UNIVERSITY OF SKÖVDE

NEW YORK UNIVERSITY

NYU·poly
POLYTECHNIC INSTITUTE OF NEW YORK UNIVERSITY

Report from a semester at the Polytechnic Institute of New York University

STINT- Excellence in Teaching Programme

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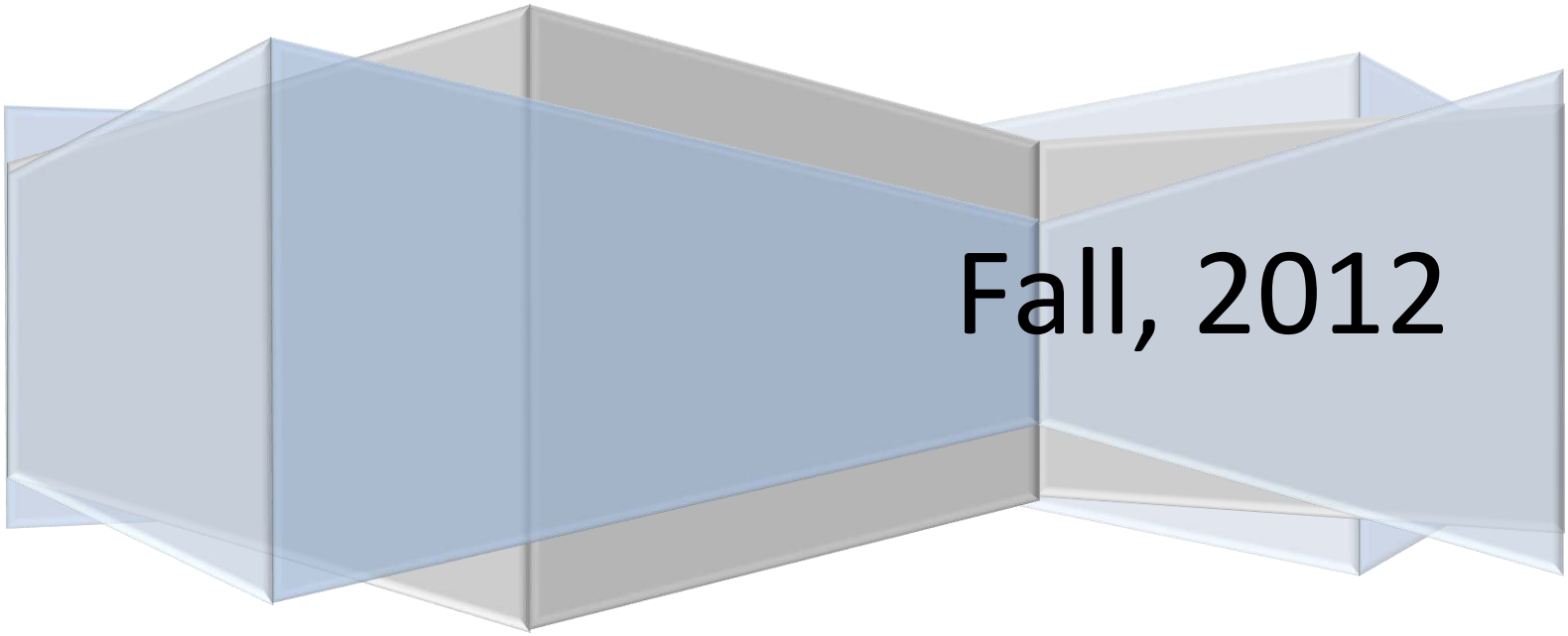

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1 Introduction

This report represents the final report of a semester's stay at the Polytechnic Institute of the New York University (NYU-Poly), where I worked as a visiting Professor. This was part of the Excellence in Teaching program, founded and financed by the Swedish Foundation for International Cooperation in Research and Higher, STINT.

1.1 Preparation and planning

The preparation and planning activities were performed in an iterative process that started before the planning trip of spring 2012. I had mail contact with NYU and NYU-Poly, where I described my working areas and gave suggestions on which department that could be suitable for me to work at.

During my spring visit I was scheduled to meet the Associate Provost at the NYU-Poly and the Director for the office of Global services at NYU. These meetings sorted out some of the practical issues as well as deciding which department I would be working at. I met up with my future colleagues and made, a rough plan of my working task during the coming fall. During the subsequent months the plan was filled with details about my future responsibilities and tasks.

1.2 Tasks and responsibilities

I worked as a visiting professor and had a co-teaching responsibility in two courses and a supporting role in a third course.

Among the working responsibilities I had were lecturing, supervising practical tutorials, supervising student projects, meeting with industrial partners; evaluate and grade presentations, reports and projects at different levels. The grading was made in collaboration with my colleagues.

Co-teaching meant that most of the administrative parts of the courses were handle by my colleagues. It also meant that we regularly discussed how the students were doing, and other related issues. These discussions gave us opportunities to contrast how things were handled in the NYU (and the US) versus how we did things at my home university (and in Sweden). I found these discussions very enriching and constructive, and they gave me valuable experience.

2 Activities during the semester

The main activities I participated in can be divided into the following groups: Teaching and industrial activities, faculty meetings, interviews and seminars; Innovation in teaching modules and miscellaneous.

Teaching activities: Altogether, I took part in 4 courses. In two of these courses I was more supporting than co-teaching. The courses were, Practices in Engineering 1 and 2, Practices in Engineering summer course (I contributed just briefly in the final part of this course), and Introduction to engineering and design (Bachelor course). The tasks I held were similar in all the Master courses and they required lecturing, industrial project supervision and management, industrial contacts and co-working in a professors' team. Due to the mix of tasks, the nature of industrial projects and different student personalities, most of the working days were partially used to keep the students progressing and keep contact with the companies they worked at (which included company visits and meetings).

In the bachelor course, my responsibilities were more limited and my participation likewise. It was very interesting to take part of this course due to the pedagogical and cultural differences that I could observed between US and Swedish engineering teaching. My participation consisted in being

part of a teaching team with a teaching assistant, a writing consultant and a professor(s). This team evaluated the students' lab report, engineering solutions and presentations.

Faculty meetings, interviews and seminars: This group of activities were very rewarding and gave insight to how the academic decisions involving teaching, the institution, and research were taken. It was a true privilege to get this, sometimes sensitive and strategic information, at first hand from Provosts (NYU-Poly and NYU). Besides the faculty meetings, the University had several seminars; some of them were prolonged for days, some were held due to a research visit. I also visited some of the staff and faculty members in other departments both in the NYU-Poly and the NYU. Despite that NYU-Poly is a small University/School; it was surprising to see the number of events that were held for students and faculty members.

Innovation in teaching modules: NYU-Poly has a "Center for Faculty Innovations in Teaching and Learning" which coordinates and generates incentives in this area. They are currently concentrating their efforts on strengthening the use of Clickers and smart boards in their education. Clickers have been used in NYU-Poly for several years, but as always the dissemination of new pedagogics takes time. In order to further broaden the use of this new technology and pedagogics, a considerable number of modules has been developed and offered to the teaching staff. The modules length range from 1-2 hours and are offered regularly over the year. I attended 3 modules of clickers and had a longer interview with the office director of the center in order to get the background and aims of this enterprise. Due to time restrictions I couldn't attend all the available modules offered by this center. A similar center, the NYU-Center for Teaching Excellence also offered a number of meeting and discourses in this area. I did attend one of them which were centred on their new learning management system and how they were making use of it.

Miscellaneous: There is a number of "activities" or events that even though they don't fit in a particular Excellence in Teaching activity they significantly contributed to my understanding of US educational system and society. I will try to define these events and their importance.

I had the privilege to work together with several great professionals, of which two of them demand special attention. They are Prof. Michael Greenstein and Prof. Robert Albano. Mike and Bob and their families made our stay a truly blessed experience. They spent numerous hours and effort in mentoring me and an additional number of hours in getting me acquainted to US culture, history and politics (the details we don't get at home). What I learned through these sometimes extended discussions, was extremely valuable and normally unattainable. Apart from the professional experience I got from them these two, and their families gave us an unforgettable private experience along with a better understanding of American culture and lifestyle.

During our stay in New York City (NYC) we lived in Harlem. For the second time in my life I felt part of a minority. We got some really good friends in our neighbourhood and even though we lived in a nice block we couldn't deny the circumstances of poverty and social exclusion that where all around us. The exposure or submersions that you get when you live in NYC, instead of just being a tourist, is truly valuable. During our stay we got to experience a multicultural society, extremely crowded, many times with limited resources and we also experienced devastation and tragedy since both hurricane Sandy and the Newtown killings took place during our stay. Despite all this (or maybe due to all this) people around us showed an amazing capacity to express tolerance, patience and kindness. I know that among US citizens, the New Yorkers have a reputation as being rude, but that is not the case. Our experience is that they seem to judge people according to what they are, how they perform and not based on superficial things, like gender, race or background. I noticed the same

positive attitude and tolerance at the university where I worked and at the companies which were involved in the student projects we supervised.

The combination of co-teaching, faculty meetings, teaching modules and the submersion in the NYC culture, did contribute to a true learning environment.

3 Important lessons

As a teacher I gained a number of lessons. One of the most important ones was the need to give our engineers an education that goes beyond the technological knowledge or skills. Not that we today don't realise its importance, but the level or our interpretation of the program goals set by the Higher Education Board in is based on our Swedish cultural view or traditional approach. Let me be more precise.

Presentation skills: One of the goals for Swedish bachelor engineers is that *"the student shall demonstrate the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences"*. I had up to my visit the NYU-Poly the opinion that we have reached this goal from year to year without major problems. Anyone in the field knows the importance for engineers to communicate their work, findings, write reports and so forth. Furthermore I do think that our companies feel that our engineer handles this issue quite well, so what is the problem?

The problem is that Swedish engineers and companies are working in an international environment and we should be concerned what is internationally accepted as a good presentation/report, what we think is of secondary importance. It is what the international arena views as a good presentation or a good report that should be our aim. Many remember the poor ability to communicate that the Swedish British Petroleum (BP) chairman Carl-Henric Svanberg showed during the 2010 Gulf oil spill disaster, the so called "small people" discourse. If he represents our Swedish standard then we are aiming too low.

I was surprise to see the emphasis that the NYU-Poly education put on "…*the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences".* I attended the introduction course for bachelor students named "Introduction to engineering and design". This course was the first course that all engineering freshman did, regardless of their field of study. In this course, they had approximately ten laboratory projects, where they needed to present to an audience of 25 students, one teaching assistant (TA), one writing consultant (WC) and one or two professors (P). They got feedback on their reports and presentations by at least 3 people (TA, WC, P), besides the questions and comments coming from their fellow students. The critics, good or bad, were given directly in front of all other students. The level of requirement was way above the level we require for our third year students and these were freshmen. This training goes on during their whole education with the addition of a courses in "Writing Requirement" during their first year.

Liberal Arts approach, Innovation and mentality: NYU-Poly students need to study, an equivalent to 48 ECTS credits in humanities and social sciences. Humanities and social sciences covers in a smaller amount writing requirements, while its main core is in the fields of:

- Science, Technology and Society
- Culture, Arts and Media
- and Society, Environment and Globalization

This amount of credits is considered a minimum, and in order to be able to fit those, NYU-Poly has developed a number of special modules for the engineering programs. The merge between the NYU-Poly and the NYU, will probably lead to a higher number of credits within Humanities and social sciences modules or/and a slight difference structure. The aim is to integrate the engineering students to the general humanities and social sciences education of the NYU.

Another big difference is the concept of major and minor in the college education. A Minor basically means that the student is able to focus part of their education in an adjacent field to their Major. For instance the Mechanical engineering curriculum (the major), gives the opportunity for their students to get a minor in Aerospace Engineering or an Interdisciplinary Minor in Nuclear Sciences and Engineering. A similar possibility is open for Master students. Several of the Master programs offered by the NYU-Poly were so called "breddningsmaster" that is to say that student from different engineering fields gave their education curriculum a broader knowledge base.

Why are these approaches of interest for us? I see at least two main reasons; first of all we are not only educating professionals, we are educating members of society, which we feel should be able to take a stand in other matters than plain technical issues. We don't want cold hearted people that can't feel empathy or see other values than technological development. Once again these are goals in our current engineering curriculum, what is the difference then?

I think the difference is the level or importance we give to these matters. In our current 3-year bachelor education we have difficulties to fit in much more than the engineering core subjects. These subjects are considered important in order for our engineers to be well prepared for the industry. This view supported by the different program directors and industry, makes our education very specialized and our engineers likewise.

This problem was manifested this year due to the Higher Education evaluation of the engineering programs. Remember that one of the goals with our education is in line with at least the sustainability (social, environmental and ethical) view that can be found in the US education and our university saw that we need to improve in all these fields. It is paradoxical though that the general view in Sweden is that in terms of applying sustainability - social, environmental and ethical- we are far superior to the US. I don't know whether Americans would agree to that statement and I don't think that Swedish history (Second World War Nazi businesses) or that Swedish companies are ruled by ethical conscious. The latest Telia scandal is only one example of a very pragmatic view on ethic and social responsibilities. There are many others.

For the same reason lack of time, it is difficult to fit in a minor into the Swedish Bachelor programs.

Why is this specialization a problem? Well this is the second main reason**; in my view it's affecting our capacity to be innovative, to make business, to fill the industrial need**. I remember when I got a visit from one of our former students. He was working for IBM in Munich and came to visit me because he was looking for a suitable engineer to recruit. I was surprise; *don't they have engineers in Germany?* I remember I asked him. *Yes*, he answered, *but they are too specialised*. *They are experts in their particular field, but they can't make groups to collaborate, they can't sell, they can't explain things in an understandable manner*. He said our students can. He was then referring to the students we had in a truly interdisciplinary program back then, *Engineers for international business* (Internationell affärsingenjör). This program was a 4 years program were the students got a bachelor education in automation/production engineering (major) and an education in international trade and law, and language skills (minor). We had other 4 years programs that gave the same valuable interdisciplinary approach e.g. Industrial leadership (major in leadership and a minor in production

engineering). All this disappeared when we entered the Bologna convention. The argument was then that the new European standard would be a 3 years bachelor and 2 years Master program. Imagine my surprise when our Spanish partners told me that their Bologna convention is based on a 4 years bachelor and 1 or 2 year(s) masters education. Is it difficult to admit, but maybe our educational system is based on minimum requirements that don't cause a too high economical cost for the society? That might be the price to pay for "free" education. This is not a major concern in the US or in other countries where college education is mainly paid by the student's family.

Innovation is the fruit of technical superior solutions, communication, team work and business skills. This was the first things the NYU-Poly engineering students got to hear. They were told that, they were the cream of the world, that they were expected to do great things and that their education and hard work would bring them this opportunity. It was a true eye opener to be present and listen to Prof. Günther's low-key presentation. He expressed these expectations as if they were the most natural in the world. It never felt like he was bragging or exaggerating. He was just explaining the plain "truth". I felt then that we are way behind when it comes to Innovation, business, and inculcate in our students a wining mentality.

I learned many other things that I can apply in our education e.g. the way they supervise their students, which is far more demanding and at the same time more fatherly and protective; the way they approach their students, which is with more authority but still without losing the necessary communication.

There are other things that are appealing and different and that I hope would be more common in the Swedish educational system e.g. the way they make partnerships with industry, which includes both industrial education and paid research by the industry (it stands for a considerable part of their revenue). Their emphasis in college sports and the bound, identity and pride this seems to give their institution.

4 Comparison between the foreign and the home institutions

I have to some degree already compared some of the differences between the NYU-Poly and my home university, which is the University of Skövde (the Swedish abbreviation for Högskolan i Skövde –HiS- will be used). Here are some additional thoughts and clarifications on the earlier mentioned ones.

4.1 Student population

The number of students (see table) in NYU-Poly is similar to the amount of students in my home university. The difference is that all students at NYU-Poly are engineering or computer science students, while these groups are a clear minority at HiS. Even though the student population is roughly the same, there is a big difference when it comes to background and ethnicity. New York City is a truly multicultural society and NYU-Poly has a considerable amount of international students at both Bachelor and Master level. This is reflected in a mix of students from an impressive number of countries and backgrounds. Our perception of multicultural society is far more restricted to what can be experience in NYC. The experienced student density was much higher at NYU-Poly compared to HiS. The number of lecture rooms, study rooms and available student computers seem to be far less to what our Swedish students can access. The students I had in "our" courses commented the difficulty in finding suitable study space in the campus, but I can't confirm it with real numbers. We did have difficulties to get a suitable lecture room when we changed from our ordinary time. This is almost never a problem at HiS.

	NEW YORK UNIVERSI	NYU:poly POLYTECHNIC INSTITUTE OF NEW YORK UNIVERSITY	UNIVERSITY OF SKÖVDE
Founded	1831	1854	1977
# students approx.	40 000	4 600	4475
# employees	3100	374	454
Structure	18 Schools	10 Departments	3 Thematic schools

Table - General figures comparing NYU, NYU-Poly and University of Skövde

4.2 The relation between research and education

The NYU-Poly has a clear aim of having a close relation between research and education at every level of the education, but this is not materialized in every subject or course module, for obvious reasons. Many of the master programs have been developed in their strongest research areas and serve partly as hotbed for future PhD candidates. The strong relation is visible through the number of laboratories that NYU-Poly students and researchers have to their disposition. NYU-Poly holds for undergraduates an *Undergraduate Summer Research Program*, where undergraduate students take part in laboratory assignments and seminars under the supervision of faculty mentors.

The focus on keeping a close link between education and research is similar in Sweden to what I experienced at NYU-Poly. The difference strives more from the broad spectrum of engineering research and education that NYU-Poly offers, compared to HiS. Considering the number of researchers at NYU-Poly and in adjacent research centers, there is a clear surplus of expertise, which gives opportunity to drain down their findings to education. But this does not mean that it always does. For instance, there is a high number of teaching staff that are adjuncts. Many of them with relevant industrial expertise, which gives the student a clear view of what to expect when they eventually become professionals, but at the same time the teachers are not always up to date with the latest findings, trends and available tools. The challenge is to keep these two co-linked requirements in balance. They strive in that direction and so do we.

4.3 The relation between teacher and student

I have earlier commented on some of the differences I experienced when it comes to the teacher – student relation, regarding how project supervision was given. The statement was that the NYU-Poly professor is *far more demanding and at the same time more fatherly and protective.* I felt that the teaching staffs in general shows a real concern for the students' learning. There is a closer monitoring on how the student performs. They feel that they have been entrusted with these young adults and that they are responsible for shaping their future. So as a parent would, they give a reprimand if their students behave unprofessional or immature. They help them to set their professional goals and targets. They give clear instructions and reminders of the consequences of breaking agreements. And even though they become quite familiar with them, they make sure that they don't forget who is the professor and who is the student and the hierarchical and professional distance that is required. I found it extremely refreshing to observe the forthright way professors directed the students, giving

constructive critics, depending on the student's performance. I never heard a misguided comment from the teachers, even though many comments were though critics. The students seem to be used to this straight and heartfelt communication. Have in mind though that I monitored courses and teaching staff that were known to be good and dedicated. I would probably need another term to get a more complete picture including their "known" poor courses. The general word from faculty was that there was a need for constant improvement in pedagogics, but I couldn't estimate whether this was a true problem or just a reminder to us all.

Nonetheless, their student communication is quite different from how we communicate with our students and the relation we have to them. For some reason it seems like the Swedish lecturer is searching for a "friendly" relation to the students. Everything is said very cordially, we seldom give reprimands, if ever. But because they are our *friends* and not our entrusted *sons or daughters,* we don't feel the same responsibility to help them or make them progress. We don't feel that we have been entrusted with someone. We view them as adults with their own responsibility (which they obviously have), and as equals. And as such, we do what we have to do, nothing additional. I hear quite often colleagues state that they have already given their 30 hours of supervision to a particular student project and because the student consumed their available time they won't give more guidance or help. We are dealing with adults, we treat them politely, we entrust them their full responsibility and the consequences, and we wish we won't have to give them an inch more than that (I might be exaggerating). At NYU-Poly they have been entrusted with a student, and they take that responsibility. Where would you send your son or daughter?

Why do we have this difference? There are surely cultural reasons to it. It might be parameters like tuition fees. If someone, a parent actually paid you, entrusted his son to you, we might see it differently. If we look at it more carefully our students' parents have paid for their childrens'' education as well and I am sure that they would appreciate if we put some heart into what we do. I need to clarify that there are many Swedish university lectures and adjuncts, that take their teaching and tutoring seriously, just like NYU-Poly colleagues they do their very best to help and guide their students. They don't help by making it easier for the students, by lowering the requirements (neither is that the case at NYU-Poly). On the contrary they help their students by being more demanding, but at the same time more mentoring and greater pedagogues. These are the teachers everyone talks about.

It might also be a question of available time. It is difficult to fully evaluate whether the US professors have more available time in their schedule or whether they "buy" that time. What I did experience is that they do buy time by giving time consuming tasks to "Teaching Assistants" (TA). The TAs are students that are used for laboratory supervision and student report evaluation. In our institution (HiS) we don't make the same use of TAs. I know that in some courses I use an amount of days only to correct lab reports or similar. One conclusion is that NYU-Poly structure with TAs is far more cost and time efficient and should lead to more time for qualified attention to the student.

4.4 The institution's view of breadth versus specialization in education

There is a difference in the engineering view between NYU-Poly and HiS regarding breadth versus specialization. But that difference may be a natural outcome of the different length of the bachelor programs in our two countries. For instance of a the total of 256 ECTS credits (128 US credits) that NYU-Poly mechanical engineering students at bachelor level are required to fulfil, 118 credits are in their core engineering discipline. This is approx. 46 per cent of the total number of credits. And they

still have some introduction courses for engineers that they don't count within this amount. For a degree at HiS in Mechanical engineering the same amount would be 90 credits which is equivalent to 50 per cent of the total amount of credits required. The percentage of credits that is required within the engineering field is then fairly similar i.e. close to 50% for both institutions. The difference is that their fourth year gives them the possibility to give their education more breadth. As earlier discussed, the fourth year (these credits are spread over all years) gives the student the opportunity to study a minor as earlier discussed and beyond that they will still have the opportunity to fill in around 46 credits in humanities and social sciences. Study programs in other sciences have even a higher breadth in their education. Despite this extra year of college studies, the US students will theoretically finalize their bachelor program at the same age as our Swedish students. The reason is that they start their compulsory elementary school one year earlier.

Is this good or bad? It is difficult to get the whole picture, and all the possible consequences, but from a college education point of view it would make a huge difference to have an additional year. The breadth the students would acquire would benefit innovation and make them better prepared.

4.5 Competence development for teachers

I don't have a complete picture of the opportunities for competence development for teachers. There are however a couple of things that point out the possibility for development. First of all, the number of educational modules that were accessible for the teachers thru the Center for Faculty Innovations in Teaching and Learning should cover some of the needs in relation to pedagogical development. We have similar options at HiS, but I still felt that the format used by NYU-Poly, made it more accessible. Secondly, considering that the University teaching contracts normally cover only 9-10 month of the year at least part of the summer could be used to do research or for competence development.

4.6 Teacher recruitment

These observations are based on a limited experience (based on what I heard). It seems that it is more common that adjuncts are contracted to give one or two courses per year, instead of contracting a PhD scholar to do that task, unless they are going to be involved in research projects. At HiS it is a university policy to only contract teachers with PhD degree to all new teaching positions. This does not mean that we don't have adjuncts, but the new policy makes it almost impossible to bring in people with only education at MSc level for teaching positions.

4.7 Pedagogy and its importance

The pedagogic work has been far more important at NYU-Poly than at HiS. I would say that the view on pedagogics has radically changed at HiS these last 12 month. But we still don't see the fruits of it. It will probably take at least another 48 months before we can observe some substantial differences. On the other hand, NYU-Poly has worked with these issues over a longer period and more consistent and is therefore able to show a better engineering education that the one we are currently giving at HiS.

4.8 The status of pedagogical merits compared to research merits

The status of pedagogical merits is recognized at NYU-Poly, but research merits are still considered higher among colleagues and maybe at institutional level as well. Despite this they recognize pedagogical merits higher than we do. An important change has recently happened at HiS (spring

2013). A pedagogic career development has been launched, which honours and rewards pedagogical work and achievement, in a similar manner to research achievements. It will though take some time before this makes a real change in people's view and attributed status.

4.9 Curriculum and courses offered

There is a vast difference in the number of majors and programs in engineering and computers science offered by NYU-Poly compared to HiS. We see a similar difference in numbers between big Swedish technical universities and HiS. Consequently the number is not surprising. What was more interesting was to see the different topics of the majors. Even though some of them belong to the traditional engineering and computer science disciplines, others were innovative and adapted to their market needs. Here you can find BS majors like *Sustainable Urban Environments* or *Business and Technology Management*. At Master level *Urban Systems Engineering and Management* or *Financial Engineering*. The number of courses offered and electives is very generous and give the students the opportunity to tailor their education to their particular interest and aptitudes. I haven't seen that vast options of majors and courses earlier, not even in our bigger Swedish technical universities.

4.10 Forms of examination

Both institutions, struggles with adequate examination forms that truly captures the student's knowledge and skills. There is one important difference between course examination at NYU-Poly and at HiS. The difference is related to how they base their grades on the whole course performance of the student in an integrated grade scheme. The student's grade for each course is based on several course events e.g. different percentage are based on attendance, participation in discussions, presentations, exam results and reports. Our courses normally don't require attendance and we haven't got the possibility to introduce an integrated scheme for grading. This means that even though the examination can be divided in different parts e.g. assignment, report, seminar and exam, the grade is normally set by the exam results. We feel that not being able to grade and evaluate the students attendance and in particular their participation and partaking, in the end effect the students' learning process. This is especially true if the students lack proper study routines.

4.11 To what extent educational programs conform to labour market needs

Both NYU-Poly and HiS have a fairly clear view of their market needs. This can be observed by viewing the majors they offer in connection to the surrounding industry/market needs. For instance, the amount of manufacturing industry in New York State is fairly low. New York City in particular have other needs and is observed by majors like communications, media, bioinformatics, civil engineering, construction management, transportation, urban systems and financial engineering. This doesn't mean that NYU-Poly doesn't teach for labour market needs elsewhere. Their curriculums contain several majors that reflect the need in other labour market than New York State. This is expected due to the high amount of international students. Students that expect to return to their countries were the labour market is different to the one in New York State or even the US in general. HiS on the other hand lies in the most important manufacturing region of Sweden. As a consequence our majors are related to product design, production development and production management.

Another confirmation that NYU-Poly produces professionals that fit their market need is the success that their students show when it comes to getting a position and/or their salary level. In the

latest statistics of highest salary potential in the US presented by PayScale (2012), NYU-Poly graduates were ranked fourth among all engineering schools in the US and first among all New York City institutions. Skövde engineering students on the other hand have also a very positive labour market after their graduation. Their salary levels are somewhat lower compared to comparable engineers in other areas of Sweden, but this has mainly to do with the salary level in Skaraborg, which is lower than big city areas like Stockholm or Gothenburg.

4.12 Use of technology

NYU-Poly doesn't overuse technology in their education, but they do have a higher use of technology compared to HiS. The two main technologies they make use of in their campus are the so called smart boards and the clicker technology. In order to further expand their use among teachers a considerable effort is made in giving access to short course sessions at suitable times for the staff. During these mini course modules an appreciated feature is when expert users share their experience and give practical suggestions on how to use this technology.

At HiS, we currently have very few smart boards and they are hard to access. The clicker technology on the other hand has been discussed within our pedagogical development work. We are currently looking at different technical solution and providers. The aim is to enhance student learning by making better use of these technologies.

4.13 Distance education

Both institutions have a sizeable number of courses and even programs offered as distance education. This is an educational form that is growing. Distance education takes a variety of forms, from being only net based education to net based education with physical meetings and/or by the use of physical study units that are remotely connected to the university (lärcentra). At HiS there are several thousand students (not necessarily full time) that take part of University diploma or bachelor education through distance education.

NYU e-Poly education has been ranked ninth by the US news and World Report's ranking 2013 (USNews, 2013). They offer 68 virtual classrooms, 14 full time and 22 part time teachers that are involved and a robust technology that has been highly ranked and appreciated. They deliver nine Master's degree programs. NYU e-Poly scored particularly high in two categories, student services and technology and faculty credentials and training. NYU's global structure, with three campuses globally dispersed, has helped the development of a robust technology and quality programs for distance education.

An important difference between the NYU-Poly and HiS approach is the level of ambition with distance education. At NYU-Poly they handle distance education as a separate organisation (they do share resources) and it is heavily marketed, even for campus students. It is more often used for contract education than it is at HiS. An interesting detail that was presented at a faculty meeting was that contract education that had been given to multinational corporations had exposed these companies to new technologies for collaboration. Apparently their own employees, who were dispersed all over the world, achieved a much better communication and interaction through the NYU e-Poly's technological platform, than by the company's own systems.

4.14 Relation between the institution and its environment

Both institutions have a well-developed collaboration with the surrounding environment. HiS has several years of successful work in close collaboration with the surrounding companies, council and

municipality institutions in the area. Some examples of this successful work are; in 2009 Skövde municipality won together with Gothia Science Park (GSP) and HiS, the European Enterprise Development Award; the last 3 years several thousand industrial employees have taken industry adapted education; the majority of research at HiS is a co-production between industry and academia; several research projects are related to healthcare and municipality service improvements.

The surrounding environment of NYU-Poly is, obviously, much bigger and stretch way beyond the Borough of Brooklyn. Remember that it is part of NYU's Global University, with important relations to both the Abu-Dhabi and Shanghai campuses. The relation between NYU-Poly and its surroundings has a more business like aspect compared to the HiS approach. NYU-Poly is after all a private university. On the other hand this is what is expected by the environment. Companies, municipalities and students are well aware that activities, research, education is not for free, and they are willing to pay for the support that they can get from NYU-Poly. A fresh example is the new Center for Urban Science and Progress (CUSP) an extremely interesting and cross functional research center, well in line with their environment and heavily supported by the industry. This center involve around 20 industrial partners and collaborates with 30 faculties (NYU), it will soon be able to take in over 30 postdocs, 100 PhD candidates and over 400 masters students. The yearly budget is 500 million per year!

4.15 Special investments in education at the institution

Both institutions have done important investments in education. HiS has during the latest two years given an important focus to improvements in pedagogics. HiS started to implement the CDIO concept in education (Conceive — Design — Implement — Operate) during 2012. This teaching approach is being introduced to the field of Engineering, starting with the adaptation of single courses during 2013 and 2014, but with the aim to make more considerable changes to the engineering programs in the future. The work is supported be experienced lecturers from other institutions, and it is gaining important momentum. Another important change already mention, is the pedagogic career development, which honours and rewards pedagogical work and achievement, in a similar manner to research achievements.

NYU-Poly has worked several years with the introduction of clickers, smart board technology and virtual classrooms as part of their educational development. This includes the technology, support organisation and the educational modules for their staff. They are well ahead of us in that concern. Their main weakness, when it comes to education, is their facilities. Some of the buildings are in need of renovation or even remodelling. The renovation work has started and during my stay I saw several improvements in their facilities, but there is still a lot of work to do. Another need is the number of study places and available institutional computers for the students.

5 Action plan - topics to address and if possible introduced in Sweden

5.1 Personally

I have always been interested in pedagogics and educational development. The impediments for a more continuous development have been governed by available time and lack of good examples to follow. I feel that the experienced I got thanks to the Excellence in Teaching program, gave me a

source of inspiration, good examples and unforgettable experiences. I will personally aim to further develop my teaching abilities, following the pedagogic career development that HiS has started.

In my position, as subject responsible for education I have the mandate to make changes to our education and study programs. The first topic I addressed when I returned was to change the way we handle our final projects. We changed the supervision and the project management according to the experience I gained in NYU-Poly. The changes have been appreciated by the students and we are confident that it will give positive results to their learning experience. These changes will give the students more practice in e.g. presentation and project management skills.

We will introduce TAs in our education. We see two main reasons for it, firstly to develop engineering management students in leadership, secondly to make use of resources in a better way. Today several senior lecturers are using considerable time in correcting reports and other time taking minor tasks. Their time can be used in a more valuable way by letting them focus on pedagogics and CDIO course development.

5.2 For the department

Some actions that will affect the whole engineering department are related to the introduction of CDIO(did not see where this was defined) pedagogics to the adaptation of three courses that are shared by all the engineering bachelor degrees. The course development will take place during spring and autumn 2013 and the adapted courses will start in the spring term 2014. The department is also considering giving a broader education which would emphasise other nontechnical skills, like presentation skills, humanities and social science. It will be difficult to attain (considering that our bachelor degrees are only 3 years), but it is a priority in the department's development plan. A work group with representatives from all the engineering groups has been formed, and is now discussing how to change the current structure in 7,5 hp(?) course modules in order to include smaller modules, which would give the opportunity to give more breadth to the program.

The engineering department has also set to develop a new master program starting 2014. This program is planned to have a similar structure as the Industrial- and Manufacturing Engineering Master programs at NYU-Poly. These masters follow a modular structure that enables student with different backgrounds to share some common courses and later specialize in their main fields. This will make it possible to share a common program for engineering students in adjacent fields.

In order to gain momentum, the department is aiming to support other lecturers that are interested in joining the STINT program in Excellence in Teaching. This program is well in line with the aims of the department and the institution as a whole.

5.3 For the institution

The institution aims to improve the education quality through several strategic actions. One action is giving pedagogical achievements a higher academic recognition through the pedagogic career development. Another action is to increase the academic level of the teaching staff. This is done through several arrangements, firstly to employ only teaching personnel who has obtained a PhD. Secondly, all current adjuncts are encouraged to enter part-time PhD studies, with the aim to reach the PhD degree. Finally all graduated personnel are expected to continue with their research activities. Another strategic action, is the already mention pedagogic career development, which honours and rewards pedagogical work and achievement. These strategic actions serve as a platform for the institutions excellence in teaching development. Is this enough? Of course not; I think that these actions together present a clear signal of the importance that we should put on excellent

education. There are still many areas that need to be developed, we have just initiated these activities and programs, they need to be applied and the institutional aims need to be reinforced by new activities and resources. The most important part is to create a culture were excellent education is nurtured and expanded. Every employee has a responsibility to understand the importance of excellent education and support these aims by actions.

5.4 In the Swedish research and education system

There are in my opinion several problems with the structure that the Swedish educational system has adopted. One of the aims with Bologna was to unify the European educational system and give students higher mobility. Paradoxically the Bologna agreement has made our collaboration with Spanish Universities more difficult, due to the two different structures.

The strict 3-year Bachelor degree and the exclusion of a Breadth Master (breddningsmaster), is limiting our possibility to create attractive education that creates innovation and engineers that are able to seize business opportunities. The old 4-year engineering programs attracted excellent students that didn't want to be confined to be technical nerds. Today many of these students (which in a higher degree were women) are studying other topics, which probably are not within engineering. Remember that one of the main problems in Swedish engineering education is the scare number of students that choose to enter the field. Sweden and its industry, is in great need of highly skilled engineers. We might have the very best technical engineering programs, but what does it matters if "*they are too specialised*; *if they are experts in their particular field, but they can't make groups to collaborate; if they can't sell; if they can't explain things in an understandable manner*."

If innovation and entrepreneurship is the way out of the western world economic crisis, we need to reconsider the Swedish educational structure. Would the suggestions presented in this report be the final solution? Hardly, but it would in my opinion contribute to an educational structure that better supports the needs of our society.

6 Conclusions

The experienced gained through a semester at a top university, in a metropolis like NYC, with the support of brilliant professionals has been an enrichment and truly enjoyable time. Its value goes beyond the professional, but its main contribution is still bringing in to our educational system new ideas, new perspectives and keeping our awareness of our surroundings up to date. Despite that this report mainly focuses on what we can learn, the experience has also giving me the awareness that our educational system is very good as a whole. It is my conviction that we are educating top engineers and generating true value for the Swedish society. Like the Japanese we should focus on what we can improve, instead of being happy with what is already good.

Some of the statements may sound harsh. This is partially intentional. We don't observe or appreciate low rendered expressions. Remember that several statements are not based on facts. They represent my opinion, which I based on an experience at a foreign institution during a limited time. But all the observations are presented with the aim to improve our educational system. We should aim to create excellent professionals. Professionals that are expected to do great things, we shouldn't settle for anything less to what prof. Günther warmly expressed during the students' first lecture at NYU-Poly. Paraphrasing his word "you are the best, you are expected to do great things and your education and hard work will bring you the very best of opportunities."

7 References

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