

Master programmes at the Centre for technology, innovation and culture/TIK - self-evaluation

Background

The TIK Centre is a multidisciplinary centre for research and education (masters, ph.d.) that is situated within the Social Science Faculty of the University of Oslo. The focus of TIK's work is to conduct high quality research and education that provides an in-depth understanding of the interrelationships between science, technology, innovation and society.

The TIK Centre has two master programmes:

- ESST MA programme in "Society, Science and Technology in Europe" in collaboration with the international ESST network of 13 universities (one-year programme)
- TIK MA programme in "Technology, Innovation and Knowledge" (two-year programme)

While the ESST master programme was established in 1993, the TIK master is relatively young, with the first students graduating in 2009. The two programmes encompass a combined total of 60 students (approximately 30 students admitted annually). Both programmes are strongly *multidisciplinary* with regard to orientation, scope and goals.

The overriding goal of TIK's two master programmes is to provide research-based education that provides students with perspectives, skills and qualifications that make them attractive on academic and other labour markets. It can be argued that contentious issues concerning the development and role of science, technology and innovation in society have been at the core of many scientific and societal debates – both in Norway and internationally – for many decades. There is thus an urgent need for strong programmes that can provide students with multiple approaches and tools to examine, understand, and problematize these issues as a basis for future qualified work within the academy, firms, public administration, politics, and private organisations. TIK's programs should be among the internationally leading master programmes in their fields.

This self-evaluation is submitted within the framework of the Social Science Faculty's periodic evaluation of TIK's master programmes that is to be conducted in spring 2013. A similar evaluation of TIK's programmes was carried out in 2008.

The current evaluation is particularly timely for TIK. Last year the Centre made a decision to do a systematic, critical review of its two master programmes as part of its own on-going ambition to renew and strengthen the content, quality and relevance of the programmes. This internal review will be carried out under the leadership of the new programme coordinator in late spring 2013. *The Social Science Faculty's periodic evaluation is thus expected to provide valuable input to TIK's own internal review and revision.* TIK thus appreciates this opportunity to present an overview of the respective programmes, a critical analysis of their strengths and weaknesses discussion of selected challenges and concrete proposals for strengthening these programmes.

The self-evaluation has been written by TIK director Jane Summerton and student coordinator Øystein Moen. In addition, the following people have provided valuable input: associate professor Sissel Myklebust, ESST programme coordinator, fall 2012 og ESST and TIK programme coordinator from spring 2013; professor Kristin Asdal, TIK's leader group and responsible for courses in ESST and TIK programmes; professor Magnus Gulbrandsen, TIK's leader group and responsible for courses in ESST and TIK programmes; Anne Cathrine Wesnes, TIK's administrative leader; and professor Olav Wicken, former ESST and TIK programme coordinator.

The self-evaluation has also been submitted for comments to the Programme Council for the two programmes.

This self-evaluation will be organised as follows. First we will provide a short background to the TIK master programmes and the international academic context in which these programmes are situated. This section will be followed by presentations of the ESST master programme and the TIK master programme – their design, course structure and content, strengths and weakness. We will then discuss the complementarities of the programs, as well as other aspects such as teaching methods, resources and organization, and student initiatives. In each of these sections, we will offer on-going, critical reflections in the form of *evaluative comments* that address specific challenges. The self-evaluation will conclude with a short summary of strengths and challenges.

1) TIK's master programmes: short history and context

TIK's master programmes can be situated within multidisciplinary fields that focus on the role of scientific knowledge, research, innovation and technology in modern society and culture. The programmes address and problematize various dimensions of these issues, e.g. how societies develop new knowledge or technologies and how these are debated and used in firms, public administration and politics, private organisations, and industries.

More specifically, the intellectual content of both TIK master programmes focuses on perspectives from the multidisciplinary fields of *innovation studies* and *science & technology studies, STS*. Both of these fields emerged internationally during the 1960s but have developed and become institutionally in somewhat different ways. The TIK Centre's core scientific competences in the two fields provides a strong foundation for providing research-based education that reflects both multidisciplinary, distinctiveness and challenges to the respective approaches. In addition to work within innovation and STS, the TIK programmes use scientific perspectives from many approaches within social science, including innovation economics, sociology, history, economic history, philosophy and anthropology.

When the ESST programme started in the early 1990s, there were few master programmes within these fields in Europe and none in Norway. In 2012 the situation is very different. Internationally the fields have expanded rapidly in Western Europe and North America in particular, leading to a large number of current master programmes in innovation studies and STS respectively. In particular there are currently many programmes in innovation-related areas, often linked to business or engineering schools.

Most research organisations and teaching programmes within these areas have typically focused, however, either on innovation or STS approaches, and there are very few programmes which cover the wide range of theories from both fields. Several of the programmes that do encompass both fields are situated within the ESST network

Within the University of Oslo, there are three master programmes that are related to TIK's programmes:

- Programme "Entrepreneurship and Innovation" at the Senter for entrepreneurship, SFE
- Programme "Organisation, Leadership and Work" (OLA) at the Department of Sociology and Human Geography
- Programme "Technology, organisation and learning" at the Faculty of Education

These three programmes differ, however, from the TIK programmes both in intellectual content, focus and recruitment.

Other master programmes in Norway that are related to TIK's programmes are:

- NTNU: master programme in technology, knowledge and society
- NTNU: master programme in organisation and management, specialisation in business strategy and development & global technology management
- UMB, Ås: master programme in entrepreneurship and innovation
- BI, Oslo: master programme in innovation and entrepreneurship
- University of Stavanger: master programme in industrial economics
- University of Agder: master programme in industrial economics and technology leadership
- University College in Lillehammer: master programme in innovation and industry development
- University of Tromsø: master programme in leadership innovation and market
- University of Bergen: master programme in innovation and entrepreneurship
- University College of Lillehammer: master programme in innovation and business

2) The ESST masters programme – overview, student performance and structure

The master programme in Society, Science and Technology in Europe (ESST) was established at TIK in 1993. The programme is carried out within the framework of the European network "Society, Science and Technology in Europe" which currently involves 13 universities in 11 countries (see [appendix 1](#)). These universities offer a joint master programme that entails a common course structure, student exchanges and sharing of resources for supervising and evaluating master theses. The network has developed its own set of guidelines which are the foundation of the ESST programme at TIK, see www.esst.eu.

Successful applicants to the ESST master programme must have a bachelor of arts or bachelor of science degree. Applicants are categorized into four broad academic areas: social sciences, humanities, natural sciences and technology, and other. Students are recruited from each of these categories. When recruiting, TIK typically interviews candidates in order to gain a clearer view on their motivations and goals. An overview of recruitment and student performance is provided in table 1:

	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
Number of applicants	49	62	77	90	40
Accepted students who started the programme	16	19	14	19	13
Students who completed the programme on time	10	17	8	17	-
Students who completed the programme overtime	1	1	1	-	-
Students who did not complete/leave of absence etc	5	1	5	2	-

Table 1. Overview of ESST masters recruitment and student performance

As indicated in table 1, the ESST programme has consistently had a favorable number of applicants, reflecting 3-5 applicants to each available position. With the exception of last year, the programme has also been characterized by an increasing number of applicants. The drop in applicants in 2012/2013 can perhaps be linked to two factors. The first is the revisions in application procedures that were institutionalized at UiO in this year, resulting in changing patterns of student applications. The second is the start of the programme in organization, leadership and administration (OLA programme) at UiO, which arguably is attractive for some students with similar interests in TIK's programmes.

TIK has chosen to require knowledge of the Norwegian language as a criterium for entering the programme. Most of the other ESST programmes in Europe have introduced English as a working language, which has increased the number of international applicants.

The ESST programme has consistently had a highly positive rate of student completion to the degree. As indicated in table 1, since 2008 two-thirds of the ESST students have finished their master programme within the defined period of 13 months, and all but a few students have successfully completed the programme. Because of the small number of students, however, the relative completion rates are sensitive to individual variations and can fluctuate considerably from year to year. *TIKs master programmes reportedly have one of the highest rates of students completing their MA-degree of any programmes at the Social Science Faculty, as well as one of the highest completion rates at the University of Oslo more generally.* This strong result is exemplified by the 89,5% "completion rate on time" of students from 2011/2012. Also viewed over time, it is clear that a strong majority complete the programme on time, a few students complete the programme somewhat late, and a few students drop out from the programme.

Evaluative comments:

A strong strategic dimension of the ESST programme is that it is the only one-year master programme at the Social Science Faculty, offering a unique opportunity for students who have already entered the job market to enrich their academic skills and return to working life within a relatively short period of time. For many students, such renewable academic participation would not have been possible on a longer, two-year basis as normally required by master programmes in social science. Similarly, the programme also provides a valuable opportunity for those students who wish to continue beyond the bachelor level but also enter the workforce rather quickly. The diverse backgrounds of ESST students also contribute to close linkages between

students and organizations, firms and public administration, which is a strong asset for the student group as a whole, often creating contacts that might not otherwise have been available to the students.

The high on-time completion rate for the ESST program is also clearly a positive dimension of the program.

TIK could consider intensifying its efforts to recruit international students as “Oslo ESST students” starting in the first semester. This would imply changing the teaching language to English, which would have to be carefully considered in terms of its advantages and disadvantages both pedagogically, intellectually and socially.

Also, a switch to English and a more international requirement base could also be expected to lead to a potentially large number of applications from candidates in other parts of the world (perhaps particularly Asia). TIK would have to consider whether or not the Centre, with its very limited administrative resources, has the required capacity to receive, evaluate and “process” a much larger number of international applications than are received today. A key issue also concerns the potential competitiveness of students within such an international pool of applicants, specifically in relation to the typically strong qualifications of Norwegian students. Here TIK could perhaps benefit from learning from the experiences of other programs within UiO that have expanded to encompass international recruiting. What are the relative costs and benefits of such strategies, and what might be lessons learned from other international programs, particularly programs at small units such as the TIK Centre?

ESST master - design, course structure and overview of course content

The ESST master programme is a three semester programme (13 months) that results in 90 course credits. The ESST network defines rules and regulations for the programme and a core curriculum for the courses that are offered in the first semester. Following successful completion of the first semester, the students may choose to write their theses at any of the member universities which offer a specialization course during the second and third semester. Assessment of the ESST master thesis is undertaken in collaboration between two ESST member universities.

The structure of the ESST programme is as follows:

3.semester	Master thesis TIK 4090		
2.semester	Design Seminar TIK4040 Option to study abroad	Specialization course in Innovation, TIK4021 or Specialization course in STS, TIK4011 Option to study abroad	Master thesis TIK4090
1.semester	Introduction to Technology, innovation and knowledge, TIK 4001		
	10 credits	10 credits	10 credits

Table 2: ESST programme structure

In order to provide a sense of the actual content of the courses, we will now provide a brief overview of the purpose and orientation of each course in turn.

1. **Introductory course in Technology, Innovation and Knowledge, TIK 4001 (30 credits).** The purpose of this course is to provide students with a broad, historically informed and state-of-the-art oriented introduction to selected perspectives on processes of knowledge production in society. The course consists of five modules. The chronological order of these modules has varied somewhat in recent years as TIK has strived to develop a chronology that reflects both a good intellectual progression for students and complementarity between fields. The five modules are:
 - Module 1: Introduction to Technology, innovation and knowledge
This introductory module aims to present an historical background to the development of the scientific issues and academic fields which are the focus of the master programme. The broad purpose is to familiarize students with how new scientific fields emerge as part of wider social, political and academic contexts.
 - Module 2: Producing knowledge
The purpose of this module is to introduce various STS-perspectives on knowledge production, as well provide an introduction to the historical development of the field. Some of the main issues for discussion are the roles of norms and paradigms in science, the roles of expertise in societies, and the ways in which different forms of technology, material objects and relations also may contribute to lay knowledge and participation in scientific and technological processes.
 - Module 3: Innovations from a micro perspective
The aim of this module is to introduce students to the various ways in which private and public organizations manage or otherwise handle practices of innovation. The students are introduced to theoretical topics such as organizational learning, innovation process management and the coordination of inter-firm innovation collaborations.
 - Module 4: Politics of knowledge and technologies of politics
This module engages with resources within the broadly defined field of STS to address issues related to knowledge, technologies and politics. The students learn to problematize the complex relationships between science and politics and gain an increased understanding of research tools and methods for studying interactions between science and society.
 - Module 5: Innovations from a macro perspective
The purpose of this module is to describe and analyze processes of innovation, the development of innovation systems, definitions and indicators of innovation, as well as innovation policy. Emphasis is on these issues as they relate to Norwegian conditions. The module also includes a full day in dialogue with key actors in innovation policymaking in Norway.

2. **Design Seminar, TIK 4040 (10 credits)**
The aim of this course is to provide students with the methodological knowledge necessary to design, organise and write a high-quality thesis within a set timeframe and deadline. The course encompasses discussions of research strategies, research methodologies and their practical applications, and on-going research projects at the TIK Centre. Besides lectures and seminars, the course also includes small group supervision of individual thesis projects. During the course, thesis supervisors are appointed for each student. An important objective of the module is to build students' confidence that they can work efficiently on their thesis project and enjoy the process.

3. Choice of specialisation course:

- At TIK – choice of one of following courses:
 - **Science, technology and society/STS, TIK 4011 (10 credits)**

The point of departure for this course is the increased societal dependency on various forms of expertise, which actualizes a number of important issues related to controversies, lay knowledge and relationships between science and policy. How do science and technology take part in controversies, how does lay knowledge influence science, and how can we understand the role of science and experience in democracy? The course draws upon studies of medicine, law and the environment to critically reflect on these and related issues.
 - **Innovation, TIK 4021 (10 credits)**

The main goal of this course is to increase the students' knowledge of important concepts, issues, theories and dilemmas in innovation, building on introductory courses in innovation studies at UiO and elsewhere in the ESST partner institutions. Through examples related to global challenges such as climate change, economic growth, and public health, the topic of innovation is linked to some of the most important issues of our time. By the end of the course, the students should be able to participate in high-level discussions about contemporary innovation theory and policy.
- **At other European universities** – choice among courses at [13 universities](#).

4. Master thesis, TIK 4090 (40 credits)

The course consists of the supervision and guiding of the ESST master's thesis. Through on-going, obligatory academic supervision, the purpose of the thesis work is that the student will gain insight into different stages in the research process and enhance her/his ability to see the relationships between choice of research question, theoretical perspective, research design and choice of method. Since the time allotted for work on the master's thesis is limited, a significant part of the student's challenge lies in selecting a research question that can be answered in a scientifically sound manner within the specified amount of time, as well as to work systematically to use that time effectively.

Evaluative comments:

In recent years the ESST master programme has exhibited a downward trend with regard to the number of students who choose to take their second semester at another European university within the ESST network. This downward trend is clear despite strong institutional mechanisms in place that support and facilitate the possibility to both take specialisation courses and write the master thesis at other universities.

An internal program evaluation that TIK carried out in September 2012 indicates the following factors behind this development:

- *Because the ESST master programme is viewed by students as being both demanding and intensive, students sometimes view a semester/thesis abroad as a risk factor that might negatively impact upon their ability to turn in their thesis within the planned timeframe.*
- *Good relationships between student and supervisor at the guest European university are highly important. Unfortunately, a few cases of students who had negative supervisory*

experiences abroad have been reported and become known by ESST students, contributing to a “negative reputation” for foreign second-semester study.

To change this situation, TIK could consider the following measures:

- *Former ESST students who have experience of the ESST term abroad could be invited to meet current ESST students and discuss the benefits of such exchanges, as well as to advise as to possible pitfalls and means of avoiding them.*
- *The Centre could strengthen its routines and measures for closer monitoring and follow up of students who go abroad. The purpose would be to ensure “early warning” and strong handling of possible academic or administrative problems among ESST students who are spending their second semester abroad. To free resources for such intensified follow-up of individual students abroad, TIK could admit fewer ESST students starting in fall 2013.*

In addition, there are two institutional requirements within the ESST network that are not fully satisfactory and that TIK should work to change. The first is the fact that the ESST programme currently uses a grading scale that consists of Pass with Distinction; Pass Good; Pass Satisfactory; Fail. This grading scale is neither consistent with the Bologna agreement or with Faculty policy. TIK has recently brought the situation to the attention of ESST leadership and should continue to use the Centre’s highly influential role in the ESST network in order to bring about a change to an A-F grading scale.

The second unsatisfactory dimension of institutional routines in the ESST network is the fact that according to current routines, each supervisor acts as one of two evaluators in the committee that is appointed to evaluate their own students’ thesis work. TIK clearly needs to work to enact a change in this practice.

Students’ assessment of the ESST programme

TIK has recently conducted a survey among its students in the ESST master programme. The survey consisted of an internet questionnaire that was distributed to all students who started the program in 2011. In other words, this group comprises current students who are in the process of concluding their studies and thus have an up-to-date overview of the whole programme. The response rate was 61% (11 of 18 students responded to the questionnaire).

The majority of the students were extremely positive or relatively positive to all practical, organisational and social dimensions in connection with the start of the programme. It is clear that as a small centre, TIK can provide an inclusive and personalised atmosphere with close, positive intellectual and social ties among students, faculty and staff.

When asked about their perspectives on the overall orientation of the programme, a majority of students responded that they are only partially satisfied. Specifically, several students note that the fact that Innovation and STS are distinct scientific approaches with little contact represents an on-going intellectual challenge for teachers to demonstrate and/or problematize the potential for multidisciplinary meeting places between these approaches in the courses that are offered. Several studies also express the view that the teachers do not fully utilize the multidisciplinaryity that is found in the students’ highly varied backgrounds and competences. Student representatives in the Program Council express similar perspectives.

The students were also asked to provide open feedback on what they were particularly satisfied with/dissatisfied with in relation to the programme. Here several students mentioned that the

process of appointing supervisors has not always been organised in an optimal manner (particularly due to circumstances in 2012). Specifically, TIK has sometimes not been sufficiently active in making sure that supervisors are appointed to all students early on. This means that it took too long for individual students to receive supervisors, resulting in unnecessary delays in getting start on thesis work. This situation was problematic considering the relatively short and intensive time period for writing the thesis.

Some students have also commented that information about concrete opportunities for foreign study in the ESST second semester has not been satisfactory, with the result that some students who initially had planned to apply for such foreign study have instead stayed in Norway for the second semester.

Finally, the majority of students note that they spend 30-39 hours/week on their studies and that the amount of work that is required in the ESST program is appropriate or demanding.

Evaluative comments:

TIK should work systematically and pro-actively to ensure that the positive study environment and close intellectual and social ties between students and faculty are not only maintained but strengthened. The results of the student survey also indicate that the Centre should

- *strengthen and expand concrete opportunities for exploring multidisciplinary perspectives of various kinds, both with regard to intellectual meeting places between innovation and STS, and with regard to intellectual exchanges among students with different backgrounds;*
- *ensure that the process of appointing supervisors for the master thesis is carried out in a timely, supportive and efficient manner;*
- *improve information about ESST foreign study; actively encourage such foreign study in the second semester*

Employment and further education beyond the ESST degree

Because the ESST master programme is a 13-month programme, graduates of the programme must complement their degrees in order to qualify for positions as ph.d. candidates. The TIK Centre has well-developed procedures to enable students to complete such complementary work, which has contributed to more than 50 ESST graduates continuing on to ph.d. programmes in Norway or internationally. ESST graduates also acquire a multitude of qualified positions within public administration, organisations and firms.

In August 2008 a labour market survey was sent to 37 former ESST students. The survey was quite extensive and contained 87 questions related to the students' careers, career development and job situations. The result of the survey was in general terms positive for the ESST programme. Nearly 95% of the respondents reported that they were either in permanent or part time positions. The majority of respondents worked in the private sector (e.g. oil and gas sector, consulting and business activities), while the rest reported that they worked within the state sector (e.g. ministries or public administration, education and research, public relations and management) or in other organizations such as charities and NGOs.

Significantly, national worklife surveys of graduates of universities and colleges in Norway have also indicated positive results for graduates of both the ESST and TIK master programmes.

Results specifically from the past two years show that these graduates have had the shortest time from degree to work position and have commanded the highest salaries (along with students with degrees in economics) among all graduates from the Social Science Faculty and Humanities Faculty at UiO.

When the former students were asked if they were satisfied with their current positions, 86 % of the respondents reported that they were very satisfied or satisfied. Almost 65% of the respondents also stated that their educational background from the ESST master programme is relevant for their current positions. Thus for two-thirds of all graduates, the programme has proved to be highly important for their on-going work, which is a strong indication of the programme's relevance.

3) TIK master programme - overview, student performance and structure

TIK's master programme in "Technology, Innovation and Knowledge" was established in 2006. In contrast to the ESST programme, the TIK master is a two-year programme that results in 120 course credits. Although the programmes have similar academic foundations (the courses are normally offered to both groups of students), there are also differences between the programs as will be discussed in the next section.

Applicants to the TIK master programme must have a BA in social sciences, culture sciences or the humanities. Examples of students' academic backgrounds include bachelor degrees in anthropology, economics, social geography, political science, sociology, psychology, history, media science, history of ideas, and philosophy. Other students might come from multidisciplinary degree programs. The number of applicants to the TIK master programme and their progression is indicated in table 3.

	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
Number of applicants	43	52	73	90	80
Accepted applicants who started the programme	8	9	16	14	19
Students who completed the programme on time	4	4	12	-	-
Students who completed the programme on overtime	3	2		9	-
Students who did not complete the program/leave of absences etc	1	3	4	6	-

Table 3. Overview of TIK masters recruitment and student performance

The table shows that the programme has demonstrated a stable increase in the number of applicants. In addition to students from the University of Oslo, the programme also recruits a significant number of applicants from other Norwegian universities, particularly NTNU and the University of Bergen.

Similarly to the ESST program, applicants to the TIK masters programme have a relatively high average grade point average, GPA. In the period 2007-2012, the lowest GPA among accepted

applicants was 63 points, which is one of the highest averages at the University of Oslo. This indicates the popularity of the program among high achieving students.

Evaluative comments:

The TIK students' rate of on-time completion is somewhat lower than that of the ESST master programme, but is this difference significant, and if so, why this difference? First, it can be argued that successful completion of two-year master programmes within social science and humanities is often characterized by delays. Second, some TIK students have expressed the view that supervisory roles in relation to the thesis has sometimes been varying in intensity and quality, as noted earlier. Thus TIK should work to become more systematic and active in seeing to it that supervisors are appointed to each student early on in the process of thesis writing. TIK could also consider adopting a more restrictive policy with regard to granting leaves of absences than has been the case to date.

TIK master - design, course structure and overview of course content

The TIK master programme is structured as follows:

4.semester	Master thesis TIK4090		
3. semester	Master thesis TIK4090		
2.semester	Design Seminar TIK4040	Specialization course in Innovation TIK4021 or Specialization course in STS, TIK4011	Qualitative method SGO4010
1.semester	Introduction to Technology, innovation and knowledge, TIK 4001		
	10 credits	10 credits	10 credits

Table 4: TIK programme structure

The programme currently includes the following courses:

1. Introductory course in Technology, Innovation and Knowledge, TIK 4001 (30 credits).

See course description in section 2.

2. Course in Quantitative Research Methodologies – a selective introduction (optional course; one week)

This course was introduced in January 2011 in response to student requests for a course that provided basic skills in such quantitative research methodologies that are widely used in particular within innovation studies, such as statistical program for the social sciences/SPSS and other forms of statistical analysis. The course has been extremely well received by students as indicated by very strong course evaluations.

Course in Qualitative Research Methodologies, SGO 4010

This course provides students with techniques and tools for qualitative data collection and research. Students acquire skills in analyzing qualitative data, as well as gain an understanding of the limitations of using such data when making empirical and theoretical generalizations. The course also familiarizes students with ethics issues in qualitative interviewing and in writing on research results.

3. Design Seminar, TIK 4040 (10 credits)

See course description in section 2.

4. Choice of specialization course:

- **Science, technology and society/STS, TIK 4011 (10 credits)**
See course description in section 2.
- **Innovation, TIK 4021 (10 credits)**
See course description in section 2.

5. **Master thesis, TIK 4090 (60 credits)**

The course consists of the supervision and guiding of the TIK master's thesis. Through on-going, obligatory academic supervision, the purpose of the thesis work is that the student will gain insight into different stages in the research process and enhance her/his ability to see the relationships between choice of research question, theoretical perspective, research design and choice of method. Notably, the TIK thesis is a theoretically and empirically more comprehensive work than the ESST thesis (60 credits rather than 40 credits). The TIK thesis also qualifies students to apply for positions as ph.d. fellows.

Evaluative comments:

Similarly to the ESST programme, the TIK master strongly reflects the dual intellectual focus of TIK's ongoing research in the fields of innovation and science & technology studies. This focus is clearly apparent both in the modules in 4001 and the specialisation courses 4021 and 4011.

The current course structure makes it possible for students to gain in-depth knowledge within their chosen areas of specialisation, but there are also some disadvantages. First, it can be argued that the existing structure does not fully taken advantage of the unique potential of TIK's master programme to provide an intellectual meeting place for the two fields. Second, the course structure does perhaps not fully encourage students to explore potential synergies of the fields in ways that might be useful to their own work. The need for more intellectual spaces for discussing synergies or other intellectual meeting places between these fields was also pointed out by students in TIK's student survey in September 2012.

At a meeting with all master teachers in spring 2011, TIK took a number of concrete measures to strengthen the intellectual meeting places between innovation and STS in the master programmes. These measures included:

- *Changing the order of the modules in the introductory course so that there would be greater continuity in the teaching of the respective approaches. Specifically this meant implementing an "every other" innovation/STS module structure (i.e. introduction – STS module – innovation module – STS module – innovation module).*
- *The final introductory module should be concluded with a lecture (four hours) that is given by researchers from both fields, explicitly discussing the ways in which innovation/technological change can be analyzed with the help of perspectives from both fields.*
- *In order to motivate students to apply concepts and approaches from the two fields in relation to each other, the examination should include the requirement that perspectives from both fields are applied. This means that it is not possible to only focus on one of the fields when writing the exam.*

TIK should continue to work to more fully utilize the potential for developing intellectual meeting places for its two core fields within both the ESST and TIK master programmes. Possible

measures might include revising the introductory course by e.g. stimulating more interaction among approaches, further developing “thematic cases” that call for explicitly exploring differences/potentials between approaches, and arranging forums or panel debates on current controversies, debates or issues that are relevant to the two fields.

An additional task for TIK’s internal evaluation is to critically review and develop the current course offerings with regard to research methodologies. Currently the Centre offers a course in qualitative methodologies in cooperation with the Department of Sociology and Human Geography/ISS (SGO 4010) , which has gotten mixed reviews from students over several years. TIK’s own course in quantitative methodologies has been offered on an adhoc-basis and must be more integrated with the rest of the program both scientifically and in terms of course credits.

Finally, TIK could work to provide more extensive evaluative feedback to students with regard to their thesis work. While ESST students receive extensive evaluative comments, TIK students currently receive only a final grade (A-F). This situation could be changed in the interests of providing students with clear, constructive scientific comments that discuss the strengths and weaknesses of their thesis work both theoretically, empirically and organisationally.

Students’ assessment of the TIK master programme

TIK has recently conducted a survey among its students in the ESST master programme. The survey consisted of an internet questionnaire that was distributed to all students who started the program in 2011. The response rate was 44% (8 of 18 students responded to the questionnaire).

The majority of students were satisfied with all practical, organisational and social dimensions in connection with the start of the programme. When asked about their perspectives on the overall orientation of the programme, a majority of students responded that they are only partially satisfied. As with students in the ESST programme, several TIK students note the challenges that stem from the fact that Innovation and STS are distinct scientific approaches and that the Centre could become better at more actively applying multidisciplinary perspectives in teaching.

Similarly to the ESST programme, the majority of students note that they spend 30-39 hours/week on their studies and that the amount of work that is required in the ESST program is appropriate or demanding.

With regard to what measures could be adopted to better prepare the students for the task of writing their master thesis, several students noted that the course in qualitative methodologies (SGO 4010) is not sufficiently relevant for their work in the TIK masters. The Centre should work to establish its own course in qualitative methods.

Students’ subsequent careers in academia, industries, public agencies

One of the goals of the TIK master programme to provide a strong academic platform from which students can apply to ph.d. programmes both in Norway and internationally. Among else, several of TIK’s own ph.d. candidates have been recruited from the Centre’s master programme.

Graduates of TIK’s master programme also work in a multitude of firms, public authorities and private organisations, although there have been no systematic studies to date of their career paths.

4) ESST master and TIK master: two complementary programmes

When the TIK master programme was established in 2006, a prerequisite as explicitly put forth by the Social Science Faculty was that the new programme would be based on the course structure and orientation of the existing ESST master. Both programmes thus focus on theoretical and empirical approaches that are central to the on-going work at the TIK Centre, e.g. dimensions of the knowledge society, science/knowledge creation and use, and issues related to power/politics/policy and industry/economy/society. Since the students to a large degree follow the same courses, they constitute one student group at the Centre, which is advantageous in numerous ways.

The two programmes complement each other in several respects. First, the two programmes have somewhat different recruitment criteria and thus engage students with heterogeneous backgrounds. The ESST programme typically attracts students with broader inter-disciplinary backgrounds – and often broader professional backgrounds – backgrounds that those that typically characterize TIK students, who are recruited from social science and the humanities. This tendency increases the heterogeneity of the groups, which in turns contributes to the interactive learning potential among the students. The ESST students, who are often professionals/semi-professionals in various sectors, have also been instrumental in assisting the teaching faculty in establishing collaborative links to firms, public administration and organisations. As noted earlier, the fact that the TIK Centre offers a one-year master programme is also attractive to many students.

Second, the ESST master programme has a strong international orientation and represents an institutionally strong programme for stimulating and facilitating study abroad. As part of a long-standing European network of 14 universities, the ESST master provides students with multiple opportunities for – and easy access to – foreign study at many European universities.

Evaluative comments:

While the two programmes reflect similar academic content as originally stipulated, there are important complementarities between them. While the TIK master attracts academically motivated students from the social sciences and humanities (many of whom are potential ph.d. candidates), the ESST master provides opportunities to create a more inter-disciplinary group that includes students from natural sciences and engineering. The ESST master also attracts students with backgrounds from universities outside Norway.

Nevertheless there are several aspects of the programmes that could be improved in future. Although the ESST master offers strong and readily available opportunities for foreign study, there has been a marked decline in the number of Norwegian students who make use of these opportunities by taking a semester abroad. The TIK Centre needs to analyze the reasons for this decline and take concrete measures to address it. How can the existing networks be strengthened in order to increase the international exchange of students (both in- and outgoing)? Should the TIK Centre choose core partners within the ESST network with which it can develop closer relationships in terms of both research and teaching, e.g. exchange of both teachers and students? How can TIK take measures to strengthen thesis supervision while students are abroad?

Also, although the scientific overlaps are highly positive in making it feasible for the TIK Centre to offer two complementary programmes, this dual offering is scientifically and administratively demanding for TIK as a small centre with limited resources. The Centre needs to analyze its course offerings in relation to available teaching resources and consider whether it is possible to develop less intensive pedagogic approaches that could reduce faculty teaching hours while still

maintaining high academic standards. The Centre should also critically examine ways in which to simplify/make more efficient the various aspects of the administrative processes for running the programmes (particularly with regard to ESST). Among else, TIK should consider what is the optimal number of students in each programme from both pedagogic and administrative perspectives.

5) ESST master and TIK master: teaching methods, resources and organization

Masters teaching is primarily carried out by TIK's senior faculty (i.e. primarily professors and associate professors), also external lecturers with specialized knowledge in specific areas are also enrolled and utilized. For example, TIK systematically engages its international "professor IIs" in master teaching. In addition, TIK's ph.d. candidates are viewed as valuable resources in areas in which these candidates have significant relevant competence. TIK often engages researchers from other departments, as well as from researchers from other universities and institutes, as thesis supervisors. Compared to many other departments within the Faculty of Social Science, TIK's master programmes are "teacher intensive", i.e. the courses use significant resources as measured by the large number of hours that the members of the faculty devote to teaching.

TIK's teaching methods include a variety of pedagogic approaches that include traditional lectures, seminars, small group discussions, individual and group assignments, study visits, and project work. An important priority is to continually ensure the societal relevance of the scientific perspectives that are discussed in the courses. This means linking the topics of the course to both societal concerns and the concerns of relevant actors within public administration, policy organisations, firms, and private organizations. Study visits and dialogues with relevant actors and organisations are therefore core components of the various courses.

For example, one examination task was to explore the ways in which theoretical approaches from both STS (e.g. actor-network theory) and Innovation theory (e.g. technical innovation systems) contribute to our understanding of innovation or technological change based on a case study (e.g. windpower, smart-house or other empirical cases related to your own interests). Students were required to use the case study to analyze and discuss what dimensions of the innovation/technological change process that would be emphasized in the two approaches, as well as what dimensions that would not be fully addressed in the respective approaches.

In another example of teaching methods, TIK's students recently carried out an assignment that had been identified by teachers in close dialogue with representatives from the Norwegian Research Council. After developing the task in small groups, the students presented the results of their work to both the head of NFR and representatives from the Ministry of Education, thus receiving valuable feedback on the societal relevance of their work

Finally, although students have considerable degrees of freedom in deciding upon topics for their master theses, they are encouraged to select topics that are relevant for ongoing research projects that are carried out by TIK faculty.

Evaluative comments:

The TIK Centre could further strengthen its on-going efforts to develop and implement innovative approaches to teaching. This work could include exploring ways to further diversify teaching methods by e.g. building on the positive experiences of thematic case work, discussing new pedagogic approaches and exchanging ideas across courses. One possibility is also to make more explicit utilize the competences and experiences of students within the two programmes in teaching.

Organisation and leadership

The TIK master programmes are coordinated and led by a Director of Studies (“masteransvarlig”) and a Senior Executive Officer (“studiekonsulent”). While the latter is a permanent staff position, the director is chosen among the academic faculty and is appointed by the Centre for a specific period of time. In order to ensure rotation among faculty and strengthen the potential for renewal, TIK has recently made the decision to appoint directors for a mandate period of four years.

The responsibilities of the Director of Studies include overall responsibility for planning and running the programmes, delegating responsibility for carrying out specific modules/courses, and providing academic support to the students, for example by suggesting potential thesis advisors. The Senior Executive Officer is responsible to follow up the decisions that are being made by the Director and the Programme Council (see below). This work includes advising and supporting students according to administrative rules and guidelines that have been established within TIK, the Social Science Faculty and the University of Oslo.

In addition, the TIK Programme Council (“programrådet”) has an advisory role and can initiate changes in the structure and orientation of the programmes. Members of the Programme Council consist of TIK’s Director (head of the Council), the Director of Studies, one ph.d-representative and two student representatives. The Senior Executive Officer serves as secretary.

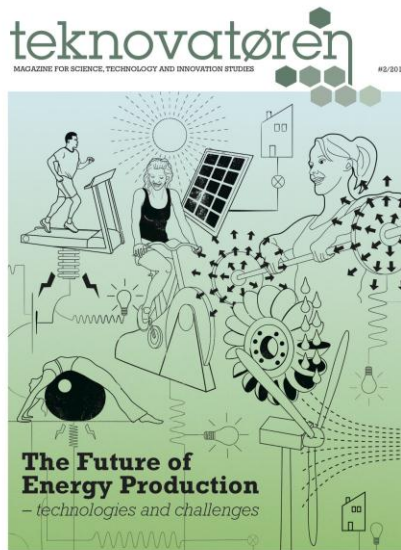
6. Student life at the TIK Centre: InterESST and student magazine *Teknovatøren*

The master programmes at the TIK Centre reflect a favourable teacher-student ratio, which means that the Centre is able to provide a strong study environment that is characterized by relatively close contact between faculty and students. As pointed out by some students in recent years, there are clearly limitations, however, in the “drop-in availability” of faculty due to many other academic demands and commitments. As one measure to increase faculty availability, in fall 2012 TIK took initiative to arranging scheduled office hours for an appointed senior teacher (who was also a professor II at the Centre). This arrangement will be evaluated in connection with the planned internal review of the two programmes in spring 2013.

TIK also systematically organizes at least one extracurricular event among students, faculty and staff per semester. Examples are a ”masters mingling” where senior and junior faculty briefly present their research interests, ”release parties” for new editions of the student magazine *Teknovatøren* (see below), the annual student-faculty soccer competition, and the Centre’s participation in the running relay “Holmenkollenstafetten”.

In 2010 ESST and TIK master students took initiative to establish a new academic magazine for innovation and technology studies at the University of Oslo, *Teknovatøren*. The magazine, which was first published in early 2011, is largely produced by the graduate students. The faculty also contributes to the publication, which has quickly become a unifying link between students and faculty members. *Teknovatøren* also acts as a portal for students to exhibit and practice journalistic writing on scientific issues.

The magazine is published twice a year (spring and fall) with a distribution of 1,000 copies. Besides being distributed within UiO, *Teknovatøren* is also sent to Norwegian universities and national research institutes as well as numerous universities abroad, including the ESST network. Economic support for these activities are provided by the TIK Centre, Grønt Punkt Norge and the Student Union Welfare Organization in Oslo and Akershus.



Students also have their own alumni organisation, InterESST, which upon its establishment in 1994 was the first such organisation at UiO. InterESST has played an important role at TIK by developing international webpages, initiates EU projects, arranging workshops and public events on contemporary issues relevant to the programmes, and spreading information to assist in recruiting students. The organisation has been less active during the last two years. The Centre should therefore consider possibilities to revitalize and increase its support to InterESST.

7. Summary comments: strengths and concrete challenges in future

The strengths of the master programmes at the TIK Centre include the following:

- The programmes are strong, research-based, multidisciplinary programmes with distinctive academic profiles and high societal relevance
- The ESST master programme is the only one-year master at the Social Science Faculty, which is attractive for many students
- The programmes are characterized by strong completion rates: 95 % overall completion and 75% on-time completion rate
- Students acquire relevant, qualified positions shortly after graduation and typically command relatively high salaries for their work
- Graduates report to a significantly high degree that the master programmes have been relevant and important in providing them with competences and skills for their on-going work

In connection with its planned internal review and revision of its master programmes in spring 2013, the TIK Centre should consider the following measures to further strengthen the programmes:

- Further develop the distinctive profile of each programme
- Continue to explore and develop innovative teaching methods, particularly in ways that encourage dialog between the two fields (innovation, STS) that constitute the scientific base of the programmes
- Develop - and more fully integrate into the programmes - courses on methodology by e.g. developing high-quality, TIK-based courses in both qualitative methodologies and quantitative methodologies
- Secure good teaching resources to the programmes and explore the potential for reducing teaching hours while maintaining high pedagogic quality
- Change the grading scale for all master courses to an A-F grading scale
- Ensure that the supervisory process for the master thesis is efficient, supportive and timely for all students
- Take measures to encourage and assist more ESST students toward taking their second semester at other universities in the European network
- In dialog with the ESST network, work systematically to change current practices in the network with regard to grading scale and supervisors' roles in evaluation procedures
- Take measures to improve evaluative feedback on thesis work to students within the TIK programme

Oslo den 10. desember 2012

Jane Summerton
Director, TIK Centre

Øystein Moen
Higher Executive Officer

ESST network – academic partners 2012

Appendix 1

1. Aalborg University, Denmark
2. Aarhus University, Denmark
3. Autonomous University of Madrid, Spain
4. Linköping University, Sweden
5. Lund University, Sweden
6. Maastricht University, the Netherlands
7. NKUA/NTUA, Athens, Greece
8. Strasbourg University, France
9. Tallinn University of Technology
10. Technical University of Lisbon, Portugal
11. University Notre-Dame de la Paix, Nam
12. University of Louvain-la-Neuve, Belgium
13. University of Oslo, Norway