# Educational Improvement Ideas Collected From All Students

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## Abstract

In the development of educational programmes we need to involve the students. The European Standards and Guidelines (ESG 2015) state: "*Programmes are reviewed and revised regularly involving students and other stakeholders*". The Swedish Higher Education Act states "*Quality assurance procedures are the shared concern of staff and students at higher education institutions*", and "*Higher education institutions shall endeavour to enable students to play an active role in the continued development of courses and study programmes*". We therefore need to know how the students perceive that the programme should be improved. Using just a few student representatives for this has clear limitations, because they might not be representative of all students. Rowley (1995) argues that "*gathering relevant, representative and useful student opinion is a necessary part of the quality assurance process*".

In the Computer Science and Engineering programme at KTH, we have a unique opportunity to get input from every active student in the programme, through the Program Integrating Course (Kann and Högfeldt 2016). The reason is that one of the intended learning outcomes is "*critically analyze and reflect on the structure and performance of the programme and their own study achievements*".

In a mandatory questionnaire sent to all students in the five years of the programme in May 2016, we asked each student to give at least one proposal for how the programme could be improved. In this way we got almost 800 suggestions for improvements of the education, at least one from every active student.

We have sorted and categorized all the improvement suggestions. We are now able to analyze which type of improvements of the programme that are most asked for, and we also get a number of good improvement proposals that we would never have thought of ourselves.


## Method & Results

All student suggestions have now been manually aggregated into categories. A next step will be to prioritize the suggestions in order to identify what should be implemented immediately or when possible, what needs further work to be useful, and what ideas should be saved for future consideration, or simply rejected.

We can already see that many of the suggestions are very realistic and valuable. Still, the brain-storming nature of the material calls for a thorough prioritization process, where it will be important to involve both students, teachers and other members of the staff. Here we can again make use of the Program Integrating Course to involve all students, but also the regular programme board and general assembly are natural fora for such discussions.

To make the most of this prioritization process, we would like to complement the material with ideas collected from the teachers in a similar manner.

## Examples from the Raw Data

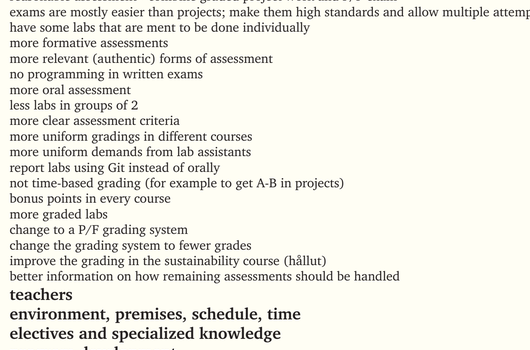
**Give at least one proposal for how the master's programme in computer science could be improved.**

| Year | Quote | Categories |
|---|---|---|
| 4 | Drop Data Security and Internet Protocols as mandatory courses. They don't feel like being advanced master courses, this would also allow for more elective courses. | K |
| 4 | Master students are not ranked once they complete their studies at KTH. For those who plan to pursue doctoral studies after their Master, grades are very important when applying to research institutes abroad. Therefore, courses that give only pass/fail grades have to be avoided, as they fail to express the students performance with accuracy. This somewhat limits the students' freedom to choose courses. Unfortunately, I had to discard some extremely interesting courses (such as DD2438) in favour of courses with an A-F final grade. It would be very useful those who plan to take a Ph.D to achieve a final grade upon graduation, or at least to obtain A-F grades for each course. For reference, please check the entry requirements of universities abroad (for instance in the US) and see their requirements for Swedish students. | K |
| 5 | Have the master thesis project start in period 2, where all preparations etc are done. This would make students try to find their thesis earlier and any issues could be worked out before it starts in period 3. | K |
| 5 | For the international version of the master of science in engineering programme, I think the year abroad should be moved to either year 3 or 4. | K |
| 2 | Switch places of the database coures and the programming paradigms course. | K |
| 2 | Encourage and facilitate the Open students who selected D to take Java Programming for Python Programmers in the summer. | K |
| 4 | Spread out courses more between spring and fall semesters, and preferably have them go both semesters (probably hard to find staff willing to, so I can see why not). Perhaps move some of the mandatory courses to the spring semester? I've had lots of troubles choosing the courses I'd like because of wrong information about when they are running and (for me) a bias towards the fall semester | K, M |
| 1 | In the course Writing in the Engineering Profession we were taught to write and evaluate scientific reports. I would suggest that we are also/instead must learn to write something that is more relevant to the engineering profession in the company. It feels like we will not have much use for what we did in the course when we finished the education. | U |
| 2 | Less theoretical and more practical. Build a project in front of us as they do on lectures in Stanford. | U |
| 4 | Better and more accessible information on which courses you can take that can be part of ones final degree. | A |
| 4 | Easier to learn what courses are available during the master. Generally before each time we are supposed to choose there is a discussion between students on where we can even find information on what we can choose. | A |
| 4 | Better orientation to the international students can be given. About how to use specific KTH systems and etc. | S |
| 4 | Since the computer science programme has so many points that the student are free to allocate to courses of their own choice it would be nice to have a bit more assistance in putting together a viable set of courses. Maybe just an online tool which allows you to see how the points are allocated in each period and what courses lead in to which other courses. | S |
| 4 | Clearer structure and interconnectedness between courses to give the students an understanding of how they relate to the learning objective's and each other. | S |
| 4 | More introduction and knowledge into what kind of jobs the different tracks will lead to and what is expected from you | S |
| 4 | I feel like there is lack of communication between courses and administration. For example, every course leader have been surprised by the number of students this year and have had to make quick changes in the course at the last minute. | S |
| 4 | By having some kind of short introduction to the courses for each track. It is hard to get a grasp on the core contents of a course without doing extensive reading or actually taking the course. | S |
| 5 | Tighter connection between courses, maybe joint projects between some courses. | S |
| 5 | Have a tool that makes it easier to visualize the education, how courses contributes to certain goals etc? OR visualize the goals for the education and how courses map to those goals, there could be some nice charts etc. Make some MDI students do this project. | S |
| 5 | For one, integrating the courses that are mandatory more into one another. While studying Artificial Intelligence we had a seminar in Vettig on the ethics of AI, turing tests, sentience and that sort of thing, but there was no connection between the two. I guess it's more flexible as it is right now, but it feels less like a unified program. | S |
| 1 | It would be nice if the course coordinators had the ability to put dead-lines in a sort of "common calendar" so that we students can get a broader view on the period's "to do". Especially regarding the courses Writing in the Engineering Profession and MDI dead-lines have been very unclear. | S |
| 3 | Make computer science connections in math courses. Had I known how important linalg is for machine learning, I would have been more motivated to learn everything properly. | S |
| 4 | Better and more relevant examination. For example, the course Protocols and principles of the Internet has an written closed book exam that tests many details of the protocols that you have to remember by heart (such as how IPv4's headers looks like). This might not be the best way to test this knowledge, since you in the industry do not have to remember these things - you look it up! This is a problem in the entire KTH education (och probably in programs all over the world). | E |
| 4 | Better more reasonable examination (Project work, P/F exams) to allow students to not fail everything by having a bad day. E.g. an exam that is 100% of the grade, and you have a fever that day, is no fun. | E |
| 4 | The mandatory courses should have experienced teachers who engage with the students in a good way. He or she shouldn't skip classes, be flimsy with the instructions, monotonous in his or her way when lecturing and so on. Find passionate people and I'll be inspired by the course, not demotivated. | L |
| 1 | The sofas outside e.g. Red have metal pieces underneath, scraping the floor. Very sad. | M |
| 4 | I do think that there is room for expanding personal choice within the education, and to design evaluation in such a way that it empowers students with agency and a genuine sense of accomplishment. | V, E |
| 5 | Encourage students to design their code in lab-assignments/projects in a more maintainable way and not just in a ad hoc way. | P |
| 1 | More practical application in working life (even though I know it is not reasonable or cost-effective for the university). | O, TILL |
| 4 | Either have less group project courses or have some kind of course/instructions teaching best practices when working in a group and how to plan a project. | G |
| 4 | Firstly, the teacher should require teams to assess their performance regularly not only self-reflection after the project. The other critical element of teamwork success is that all the team efforts are directed towards the same clear goals, the team goals. For example, during the group project, teams should ask themselves such that "How well are we meeting our goals and expectations? "What are we doing well?" "Do we lead away from the original goal?", if it possible, the teacher should randomly pick several groups and attend their meetings. | G |
| 5 | More focus on collaboration, particularly with diverse groups of people | G |
| 2 | Involve areas of current interest more. After my time at KTH I still do not know what a cloud means and its function. Yet it is mentioned constantly in the media and businesses. For example, there could be a flexible course that will cover what is currently of top interest. | MOD |
| 5 | The quality of the lectures are very varied, often okay, sometimes bad. The format for a couple of courses seems outdated. | MOD, L |
| 2 | Update the course content. Log how the course content has been updated, so we can see how it changed. Have the requirement that there should, in all courses, be a recap of what has developed in the area recently. | MOD, UTV |
| 1 | I am satisfied with the education, the teachers etc and believe that there is a purpose to all the courses we take, even though I myself do not always see this. | - |
| 4 | More/better detailed feedback on problem solving assignments, proof writing and report writing. Now, mostly it is "this sucks, minus points" as feedback. It teaches me nothing except "try something else next time". Especially with proof writing and report writing. | Å |
| 4 | Systematic feedback by peers would be awesome, even though I understand that i might not be practical. | Å |
| 2 | It feels like criticism and discussion among students about their work are absent or deficient. It is not because it is not possible, but the students are not pushed to discuss or criticize others' work, analysis, provide feedback, etc. | Å |
| 4 | I think we should introduce the concept of practical courses (These are common in Germany, for example) where you concentrate on something specific and build something concrete together with other students in that area (a bit like the project done in mjukvaruteknik in the datateknik bachelor). Other than that I think the programme holds a high standard. | TILL |
| 4 | Introduce a cross-functional project in the master's that allow you to interact and work in a realistic working scenario! | TILL |
| 4 | More opportunities for help during courses. This year it was overcrowded which meant that all resources were allocated for lab presentations. The courses in the master's programme are so interesting and you don't want to miss out on them. | H |
| 4 | Student councellor be more active in reaching out students that having difficulties in studies | H |
| 2 | I would like to have more ways to ask for help. Certainly there are exercises and other occasions to ask for help. But these are scheduled and there are times when no exercise or other time is available before a deadline. Admittedly, it is my responsibility to plan ahead. However, this is not always possible, or part of a learning process. Email and comments on the KTH portal feel so far away and can take too long to answer in order to have a conversation. Some form of chat forums or similar might be more appropriate. Although only among different students. | H |
| 4 | By using the information from the course evaluations better. In some courses it seems like the answers from the course evaluations is not used and that there is no interest in improving the course what so ever. | UTV |
| 5 | Take part of student feedback in existing courses. Some courses might not be relevant to my degree, but could still be exceptionally good courses, and I might want to take them. So if there was a way for me to read student feedback to find the really good courses, that would be of help. | UTV |
| 3 | It would be nice if the program coordinator could compile the program changes each year and publish them so you do not need to hear everything by rumour. | UTV |
| 1 | It would be good if a centralized point for assignments (where you can check if you have one) could be created. More math courses could use the video system from the analysis course, even if the video platform quality is poor. | EL |
| 1 | Internal competitions/challenges in programming hosted by KTH - no prize money or so, just as a nice side project with little honor involved. Designing an app, solving problems, designing a game in limited time ... endless possibilities. | X |
| 3 | Build a course independent website where you collect good links to things like "everyone" who are studying computer science "should" know. When you have time, you can then explore and learn more about the things you will probably need. | X |
| 5 | Make the students read more research-papers, and involve the students in open source projects. | F, P |
| 5 | Increase the difficulty and depth, such that students learn more. | KRAV |
| 5 | Give master's students more perks, for example access to a coffee machine or similar things. That way more students would be motivated to come into school and work and motivate each other. | MOT, M |
| 4 | Somehow to actively encourage working with people of different backgrounds. | J |
| 2 | More English course material. | SPRÅK |
| 2 | The mind set that "Google is your textbook" should be removed. If you enter a course without prior knowledge a lot of the course activities will be unresonably hard. | B, L |
| 1 | I feel that when you need help with any software in any course and use Windows, there's nothing. Everything is built around Ubuntu and Unix just because they are easy to configure. All courses must have clear instructions how to get the software, that should used throughout the course, to be configured on all operating systems | D, H |
| 3 | Inflexible with courses given by different schools, for example DTEK from Kista. | ? |

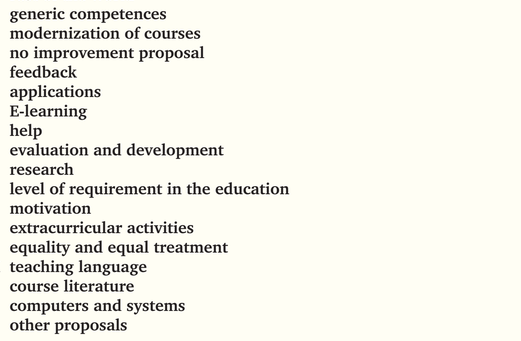
## Classification into Categories

| Number of proposals | | Category |
|---|---|---|
| 17,7% | K | **courses in the program** |
| 11,8% | U | **course structure and content** |
| 10,1% | A | **administration and information** |
| 8,7% | S | **program coherence** |
| 11 | | better coherence between courses |
| 7 | | better coordination between courses (deadlines, course content etc) |
| 5 | | make computer science connections in math courses |
| 8 | | the teacher should be aware of the prerequisites of the course |
| 5 | | explain the purpose of the course |
| 1 | | show where the education may lead |
| 4 | | connect the communication skills course to other courses |
| 1 | | connect the human computer interaction course (mdi) to other courses |
| 4 | | make the "red thread" visible in each course |
| 1 | | you should be given a mentor who you could talk to |
| 2 | | teachers should be more interested in the opinions of the students |
| 1 | | more contact with the prosam seminar group outside of the seminars |
| 1 | | meet master students in a prosam seminar |
| 1 | | sustainability and ethics could be discussed in prosam |
| 1 | | cross-course projects |
| 1 | | make a visualization of the education |
| 1 | | give better assistance in putting together a viable set of courses in the master's program |
| 4 | | improve the integration of international students |
| 1 | | better orientation to the international students about how to use KTH systems etc. |
| 1 | | make Swedish students meet more exchange students |
| 1 | | more centralized information and communication with teachers |
| 1 | | improve communication between teachers and the administration (regarding e.g. number of expected students) |
| 1 | | have a short introduction to the courses for each track |
| 1 | | more defined goals and more collaboration between students of the same track |
| 6,6% | E | **assessment and grading** |
| 2 | | more clear wordings of assignments |
| 1 | | more clear wordings of assignments in the programming course (inda) |
| 1 | | more clear wordings of assignments in the operating systems course (os) |
| 1 | | limit the number of reexaminations |
| 3 | | increase the number of exam opportunities |
| 1 | | lab week at Christmas, not only in June |
| 1 | | design assessment such that it empowers students with agency and sense of accomplishment |
| 8 | | less written exams, more practice assessment |
| 1 | | more and smaller labs |
| 1 | | reasonable assessment - combine graded project work and P/F exam |
| 1 | | exams are mostly easier than projects; make them high standards and allow multiple attempts without penalty |
| 1 | | have some labs that are ment to be done individually |
| 3 | | more formative assessments |
| 1 | | more relevant (authentic) forms of assessment |
| 1 | | no programming in written exams |
| 1 | | more oral assessment |
| 2 | | less labs in groups of 2 |
| 2 | | more clear assessment criteria |
| 3 | | more uniform gradings in different courses |
| 1 | | more uniform demands from lab assistants |
| 1 | | report labs using Git instead of orally |
| 2 | | not time-based grading (for example to get A-B in projects) |
| 1 | | bonus points in every course |
| 1 | | more graded labs |
| 1 | | change to a P/F grading system |
| 1 | | change the grading system to fewer grades |
| 1 | | improve the grading in the sustainability course (hållut) |
| 1 | | better information on how remaining assessments should be handled |
| 5,3% | L | **teachers** |
| 5,1% | M | **environment, premises, schedule, time** |
| 3,8% | V | **electives and specialized knowledge** |
| 3,6% | P | **program development** |
| 3,5% | O | **rest of the world** |
| 3,0% | G | **generic competences** |
| 2,2% | MOD | **modernization of courses** |
| 2,2% | - | **no improvement proposal** |
| 2,1% | Å | **feedback** |
| 2,0% | TILL | **applications** |
| 1,8% | EL | **E-learning** |
| 1,8% | H | **help** |
| 1,8% | UTV | **evaluation and development** |
| 1,3% | F | **research** |
| 1,0% | KRAV | **level of requirement in the education** |
| 1,0% | MOT | **motivation** |
| 0,9% | X | **extracurricular activities** |
| 0,8% | J | **equality and equal treatment** |
| 0,7% | SPRÅK | **teaching language** |
| 0,5% | B | **course literature** |
| 0,3% | D | **computers and systems** |
| 0,3% | ? | **other proposals** |

**10 most common categories year 1**




**10 most common categories year 5**




## Followup Processing

**Immediately Applicable Ideas**

**Ideas that need more work**

**Save for future consideration**

## Conclusions

- Surprisingly many proposals are realistic and well founded.
- The suggestions can serve as a pool of ideas.
- The suggestions must now be prioritized.
- Any statistical analysis must be done with care, and take into account how the data was collected and classified.
- Feedback to the student group will be an important part of the follow up process.

## References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