Evaluation Committee Report
on
IT Study Programme Group
Tallinn University (TU)

The Estonian Information Technology College (EITC)

Abstract:

This report describes the results of an Informatics and Information Technology Study Programme Group Assessment carried out as a peer review at Tallinn University and The Estonian Information Technology College. The principal goal of the report is to give recommendations for further improvements in both institutions. The analysis of the study programmes and the recommendations for them are split up into two levels: there are remarks on each study program group as a whole, and there are also detailed remarks on the individual study programmes. Finally, there is a short discussion of global issues and their effects.

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1. Introductory Remarks

The *aim* of the assessment was the *evaluation* of two study groups, one with 5 study programs at Tallinn University (TU) and Haapsalu College, and the other with 3 study programs at the Estonian Information Technology College (EITC), which is also located in Tallinn. Both study program groups are in the field of Informatics and Information Technology. The evaluation individually looked at all study programs within each study program group, but also at their relationships, their common grounds and their differences, the coherence within each group, and the implementation, in terms of available resources and the workload for students as well as teachers.

The work of the assessment panel started on November 10 with an introduction to the assessment procedure by EKKA, the Estonian Quality assurance organization for education, which was the organizer of the assessment. The members of the panel discussed the organization of the various site visits, assigned responsibilities to its members and set up general information and principles for the discussions and meetings at Tallinn University and at the IT College.

During the following two days (i.e., on Tuesday and Wednesday), all day meetings were held at Tallinn University in two parallel tracks, collecting additional information for the evaluation of four study programs there. On Wednesday, a subgroup of the assessment panel also visited Haapsalu College, as part of the audit of the Applied Computer Science study program, which is offered there and is targeted at the professional higher education level.

Thursday and Friday were then devoted to a visit of the whole team at the Estonian Information Technology College (EITC), with 3 study programs, also designed for the professional higher education level.

In all cases, the schedule for the visits of the various study programs and the discussions on site also provided short time slots, during which the panel members could aggregate the information and discuss first conclusions and implications for further questions.

Finally, on Saturday, November 16, the panel had an all-day meeting, where the structure of the final report was set up and where the panel members then compiled their findings in a first draft of the assessment report. This work was executed in a cooperative way, forming dynamically smaller teams for various sections of the report, and using the SharePoint structure set up by EKKA in order to support the collaboration in compiling the report. Of course, the members of the panel also intensively discussed their individual views on the relevant topics. In the weeks following the audit in

Tallinn, the draft of the report was edited and turned into a final version of the assessment report, which then was submitted to EKKA.

The following persons took part in the assessment panel:

- Prof. Liz Bacon, University of Greenwich, UK
- Prof. Ernst W. Mayr (chair), Technische Universität München, Germany
- Prof. Albert Sangrá, Universitat Oberta de Catalunia, Spain
- Prof. Stephen A. Brewster, University of Glasgow, UK
- Prof. Tanel Tammet, Tallinn University of Technology, Estonia
- Aleksandr Požidajev, Tallinn University of Technology (student council), Estonia
- Andres Kütt, Nordea Bank, Estonia
- Hillar Bauman (coordinator), EKKA, Estonia

The work of the panel is to be understood under the heading of Quality Assessment of Informatics and Information Technology Study Program Groups. As such, a number of formal recommendations and stipulations for the structure and the goals of the assessment apply, as established by the EKKA Quality Assessment Council: Quality Assessment of Study Programme Groups in the First and Second Cycles of Higher Education (13.06.2012). The panel took care to follow these principles and regulations.

2. Tasks of the Audit Team

Study Program Group evaluation

The overall task of the assessment panel consists of the evaluation of two study program groups (SPGs), one at TU and the other at EITC. SPGs serve the purpose to make efficient use of the available resources. For optimal results, the elements of the *SPGs must form a coherent whole* that caters for a wide spectrum of industry and student needs. Nonetheless, the various study programs should be sufficiently distinct and allow for a clear differentiation of their target groups and the specific areas of skills and competencies they teach. The study program group evaluation comprises all findings which are not specific for a study program but hold for all study programs of the group.

Study Program evaluations

In terms of time and effort invested, assessment of the individual study programs obviously required the biggest part. In addition to having a close look at each curriculum per se, measures and procedures for curriculum development and adaptation to the changing needs and expectations of industry and mechanisms to maintain the overall quality and integrity of the program and balance between different course elements were considered essential.

3 Tallinn University (TU)

Information and Information Technology

3.1 Short Characterization of TU

TU is a public university focusing primarily on the fields of humanities and the social and natural sciences. It is the most important institution for research and education in the humanities, social sciences and teacher training in Tallinn and the whole northern Estonia area.

TU is a result of merging several higher education institutions that took place mainly during 2004-2005. The largest founding partner was a former Tallinn Pedagogical University, which has carried on the traditions of Estonian teacher training since 1919.

The general perception and a role of TU in Estonia can be characterised as being focused on teacher education on one hand and a wide area of humanities, social sciences, marketing and media on the other hand. In these areas TU is considered to be a leading university in northern Estonia, with the University of Tartu being the leading university in southern Estonia. For technological areas, natural sciences and economy, the Tallinn University of Technology is generally perceived as being the leader in northern Estonia.

Since 1992 TU has been the fastest-growing university in Estonia and has significantly expanded its scope of academic activities. According to the ISCED classification, the fields of training and research in TU comprise the following study programmes:

• humanitarian sciences and arts (48)

• social and behavioural sciences (35)

• education (33)

• natural and exact sciences (19)

• health and well-being (12)

The amount of R&D is distributed differently: humanitarian sciences and arts, social and behavioural sciences, and natural and exact sciences having about the same total budgets that exceeds significantly the total budget of research for the two remaining fields.

Study programmes in informatics and information technology are offered in two academic units of the university – Haapsalu College (at the applied higher education level) and Institute of Informatics (at the bachelor, master and doctoral levels). The overall stated theme of the Institute of Informatics is digital ecosystems.

The specialized target focus of IT programs in TU is teaching of the educational technology program: this is Tallinn University's area of responsibility in Estonia, according to the agreement signed 28.01.2013 between TU and the Estonian Ministry of Education and Research. Additionally, the IT programs have stated a focus on the digital environment and digital media.

3.2 Study Program Group Findings

The team had very open and interesting discussions and a corresponding exchange of ideas with the rector, vice rector, and persons responsible for the study programmes, the staff, the students and the industry representatives (employees, employers and alumni).

The bachelor and master programmes in IT are fairly different, in terms of the approaches taken, the lecturers and administration. While the bachelor studies can be characterized as conventional IT programs with good quality, the master studies are more specialized. On one hand, the master studies cater for the needs of students working in parallel to their studies: all the lectures and contact hours take place over two or three days, every second week.

We note that both the Institute of Informatics in Tallinn and Haapsalu college offer IT bachelor level studies, with Haapsalu college being characterized as a small and very tightly-knit community with exceptionally good interaction between students and the staff, offering several interesting cross-subject courses and projects in addition to conventional bachelor level courses.

The focus of IT master studies at TU is clearly in line with the general focus of the university on social sciences and teacher training, thus complementing a technology focus in IT provided by the Tallinn University of Technology and Tartu University.

Strengths:

The general quality of the study environment and the lecturers is high. Student access to IT technology is very good, the study rooms, equipment and the library are of high quality.

Both students and faculty (lecturers and researchers) appear to be highly motivated. The students are not under stress, feel good about their studies and perceive the university as motivating and receptive to their needs.

Considering the master study programmes, we found that the teaching methods are highly innovative and the lecturers are clearly focused on methodological innovation in teaching, including a strong focus on reporting assigned works via blogs commented by lecturers and other students. This innovation is in line with the research conducted, which is focused on both using IT in teaching and on human-computer interaction.

The aforementioned research areas are an excellent fit with the focus of TU in general and have a great potential for supporting innovation in all the TU study programs as well as all the other educational institutions.

The master study programmes are well suited and used as a part of continuous education in the sense that there are no requirements for the applicants to have an IT background as the courses teach the students to employ IT in a range of humanities-oriented application areas.

The prospective employers clearly appreciate the knowledge and training provided to the students and the employment perspectives of graduates in their respective fields are very good. There is clearly a strong need for professionals with the competence obtained from the studies.

Areas of Improvement:

IT programmes of TU are on a good track with respect to quality improvement, international visibility, and the relationship of education to research. However, further important steps can be made.

The team found that the bachelor and master studies differ markedly, both by the focus, the lecturers and the students: there is fairly little overlap or connection between these two. While this situation has some positive aspects, it also means that the benefits that could arise from a closer synergy between these two are lost. For example, while there is a lot of academic freedom and relatively little stress for people engaged with master studies, the lecturers of bachelor studies in Tallinn are sometimes overloaded. The innovation created during the master study groups and the research by lecturers does not necessarily carry over to the bachelor studies. The master study programs offered with their high suitability for non-IT professionals are not necessarily a best choice for the graduates of IT bachelor studies.

Considering the master studies we found that the amount and complexity of work required from students is not especially high. For example, with a few rare exceptions like statistics, it is uncommon for students to fail a course. Students with little time or little motivation could choose to take their obligations lightly, thus potentially devaluating the expected professional competence of graduates. It also means that the graduates are currently not necessarily viewed as able to fill positions where a high level of competence is expected.

Although the group work and real-life scenarios are strongly emphasized, for some master level programs the real cooperation with IT industry could be a lot stronger. The employers that the team met were focused on providing education, connected to TU or highly specialised in human-computer interaction consultancy, meaning that the wider spectrum of IT industry is probably not engaged as much as they might.

The high potential created by research in educational technologies and human-computer interaction could be used and promoted more actively in other TU study programs and other universities. This is obviously not a shortcoming of the research, but should be viewed as a challenge worth taking seriously by the whole TU.

Recommendations:

We recommend lowering the difference of expectations between the bachelor study lecturers and the master study lecturers and researchers. For example, it might be worth considering the employment of master level lecturers also in bachelor studies, to some extent. This would simultaneously reduce the high workload of bachelor level lecturers and would help to carry the educational innovations to bachelor studies, thus also being a good testing ground for research.

We also recommend increasing the complexity of work expected from master students. This would clearly raise the level of the quality of the graduates, increase the attractiveness of programs to people with some IT background and would counter the danger of devaluating the expected professional competence of students. It would also create a more challenging environment for educational technologies and the human-computer interaction research conducted.

Coordination between faculty should also be strengthened. Even though faculty profiles regarding bachelor and master programs are probably different, they should talk to each other and discuss more deeply the common issues.

As noted before, we recommend putting more effort on applying and promoting the research and experience in educational technologies and human-computer interaction to both TU as a whole and

to other universities as well. The key issue here is probably the right focus and openness, i.e. organising cooperation, seminars and open access to tools and guidelines in exactly these areas where the research groups have created the most interesting and most innovative results and practices.

Students need an incentive to fill in the student survey however this doesn't occur until they are prevented from registering for the next semester. This means staff can wait for feedback from about May until Sept which is too long and also reduces the time available to make changes to a course before it is delivered again in the following academic year. If possible it would be better to find an earlier incentive such as preventing students from receiving their results until they fill in the survey.

There is a good level of group work in the programme however it would be helpful to give the students some training on group dynamics and how to deal with members of a group who are, for example, underperforming.

In terms of extensions to assignments, students reported that extensions were possible depending on who you asked, when you asked, and how you asked. Training students to adhere to deadlines is an important skill they need to learn and one industry expects. In a quality system, students should be treated more consistently and all those who have a genuine need for an extension should be supported, otherwise all students should expect to submit by the deadline.

Internationalisation is an important part of the University strategy. It can be hard to persuade students to study abroad due to home and work commitments, however some students were very keen however they felt there were not enough Erasmus places. The agenda, to increase staff and student exchanges, attract more foreign students to Haapsalu etc. should continue to be pursued.

Whilst staff members are trained in how to write learning outcomes, the resulting output is of variable quality and they are often written inconsistently. It is unclear if there is an approval process once they are written, if there is then this is not working, if not, one should be introduced.

3.3 Study Program Findings

Computer Science BSc

1. Study programme and study programme development

Strengths:

- The course provides a good quality practical computer science education. There is a strong focus on practical skills rather than more theoretical knowledge. The students are highly valued by industry. The practical skills they gain are what Estonian industry wants (at least in the short term).
- The students all appreciated the course and strongly believed that it gave them the skills required. The teaching is flexible, allowing them to work either in the University or part time. As most of the students worked alongside the course, this flexibility was very useful to them.
- The students were happy with the feedback they received from the staff, finding it helpful and detailed. Feedback we generally given within three days via email or Skype.

Areas for Improvement:

- Industrial involvement in the course could be stronger, given its practical focus. Some lecturers do arrange visits to different companies but there is not as strong a connection as there could be given the practical interests of the students.
- There is no real connection to the Masters course. It would be very good to see more involvement of the lecturers from the masters in the undergraduate teaching. There are some higher profile researchers teaching on the Masters programme and they could help inspire the undergraduate students and teach them about the current state of the art.
- Staff complained that students were unable to write good essays (a common problem!). Students put off submission as they don't like writing. This then leads to poor quality assignments done at the last minute.
- The students wanted more elective modules to give them more choice and flexibility.
- The students wanted more maths material in the first year. This is mostly pushed into the second year but they wanted it more balanced across the years as they needed to know some of the material earlier.

Recommendations:

- There should be clear lateness penalties across the programme, used in all courses. This seems to be handled per module rather than uniformly across the course. This can cause confusion for the students and be used as an excuse for late submission.
- To support the essay writing, staff could have weekly meetings with students to support them, or done on an individual course basis as required. They should be given more motivation as to why essay and report writing skills are beneficial to them when they graduate.
- More bachelors thesis topic suggestions from industry to boost links and relevance to companies.
- Need to make some time for staff to do research, if that is expected of them. Currently some of the staff are overloaded with teaching. To keep them motivated and aware of the latest research in computing, research time is invaluable. This will also improve teaching quality as they can bring the state of the art knowledge into their classes.
- Use of plagiarism detection tools should be enhanced as planned to help reduce incidences. This will not catch everything (and is not good for code) but can save academic staff time when dealing with plagiarism cases and aid detection.
- Some elective courses are available that are not suitable for BSc computing students. These are shown as they are available in the department but shouldn't be taken by BSc students. This needs to be made clearer to the students.

2. Resources

Strengths and areas for improvement:

- The resources available to the students are very good. The labs have up to date machines and there is a good cycle and funding for the renewal of equipment.

3. Teaching and learning

Strengths and areas for improvement:

- There is a yearly curriculum review to assess new modules and whether there should be changes. New modules often brought in as electives before they are integrated into the course. This process ensures that the course is kept up to date and relevant.

- A wide range of pedagogical techniques are used: group and individual work, simulations, etc. This gives the students a good experience of different learning techniques. As compared to the Masters students, the BSc students were very happy with group work and enjoyed it.
- Plagiarism – there isn't much evidence that there is a lot of plagiarism. However tools are not being used to help detect it as yet.
- Students not submitting coursework on time. There are no clear punishments for lateness. A clearer policy should be in place for this.

Recommendations:

- Have meetings to share teaching best practice between staff. This is done informally at the moment but may be beneficial to make it more formal.
- Create a clear policy on late submissions of coursework.

4. Teaching staff

Strengths and areas for improvement:

- The students found the staff very responsive and helpful.
- A third of lecturers are external which brings practitioner input into the programme. This keeps the course focused on real world needs. The students and the staff both wanted more industrial involvement in the course.
- Good staff development. Staff are given time to attend courses and make overseas visits. Sabbaticals are available. However, no staff had spent time abroad in the last 5 years.
- Staff workload is high – they have to teach more modules to earn higher salaries. This puts them under a lot of pressure. Staff research time is squeezed due to need to teach so much. It is therefore hard for full time lecturers to teach and do research.

Recommendations:

- Give staff possibilities to attend meetings abroad to increase the internationalisation of staff.
- Support time for more research if staff want it. Share knowledge between the Masters course and the bachelors. The staff members on the Master's course are more research active and could encourage the colleagues on the bachelor's course who want to do more research.

5. Students

Strengths and areas for improvement:

- The students were very happy with the course in general. They were engaged and enthusiastic.
- Dropouts are a problem as students are in high demand from industry. The students tend to drop out in the second and third year when they have some skills valued by industry. This is difficult to deal with as the market for those with computing skills is currently very strong. Allowing study to be as flexible as possible will hopefully keep them at the University and to not drop out.
- Students all work alongside the course so have little chance to engage in Erasmus exchanges etc. even thought there was interest in this from the students.

Recommendations:

- Provide more information about Erasmus exchanges to encourage the students to visit other countries.

Management of Information Technology MBA

6. Study programme and study programme development

Strengths and areas for improvement:

- The programme curriculum has been periodically updated and complies with the current regulations, and with the ones coming from the Curriculum Council.
- There is a good relationship and two way feedback with employers. Employers highly value the MIT programme graduates as graduates who can communicate and deliver knowledge.
- Companies would like students with more teamwork competencies, but the university tends to focus on individual work.
- Even if a more "hands-on" approach could be much appreciated, it seems to be considered that the university cannot provide practice.
- There seems to be a higher demand for places on the programme than places available.
- A number of "internationalisation at home" activities are carried out: invitation to foreign teachers, and providing opportunities for the Master's students to go abroad.

Recommendations:

- Strengthen teamwork competencies by providing more team based activities.
- Introduce reflection on a more practical approach of a number of courses, in order to make them much more motivating for the students.
- Introduce the "international approach" in the curriculum of courses where you can.
- Explore the opportunity of increasing the number of students admitted.

7. Resources

Strengths and areas for improvement:

- Available resources are very good, and seem to be adequate. Teachers develop their own materials, so students do not use the Library a lot even if it is well equipped.
- Teachers' materials are all available in the university's virtual environment, and they provide all the information needed.
- At the Master's level, students more often use access to databases and electronic journals, especially in order to prepare their thesis.

- Two virtual learning environments are working at TU: Moodle and IVA. People are strongly positioned in favour or against one or other, and plans for creating a new one are in progress.

Recommendations:

- Widen the use of open educational resources as a means of enlarging the materials the students can access, and decreasing the pressure on teachers to permanently create new materials.
- The new virtual environment should permit a significant increase of interaction between students, and between students and teachers.

8. Teaching and learning

Strengths and areas for improvement:

- The programme runs mainly on weekends, and there is a huge amount of individual work.
- Most of the contact hours (5-7 sessions for each module, most lasting four hours with a break in the middle) are used for practical lessons and seminars (small group exercises, and feedback on written reports sent by e-mail).
- Video recording is utilised for substituting seminars and lectures.
- There is no specific e-learning strategy for supporting students in their individual work.
- Support for individual work is not well developed, and could be a risk factor for drop outs.

Recommendations:

- Carry out an e-learning strategy for supporting the individual learning process, specially fostering interaction with teachers and collaboration with peers.
- Support teachers with a professional development programme in order to help them introduce more advanced teaching techniques and to take advantage of the benefits of e-learning.
- Design sustainable ways of supporting students alongside individual work, increasing interaction and teaching online presence, by being more proactive, to avoid increasing the risk of drop out.

9. Teaching staff

Strengths and areas for improvement:

- Teachers' qualifications are adequate.
- They are very well valued. Their role has become mentors, and students especially value their practical approach as practitioners.
- There is a need for new teachers to assume the new ICT innovations and entrepreneurship course.
- The institution finds it difficult to influence the teaching performance of the visiting lecturers, because they are in high demand and salaries are much higher in industry.

Recommendations:

- Develop strategies to support the feeling of belonging to the TU-MIT community an added value in your industrial environment. Alumni could help with this goal.
- Hire a new teacher for the ICT innovations and entrepreneurship course, and create networking around him/her.
- Provide the visiting lecturers with some extra motivation linked to following a professional development programme. This could be very useful in order to give them the feeling of becoming part of the academic community and performing as expected.

10. Students

Strengths and areas for improvement:

- Students are mainly satisfied with the programme.
- They have great confidence in the reaction of the university when they have to complain or suggest something to be improved.
- Most of the students are working, so it is hard for them to keep studying.
- Completion time is, on average, 2.5 years.
- Learning is a major motivation for study, more than having a diploma.
- Cheating does not seem to be an issue.
- Dropout rates seems to be explained by several factors, but especially two: a) lack of motivation due to the fact that when you find a job and the salary is good, you do not need to keep studying; and b) an uneven balance between personal, professional and study life.

Recommendations:

- Consider an important part of your students are “part-time” students, and keep supporting them with flexible learning opportunities.

Human-Computer Interaction MSc

11. Study programme and study programme development

Strengths: The course has some significant strengths:

- The course curriculum covers the major topics of Interaction Design. The course is specialised in this area, rather than covering the whole of human-computer interaction. This is appropriate and relevant for the students.
- A variety of different tools are used to support learning. Students are encouraged to share their own work via blogs etc. which they can then use as portfolios after the course is completed. Moodle isn't used to ensure that material is not held in closed repositories. Tools have been developed in-house, e.g. WordPress plugin, which allows students to submit assignments and give to give feedback using more open systems. The students used a wide range of different tools which gives them a good knowledge of different techniques, but there were some complaints that there were too many and that caused some confusion.
- Course material is well connected to research through bringing in HCI PhD students to teach on the course and the fact that many of the lecturers are active researchers involved in external research projects. This keeps the course fresh and up to date. Master's thesis topics come from research projects so are research relevant. Students have access to the latest research literature through the ACM Digital Library, for example.
- The course attracts a wide range of students reflecting the diversity of the HCI area. Only 20% are skilled developers, some are behavioural scientists, some designers. This means the students are exposed to lots of different skills which are relevant for jobs after they finish the course.
- The course has a clear niche as there are no other courses like it in Estonia. It fits well with the needs of companies and the students are highly employable. The students were very enthusiastic about the course and its contents and were happy they were getting the skills they needed for the workplace.
- There is no competition from other universities in the country, it is easy to get students as the topic of the course is very popular, and the students have very good job prospects.

Areas for improvement:

- The course is not well connected to industry, for example there are no industrial lecturers and only a few master's thesis topics come from industry. Students and staff both wanted

more connections to industry so more efforts should be made to bring in industrial lecturers and projects.

- Most students take more than 2 years to complete due to them working alongside the course. Students also drop out due to demands of industry. There is a push from the university for students to become more international and travel to other countries for internships, etc. However, it is hard for students to travel to other countries if they are working alongside the course, so many do not go abroad.
- Students come in with a wide range of backgrounds, from technical to design. It is hard for the course to meet all of their needs as they are very varied. The amount of practical development work the students do is limited due to their wide range of backgrounds. A Java course is offered to try to get the non-developers up to speed quickly but some of the good programmers are not pushed too hard.
- There are foreign students on the course and they thought the course was good but were often not supported well by the University – e.g. instructions from the University were in Estonian only. However, there was good support within department with a coordinator in place to support overseas students.
- The course does not really push the students too hard. It a relatively easy course that is graded quite high. A Master's thesis graded A at TU would probably be graded lower in other places.

Recommendations:

- Make some stronger connections to industry to create stronger links. Get companies in to department to visit, to suggest research and masters project topics.
- Students need to get better software development skills. An initial test could be used to stream students into those who can and who cannot program. Then courses can follow up with each group.
- Could be more effort is sharing best practice across lecturers to ensure good ideas are shared.
- Give clear support for Erasmus and other overseas exchanges so students know what their options are.
- More clearly and consistently specify marking criteria across modules.
- The course should be made more challenging to push the students a bit more.

- Create some more links with the undergraduate computer science course. The masters students had little to do with the undergrads but both would benefit from sharing more.

12. Resources

Strengths and areas for improvement:

- Students are well resourced with a good lab for interaction design with lots of equipment.
- Equipment is good and there is funding in place to renew it as required.

Recommendations:

- Students have to use many different platforms to study and for assessment as lecturers use individual systems. There is no one system used by all the lecturers, e.g. Moodle. They had good reasons for this decentralised approach but perhaps things could be harmonised a bit as the students found it difficult to deal with the different systems used by all of the different lecturers.

13. Teaching and learning

Strengths and areas for improvement:

- Deadlines can be quite flexible to accommodate the needs of the students who are working. This works well and was appreciated by the students.
- However, it can cause some problems with marking and feedbacks if people submit too late as then all of the marks are returned late.
- Plagiarism is not an issue as there is such a small group of students. Staff can detect it if it occurs.
- Students were less in favour of group assignments but it is good for them to practice and learn to work in groups as that will be a common situation when in industry. One reason for this is that many of the students did not attend the university every day.

Recommendations:

- Clearer guidelines and consistency across the different modules within the programme on marking deadlines and penalties for lateness.

- Motivate the students for working in groups.

14. Teaching staff

Strengths and areas for improvement:

- Lecturers are excellent researchers involved at an international level in HCI and educational technology.
- Excellent relationships between staff and students. The students work closely with staff on research projects as part of their master's theses.
- Access to staff is good. Feedback on assignments and exams is rapid and of good quality.
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Recommendations:

- Could be more international and industrial lecturers to bring in a wider variety of skills and knowledge.

15. Students

Strengths and areas for improvement:

- Students would like more international teachers.
- Drop outs are a problem. The students are in high demand and generally don't need to pass the course to get a good job. Those who stayed were doing so more for 'self-assessment'.
- Student take up of visits to international universities is low. Partly because students are working alongside their courses and also it can be hard to match up courses so that the students get value.
- Students without a technical background find programming difficult but they need to develop some skills to work as HCI professionals.
- Students feel a little disconnected from the university as they don't attend all the time and do not meet the lecturers too often.

Recommendations:

- To increase internationalisation the University could provide more Erasmus support for students.
- Provide further support to students with non-technical backgrounds to help them develop their development programming skills. Provide modules to allow those skilled in technical areas to be pushed harder to extend their technical knowledge.

Educational Technology MSc

16. Study programme and study programme development

Strengths and areas for improvement:

- The content and the structure of the programme are consistent, but some duplication exists.
- The program is meant to be a TU flagship course related to the Estonian university system.
- There is a good relationship with the industry and other stakeholders, such as schools.
- English skills are an entry requirement, but for some students to read in English takes a long time.

Recommendations:

- Some courses and assignments should be revised in order to avoid duplication and get a smoother sequence in the order that the courses are studied.
- Try to get more industry companies where the students could do their apprenticeship, in order to widen the spectrum of the professional profile.
- Encourage students to take English language courses for those students who need it, and make the language course match the needs of the programme as far as possible.

17. Resources

Strengths and areas for improvement:

- Resources are quite enough, accessible, and permanently updated.
- Spaces for studying and practising are quite enough.
- TU virtual environment is questioned.

Recommendations:

- Identify issues regarding the TU virtual environment and raise them with the corresponding body.

18. Teaching and learning

Strengths and areas for improvement:

- The programme is a good example of how new teaching models and open approaches can be applied.
- An important part of the course runs online. This is a must in such a programme. Contact hours are mainly utilised for discussing and checking.

- continuous assessment approach is used, so most of the courses do not have any graded examination, but different activities lead to formative feedback. Students understand the assessment criteria well.
- There are some courses felt to be the hardest ones, i.e. Data analysis: inferential statistics.
- Dropout rates are not perceived as an issue in this programme. The major risk for dropping out is coming from the combination of working with studying.

Recommendations:

- Revise those courses considered hard to pass in order to design more flexible but rigorous strategies for them.
- Consider linking more learning activities with problems the students could face at their workplace in order to ease problems when combining working with studying. For this purpose, the competence of application of learning has to be developed further.

19. Teaching staff

Strengths and areas for improvement:

- Teachers are satisfied and proud of being part of the programme team.
- The qualifications of teachers are adequate.
- High satisfaction regarding teachers is achieved. They are considered very human, and very open to interesting, modern, open approaches for teaching.
- New teaching positions should be created and filled as this becomes necessary for the programme.
- There are a good proportion of visiting teachers linked to the industry.

Recommendations:

- As IFI receives the funding for the programme, an agreement between IFI and CET should help to plan how many new teacher positions can be provided for the next period of time. This is important for the stabilisation and development of the programme.

20. Students

Strengths and areas for improvement:

- Programme students are highly motivated. Most of them are adult people, and they are already working.
- They are very satisfied with the overall programme, and it is delivering the expectations they had when they started.
- They would like to have more flexibility when selecting the courses, because some of them are not evenly distributed across the semesters.
- The highest consideration is coming from the permanent adaptation to change that the programme is providing.
- They do not feel the programme is too easy. They need to work a lot, but they feel motivated to do it.
- Eight students graduated in 2013. Even if to get the diploma is not the main aim, graduation is really important.
- Some complaints regarding the TU virtual environment arose.

Recommendations:

- Revise the course distribution across the semesters in order to give more flexibility to the students to take those courses, in which they are more interested at a particular moment.
- Identify issues regarding the TU virtual environment and raise them with the corresponding body.

Applied Computer Science Professional HE at Haapsalu College

21. Study programme and study programme development

Haapsalu College is part of Tallinn University and has an equivalent status to the other Institutes within the University. It was set up in 1998 to provide higher education to the region and is the only Higher Education Institution in Lääne County. It is a small College having admitted 246 students this year in about 5 disparate areas. There is a continuous cycle of analysing local workforce needs and reviewing programmes to ensure they provide relevant knowledge and skills to the local industry. This was the main driver for setting up the College however, despite this, the Applied Computer Science programme has managed to attract students from all over the country which is testimony to the quality of the programme.

Strengths and areas for improvement:

- Haapsalu College is small and offers niche programmes. As a result of their size, they have a very good and close working relationship with their students who are all known personally, by name to all the staff.
- The quality of the administration is very good.
- Because there is a small and very stable group of staff, they work very well together and talk regularly. As a result, there are many good practices that take place in the College which have not been observed elsewhere in the university, for example, discussing actions taken with students, as a result of their feedback.
- The College has a very good, but informal, process for mentoring new staff and discussing approaches to teaching, assessment and marking within the team. This helps ensure consistency and shares good practice between the teachers.
- They have a very good process for liaising with the industry, not only for feeding back into the curriculum but also to ensure students are able to experience some real-world assignments as opposed to imaginary ones made up by their teachers, during their studies.
- The fact that many students attend the College based on word of mouth reputation from alumni is testimony to the quality of the provision.

Recommendations:

- A large portion of the staff travel from Tallinn to teach at the College so are only accessible locally once per week. Some stay around after class to help students, but this is not always

possible. Outside class students can email staff for help and this approach generally works, and local tutors will try to step in as needed however, the students felt that some more local staff would be beneficial.

- The majority of the students were more enthusiastic about the multimedia side of the course than the mainstream computing side, however most students preferred one or the other. Given the competition in computing, the team might wish to consider focusing on the multimedia aspects of the programme which would be a better fit in terms of market need within the local community and the country in general.
- The programme is very focused on providing students with knowledge about tools and the skills to use them which are in demand by local industry. However, tools in ICT change very quickly and the programme team should keep under review the balance between the theory, skills and tools aspects of teaching, in order to ensure that students graduate with the knowledge of how to become lifelong learners as well as an employable skill-set. For example, more focus on the software development process rather than the specific tools for creating software would likely to be beneficial.
- Whilst dropout rates need to improve (currently around 50%), they are very good compared to many other parts of the university. The main reason being that the College is small and they know their students well and put considerable effort into contacting them and encouraging them to complete which is to be commended. The College should however continue to work with local employers to help them to encourage their staff to complete.
- There was a perception that because the College is small and knows its students too well, the staff naturally develop a strong, and perhaps too cosy relationship with their students. Whilst this has tremendous benefits in terms of dropouts and support etc. it can also make it hard for staff to be tough on students (for their own good) when, for example a student is asking for an extension to the submission date of an assignment. Formalised policies around these areas would help staff to provide a more robust and professional stance on various issues.
- The College, as planned, should try to offer students the opportunity to work with other areas of the College to develop unique IT applications to solve real-world problems.
- Students felt that the maths they were taught in the third year would be better in the first year because of prerequisite dependencies between classes.
- It was suggested that some additional teaching on the artistic side, to support multimedia development, would be useful and if possible this should be introduced to the curriculum.

22. Resources

Strengths and areas for improvement:

- The resources at the College are very good. Students reported adequate access to computers and many do their work on their own computers.
- In terms of the library, students did not make much use of it, they felt some books were out of date. However in a fast moving field, this is often unavoidable and there were no specific complaints about the resources. Students felt well supported overall.
- The quality of the teaching space and classrooms is very good and the feedback from the students supported this.
- The College has appropriate policies around replacement of computers etc. to ensure resources are kept up-to-date. The College is at capacity and there are no plans to expand so no changes are required to the policies.

Recommendations:

No recommendations regarding resources.

23. Teaching and learning

Strengths and areas for improvement:

- Staff members are very committed to teaching and learning, and very prepared to try out new pedagogy and adapt to new ideas and approaches. A range of e-learning tools are used by staff to engage with and develop their students.
- The students are exposed to real-world case studies through strong employer engagement and this is a real strength of the programme.
- Students have unique opportunities to apply their knowledge in other areas taught by the College and this should continue to be developed.
- Due to the close working relationship of the staff and students, academic fraud does not appear to be a significant problem in this programme.

Recommendations:

- Continue to develop and exploit technology enhanced learning in the curriculum.

- All courses have learning outcomes however the quality of these is variable despite training. New procedures for review and sign off should be considered.

24. Teaching staff

Strengths and areas for improvement:

- Staff members are generally well qualified and their development is well supported with funds to attend conferences, or to study further for higher academic qualifications. The process is well defined and everyone reported it as working well.
- The College has an informal but very strong mentoring programme for new staff which is to be commended and should be formalised and adopted more widely across the university.
- Staff members have strong links with industry and although there is a desire to increase this, they work very closely with local organisations who provide advice on the curricula and real-world input to the programmes.
- Alumni reported the staff being very professional, many were working in the field which brought real-life case studies into the classroom and overall felt they were “fantastic”.

Recommendations:

- Some of the alumni, who were not teaching at the College would be happy to do so and this should be explored if possible.

25. Students

Strengths and areas for improvement:

- Students are generally well motivated to complete their studies. The College has a 50% dropout rate and whilst this could be improved, it is very good compared much of the rest of the university and also give the challenges that students don’t need to complete in order to obtain employment. The staff members do an excellent job of motivating the students and work hard to support them through their studies and persuade them not to drop out.
- There is a good range of options on the programme for students to choose and flavour their degree according to their preferences.
- Overall the students reported being happy with the curriculum, most seemed to prefer the multimedia aspects over the core ICT/computing side of the course.

- The students reported being happy with the resources and the support they received from both academic and support staff.
- The alumni were very happy, all reporting they would be pleased to study at the College again and that they would employ students from the College.
- The alumni felt that the quality of the graduate was good although the College had not yet managed to establish its reputation (which is deserved) in the marketplace. They also said that the Diploma was very good, but not yet appreciated by the private sector.
- Although there was apparently a strong body of statistics available about the alumni, it contained considerable gaps (for example the number of alumni who had gone on to gain a master's degree).
- While the levels of English were described as adequate, the interviews revealed a slightly but apparently lower proficiency than in other parts of the institution.

Recommendations:

- The students would like more Erasmus placements so they could spend some time studying abroad.
- Review the curriculum to see if it might be more appropriate to position the programme in the more niche are of multimedia and also if the third year maths is taught in the right year.
- Establish a more thorough statistics gathering procedure on students and alumni in order to facilitate monitoring the effect of recent changes of legislation in terms of tuition.
- Ensure the levels of English language proficiency do not inhibit the learning process or internationalization on the institution level.

3.4 Summary of Conclusions and Recommendations

The overall state of the study programs reviewed can be considered good. Strong motivation levels of students and teachers as well as feedback from the industry are testimony to that. There are, however, areas that could benefit from some improvements.

The first significant such area is the dropout rates. While we recognize, that the peculiar state of Estonian ICT labour market is a big factor in this, there are probably ways the dropout rates could be improved. It is important that, in the light of the new regulation on the tuition fees, dropout statistics are closely monitored and a specific plan of improvement is put into place as the student behaviour cannot be predicted and will at the same time have a strong impact on the finances of the institution.

Secondly, the academic workload of students in the study programmes does not appear to be sufficient. Although a relationship exists between study load and dropout rates, the overall outcome of the education could probably benefit from higher workload.

Thirdly, in multiple cases we observed that the programmes would benefit from deeper interaction with the industry beyond teaching classes and supplying funding. In particular, replacement of synthetic cases and tasks with the ones stemming from everyday work of Estonian companies would be likely to benefit everybody involved. Such cooperation implies a high level of trust between the institution and the companies as well as relatively large amounts of effort but we feel the students would benefit greatly from exposure to real-life problems in the course of their education. This certainly doesn't mean that programmes should be designed by industry. The university has the commitment to freely design them building on the knowledge coming from research, but a closer collaboration would be welcome.

Finally it should be said that, although we observed strong levels of initiative and motivation among the administrative and teaching staff, many of the beneficial tendencies do not necessarily seem systematic in nature. Therefore, dissemination of best practices suffers and many commendable practices depend on specific individuals. It is recommended that steps are taken to improve the overall process maturity of the institution and formalize the practices in place to the extent it is possible without endangering the laudable initiative.

4 The Estonian IT College (EITC)

Informatics and Information Technology

4.1 Short Characterization of EITC

The Republic of Estonia, the Association of Information Technology and Telecommunications (AITT), Estonian Telekom, the University of Tartu (UT) and Tallinn University of Technology (TUT) founded the EITC in 2000. The founders sought to provide the best applied IT education in the region, combining high-tech know-how and the practical needs of the information society. This mission EITC still fulfils today.

The college is governed through the Information Technology Foundation for Education (ITFE) representing the interests of the founders and is the only privately held higher education institution to have signed an agreement covering education funding with the Estonian Ministry of Education and Research.

The college is an institution of professional higher education accepting students into three curricula: IT Systems Administration, IT Systems Development and Information Systems Analysis. The curricula are designed to provide practical education in a specific field complementing the more academic study programs of the founding universities. Combined, the college has 763 (as of 2012/2013) students making EITC by far the largest supplier of professional higher education in Estonia.

Although EITC has strong ties to industry via its founders, these relationships are extended to integrate up-to-date sector knowledge into the everyday teaching. 53% of the teaching staff are visiting practitioners. Also several key study resources (Cisco lab, telecommunications lab, etc.) have been established in cooperation with industry. This practical aspect of the studies is complemented by the more academic approach provided by 13 resident lecturers and 18 visiting teaching staff from other universities.

In 2008, a new building for the college was completed. It is located at the Technopolis campus in Tallinn, which also hosts major software companies like Skype, IT departments of government agencies, departments of TUT and a significant number of start-up companies. This location allows EITC to fully harness the innovation and academic ecosystem created.

EITC also fulfils a larger role in Estonian society by contributing to the popularization of STEM subjects among Estonian students. The college contributes to various activities in the field by AITT but also acts directly, most notably via its Robotics Club. The latter acts as an important source of study motivation as well as a practice base for the students and a top robotics competence centre in Estonia, as testified by numerous victories at the annual Robotex competition hosted by TUT and UT.

4.2 Study Program Group Findings

In general, the study program group is in good shape. In particular, the following clear strengths have been identified:

- Students seem to be very happy with the study programs.
- Students are highly motivated due to the strong relationships with the industry, competent teaching staff and a clear practical foundation of the study, yielding a wide range of benefits. This in turn leads to high student satisfaction levels.
- The extent to which practical work is interwoven into the study is highly appreciated by the students, staff, management and employers. The latter is reflected in very good job prospects for the students.
- The facilities of the institution are excellent and up to date.
- The equipment used both for teaching and for practical work is up to date; the institution is an excellent example in Estonia.
- Course material is up to date and subject to constant revision.
- ITC has a strong reputation among students, teachers and industry representatives.
- The teaching staff have developed a wide range of teaching styles fostering self-development and suitable to the daily, evening and distance learning methods used.
- The relationship between students and teachers is good. It is supported by the efficient use of educational technologies (e.g. recording of lectures) and well-timed bi-directional flow of personal feedback.
- The relationship between ITC and the industry is strong: there is a clear focus on the market needs and a robust commitment to be involved in both the teaching and the management of college.
- The balance between full time college staff and visiting lecturers from industry is in good and in accordance with the mission of ITC, expectations of students and the needs of the labour market.

There are also several areas in need of improvement:

- The dropout rates are quite high. There seems to be a certain level of resignation present, leading to acceptance of the dropout rates as an inevitability caused by the state of the labour market. Especially given the upcoming changing of funding models and the diversity of the ICT student body, strong KPIs should be put in place to ensure that the students remain motivated and that the dropout levels do not increase further.
- There are clear cases of plagiarism, and while there is a strong feedback loop from the specific cases to the assessment and teaching methods, a more robust institution-level set of processes and policies would be beneficial. For example, there does not seem to be an internal review process of teaching and assessment methods.
- In some cases there does not seem to be enough time to go into depth in some material; several lecturers appear to be overworked during relatively long continuous periods of teaching.
- A more consistent teaching approach should be fostered. Agreements regarding workload, assessment criteria, and balance between individual and group work have to be established within the whole teaching staff.

In addition to pointing out the areas in need of some improvement, the following specific recommendations can be made:

- Continue to invest in the specific strengths like technology enhanced learning and the robotics area.
- The teaching methods should be adjusted to reduce the potential for plagiarism. Currently, the issue is mostly dealt with by application of labour from the teaching staff. This effort should be supported by relevant software solutions and a robust process for reporting and investigating cases with consistent punishments for students for similar offences.
- An internal review process for exam questions and assessment materials would help to ensure the consistency of assessments.
- It would be worthwhile to use the willingness of industry contacts to engage students with developing actual real-life projects for real clients during their studies.
- In order to foster internationalization, ways for providing better access to the Erasmus study exchange program for most of the students should be explored.

4.3 Study Program Findings

IT Systems Development Professional HE

1. Study programme and study programme development

Strengths:

- The course teaches practical systems development. There is not too much theoretical work (if students want that kind of course then they can attend the Tallinn University of Technology instead). These practical skills are highly appreciated by Estonian employers and the students from the course are highly regarded for their practical expertise.
- There is good input from industry with a mixture of staff from the College and people from companies teaching the students. There is a steering committee which includes companies to guide and oversee the course and College.
- Student satisfaction is very high and the community within the college is very good. The students really felt they belonged and had a very positive attitude towards the college. The course creates interest, motivation and drive in students. The numbers of student are strong and growing.
- There is a high level of pedagogical maturity in the teaching, with many different teaching techniques used. The curriculum is reviewed twice a year and new modules are added/removed based on the input of companies and partners.
- The Robotics Club is a fantastic asset for the college. The Club has a very high profile within the country and undoubtedly works as a great recruiting tool for new students.

Areas for improvement

- Dropouts – There are many dropouts from the course, particularly in the second year when the students have learned some skills. The practical nature of the course means that companies want the students. This means that many drop out and do not complete. The staff have tried many things but none have succeeded. They now seemed quite resigned to the problem.
- There are many different modules running at the same time and some of the students complained about the switching needed between these courses. They also complained that some of the material was not in-depth enough.

- Plagiarism – there are lots of problems in first year in particular and particularly in on-line tests. It is less of a problem in later years as many of the modules are graded face-to-face. This works but is very time consuming for staff. To keep the great reputation of the course and College then this must be handled clearly and fairly without a huge cost to the teaching staff.
- There is no internal review process for exam questions to ensure they are of good quality and sufficiently different to questions set in previous years. This is currently done informally.

Recommendations:

- The Robotics club doesn't feed into teaching, which is a real missed opportunity. It would be really excellent to have more of a focus on this as part of the course. It is highly motivating for the students and would give them practical skills.
- Change teaching methods to deal with plagiarism, e.g. live code reviews to make students stand up and present the code they have written. Use tools to help such as TurnItIn. The staff have been quite flexible in trying out new techniques but the cost of doing this has been high. Solutions are needed to reduce the problem without overloading the staff. A unified policy across courses in the college would be useful. There should be more discussion of the issue with students at the start of the course to dissuade them from cheating in the first place.
- Create an internal review process for exam questions to ensure that all are checked by another staff member before the exam is sat by students.
- Could be more formal cooperation with the Garage 48 organisation.

2. Resources

Strengths and areas for improvement:

- The resources for the course are very good. The building is excellent and there are labs of machines for the students to use. The CISCO Lab was highly appreciated by the students for the practical skills it gave them. The students felt that they had the resources they needed for their tasks.
- Distance labs have been set up for those who are not actually in the College. They work well for students who are part-time or doing the course via distance learning.

- A very comprehensive study information system has been set up by the college to support the staff and students.
- The students found access to MSDN useful.

Recommendations:

- The students needed some help to set up the Skype chats etc. in the beginning. Many different systems were being used by different modules and the students sometimes found it hard to set everything up at the start.

3. Teaching and learning

Strengths and areas for improvement:

- Good use of different teaching methods – use of Wiki, blogs, peer assessment, etc. are used on different modules. Use of Skype multichats for part time students was popular for those who did not attend often. Innovation in teaching methods was shown. These methods had also been used to attempt to deal with issues of plagiarism, although with quite a high cost in terms of staff time.
- Lots of learning takes place at a distance, even for full time students. This gives the students lots of flexibility, which they appreciated as most were working alongside their study. They felt there was good teaching support even when at home. The way students are taught prepares them for work, e.g. code review, reviewing the reviews, etc.
- Setup of the curriculum and teaching staff is sustainable with built in succession if any staff change.
- The issue of the difficulty level of the course was discussed with staff and students. Some of the modules do not push the students as hard as they might to really stretch them and their skills. The course could be made more challenging for students to give them more in-depth skills and knowledge. It was felt by both groups that if the course was made harder then 10% of students would be happy but 30% may drop out.
- There should be clear penalties for late assignment submissions. This should be uniform across the different modules within the course.

Recommendations:

- Could split difficult first year courses into two so that more focused on equal level of ability. Might reduce plagiarism too.
- Clear procedure for penalties for late submission of work should be put in place.

4. Teaching staff

Strengths and areas for improvement:

- The staff were motivated and enthusiastic. Many of the staff work for companies and come to the college to teach part time. Most of them were alumni from the college who wanted to give something back. This combination of college staff members and external teachers keeps the course up to date with the latest developments in industry. However, care must be taken that these external teachers are taught how to teach. The college has processes in place for this.
- The staff teach for 4 days and have 1 day for other work. This gives them some flexibility. However, when asked about the workload model used to allocate teaching and other activities, not all of the staff could clearly explain it or how work was allocated to them. There was an expected load of 500hrs per year but it was not clear how this was made up from face to face teaching and e-learning.
- Staff can go abroad for visits and international exchanges to help keep them up to date.
- Staff give good and rapid feedback to students. This is supposed to be given within 7 days.
- Staff are involved in standards setting with the Qualifications Centre which feeds back into curriculum.

Recommendations:

- Clearer workload model should be put in place so that staff can understand their level of activity.

5. Students

Strengths and areas for improvement:

- The students were highly motivated to study and enjoyed the course. They believed it contained the material they needed to know. The students were keen to learn the material as it clearly led to good job prospects. The employers within Estonia value the student from the course highly as they come out with skills that can be used immediately.
- Dropout rates are high and consequently graduation numbers are low due to the points above. Companies in Estonia want the students and the skills they have.
- The students complained that due to the number of modules they took some didn't go into the depth that they would have liked.

Recommendations:

- Whilst information about ethics and plagiarism are available online and students are referred to them at the start of the year, given the plagiarism problems, perhaps there should be more discussion and debate with students at the start of the year to help them understand better what constitutes plagiarism.

- There should be clear and consistent marking schemes and penalties for lateness across the different modules on the course.

IT Systems Administration Professional HE

6. Study programme and study programme development

Strengths and areas for improvement:

This collaboration by Government, Universities and Industry provides a unique experience in Estonia, delivering a modern, practical course in IT. Graduates from this programme are clearly in demand by industry and benefit from much of the teaching being delivered by practicing industry professionals. Overall this is a good programme however the following curriculum issues were raised:

- The applied curriculum is a strength of the programme making the syllabus very relevant to industry. It is, in general, is well thought through and would appear up-to-date as defined in the course specifications. However some students did comment that they felt some lecturers were not delivering the leading edge material by some of the visiting lecturers so this needs investigating.
- Input and support from industry is excellent.
- Some staff and students felt that the students were not being stretched as much as they could be.
- It was felt that some of the first year course did not contain sufficient IT which was demotivating and that all the courses were not as relevant to these students as perhaps to computer science students e.g. physics.
- Given some students come with a BSc, an MSc programme instead or as well might be appropriate.
- Employers would like to see more real-world issues taught such as version control.

Recommendations:

- Consider developing a master's version of the programme to suit needs of students better who already have a BSc.
- Review the content of the first year and try to bring in more IT topics.
- Whilst staff are provided with training / guidance on how to write learning outcomes, the quality is variable. Although staff have been trained in how to write learning outcomes, it is unclear if there is a sign off / approval process as some are very poorly written. There should be a process of review and sign off to ensure those produced are fit for purpose. The use of e.g. Bloom's taxonomy might help with finding verbs to use for the different levels of study.

- Some students felt that the curriculum being taught by some lecturers was very dated, whilst for others it was at the leading edge. The College should introduce procedures and processes to ensure that the curriculum delivered by staff is kept up-to-date, noting that the description of a course might be different to what is actually taught in the classroom.
- Whilst the curriculum is very industry focused, employers would recommend further updates to include real-world topics such as version control.
- Employers are very willing to help provide more real-world examples of the right size for students to develop their skills on and this should be taken on board in the curriculum where possible.
- Whilst soft-skills are taught, there is no systematic review across the program to determine if the volume is about right. Developing group working skills, presentation skills and the ability to communicate ideas etc. was flagged as important by employers and more of this was requested, whilst acknowledging that these areas have improved significantly over the years.
- Internationalization remains a challenge, especially getting students to study abroad as they often have work commitments which prevent this nevertheless efforts to support this agenda should continue.

7. Resources

Strengths and areas for improvement:

- Overall the resources are very good and there is a process for regularly renewing and investing in updating the provision.
- There are several specialist laboratories that support this programme which are well equipped. Both the robotics club / lab and Cisco labs were excellent and it was pleasing to hear about the achievements of the students in local robotics competitions. Clearly this is a strength of the College.
- The classrooms are well equipped, and the ability to have lectures recorded automatically is excellent. This was clearly a resource the students valued. A wide range of delivery methods were used such as Moodle, discussion forums etc. which is good and the students appreciated that diversity. The use of technology enhanced learning to support the students is welcomed and valued and the College is encouraged to continue to invest in this area.
- The students have access to a good local library and electronic journals and books.
- The labs are updated every 3-5 years, 3 years being the target and the usual achievement. Software and hardware donations from industry, along with their support, were very welcome.

Recommendations:

- Continue to invest in technology enhanced learning.
- Continue to invest in areas of strength such as the robotics area.

8. Teaching and learning

Strengths and areas for improvement:

- The teachers use a range of modern teaching techniques across the programme including a considerably amount of technology enhanced learning which is heavily used by most of the staff and strongly appreciated by the students. The technical support for this area was excellent with the facilities to record lectures being automatically synchronised with the timetable and welcomed by students.
- The delivery of some modules by industry lecturers was welcomed although students commented that a few of the industry staff could be difficult to contact outside of class. The evening study options were welcomed by students however 5 nights per week was a challenge for some given work and family commitments, as commented above and can mean they miss some classes.
- The practical nature of the course was welcomed by students, staff and industry so this is a real strength of the programme and there were good processes in place for recognising prior learning.
- Employers welcomed the development of more soft skills e.g. team working, presentation skills, in the course and had seen real progress in recent times however they would still like these areas enhanced.
- Student feedback is taken on board and updates are made as a result.
- Teaching staff from industry is a real strength of the programme.
- Alumni contributions back to the College in a variety of forms, is excellent.
- The short videos produced by staff to market each course to students are strongly welcomed by students and the preferred approach to finding out the content.

Recommendations:

- The information given to students of actions taken as a result of their feedback was welcome however it was not clear if this was a formal or ad hoc process. As some students said they did get feedback on actions taken and others said they didn't. If there is no formal policy in this regard then one should be introduced.
- Plagiarism and cheating has been identified as an issue on this programme. Students reported that if there was an opportunity to cheat then some students always would do so and particularly in the courses they felt were the hardest. Staff should ensure they share best practice with regard to setting assignments that make it hard for students to cheat, in addition to employing appropriate mechanisms to catch as much as possible.
- Employers made it clear that they need the good, capable students so it is important, both for industry, and the reputation of the College, that students who are not capable do not pass.
- English is not a compulsory subject and for some students, it would be beneficial to require them to improve their English.
- Students found it hard to contact some visiting lecturers outside class as although local, they were not based on the campus. Mechanisms to ensure some support outside class should be discussed with visiting staff.
- The College should introduce a more consistent policy regarding extensions to assignments which are awarded on an ad hoc basis by individual staff. Employers emphasised the need for students they employ to understand the importance of deadlines and as part of a quality system, students should be treated consistently. Those who have a genuine need for an extension should be awarded one and those who don't should be required to submit by the deadline.
- Making friends on a course is well-known to be a critical factor in the retention and success of students so further activities to support study groups and the formation of friendships at the start of a programme would be welcome.
- Review the mode of delivery to see if it is possible to add an additional delivery mode in order to reduce the weekly commitment required by students who are working full-time.
- Enhance the soft skills development such as team working, presentation skills, social skills, entrepreneurship etc. all of which were requested by employers.

9. Teaching staff

Strengths and areas for improvement:

- There is a good, dedicated small team of staff who work well together, discussing teaching approaches, assessments and mentoring and are very committed to their students.

- The staff on the programme are well-qualified. They clearly put a huge effort into their teaching and to supporting their students to succeed. The combination of a core of full-time staff and many visiting lecturers from industry works well and provides students with a unique, modern curriculum with a wide variety of inputs and experiences. Students reported having good access to staff outside classes although raised one or two issues with access to some of the visiting industry lecturers as reported above.
- Staff are trained in how to teach when they join they College which is excellent.
- Staff development is excellent, the staff felt very well supported in terms of their staff development and said training was always supported. However, they are keen to do some research and there is no doubt the programme would benefit from research active staff however it would appear that there is no mechanism for staff to be given time to undertake research. There is a good process for mentoring new staff into the team and it might be useful to document what new staff can expect in this regard.
- Some staff were also feeling very overloaded and although willing, some staff were working 14 days without a break which is exhausting.
- In some modules plagiarism can be an issue and some staff development / sharing of best practice would be useful to help design assignments to reduce plagiarism as far as possible. This will not eliminate it however there is some concern now that future funding will be by graduates. This, coupled with the fact that the main way of assessing staff performance appears to be through student feedback, puts pressure on staff to keep students happy. Another example of this is adherence to assessment deadlines, as identified above. Staff come under pressure from students to accept late submissions and one of the complaints by employers was that students need to learn the concept of deadlines better. Whilst the student voice is a vital component in the review of staff performance, it should be the main measure of quality and should be balanced with other more independent assessments of staff performance.
- Employers commented that the College should focus on delivering more students of a higher quality and also bringing more industry case studies into the classroom which they were willing to assist with.

Recommendations:

- Support staff development to ensure plagiarism is designed out of assessments as far as possible.

- Introduce additional mechanisms to judge the performance of staff by means other than the student voice.
- Introduce more real-world case studies / problems to solve from industry into the teaching.
- Whilst the mentoring of new staff that takes place and is very good, it is nevertheless an informal process that occurs within a small team by choice and the institution should ensure that this is happens as part of a standard institution wide approach.
- The workload of some staff is very high with some working 14 days with no break and very long days to support day students, evening students and distance learning students. This should be reviewed.
- High workloads make it very hard for staff to undertake other activities such as research which would be beneficial to the curriculum. A mechanism should therefore be considered to support staff undertaking research annually (not just through a sabbatical every few years).

10. Students

Strengths and areas for improvement:

- Students were all very complimentary about the programme, the quality of teaching and very much liked the applied focus of the programme. They reported that the quality of the courses was good and that the industry input was highly valued.
- The students that the team met were highly motivated to study their programme and many had made significant personal sacrifice to achieve their goals. The students are highly valued by employers, so much so than many achieve employment before they graduate which can led to excessive dropout rates. However the employers the team met with were highly supportive of helping the students to complete their programme recognising the benefit of employing more rounded graduates with a broader range of knowledge and skill base.
- The students were very happy with the resources and the teaching. Some of the issues they raised have been documented above so will not be repeated here e.g. access to industry lecturers outside of class. However, overall these issues were minor, their experience on the programme was highly valued and they felt the staff frequently went beyond the call of duty to support them.
- Students welcomed the international experience and the exchanges that were available although many could not avail themselves of the opportunity due to work and/or family commitments. That said, opportunities were restricted with less than a third of the Erasmus exchange agreements actually being active. The College should work to address this.

- In order to support international students coming to Estonia, more information should be presented in English. Whilst the majority is, there are still e.g. emails that are distributed only in Estonian and that can make life challenging for those students who don't speak the language.

Recommendations:

The areas for action have mostly been documented above in other sections e.g. supporting development of friends at the start to reduce the dropout rates.

- Increase the number of active Erasmus exchange agreements to support student mobility.
- Ensure all communication is in English as well as Estonian to support international students.
- The motivation to complete the programme can be low from some students, either because they don't have the ability to succeed or because they are very good and have already found a job in industry. It was clear that employers would like their students to complete their studies and non-completion will start to impact on funding levels, so the College should work with employers, the Government, and staff, to send a joint message to the students about the importance of completion for their longer term development.

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11. Study programme and study programme development

Strengths and areas for improvement:

- Meetings with students and the industry representatives clearly showed that the study program contents are highly relevant for industry. Both groups were enthusiastic about the study program and its contents.
- The program has no direct competitors in Estonia at the present time and clearly fills a need.
- The curriculum is up to date and relevant.
- Some of the more general first year courses, e.g. physics, are not relevant to the students on this programme. On the other hand, there is not enough IT material in the first year to motivate students.
- Maths and physics courses are not synchronised. There were times that the students needed information from one course for the other but they had not yet been taught what they needed.
- Due to the fact that most students on the course already have a degree, a general question arises as to whether a professional higher education is the right level for this course. Alternatively, the College might consider adding a Master's course as that might be popular with potential students.
- In general the contact hours are acceptable although attending every evening Monday to Friday for 3 hours per evening is a huge commitment and likely to lead to higher than desirable dropout rates. Allowing students to study at a slower pace over a longer period (more than the current maximum of 4 years supported by the students) might help the dropout rates.

Recommendations:

- Consider increasing the number of elective courses to suit the wide range of interests.
- It might also make sense to teach the program in a part time basis to suit the needs to working students.
- Allowing students to study at a slower pace over a longer period might help to diminish the dropout rates.
- Consider reducing the number of less relevant courses and introducing more IT related courses during the first year.

12. Resources

Strengths and areas for improvement:

- The study administration system OIS is good.
- The resources are very good, classrooms are well equipped, the ability to have lectures recorded automatically is excellent. This was appreciated by students who work part time and don't attend the College every day. The tools are also easy to the staff to use and there is dedicated technical support to help with this. This means that there is a good library of material now available to the students.
- The students have access to a good local library.
- Location in the TU campus and Technopolis is excellent and provides ample opportunities to students. There could be more activities to bring the College students together with the TUT students working in the same areas.
- There is a wide range of course content delivery methods available: Moodle and others. This gives the students access to lots of different pedagogical techniques to suit their needs.

Recommendations:

- Continue to invest in strengths, in particular the already excellent technology enhanced learning.

13. Teaching and learning

Strengths and areas for improvement:

- The general learning environment is excellent with good support for the students.
- Practical work and problems presented suit the needs of students. They have a good practical focus which is relevant for this course.
- Industry contacts are willing to invest time in improving the courses.
- The recognition processes of prior learning are useful given the wide variety of backgrounds the students have when coming to the course.
- Flexible learning techniques very suitable for this group of student, e.g. recorded lectures. Flexibility and evening courses are appreciated by the students.
- The number of contact hours is acceptable.

- Plagiarism is a serious problem diminishing the motivation of both students and teachers; teachers find it hard to effectively tackle the problem.

Recommendations:

- Consider gearing the study program towards part-time studies to meet the needs of students who work full-time.
- Use industry contacts to introduce real-life tasks and examples to courses.
- Improve the consistency of courses complexity-wise: some courses are considered to be really easy while others are considered to be very hard.
- Learning outcomes and assessment practices should be peer-reviewed to synchronise the courses and make the assessment procedures more consistent. This would also allow staff to share best practices more easily.
- Introduce believable and practical institutional policies and guidelines as well as technical support to help teachers fight plagiarism.

14. Teaching staff

Strengths and areas for improvement:

- The teaching staff and external lecturers are well-qualified.
- The approach of using industry practitioners in combination with permanent staff works very well for this program and makes the course relevant for the needs of industry. The practical skills are also appreciated by the students.
- Staff development is excellent, yet there is a lack of opportunities to do research.
- Some of the staff are clearly overloaded for long periods.

Recommendations:

- Continue using industry practitioners in combination with permanent staff.
- Avoid overloading staff for long periods of time.

15. Students

Strengths and areas for improvement:

- The students are well-motivated, in particular due to the perceived needs from their daily jobs and industry needs in general. The students were highly motivated and enthusiastic about the course and its contents.
- A significant percentage of incoming students are already qualified in the IT area either by previous studies or professional experience. The course could be adjusted to fit the needs of these students better. Additionally, a Masters course could be added which might suit the students even better.
- Students working full time tend to miss lectures.
- At the beginning of studies it is hard for the students to form groups. They should be given some support to help with this at the beginning. The problem is that part time students don't get to know their classmates easily as they are not in the College so often.
- The dropout rate is high and the graduation numbers low, largely due to the significant percentage of students working full time.

Recommendations:

- Help the students to form groups and get to know each other already at the start of their studies.
- Consider gearing the study program towards part-time studies and consider remodelling the program as a master level study program.

4.4 Summary of Conclusions and Recommendations

- The study program group of EITC fulfils its mission, has (among the professional HEs) biggest market share, companies are very satisfied with graduates of the programs.
- Curriculum is up-to-date, oriented towards practice and skills needed by the companies, also provides room for specialization with a sizable number of electives.
- Teachers: highly motivated, innovative wrt teaching methods and program contents, high availability for students, making use of staff development opportunities.
- Students: very well motivated, often quite enthusiastic about their studies (also as alumni), often picked EITC because of its reputation.
- Resources: modern technology for e-learning, good use of video recording technology (in particular for evening and remote students).
- Recommendations: act on willingness of employers to provide topics for industrial projects, maintain (and increase) efforts to ensure the quality of the study programs, quality and fairness of the assessment of students' performance, cooperation with industry.

5. Strategic topics

In addition to the specific topics and issues outlined in the rest of the report, there seem to be over-reaching trends of strategic nature having an impact on the study programmes assessed.

Firstly, the transition from FP7 to Horizon 2020 is going to cause a significant shift in terms of funding to the university but also in terms of changes in the entire society. The newly created government policy document, Eesti Infoühiskonna Arengukava 2020 and the associated funding mechanisms significantly change the focus of financing as well as changing areas of competences needed. It can also be projected, that the significant increase in funding targeted towards the ICT area will lead to higher employment pressure towards students. These changes should be taken into account in study programme development and efforts towards student retention.

Secondly, there is an ongoing issue regarding tuition and funding policy change that is likely to have an impact on the institutions assessed. Although the actual impact of the change cannot be predicted, dropout rates are likely to be affected. Given the strategic nature of that topic, it is recommended that a more thorough monitoring and assessment of various related metrics is put in place to detect any undesirable effects the policy change might have.

Thirdly, the internationalization and demographic trends of Estonia are likely to have a strong effect on the study programmes in the near future. The institutions assessed seem to be moving to counter some of the negative demographic trends via internationalization but the upcoming changes in the labour market resulting from both of these trends need to be observed as well. In this sense, it would be a possibility to develop a programme that could work as a niche of specialization. As far as Estonia is a small country, the way for not only sending people abroad, but attracting people too, is to be very specialist in a particular area.

Finally, while the e-learning facilities are not mentioned as a major issue neither by the students nor the teaching staff, the area might benefit from a more strategic focus. In particular, there seems to be lack of cooperation between the institutions, a wide variety of different technologies are used and there does not seem to be any e-learning environment clearly surfacing as the dominant market leader. Given the size of the community and the internal mobility of both teachers and students, a tighter cooperation in terms of technology development and sharing of best practices would likely yield benefits. Online learning can be the window to be present in the rest of the world, and the country will need that in order to be present in the international arena.

Munich, January 27, 2014 Ernst W. Mayr

(Audit Team Chair)