that actually work,' says Jørgensen.

'Traditionally, research has been a collective effort, while in teaching, it is every man and woman for themselves,' says Vigdis Vandvik, professor of biology and centre director at bioCEED. *'In bioCeed, we want to create a culture for discussing teaching and taking an scholarly approach to one's own teaching practice. This means that teachers must have an awareness of which teaching methods they employ and why. They have to investigate whether the methods produce the desirable learning outcomes and share the results of their investigations with their colleagues. This is known internationally as Scholarship of Teaching and Learning,'* Vandvik explains.

Vandvik believes that Christian Jørgensen's teaching is a good example of teaching as a collective responsibility.

'Christian gets students to take part in the teaching and constantly adapts his teaching methods and content to the students' needs. He is good at seeking support from the surrounding academic environment in this process,' she says.

She also points out that student evaluations of teaching often focus on what the lecturers do and the 'entertainment value' of the teaching rather than on what the students themselves contribute or their own responsibility for achieving a good learning outcome.

'Lecturers are not necessarily always that good at thinking through the objectives of their teaching activities either. We go through our regular plan, even though we know that the students don't learn very much from the methods we use. The key is to investigate what works and learn from each other,' in Vandvik's opinion.

'Christian gets students to take part in the teaching and constantly adapts his teaching methods and content to the students' needs. He is good at seeking support from the surrounding academic environment in this process.'

Vigdis Vandvik

ProTed leads the way towards a five-year R&D-based primary and lower secondary school teacher education

Profession-oriented, integrated and R&D-based are qualities highlighted in an evaluation of the five-year primary and lower secondary school teacher education programmes taught at the University of Tromsø – the Arctic University of Norway (UiT). **WRITTEN BY**: Gørill Warvik Vedeler

ProTed

Two external evaluation committees praise the academic environment and ProTed, among other things for the framework conditions set for realising the goal of providing research-based education, and they conclude that the master's degree-level teacher education programmes, both for years 1–7 and years 5–10, have a clear research orientation. This is clear, among other things, from the action taken to integrate practical training with new types of tasks for students and research cooperation.

'ProTed is experiencing considerable interest in the experience gained in Tromsø from both national and international teacher education institutions,' says Centre Director Hilde Sollid at ProTed in Tromsø.

EXPLORATIVE PRACTICAL TRAINING

The evaluations emphasise that the academic environment has facilitated research-based education, but at the same time recommends that UiT further develops and strengthens integration, particularly when it comes to making research training more concrete by defining coursework requirements for all courses, and that students be introduced to more international research literature as part of their syllabus.

The committee's recommendations indicate that research methodology must be a recurring theme throughout the study programme, with clear progress from the first to the last semester. Students should develop a good understanding of methodology well before they determine the research design for their master's thesis. It is important where in the programme the practical training papers, intended to promote students' critical and analytical competence at the early stages of the programme, are written.

'Students report to the evaluation committees that explorative practical training (R&D assignments related to the practical training) is perceived as profession-oriented and valuable. This confirms that such strategies work well, both in order to maintain a high level of opportunities to learn and to link theory and practice through active coursework requirements and types of assignments,' says Hilde Sollid.

COOPERATION ON RESEARCH

'Since the five-year master's degree programmes were established, an important element has been to establish a tripartite cooperation (between the subject teacher, practical training supervisor and student) on the students' R&D assignments, particularly the bachelor's theses, which have focused on action learning relating to the practical training periods. Students also work together in groups,' Sollid explains.

The evaluation emphasises that 'the academic staff seem to have developed an environment where collaborative research can take many forms', and that there are many indications that the university school project has given research and research results a greater and more natural place in everyday school life.

The academic environment at UiT's department of education is organised into research groups. One of the committees emphasises this as particularly positive. The research groups manage and promote a broad range of academic perspectives, and their composition can help to ensure that interdisciplinarity also becomes more prominent in teaching.

'One of the expert committees writes that school managers and practical training supervisors perceive students as more competent and aware than before, and that students thereby have greater influence on the school's practice,' concludes Sollid.

Evaluation of Pilot i Nord *(Pilot in the North)*

The expert committees were appointed by the Faculty of Humanities, Social Sciences and Education at UiT in June 2015. The reports were completed in February 2016.

The committee's remit was to assess the new five-year integrated study programme design, its use of work methods and forms of assessment, syllabus, progress and context with particular focus on the R&D basis and master's degree, practical training, the creation of university schools etc.

Committee for master's degree teacher education programme for years 1-7
- Professor Marit Johnsen-Høines, Bergen University College
- Professor Kari Smith, University of Bergen
- Professor Anne Marit Valle, University of Nordland

Committee for master's degree teacher education programme for years 5-10
Vice-Dean/Associate Professor Finn Aarsæther, Oslo and Akershus University College of Applied Sciences
Associate Professor Hilde Wågsås Afdal, Østfold University College
Professor Geir Botten, Sør-Trøndelag University College

NEW DIRECTOR: 'CEMPE to be a spearhead'

Jon Helge Sætre took over as director of CEMPE on 1 March this year. Sætre has a background as a researcher and musician, and has in recent years worked at Oslo and Akershus University College of Applied Sciences and the Norwegian Academy of Music.

Sætre shares the Norwegian Academy of Music's ambitions for CEMPE, namely that the centre should be a national and international spearhead of innovation in music education while still preserving the best of the existing traditions.

'The Norwegian Academy of Music is an exciting workplace with highly competent professionals with a broad range of skills and interests. To me, it is an attractive combination of music education, performing music education and practical development work. In my opinion, CEMPE can play an important role, and I look forward to working with such a good team. It will be exciting to enter into a dialogue with them about a staking out a common path,' says the new centre director.

PHOTO: Kjetil Bjørgan, NMH.

R&D-based development of teacher education programmes

ProTed is actively working to promote R&D-based development of the study programmes.

One of the ways in which the centre works is to facilitate arenas where the parties in the sector can exchange research-based and experience-based knowledge.

National arena:

Knowledge Parliament for R&D-based teacher education

15 September 2016

The Knowledge Parliament is an arena where teacher education institutions and other parties in the sector meet to discuss key development areas in teacher education. The education programmes themselves and the research field define the agenda. ProTed and the Knowledge Centre for Education cooperate to develop the arena.

Read more at the Knowledge Centre for Education's website:

> http://bit.ly/1zP8JEV

International research conference:

Bringing Teacher Education Forward

6–8 June 2016

The purpose of the conference is to bring together perspectives from national and international research that can shed light on the road forward in teacher education development:

> http://bit.ly/21pfaxl

Arena for partnership between the study programmes and the professional field:

The university school conference

Date to be announced

The purpose of this conference is to bring teacher education programmes and schools together for an exchange of points of view on how we can build competence to develop the professional field and teacher education programmes together.

See ProTed's website for further information about the event:

> http://www.uv.uio.no/proted/

Let inquiry drive the learning experience, Professor says

'Inquiry-based learning' has been at the core of Professor and Pro-Vice Chancellor Philippa Levy's work for years. Here, the recently appointed member of the evaluation panel for this year's call for new SFUs shares insights and tips with the Norwegian HE sector.

"Inquiry-based or inquiry-guided learning (IBL) describes a cluster of strongly student-centred pedagogical approaches in which students' inquiry or research drives their learning experience," Professor and Pro-Vice Chancellor Philippa Levy at The University of Adelaide explains.

With IBL, students use the scholarly and research practices of their disciplines to carry out small or large-scale inquiries that engage them actively with authentic questions and problems. Supported by academic subject-specialists and staff with specialist learning support roles, their learning takes place through a process of exploration and discovery.

"This is in contrast to pedagogies where learning is designed around the transmission of particular concepts and content by teachers. IBL can be seen as an especially student-centred and powerful form of research-based education, being based on students learning through doing research rather than on the communication of research knowledge by staff to students," says Levy.

> *IBL can be seen as an especially student-centred and powerful form of research-based education.*
>
> Philippa Levy

IBL RELEVANT FOR THE 21ST CENTURY

From 2005 to 2010, Levy was Director of a Teaching and Learning (CETL), which focused on supporting the development of IBL especially in the arts and social science disciplines. She strongly believes that IBL can contribute to enhancing students' employability and the positive impact of higher education in society. Approaches that bring students together from different disciplines to take interdisciplinary approaches to working on problems are perhaps especially relevant to a 21st century higher education.

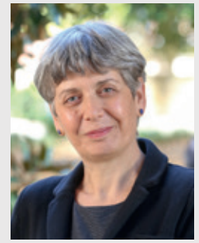
"IBL aims to inspire a questioning, open stance in students and to foster higher-order attributes with wide relevance to graduate employment, home life, and community. These include things like initiative, self-belief, responsibility, independence of mind, critical judgment, problem solving, creativity, self-management, collaboration and communication – as well as discipline-specific research skills," Levy elaborates.

"The research skills and thinking developed through IBL are very relevant to addressing the world's complex challenges, but they are not only of value to students who intend to go on to higher study and research. There is often an applied dimension to IBL, giving students opportunities to work on practical, workplace or other 'real life' problems," she continues.

Levy is currently Pro-Vice Chancellor for Student Learning at The University of Adelaide in Australia.

"In Australia now, the higher education sector is challenged by the government to connect even more with the national innovation and entrepreneurship agenda," Levy explains.

"An education based on inquiry equips students well for this."



PHILIPPA LEVY

Professor Philippa Levy currently is Pro-Vice Chancellor (Student Learning) at The University of Adelaide, one of the Group of Eight research-intensive institutions in Australia.

Previously she was Professor of Learning and Teaching Enhancement in Higher Education at The University of Sheffield and, from 2012 to 2015, Deputy Chief Executive and Director of Academic Practice at the Higher Education Academy.

From 2005 to 2010, she was Director of a national Teaching and Learning (CETL) based at The University of Sheffield, which focused on supporting the development of IBL especially in arts and social science disciplines.

DEMANDING, BUT WORTH THE CHALLENGE

In order for IBL to work, teachers are dependent on active engagement from students, something that not all students welcome with enthusiasm.

"Students do not always respond positively to IBL in the beginning because it can challenge their assumptions about the role of teachers and learners, and demand that they develop unfamiliar new skills. Therefore, students need plenty of support. This support can gradually be loosened as students gain in confidence and expertise," says Levy.

Even if it demands a lot from students and staff, Levy finds that there is solid evidence that IBL can be a very engaging, high impact approach to learning with benefits for educational outcomes that relate to discipline knowledge and, more broadly, to the students' intellectual, personal and professional development.

"Studies have shown benefits such as increased student enthusiasm, ownership and responsibility in learning, deeper engagement with the subject-matter, improved grades and improved research skills", Levy states and continues:

"It can also strengthen identification with the academic or professional discipline and improve the transition from secondary education as well as increase retention in higher education."

To Professor Philippa Levy, IBL is definitely worth the challenge.

READING TIPS FROM PHILIPPA

A good introduction to IBL, with international contributions, is Lee, V. (ed.) (2012) Inquiry-Guided Learning: New Directions for Teaching and Learning, Number 129. San Francisco CA: Jossey-Bass.

For some best practice examples and an IBL Planner tool, see The Sheffield Companion to IBL, at: http://bit.ly/1rQwi3d

Issues relating to introducing IBL from the first year of undergraduate study are explored in Levy, P. and Petrulis, R. (2012). How do first-year university students experience inquiry and research, and what are the implications for inquiry-based learning? Studies in Higher Education, 37(1) 85-101.

KEY POINTERS FOR EXCELLENT INQUIRY-BASED LEARNING

Excellent IBL genuinely empowers students as co-creators and producers in learning and provides just the right balance of educational challenge and support. Levy's key pointers are:

- Organise your course around students tackling one or more questions or problems, whether set by you, by the students themselves or an external body.
- Carefully sequence tasks for students in a way that moves them through an emergent process of discovery and helps them to develop their inquiry skills in a structured progression.
- Do not rule out giving teacher-led presentations of relevant material from time to time, but make sure that these play a supporting, not leading, role in your students' experience.
- Use digital technologies creatively to help scaffold students' inquiries, for example 'flipped classroom' approaches for large classes, and encourage (and support) students to use technologies imaginatively in producing the outputs of their inquiries.
- Celebrate your students' inquiry achievements and share them among the whole class and with wider interested audiences.

'This collection of articles can serve as inspiration for new SFU applicants,' according to editor Helen Bråten (centre). Here photographed with contributors (from left) Duncan Lawson, Asbjørn Bråthen and Kirsti Rye Ramberg.

HEADING FOR EXCELLENCE?

In March, NOKUT launched a collection of articles about the SFU arrangement. The publication describes some of the experience gained so far.

NOKUT published the collection of articles entitled 'På vei mot det fremste?' (*'Heading for excellence?'*) during a seminar for applicants in connection with a new call for applications for Centres of Excellence in Higher Education. The seminar was held to provide information, tips and inspiration for the application process before the deadline for submitting applications on 13 May.

The collection comprises seven articles, some written by contributors from NOKUT and some by external contributors. They can also be useful to new applicants, in editor Helen Bråten's opinion.

She is glad that the collection of articles has now been published:

'It is the product of a lot of discussion and effort. The idea is for this experience to contribute to the further development of the SFU arrangement, both for us in NOKUT as administrators and for educational institutions, both those who currently have SFU centres and those who do not.'

You can read the whole collection of articles or select individual articles in the knowledge base for the SFU arrangement at:
> **www.nokut.no**

Printed copies of the collection can be ordered from:
> **www.nokut.no/SFU/Kunnskapsbase**

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Ingvild Andersen Helseth

CO-EDITOR:
Emilie Valebjørg

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