

1- Introduction

This report summarises the external evaluation the master's degree programme in Telemedicine and e-Health (MA-T&eH) at the Arctic University of Norway (UiT). The evaluation is based on documents provided by the Faculty of Health Sciences and interviews with the Vice-Dean, staff in charge of the program and students.

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Professor, PhD, Pieter Jelle Toussaint is appointed leader of the committee's work.

1.1 Mandate and Process of the Evaluation

1.1.1 Original mandate and divergent direction

The committee's initial mandate was, as stated in the document *Guidelines for external evaluation of study programmes at the Faculty of Health Sciences*, as follows:

...to evaluate coherence in the study programme and analyse, if the subjects are related to the intended learning outcome and if the teaching methods are supporting that objective. The committee is also asked to evaluate whether the study programme's content and learning activities answer to the demands in working life.

On the 3rd of May 2017, the committee received a mail from the contact person at the Faculty of Health Sciences, who was in charge of sending out the required documentation and organizing the site visit. Here it was stated that the committee should also take into account the assessment of the master in Telemedicine and E-health, as expressed in section 7.1 of the document *Gjennomgang av studieporteføljen - del 2: erfaringsbaserte og to-årige masterprogram*. One of the issues highlighted in this document regarding the MA-T&eH is the low number of Norwegian applicants to the program in general, as well as the low number of applicants for the technology track. Another issue highlighted was the relatively high level of drop out.

Besides that, the explicit request to the evaluation committee in *Gjennomgang av studieporteføljen* (p. 47), was the following:

With the revision of the programme the focus should be on getting clear which competences the field of practice needs, and whether it is beneficial to have to separate tracks. It should also be assessed what the implications are of the establishment of a 5-year master in Health Technology at the faculty of Natural Science and Technology, for the content of the programme in Telemedicine and E-health. (Translated by P.Toussaint)

At the start of the site visit, it was made clear by the Vice-Dean Professor PhD Geir Lorem that the technology track would not be continued, which made the recruitment problem for this part obsolete. The evaluation therefore focuses on the health track of the master program. Summarized our mandate included the following seven goals:

1. Analyse the recruitment problem
2. Analyse the drop-out problem
3. Evaluate coherence in the study programme
4. Analyse if the subjects are related to the intended learning outcome
5. Analyse if teaching methods are supporting that objective
6. Evaluate whether the study programme's content and learning activities answer to the demands in working life.
7. It should also be assessed what the implications are of the establishment of a 5-year master in Health Technology at the faculty of Natural Science and Technology, for the content of the programme in Telemedicine and E-health.

1.1.2 Process

The evaluation was based on information gathered through documents and interviews.

Documents

The documents received by the committee were the following:

1. Guidelines for external evaluation
2. Master in Telemedicine and E-Health: Health field of study (Background information, containing statistics on student numbers and results)
3. A list of publications in CRISTIN of the telemedicine and E-health group for the years 2014-2016
4. Master's Programme in Telemedicine and E-health, programme description of both the health and the technology tracks (from 2014)
5. Quality reports for the study over the years 2014-2016 (in Norwegian)
6. Gjennomgang av studieporteføljen - del 2: erfaringsbaserte og to-årige masterprogram. (in Norwegian).

The committee requested information on the 5-year Health Technology master, but were told that there was no written information available. We could contact a person involved in setting up the master, but have not used that opportunity, mainly because the MA-T&eH's health track has a different objective and target group. This report therefore does not address goal 7 above.

Interviews

The committee conducted interviews with a number of key persons involved in the master during a visit on June 14th 2017 to UiT, Tromsø. Based on the documents send to the committee a number of questions had been prepared, though the dialogue was open ended pursuing also issues and questions that arose during the interviews. The committee was in contact with the following persons:

1. The vice Dean for Education, Professor PhD Geir Lorem
2. The two heads of study, Professor PhD Gunnar Ellingsen, Professor Dr.med. Rolf Wynn, and student advisor Judy Au
3. Two students (One first year student; one who completed the master)

Analysis

Based on the documents and the interviews, the committee identified a number of themes that reoccurred and that highlighted the problems with the master from the perspectives of these important stakeholders.

This process showed that the mandate goals 3 and 4 (above) were not seen as problematic by the stakeholders. They are therefore not, or only superficially, addressed below.

2 Evaluation and recommendations

This section addresses the main themes that emerged from the documents and the interviews. Each theme is described and some recommendations are formulated, specifying possible ways to deal with the problems identified. However, before addressing this problem-oriented themes, we summarize shortly what we consider to be the strengths of the program, and why we recommend it to continue.

2.1 Strengths of the program

The program addresses an important field of knowledge and domain of practice. The establishment of the Norwegian Directorate of eHealth (<https://ehelse.no/english>), indicates that there is a demand for people that have knowledge about the use of ICT in health care at a national level in Norway. Internationally, developments like the failed implementation of a national Electronic Patient Record by the National Health Service in the UK, as well as mixed results with implementation of telemedicine on a large scale, show that there is a need for evidence based health informatics as well as a need for people with knowledge and insight into socio-technical design and application of healthcare IT.

The program aims to provide such knowledge and is connected to a strong research group, as demonstrated by the impressive list of publications over the years 2014-2015. Furthermore, the program has a strong connection to the Norwegian Center for E-health Research, which opens up for translating research findings into guidelines and recommendations that can impact policy making and implementation activities. The content and the organization of the teaching material is assessed as being satisfactorily by both staff and students.

2.2 Themes

Recruitment

Presently the program accepts only students with a BA in the health or computer science professions. The latter groups of students only comprise a low number of 1,8 admitted students per year, and presently the 'Technology' track of the program is likely to be closed. Thus, the following remarks will focus on recruitment and admission of students to the health track.

Whereas a master in telemedicine and e-health seems to be attractive for international students as evidenced in the high number of international applicants, this does not seem to be the case for Norwegian students. The number of potential students is of course much smaller in Norway than internationally, and the present restrictions to have a BA within the health professions additionally reduces the number of potential Norwegian applicants. There did not seem to be a strong reason for this restriction other than the benefit of having students with domain knowledge and practical experience with healthcare work, which enriches the program, also considering that interdisciplinarity is one of the major strengths of the program itself. However, the staff mentioned that health care is subdivided into many specializations and a subsequent heterogeneity of knowledge genres and practical experiences arises (nursing, radiology and surgery are quite different practices). Furthermore, the practical experience required often means that the target group consists of people that have been or are in a job, possibly have a family, mortgage, etc. It can be difficult for these people to engage in a full time master.

An additional reason for the low number of Norwegian applicants could be that the program is not well known within Norway, though this is uncertain given the high profile of research and of the National Center for Telemedicine to which the program is closely associated. Moreover, according to students, it is hard to know what to expect from the program before enrolling and its benefits for a career improvement are not clear beforehand. However, reaching out to the proper target groups via marketing efforts is a challenge.

Possible strategy: The committee proposes three measures to deal with the above challenges:

- Open up admittance for students having a BA with the social sciences, computer science, or healthcare. A less strict admittance criteria might attract Norwegian students at a time when further studies are of interest. Most likely, it will also attract more international applicants.
- With respect to marketing, students argue that the MA-T&eH was not widely known within UiT, and if true this would seem to be one first target. So, market the master among BA students in relevant BA-programs. Success stories or the involvement of alumni could help to sharpen the message and provide more tangible and concrete examples of the benefits of enrolling.
- Also, the program could be advertised on national events, such as the yearly eHIN conference in Oslo to attract Norwegian students beyond the Northern Region.
- In addition, it would be possible to send out information about the program to organizations that employ potential students, such as hospitals, community care and Health ICT organisations.

Academic and professional training

The program aims to have a profile that includes both an academic orientation and a professional orientation. In practice the academic orientation has mainly been in focus. The courses are firmly grounded in the scientific work of the faculty members involved in the program, and the students acquire important academic skills, such as the use of different research methods and techniques, and academic writing (students are also involved in scientific writing and publishing). However, both from side of the students as from the side of the faculty, there is a wish for more practice orientation. One of the aims with the program, as expressed by the vice dean, is that it provides knowledge and skills considered relevant by (Norwegian) community health care providers and the health IT industry. Also, the students expressed an interest in more practical experience with health IT systems. From both the documents and interviews, it became clear that the challenge was not a choice of between the two profiles (academic or practice), but a question of finding a better balance between the them.

Possible strategy: The committee recommends the following three measures:

- The program already uses guest lecturers (much appreciated by the students), but it has not been clear from the documentation or the interviews to which extend these guest lecturers are coming from academia or from practice. It is recommended to include guest lecturers that have a role as system developer, system implementer or similar. By sharing their experiences with the students, they can give them insight into how health informatics works as a community of practice.
- The possibility for internships should be offered to students. For example, students could be part of a work practice during part of their master project. Internships could be particularly beneficial for students with no previous experience in healthcare, should recruitment policies be made more inclusive (see “Possible strategy” about recruitment).
- Establish a reference group that includes representatives from relevant organisations in the healthcare sector (Helse IKT Nord, Sykehus Nord, DIPS, Community care) in order to get feedback on the content of the study program and the competences required, as well as establishing a network for internships and jobs (see also the section on *Relationships with stakeholders*).

Norwegian and International students

During the lifetime of the program, students have mainly been recruited internationally with a low number of Norwegian students. According to interviews, international students comprise 80-90% of all students. Norwegian and international student seem to have different problems. Presently, Norwegian students typically have full or part time jobs, family, and mortgage according to staff. There is a consensus among all that were interviewed that it is difficult to take leave or acquire financial support to cover for time to study. Norwegian candidates continue their work during studies and tend to take only one course at the time which prolongs their program enrollment beyond 2 years and increases the likelihood of dropping out. It was also suggested that the program being entirely English-based (both the teaching and the writing of essays/reports is in English) might hamper Norwegian students to apply or complete. However, the latter argument would also seem to apply to international students not all of which have English as their first language.

International students might have difficulties to join the program due to the financial requirements. They get a students' visa for only 2 years. For this reason, however, they are more committed to finish their studies in due time and go back to their countries of origin (they often have to go back to their countries to collect data for their thesis). Finishing the master program has granted students good positions in their countries, according to staff.

Possible strategy: *Norwegian and international students seem to have partially conflicting interest.* Given the wish to enroll more Norwegian students, the challenge here is to make it more easy for these to enroll without making it more difficult (if not impossible) for the international students. The committee proposes the following measures to be taken:

- With respect to the language issue, a possibility is to open up for writing exam papers and master theses in either English or Norwegian. Even though teaching and curriculum remains in English, Norwegian students can produce their work in the language they are most comfortable with.

- With respect to the challenge of combining the study with work and a family, turning the program into a part-time study is not an option, because that would make it impossible for international students to get a visum. A different option would be to extend the use of net-based teaching. This could reduce the need for students to be physically in Tromsø, but might also mean decrease of the quality of the study environment and of completion time, since F2F communication with fellow students and lecturers tends to be valuable.
- As stated above, a more open admittance criteria of a BA in social sciences or health care might attract more Norwegian students, before they get full time jobs, etc.

Drop-out

Dropping out of the program has been reported as a major issue. The percentage of students that complete the master program ranges from 50 to 100 percent for the years 2009-2016 (where numbers for 2014 and 2015 are missing). Overall success rate is ca 60%, so a drop-out rate of approximately 40% on average. The highest dropout rates occurred in the years 2009, 2013 and 2016, where it was 50%.

There are two main reasons for dropping out.

- Early drop out: Since candidate are allowed to apply for admission to more than one program, they can decide to leave the program early-on in favour of a different program. Also, students may discover that the workload is too demanding in combination with other work and family obligations.
- Second year drop out: After the first year, students have one full year to complete their thesis. During this year, the periodic consultations with the supervisor are the only connection to the master program. Both lecturers and students addressed the lack of study facilities and the distance to fellow students enrolled in this as well as in other programs as an issue (losing the feeling of being within a learning/student environment).

Possible strategy: The first year dropout seems difficult to address other than providing more information upon the program and overbook in order to arrive at the wished-for number of students after early drop-out. As for the second year drop-out, the main problem seems to be that students primarily work on their own and find it challenging to properly manage their master project. The committee proposes three possible measures that could be implemented to help students dealing with this problem.

- First, increase the number of obligatory meetings between students and lecturers during the second year. A possibility could be to schedule a number of meetings where students present their master project (progress, challenges etc.) to each other and supervisors. In this way they could learn from others and get feedback on their work and how to proceed.
- Encourage students to work together on a master project. Even though collaboration can introduce new challenges, it helps to share the responsibility for the project.
- Divide the master project into two parts of each 30 ECTS (i.e. two semesters). The first part could be methods, theory, or data generation project in preparation for writing the thesis in the second part. The first part should focus on a subject or issue related to the thesis, and could consist in describing a research design and generate data; conducting a literature review or write a 'related work report', or writing the theoretical chapter(s) for the thesis. The second part would be the thesis and here the generated data could be analysed and the thesis written. This division into two of the

second year could provide students with a structure, scheduled meetings and a number of smaller goals on the road to the large end goal, and hence possibly improve completion rates.

Study facilities and environment

In the meeting with the students, it was argued that the program lacked some basic facilities that could help to increase the feeling of being part of a learning community. The first thing mentioned was that students in the program did not have access to a study room in the faculty (desk and chair), though this allegedly is the case for other programs. Having access to such a facility would support the development of a learning community between students, and would be especially helpful while working on the master thesis. It would make it much easier to connect to the other students working in their thesis. A need for more gathering events outside the regular lectures was also pointed out.

Possible Strategy: The committee proposes two possible measures:

- Give students access to a common study place where they have access to working spaces, and can sit together with other students studying, working on exam assignments or writing their master thesis.
- Organize common events outside the lectures, such as seminars or social gatherings. This could enhance the group feeling.

Relationships with stakeholders

The program has many stakeholders, such as: UiT, the National Center for E-health Research, the Faculty of Health Sciences, the University Hospital, health IT industry, community healthcare and students. All having their own specific interests in the program. Trying to balance - if not all, then at least some of these interests - is a challenge. This is reflected in the discussion of some of the themes above, like combining academic and professional training, and being attractive to both regional, national and international students. Presently, there is no established way in which to engage stakeholders in program and curriculum development.

Possible Strategy: The committee recommends to establish an advisory board in which the main stakeholders of the program are represented. This advisory board should meet the program directors twice a year and give input to which profile and competences (for example, which competences do IT vendors or community health organisations need) they would like the program and final candidates to have, as well as provide a wider network through which to establish cooperations (internships, course and thesis projects). This advisory board could be central in a continuous process of evaluating and redesigning the program, as well as a way for the program to make itself visible in Norway and provide students contact with employers. Moreover, while students perceive the usefulness of the program for their practice they are also aware that it does not grant exclusive access to specific positions as other program do. A stronger and more stable relationship with stakeholder could also be beneficial in terms of establishing a new professional profile recognized by potential employees.

Conclusions

The committee is of the opinion that the program offers an important educational service, and should be retained. It has some strong points (both nationally and internationally attractive; combining academic and professional training; connection to a strong academic milieu) that should be sustained. We think that the challenges faced by the program, can be dealt with by implementing the recommendations given above in relation to the several themes discussed.

The committee hopes that the evaluation done and the recommendations given will be useful in the process of changing the program in order to meet the challenges identified. The committee would like to thank the Faculty of Health Sciences of UiT for their confidence expressed by appointing us as members of the evaluation committee, and the participants in the interviews for their insights and contributions.