



**IT FACULTY**

Fastställd av IT-fakultetsstyrelsen 2019-09-11  
Dnr V 2018/612

# REPORT

## **DEVELOPMENT PLAN**

**N2SOF – Software Engineering and Management  
master program, 120 credits**

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University of Gothenburg

The Department of Computer Science and Engineering, and the Software Engineering and Management bachelor program in particular, would like to thank the external evaluation committee for their report and recommendations. For most of the parts and recommendations we agree with the external evaluation committee and we believe that the recommendations are well-grounded and possible to implement. Below are our more specific comments for each recommendation from the report together with other known recommendations to improve N2SOF.

The recommendations and improvements are divided into eight categories: General, N2SOF General, Course evaluations, Student engagement, Study environment, and Pedagogical approach and Project courses.

Please note, the order of the below recommendations and improvements are not based on the order that they appear in the evaluation report from the evaluation committee, nor are they based on the order in which they will be implemented.

The budget of those action points proposed in this document to be performed by the program manager amount to 10% of the program managers work time (approximately 170 hours). This is to ensure that all action points planned can be executed within a year without negatively impacting the duties and task of the program management. Required resources for action points that are to be performed by other persons are listed below accordingly.

## General

### Recommendation 1: A formal description of the program manager role and having a deputy program manager

*“A formal description of the program coordinator role and having a deputy program coordinator is recommended.”*

Although, as pointed out by the evaluation committee, the role of the program manager is well understood by the program manager, we agree that a formal description of the program manager role is needed. Instead of having one specific formal description for each program manager at the department of Computer Science and Engineering (CSE) at University of Gothenburg, the formal description of the program manager role should be a general description that applies to all program managers at CSE at University of Gothenburg.

We have a positive view of having a deputy program manager. However, before assigning the role of deputy program manager to a faculty member, we need to look into the scope of this role, the workload, responsibilities etc.

**Action point 1:** Create a formal description of the program manager role at CSE, University of Gothenburg. In addition to the formal description, a template for the role description will be created at the faculty level.

**Responsible role/function:** Vice-prefect (Staffan Björk)

**Required Resources:** 20 h

**Expected to be implemented:** Fall 2019

**Expected outcome:** The action point should improve the onboarding process for new program managers.

**Action point 2:** Determine the scope of the role of a deputy program manager. This will include a discussion with all program managers.

**Responsible role/function:** Vice-prefect (Staffan Björk)

**Required Resources:** 80h

**Expected to be implemented:** Spring 2020

**Expected outcome:** The action point will provide input for a decision for or against the introduction of deputy program managers.

## Recommendation 2: Improve process of establishing changes to course plans

*"It takes a long time to establish course plans and the result is often very general. This is partly due to that the systems for GU and Chalmers differ. Too general course plans make it difficult for students and teachers to plan the courses. It also makes courses less transparent for evaluation and improvement."*

It is a correct observation that the two processes of Chalmers and GU are not as synchronized as one would wish. This problem was already known before the evaluation and is currently worked on by the Vice-prefect (Staffan Björk).

Each course plan (syllabus) is accompanied by a detailed course plan (course PM), which is published latest two weeks before the course starts and includes more details on the course, enabling students to prepare for the courses. The observation that students and teachers perceive the course plans (syllabi) as too general is an insight that we were not aware about before. This requires an investigation on what students and teachers perceive as missing from the syllabi.

**Action point 1:** Improve the process for establishing course syllabuses at CSE, in order to shorten the time required.

**Responsible role/function:** Vice-prefect (Staffan Björk)

**Expected to be implemented:** May 2020

**Required Resources:** 20h

**Expected outcome:** The action point should lead to a more effective course plan process.

**Action point 2:** Investigate students' and teachers' perception of course plans and potential lacks in the level of detail.

**Responsible role/function:** Vice-prefect (Staffan Björk)

**Required Resources:** 20h

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should lead to specific input for program managers to drive and influence the level of detail in the course plans.

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### Recommendation 3: Coordinate impact of course changes between programs

*"The process for changing courses was implemented a year ago and prescribes that teachers initiate the change which is reviews by a course plan group for later approval by the vice dean. The program coordinators need to make sure that changes do not affect other programs negatively. It is not always that this communication works as intended. A suggestion is that the course plan group would call teachers and administrators for a regular check-up."*

This is a good proposal and the issue is under discussion since some time. A change of the process is under way. In addition, regular meetings between the program managers were instantiated in Spring 2019 to improve communication about course changes.

**Action point 1:** Integrate regular check with teachers, program managers, and course plan group.

**Responsible role/function:** Vice-prefect (Staffan Björk)

**Required Resources:** 10h

**Expected to be implemented:** 2019/2020

**Expected outcome:** The action point should create a platform for program managers to identify potential conflicts early on in the process of changing a course plan.

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### Recommendation 4: Avoid delayed start for foreign students

*" Foreign students can meet problems if they are admitted in the same application round as the Swedish students, with notification in July. Typically they start late due to the long processing time of their visa applications. A delayed start of one week can be acceptable, but no longer. There are proposals for blocking foreign students from the second application period to avoid these problems."*

The admission process is not in the hands of the program management. There is an international admission round providing students with the possibility to get admitted earlier, to avoid delays due to visa problems.

**Action point 1:** The Vice-prefect and program manager will have a meeting with the admission office to identify what can be done in addition to improve the situation and perform identified improvements accordingly.

**Responsible role/function:** Vice-prefect (Staffan Björk), Manager of the program N2SOF (Regina Hebig)

**Required Resources:** 10h

**Expected to be implemented:** 2019/2020

**Expected outcome:** The action point should reduce the number of visa related study delays, if possible.

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## Recommendation 5: Instantiate a discussion group for strategic program development

*"The program coordinators [...] He is also coordinating a Chalmers program; Chalmers has more meetings with program managers where also strategic development is discussed. Having some kind of group for IT-educations at GU is an idea suggested by an interviewee."*

We agree that this is a good idea. The Vice-prefekt Staffan Björk already initiated such a group in Spring 2019. We propose to continue that work.

**Action point 1:** Continue to establish the strategy group on GU education as well as continue that work on faculty level, including both DoIT and ITIT.

**Responsible role/function:** Vice-prefekt (Staffan Björk), Pro Dean and Responsible for undergraduate education at the IT Faculty (Miroslaw Staron)

**Required Resources:** 40h

**Expected to be implemented:** 2019/2020

**Expected outcome:** The action point should lead to a stable group concerned with strategic development.

There are potential synergies with **recommendation 14**.

## N2SOF General

### Recommendation 6: Active strategic development of program

*“The program coordinators are aware of the responsibility for strategic development, but since the program was changed recently they currently take more of an observing role. This can be OK for a short period only.”*

We agree. The strategic development of the program will be based on student feedback, such as input from a yearly program evaluation, course evaluation meetings, and application numbers to the program. Strategic goals and decisions will be made and discussed on three levels.

1. The faculty will be involved to come up with possible directions for course-level development as well as to provide feedback on program-level strategic questions. This will happen as part of teacher meetings (2 times per academic year) and more frequent division meetings.
2. Strategic changes and decisions will be presented and discussed at the department level, including the Vice-Prefect as well as program managers from related programs at the University of Gothenburg and Chalmers.
3. Strategic changes and decisions will be discussed with the student union before they are put into action.

Specifically, we are currently planning to strategically change the master program, with start of the new program 2021. This will affect several aspects, which were also subject to recommendations:

- a) The focus of the program will change away from “Software Engineering and Management” to a more technical direction. A current proposal is a focus on “Software Engineering for Intelligent Software Tools and Languages”. This is motivated by student’s feedback. This change will increase the specialization in the program, see **recommendation 10**. Furthermore, the change will also influence the handling of management education, see **recommendation 8**. As a side effect, the program will gain an own profile to gain a clear distinction from Chalmers’s “Software Engineering and Technology” program.
- b) The overlap with courses in the bachelor education will be reduced (see **recommendation 7**).
- c) The coverage of national learning outcomes will be made explicit in the program syllabus and in the course plans (see **recommendation 9**).
- d) The connection to research will be made more explicit in the courses (See **recommendation 11**).

**Action point 1:** Finalize the decision on the future direction for the master program, considering input from faculty and other program managers.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** until January 2020

**Expected outcome:** The action point should lead to an implementable and potent plan for the strategic development of the master program (see recommendation 10).

**Other action points:** see **recommendations 7, 8, 9, 10, and 11**.

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## Recommendation 7: Decrease amount of introduction level content and overlaps to N1SOF courses

*“The required prerequisites of the students are very general, which makes it necessary to start at a low level. Unnecessary time is spent on rehearsal of concepts taught in the bachelor courses. This hampers the utilization of the full potential of highly merited teachers and makes strong students understimulated.”*

*“There is flexibility in the prerequisites with only a general degree required and no specific pre-knowledge within software engineering. The main reason might be to attract a broad group of students to the program. The open admittance criteria, however, creates problems since several courses in the first year, as a consequence, must cover topics usually included in 1st level SE courses.”*

*“Students with a background from the program's 1st-cycle sibling, N1SOF, point out that several parts of these courses repeat topics from that program. The consequence may be that the breadth and depth criteria in the main topic of study are difficult to satisfy for all students.”*

It is true that the pre-requisites are not very high. However, just increasing the prerequisites is not sufficient to address this problem, as many courses are given for both, GU and Chalmers students (often for resource reasons). Increasing the level of specialization in these courses requires a change for the Chalmers student's too. There are positive developments in Chalmers's Bachelor Software Engineering education that will lead Chalmers's students to fulfill higher prerequisites in future. However, until then we have to find other ways to address with the problem.

**Action point 1:** In short term we will form focus groups of teachers teaching similar subjects on Bachelor and Master level. The goal for the focus groups will be to analyze similarities and overlaps and to improve the course plans, such that overlaps are minimized.

**Responsible role/function:** Managers of the programs N2SOF (Regina Hebig) and N1SOF (Richard Berntsson Svensson)

**Expected to be implemented:** latest by January 2020 (with submission of changed course plans to GU and Chalmers)

**Expected outcome:** The action point should lead to specific inputs for course development of affected courses.

Note that there is no action point to increase the pre-requisites until next year already, as it would have no immediate effect on the courses. In addition, the planned change of the program in 2021 will be used to address this issue.

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## Recommendation 8: Improve handling of management subject - Make progress in management topic more explicit in course plans.

*“Progress in management subjects is under-documented in the course plans.”*

*“No teacher conducts research in management, but many teachers have research connected to managing software projects. This is a weakness that might be addressed with more formalized cooperation with management researchers.”*

The course Project Management in N2SOF is taught by a teacher from the Division of Innovation Engineering and Management, who performs research in management. We apologize if that was not visible from the submitted documents. However, we agree that this is a weakness of the program.

**Action point 1:** Due to the character of our education and student feedback, the program will undergo a strategic change that will remove the management focus and substitute it with a more technical focus.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** by January 2020 (with submission of changed course plans to GU and Chalmers)

**Expected outcome:** The action point should result in a program focus that is useful for and attractive to students as well as strongly supported by the research focus of the program’s teachers.

## Recommendation 9: Document coverage of content in CDIO-matrices and make sure that program learning outcomes cover national requirements

*“Make use of CDIO-matrices to relate individual courses to the learning goals. Experience shows that compiling all courses into a matrix for the entire study program is a good way to ensure good coverage and to identify development areas.”*

*“Not explicit in the program level learning outcomes.”*

Thank you for the suggestion. The focus of this comment is on the need to make sure that the program fulfills national requirements for a master education, by covering national learning outcomes as well as to document how this coverage is implemented with the program’s courses.

We are familiar with the concept of a CDIO-matrix, as we already used this in Spring 2019 to make the coverage to national learning outcomes explicit for the Chalmers’s software engineering master program. We will adopt the same to make sure that national learning outcomes are covered and make program level learning outcomes more explicit.

**Action point 1:** Explicit formulation of program level learning outcomes on the website and creation of the CDIO matrix to track how the courses cover these learning outcomes.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** until January 2020

**Expected outcome:** The action point should lead to more transparency in the master program and enable the identification of development areas.

## Recommendation 10: Increase specialization/reduce flexibility

*“The general problem for the program seems to be balancing the flexibility of who to admit and the flexibility to let students make specialisation apart from the master’s thesis.”*

*“The program allows for additional specialization with elective courses. Profiles may add to the problem, in particular for students with a non-SE degree.”*

We agree with this observation. The current program contains 6 different profiles, which contributes to a situation where courses that contain deep subject knowledge are competing with non-software engineering course.

The problem can only be solved by removing the profile system, which implies a bigger change of the program. Therefore, this will be address fully with the planned new program by focusing it on one strong profile that complements the profiles offered at Chalmers’s sister program. Until then we will explore what specialization and courses are the best choice.

**Action point 1:** As part of the strategic change in the program (see recommendation 6), we will develop one core-profile for the new program by identifying and securing development and access to relevant courses.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** until May 2020

**Expected outcome:** The action point should lead to an implementable and potent plan for the strategic development of the master program.

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## Recommendation 11: Clarify connection to research in majority of courses

*“The connection to research is primarily managed in the Empirical SE course and the thesis. The fuzzy connection to research in a majority of the program’s courses connection makes it somewhat unclear whether this criterion is met.”*

*“There exists a connection from the course syllabus to research, but it is not explicitly provided to the students; that could be improved by more systematically emphasizing which literature and exemplifying which course parts that relate to actual research.”*

It is true that the connection to research is often not made explicit in course syllabus and course PMs. We will ask our teachers to reconsider their course syllabi under that perspective together with us and investigate how we can make these connections more explicit.

**Action point 1:** Inspection of course syllabi and course PMs together with teachers to identify additions that can be made to make the connection to research more explicit.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** December 2019

**Expected outcome:** The action point should identify needs and provide specific input for course and syllabus development.

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## Recommendation 12: Clarify balance between individual and group assessment in projects

*“The balance between individual and group assessment in projects should be made clearer to guarantee the individual's competencies and skills. This might work well in practice, but is not well attained in the course plans.”*

We agree with the importance of this subject. During the spring semester we even performed an internal program evaluation among students with focus on group work. We will use the results to start a discussion among teachers on what strategies for individual grading are perceived as fairest among the students.

The challenge is to find the right balance between information provided in the official course syllabus and the – also official - course PM. We agree that a minimum of information about individual grading needs to be in the course syllabus.

**Action point 1:** Inspection of course syllabi and course PMs of all software engineering core courses at the master level to identify courses that lack a description of individual grading strategies in the syllabus and courses that need to be more specific about individual grading in the course PM.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** December 2019

**Expected outcome:** The action point should identify needs and provide specific input for course and syllabus development.

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## Recommendation 13: Investigate level of challenge

*“The students report that they are spending between 10 and 25 hours per week on the program. That leaves space to increase the load to correspond to the points that the students earn at the end.”*

*“Some students, however, express a concern that they expected the program to be more challenging.”*

This feedback is reason for concern. There are multiple possible reasons for that observation. It is of course possible that the program is in general too easy. However, we are constantly monitoring the effort required for courses via the course evaluation and most courses in the program rank as balanced to high work load courses.

On the other hand, it is possible that, due to the diversity of the students in the program, some students come with more prerequisites than others and therefore have an easier time in the program. However, we agree that all students should be challenged and get the possibility to grow.

In order to address this properly and prevent similar problems in the future, we propose a further investigation into this problem.

**Action point 1:** Inspection of courses together with teachers to identify the level of challenge as well as improvements that can be made to advance the courses' content.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** April/May 2020

**Expected outcome:** The action point should provide specific input for course development.

## Course Evaluations

**Recommendation 14:** Create focus group to understand lack of excellent grades and involve student unions

*“A suggestion for the future would be that the student union organizes the course evaluations for a set of related study programs. It’s probably better if course representatives are elected by their fellow students and meet a few times per year to share their impressions and develop the feedback to GU together. This way the students can follow-up on the input they give and the students will be more motivated to contribute to the long-term development of the program.”*

*“There is no “excellent” grading in the program evaluation; the director would like, therefore, to create a focus group to understand what the students are missing on the program.”*

These are two good proposals. For the Chalmers program several student representatives are invited to a strategy meeting once per study period. Student union representatives for GU and Chalmers, who have a broader overview about multiple programs meet with the program manager once to twice a year. This level of involvement could be increased to target strategic improvement discussions if the student unions and students have the capacity to do so. For example, regular meetings with a focus group that follows up the development of the program could be an approach to this. Also the internal program evaluation is currently run by the program manager and could potentially be handed over to the student union.

**Action point 1:** Contact GU student union and students to form a focus group and once per semester a meeting of the focus group to update and identify strategies for development of the program and its courses.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should improve the communication channel between program management and students.

## Recommendation 15: Present course evaluations and course changes systematically to students

*“The final reviews/proposed changes are not presented to next-year students, i.e. some teachers inform about them, and some not. This should be ensured for each and every course.”*

We agree that this should be ensured in every course.

**Action point 1:** Introduce a mandatory section for last-years course evaluations and resulting course changes into the Canvas course template.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig), Manager of N1SOF (Richard Berntsson Svensson)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should solve the problem of lacking access to course reviews.

## Student Engagement

### Recommendation 16: More responsibility for students

*“Students’ responsibilities are managed through a representatives group; the students of the program would like the responsibilities to be broadened to the individual student level.”*

This perception by the students is an interesting observation. Representative groups for the course are already today depending on the input given by all students and fulfill the role of a communication medium between students and teachers. Furthermore, students can volunteer for these groups and are otherwise selected randomly, which gives every student the opportunity to actively participate.

Possible reasons for the observation could be an underrepresentation of GU students in these representative groups as well as a lack of knowledge about the system among the students.

**Action point 1:** Review of representative groups to identify whether GU students are fairly represented and identify potential reasons for a biased representation.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** April/May 2020

**Expected outcome:** The action point should provide information about the need for and (if so) specific input for the improvement of the course evaluation process.

**Action point 2:** Creation of a program page in Canvas that informs students about their options and responsibilities to get active in improving the program and the courses (will be synchronized with action point 1 for recommendation 17). In addition, students will be informed about these options at the start of each academic year.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** December 2019

**Expected outcome:** The action point should provide more transparency about the program and at the same time enable students to get in touch with each other more easily.

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## Recommendation 17: Foster a feeling of program identity among students

*“The program lacks a program identity amongst the students. A better formulation and communication of program goals and philosophy of progression is needed.”*

We agree that this is an important aspect about the education and will approach it on different levels.

**Action point 1:** Creation of a program page in Canvas to communicate program goals and philosophy as well as allow students to get in contact with each other.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** December 2019

**Expected outcome:** The action point should provide more transparency about the program and at the same time enable students to get in touch with each other more easily.

**Action point 2:** Involve student unions of GU and Chalmers to create social events such as a Christmas mingle. In addition, other programs will be visited to learn which activities can successfully be applied to create a program identity.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** December 2019

**Expected outcome:** The action point should improve the quality of study experience and increase interaction between students.

## Study Environment

### Recommendation 18: Improve physical spaces

*“The physical learning environment seems adequate; it’s not brought up as a problem during interviews. The students in software related programmes have access to the entire first level of the Patricia building and Kuggen where there are both individual study places and rooms for group work.”*

*“The physical space is satisfying. Some limitations refer to the lack of access to some all-purpose and meeting-type rooms for the GU students compared to Chalmers students, and to non-working power outlets in some of the classroom.”*

GU and Chalmers students share and have access to the same facilities. The lack of better facilities for meeting outside classes is a known problem. Rooms in Jupiter or Kuggen would be required. However, this is a bigger matter which is not trivial to address.

The named maintenance issues should be addressed.

**Action point 1:** Investigate required maintenance steps for the classrooms.

**Responsible role/function:** Vice-prefect (Staffan Björk), Manager of the program N2SOF (Regina Hebig)

**Required Resources:** 10h

**Expected to be implemented:** December 2019

**Expected outcome:** The action point should lead to an update of the maintenance and resolution of the problems with the non-working power outlets.

**Action point 2:** Investigate options to create additional meeting spaces for our students.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should serve as input for further decisions on usage and development of available spaces.

## Recommendation 19: Improve virtual space

*“The virtual space is not satisfying because of “too many systems” ; the students are complaining about not having single points of communication (the preferred is an online portal). On the program level, there are several communication points (systems) including both GU and Chalmers; at the course level, the communication points are not unified across the courses. As a consequence, students are afraid and stressed to miss important information, as well as their student-teacher interaction is too low.”*

*“There are different IT-platforms for GU and Chalmers which complicates the access of information and communication for the students. According to the students, this leads to negative consequences as regards communication and information”*

This is true, but already changing. GU and Chalmers co-introduce Canvas as a substitute for GUL and PingPong. With that change students will be able to access all of their courses via the same system, including communication with the teachers.

**Action point 1:** Monitor the implementation of Canvas use in the program courses to observe whether problems are resolved successfully.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point will allow to identify remaining gaps after the Canvas introduction, which should help to decide on further action needs.

## **Pedagogical Approach and Project Courses**

### Recommendation 20: Ensure pedagogical education of PhD students'

*“Teachers’ pedagogical skills are satisfying, especially professors. The Ph.D. students, according to the program students, are not satisfactory in pedagogical skills. A recommendation is to ensure that Ph.D. students and other teaching assistants (“researchers”) take necessary pedagogic education/course(s).”*

PhD students are already encouraged to take pedagogical courses as part of their education. However, we have no influence on when they are going to take the courses. However, PhD students are not in charge of courses or course designs, ensuring that all teachers responsible for a course have the required level of education.

**Action point 1:** Together with the director of studies, hold an introduction meeting with the PhD students before every semester to help them understand the pedagogical aspects of their work.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig), Director of Studies (Eric Knauss)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should help PhD students to understand the pedagogical aspects of their work as well as plan their own further pedagogic education.

### Recommendation 21: Increase activation of students in class and improve contact to teachers

*“Students’ expectations are to be more engaged during teaching sessions, in different ways, as well as to have better-functioning contacts with the course teachers for Q&A.”*

The level of engagement during teaching sessions depends on the pedagogic choice made by the teachers. As all teachers have a pedagogic qualification, the choice of teaching style is their decision.

However, on a program level we can foster the exchange of knowledge and experience among teachers. In addition, we will have to follow up on the observation that communication with the teachers must be improved.

**Action point 1:** Systematic investigation of communication gaps perceived by students to identify areas for improvement.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should provide specific input for those courses that need improvement of communication to support teachers in the course development.

**Action point 2:** Organize regular teacher meetings.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig), Manager of N1SOF (Richard Berntsson Svensson), Director of Studies (Eric Knauss)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should lead to a better information exchange between teachers and enable them to learn from each other and adopt successful teaching strategies used by their colleagues.

## Recommendation 22: Provide better guidance concerning course literature

*“For some of the courses, the literature is extensive, which is fine on the master level, as long the students are informed about what they have to read, in which order, and why – a reading instruction for the literature should be provided; one example is to make clear which parts of the literature are relevant for the final exam.”*

*“The articles entitled in the course literature are not followed with clear guidelines on how to use them, therefore the students simply read them, or do not read them at all. Only a few provide the basis for assignments.”*

We agree that reading lists can be improved by distinguishing between “mandatory course literature” and “recommended reading”.

**Action point 1:** Review reading lists in program courses and propose teachers to distinguishing between “mandatory course literature” and “recommended reading”.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should reach all teachers in the program and increase the number of courses that provide clear guidelines on how to use the literature.

## Recommendation 23: Ensure quality of tools selected for use in program

*“Some of the software tools used on the courses, such as on the MDD course (DIT596) are too complex, according to the students.”*

This is valuable feedback. The level of complexity in tools used for teaching can vary and cannot always be on the level of professional tools, especially in courses that teach concepts close to current research. Thus, we need to find a way, together with the teachers, to deal with that level of complexity and minimize a risk to teaching.

**Action point 1:** Focus session with teachers of affected courses to discuss alternative solutions.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** March 2020

**Expected outcome:** The action point should enable us to understand whether tool complexity is an inherent part of the learning experience or whether alternatives can be found. It serves as input for further course development by the teacher.

## Recommendation 24: Increase theory parts in project courses

*“The given theories on the “project-heavy” courses, according to the students of the program, are too limited.”*

We agree that this needs to be further investigated. Project courses should provide students with necessary theory to enable a progression of learning.

**Action point 1:** Review balance between theory and practice in all courses of the program.

**Responsible role/function:** Manager of the program N2SOF (Regina Hebig)

**Expected to be implemented:** May 2020

**Expected outcome:** The action point should provide specific input for those courses that lack theory to support teachers in the course development.