

Report from my Williams College Teaching Sabbatical semester

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Preface

In 2016, I received a STINT Teaching Sabbatical grant, and an invitation from the Computer Science department to visit Williams College for a semester to teach a course. This report contains an account of my experiences and my reflections.

Williams College

Williams College is a liberal arts college situated in Williamstown in the north-west corner of Massachusetts. The setting is rural -- the closest city is Albany NY; about 1 hour by car -- which means that there are few non-college activities to distract the students (or the faculty). Williams College is a prestigious college, ranked no 1 among US liberal arts colleges¹, and mostly admitting students with an extremely strong academic record from high school. In addition, many students are accomplished athletes, musicians, dancers, or similar, and tend to be overachievers in general. The college prides itself with its "need-blind" admission system: the college first decides which students to admit, and first after that checks to what extent the students can pay the large fees (in the academic year 2016/2017: around \$64,000/year, including full board). Gifted students whose families have limited financial means get parts or even all of the tuition fees sponsored by the college.

Liberal arts college require the students to take a broad collection of courses. At Williams, courses are divided into three divisions: (1) Languages and the arts, (2) Social studies, and (3) Science and mathematics. During the first two years, students are required to take courses from each of the three divisions in fairly equal proportions, at least one intensive-writing course, in which the students will produce at least 20 pages of written text, and at least one "diversity" course (a course having the explicit goal of exploring "a diverse, globalized world and the multi-cultural character of the United States"). In addition, the students are required to enroll in at least two physical activities. All of these requirements reflect the liberal arts ethos to educate the whole person, rather than producing specialists for the job market.

Before the junior (3rd) year, students decide on their major subject. The major requirement, which assures that every student will study one subject in depth, requires the student to take at least 9 courses in their major subject, out of the total 32 courses they will take during their 4 years. Many students graduate with double majors; sometimes with very different subjects. For example, in my class, I had a student with a double major in Computer Science and Music, and another student with a double major in Computer Science and Japanese. Most students graduate with a Bachelor's degree; there are only two Master's programs, and no graduate programs at the college.



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A hallmark of Williams College is the vast amount of resources available to help students and faculty to perform well, and concentrate on their studies and teaching, respectively. For instance, there are various support persons and groups to help students (and faculty) with their writing, a support group (for faculty) for helping out with pedagogical issues, etc. On the other hand, members of faculty are expected to join various committees, which can be quite time-consuming (but something I was spared due to my visiting status). In general, pedagogy and being a good teacher are seen as extremely important at Williams -- a notable difference to my home university KTH, where only your research record matters. Students are expected to work very hard, and most courses have challenging hand-in assignments due every week, as well as mid-term and final exams, and (in the sciences) laboratory work or implementation work on top.

Initial contacts

My initial contacts with the college consisted of e-mail exchanges: I corresponded with the Dean's office and the Housing office in order to arrange the extensive paperwork required by the US authorities, and to find a furnished house or apartment to rent. I also had some e-mail discussions and a Skype conversation with Brent Heeringa, the head of the Computer Science (CS) department, who asked me what I wanted to teach: An intro course or an elective course? I suggested I would give an elective course "Natural Language Processing" ("NLP"), a proposal which was received with some enthusiasm; NLP had never been taught at Williams before, and it was expected that there would be a number of students interested such a course. In early April, I visited Williams on a scouting trip. I was warmly welcomed by all members of the Computer Science department, and by John Gerry at the Dean's office who was kind enough to show me around the college, and Williamstown itself.

I also audited some lectures in various computer science courses, to get a feel for the teaching climate at the college. Thanks to help from the Housing office, I was lucky enough to be able to rent a charming house and a car by a Biology professor, who was going to Australia on a sabbatical almost exactly the same period I and my family would be in Williamstown. I also met with the principal of Mount Greylock Regional High School, where two of my daughters would attend high school during our semester in the US. Having sorted out these practical but fundamental matters, I returned to Sweden.

My course

The course I planned to give would be a mixture of two courses I give in Sweden: "Language Technology" (6 hp), and a "Information Retrieval and Search Engines" (9 hp), a coding-intensive master's level course. Since I wasn't too happy with the current state the former of these courses,



I saw my visit to Williams as an opportunity to update and modernize the contents of that course, develop new homework assignments, etc. In retrospect, this was perhaps not such a wise decision, since it meant an enormous amount of work for me -- much more than I had anticipated -- which meant that I had little time to attend seminars, audit courses of colleagues, and participate in the faculty life at Williams. By contrast, several of my colleagues at KTH that have been STINT fellows previous years have either given a their own KTH course more or less unchanged, or co-taught a course with a faculty member at the visited university, which allowed them to spend more time on other activities besides teaching. On the other hand, having the full responsibility for a course at a different university than my own was a valuable experience as well, and I can certainly benefit in the future for all the work I invested.

Currently (2016) at Williams, Computer Science seems to be a hot topic, and all the CS courses are full or overbooked. My course had been "capped" at 24 participants, but the department head had guessed that perhaps 10 or 12 student would sign up for the course, since there is also a tendency among Williams students to be somewhat suspicious towards new or visiting faculty members, who might not live up to the teaching standards of Williams. However, a few days before course start, the course was fully booked, and I started receiving e-mails from students who asked if they could take the course anyway. I consulted some of my colleagues, who assured me that I could accept as many students as I liked, but I also would have to suffer the consequences. Comments like "I used to be generous in accepting extra students, but I really like to sleep more than two hours a night" made me a bit cautious, and I decided not to accept extra students. I hadn't realized that the first two weeks of the semester is an "add-drop" period, and that some of my students that had signed up for the course had done so only while waiting for a spot in another course; once they were accepted to that other course they dropped mine. When the dust had settled, I had 22 students on the course + 2 students who wanted to "audit" the course, meaning they would attend the lectures, but not do any examination, and not receive any credits.

The students

My 22 students were a mixed group: 9 seniors (4th year students), 9 juniors (3rd year students), 3 sophomores (2nd year), and even 1 freshman (1st year). Some of the junior and senior were Computer Science majors, but others were majoring in other subjects (e.g. Economy, Statistics, Psychology, Mathematics). They turned out to be a charming group of students; very clever, nice, and active in the classroom.

After discussing with the department head, I had specified the prerequisites for the course to be two other CS courses: one basic programming course, and one on data structures. I wanted to give the students lots of programming assignments as homework, and felt comfortable in doing so because of the prerequisites, but also because I was repeatedly told that the Williams student is exceptional: He or she is cleverer, more talented, more hard-working, more productive and more successful than any other student anywhere else. This narrative, which is being perpetuated by students and representatives of the college alike, is not without basis: Admission to the college is highly competitive (19% acceptance rate), and if the Admissions Office so desired they could accept nothing but students with near-perfect SAT scores. I was told during the introductory week for new faculty that "if you want your students to read one book a week, they will do it". Generally it seems to be assumed that there really is no upper limit to much work one can heap on one's students. I can't help thinking that this narrative must be quite counter-productive at times, and put an enormous

burden of stress on the students. This is on top of the pressure most American university students surely must feel already from the fact that their tuition is expensive, and often paid by their parents.

Be that as it may, I came into the course expecting that there simply would be no weak students. This would quite unlike the situation at my home university KTH, although arguably being the top polytechnical university in Sweden, there always seems to be a group of 15-20% of the students that are very weak, with shortcomings in their mathematical skills in particular. However, some weeks into the semester it became clear that not all my Williams students performed equally well. The majority of the students were truly excellent and received full marks on more or less every homework assignment, some were perfectly OK but not outstanding, while a few others turned in flawed solutions, or complete non-solutions. I think these discrepancies primarily reflected the differences in coding practice rather than theoretical understanding; the students that enjoyed programming and had done a lot of it (much of it in their spare time, no doubt), seemed to find the homework assignments quite easy. In some other cases, it seemed to be a matter of priorities: the students at Williams are incredibly busy. Many do varsity sports, other play musical instruments and participate in orchestras and bands; yet others are involved in stage plays, dance productions, and various other activities. Although many Williams students seem to be able to handle all these activities while still receiving top grades in all courses, some students clearly have to prioritize among their undertakings.

Two of my students had more problems than the others. One of them simply disappeared from view, stopped attending lectures, answering e-mail, or handing in homework assignments. Rather than treating the issue the way I would have done in Sweden -- that is, ignoring it -- I followed due procedure at Williams, which involved contacting the Student Dean's office, who have the responsibility in such cases to reach out to the student and find out what is wrong. In this particular case, it was clear that the student had some psychological issues, and he finally dropped the course. The second student seemed completely unprepared for the assignments; he didn't have the prerequisite knowledge at all, although on paper he had taken the required courses (albeit with bad grades). I invited him to my office hours to give him extra help, but it was soon clear that it was to no avail: His lack of knowledge of programming and mathematics was so fundamental, it was clear that he was not going to pass the course. After some more discussions with the Dean's office and the head of the CS department, this student too decided to drop the course.

I should make it clear that dropping a course at Williams College is no light matter. The pace at Williams is 4 courses per semester + 1 short course a year during "Winter Study" in the first three weeks of January. No student is allowed to fall behind, and if a student fails or drops a course, this has to be made up, either by taking a course during summer, or by reading 5 courses one semester. The tendency at KTH and other Swedish universities that students take an extra 6 months or a year to complete their studies, is not seen at Williams. The Dean's office works actively to help students that experience problems in their studies, and offers a lot of help, for instance the "Math and Science Resource Center" providing help in basic science courses (each Sunday to Thursday evening from 8pm to midnight!), writing workshops, peer tutoring, etc.

Teaching and assessment

Before my course, I asked the CS department head and several other colleagues about how I should organize the course, in order not to deviate too much from the standard at Williams. The answer was

invariably the same: Do as you like. Teach to your strength. It's your course, you organize it as you see fit.

In the end, I decided against having any written mid-term or final exams, and opted for a scheme of homework assignments, which the students were supposed solve independently, and a final project, which the students would carry out in groups of two. Besides the first two weeks, the reading period in mid-October, and the Thanksgiving week in November, I planned a homework deadline each Tuesday at noon, altogether 9 assignments. My thought was that each assignment would contain some theoretical questions and some programming tasks, and planned to reuse some assignments from my Swedish courses, and construct a number of new ones, two of which I prepared in the summer before the semester. Constructing such a programming task is quite a lot of work, since the students are handed a "skeleton" program with some parts omitted, and the task is to provide the missing pieces. Therefore, I needed to construct these skeleton programs, input data files, files containing the expected output, problem descriptions, etc. I also wanted to give each student personal feedback, if even only a little, on each assignment. Since I didn't have any teaching assistants, assessing the homework, which involved reading and understanding 22 student's computer programs, and writing personal feedback was an time-consuming endeavor. Had it not been for the fact that 10-12 students always handed in perfect solutions each time, my course organization would not have worked (and the really good students received hardly any feedback at all, unfortunately) In retrospect, perhaps I should have employed the interactive grading procedure we use at KTH, in which the teacher meets with the student for a short period of time (~10 minutes), and the student demonstrates the program, and the teacher asks questions about it. The program is actually never handed in, and never commented upon. On the other hand, I think the students at Williams course learned more with the (more time-consuming) course organization I actually used, but it was a valuable experience for me to see how small a group of students must be for such a scheme to work well.

When preparing my syllabus, I had a look at syllabi for other computer science courses, and also for courses from other departments. I decided to borrow some ideas that seemed standard at Williams, but I hadn't used myself before; Firstly, a detailed breakdown of how much each part of the course counted towards the grade (homework assignments 40%, final project 50%, etc.). Secondly, I made "active participation" part of that grade basis (5%). This is something I think would be impossible at a Swedish university. Finally, I employed strict deadlines for the hand-in of homework assignments: late hand-in would result in the deduction of credits. The latter routine, almost never employed at KTH to my knowledge, seems completely standard at Williams, and the students seemed to expect it. In order to give the students some leeway in their planning, I allowed the use of up to four "late days" (each late day allowed the student to hand in their homework up to 24 hours late without penalty). These four days were supposed to be used in case of illness, high workload in other courses, etc. As it turned out, most students actually used their 4 late days, but in only one case I actually had to deduct credits because a student was late beyond the four allowed late days.

I was advised against assessing individual assignments with letter grades, so I devised my own scheme of 4 points being the maximal number points awarded for a homework assignment, and deducting tenths of points for small errors, and whole points for large errors. In retrospect, I think this system was rather confusing for the students, though nobody complained during the course (but one or two students mentioned it in the their written evaluation of the course). It would probably

have been better to use letter grades after all, or perhaps a system of giving points on a scale from 0 to 100%.

As for the actual teaching, I most of the time used the old-school approach of writing on the blackboard, with the occasional use of the computer to demo some concepts. I refrained from using Powerpoint because I have observed a tendency in myself to go through the material too quickly when I use slides. However, some of the students remarked afterwards in their evaluation that the pace had been too slow at times, some students thought the pace was fine, and not a single one thought I went too quickly. This probably means that the pace was a bit too slow. I failed to take into account a cultural difference between KTH and Swedish universities in general on the one hand, and Williams College on the other; namely that Williams students actually prepare for class by reading the material in beforehand!

The teacher-student relationship

In general, the American school system is more hierarchical than in Sweden, and no American student below university level, for instance, would dream of calling their teachers by first name. As a teacher at Williams you face the decision: How do you want your students to address you? (Luckily this is a non-issue in Sweden, where the use of first name is the norm). The tradition at the CS department is to use first names, and I encouraged my students to do so at my first lecture. I understood, though, that the use of first names in teacher-student contacts is far from universally adopted at Williams. The name issue is possibly a contentious one, and it was actually the topic of an interesting discussion at one of the "First 3" lunches (more on those lunches later on). As a teacher, it is evidently important to uphold a status of authority vis-à-vis your students, and having your students call you "professor" is one way of signaling that authority. Conversely, by encouraging your students to address you by your first name might be understood as saying "I believe that my authority is big enough also without these trappings", and it might indeed be perceived as disloyal by younger colleagues who feel that the use of the "professor" title is helpful to upholding their authority. The issue is further complicated (or should I say "infected") by the fact that there are a number of studies showing that perceived authority is influenced by a number of irrelevant factors, such as age, gender and race². As a Swedish scholar visiting an American university, it is useful to be aware of this debate.

Titles or no titles, the faculty and the students at Williams are on closer terms than is common at KTH. For instance, it is easy to get funding from the college for taking your students to lunch, etc. I did not use these possibilities, but rather met my students one-on-one during my office hours, which I had 3 days a week (1 hour each time). In the beginning, few students showed up in my office, but gradually, perhaps as the assignments got more difficult, more and more students started making use of the office hours to seek guidance on how to solve the homework problems. This was always done in a most respectful way, and invariably the students had already spent a lot of time trying to solve the problems themselves before seeking help. As a result, my students always had very precise questions, and I could help them in an efficient way. I think this showed that my Williams students, very young as most of them were, had a very mature attitude towards their studies.

² I haven't researched this issue myself, but am merely quoting from the discussion at the "First 3" lunch.

A very nice way of student-faculty communication and information exchange at the Computer Science department were the Friday colloquia. This colloquium, which took place every Friday at 2.35pm, could feature an invited talk from a visitor, or student talks presenting summer internships or research projects. Every faculty member at the department attended, and the students (the Computer Science majors) had to attend a number of the meetings before graduation. Snacks were served, and the atmosphere was most relaxed.

Some advanced courses at Williams are given in the form of "tutorials", in which the teacher meets with two students at a time, about once a week. At each such meeting, one of the students presents some material, e.g. a research paper. The other student critiques and discusses with the first student. The teacher acts as a mediator, and should ideally interfere as little as possible. Such tutorials seem to constitute the epitome of good teaching at Williams; the learned conversation between a professor and a small group of disciples.

Admissions policy

As mentioned previously, the policy by which students are admitted to Williams differs greatly from that of KTH and other Swedish universities. Williams, being a private university, can accept whichever students they like, and have an explicit goal of creating a student community which is gender-balanced and ethnically diverse, but also diverse in other ways. According to Williams College's web page: *"We're not just looking for top scores and impressive accolades. We want creative thinkers, diverse perspectives, and people who'll bring as much to the community as they'll gain from it."* A colleague at the Biology department put it this way: *"Williams is looking for leaders. Not just future CEOs and university professors but leaders in all senses of the word, not least moral leaders"*. An enormous effort is spent each year to evaluate applications from prospective students, and extra-curricular activities and recommendation letters -- aspects which are completely ignored in Sweden - - are of vital importance. Some aspects of the admissions process might seem somewhat bizarre to a European (at least they do me); for instance, if the football team needs a new quarterback, or the Berkshire Symphony needs a new brass player, and a promising such player applies, his application will have much higher probability of being accepted than it would another year. The coach of the women's golf team described to me how Williams are wooing promising golf players at the high school level, encouraging them to apply to the college. I found these aspects of the admissions process somewhat unusual, but in general it is clear that the Admissions Office is doing a very good job in accepting students that create a vibrant and highly successful community.

Welcoming new faculty members

A truly amazing part of my Williams experience was the way the college receives and welcomes new faculty members. The week before the semester begins, a rich program is offered: a guided tour through the college with an introduction to all the buildings and the departments therein, a workshop on syllabus design, an introduction to the library services, an introduction to the technical equipment in the classrooms, an introduction to GLOW (the digital learning environment used at Williams), a workshop on "perspectives on learning and teaching", and a number of social gatherings, where also spouses are welcome. The activities continue all through the year with the so-called "First 3" lunches each Monday and Thursday at the Faculty House. Each of these lunches had a theme to be discussed, for instance grading, the honor code, student evaluations, faculty meetings, classroom dynamics, etc.; or else a representative from one of the college's many centers,

committees and groups came along to present themselves and their activities. Although I only participated in half of the meetings (as they continue through the spring semester), I got a very good view of the inner workings and the philosophy of the college. I also quickly got a network of contacts throughout the college, which was simply very nice in my case, but might also be very important for faculty members staying for more than one semester.

Comparison and conclusions

Williams College is clearly a fantastic institution of higher education. The question is: What can we (KTH) learn from them? Which practices and policies can we import?

Clearly, KTH is constrained in a way that Williams College, being a private university, is not. For instance, at KTH we have very limited influence which students we admit, since admissions are centrally administered on a national level. The possible exception is the School of Architecture, to which students are accepted not only on grades but also on work samples. This resembles at least to a degree the admissions procedure at Williams. Perhaps a similar instrument could be put in place also for the more theoretical programs at KTH? Clearly, the current situation is not completely satisfactory since some high schools give much higher grades than warranted, skewing the competition, and leading to KTH admitting students that are not likely to graduate. A problem in Sweden is that one can apply with high school grades alone, not needing to take the SweSAT ("Högskoleprovet"), whereas Williams College and most other US colleges and universities require each applicant to have taken either the SAT or the ACT. This way, the student's results are calibrated against the entire student body in the US. In my view, we should require applicants to take the SweSAT, and KTH should lobby for this requirement to be instituted.

The fact that Williams students are so consistently strong (with very few exceptions) have some implications: Most or all students can be expected to pass a given examination, whereas at KTH a course which everyone passes is looked upon with suspicion (this is particularly true for intro courses). Unless the admission procedure at KTH is changed to involve some kind of aptitude test, it is unavoidable, I think, that the intro courses at KTH will act as that filter instead (even if it seems a wasteful system both on a individual and a societal level). Moreover, at Williams lots of individually adapted help can be given to the few students who experience problems in a class. At KTH, fewer such resources exist (although there is some help to be had in basic math and computer programming). The Williams students always have the option of contacting their professors directly, and visiting them during office hours. Very few KTH teachers have office hours to my knowledge. A female master's student of mine described the situation: *"At KTH one reads a number of very difficult courses at a very high pace, and there is really nobody there to help you. Unless you're able to find or create a good study group among your peers, you're unlikely to graduate"*. I think this quote illustrates the difference between the two schools very well. However, it's not clear to me what can be done differently at KTH considering the student-faculty ratio (14,000-700, or 20:1, whereas Williams has 2,000 students and 300 faculty, a less than 7:1 ratio).

There is a strong emphasis on excellence in teaching at Williams. At KTH, the emphasis is firmly on research; success at KTH means success in bringing in research grants, and being an excellent teacher does little for your career opportunities. (Still, there are a number of remarkably good teachers at KTH as well, although the system does not really reward them.) Perhaps this is due to the fact that there are metrics in place to measure the success of research: number of publications, number of

citations, size of research grants? It is much harder to evaluate the quality of teaching. At Williams, quality is assessed by student evaluations, but also by peer review: A colleague visits your class at a time of your choosing, and then writes a short report, summarizing impressions and giving advice. The latter system is not employed at KTH, and to be honest I hesitate to suggest it (the workload for faculty is high enough as it is), but I think it is effective.

The way Williams College welcomes its new faculty members is a model for any university anywhere. When I started at KTH, I was left pretty much to myself to figure out how everything worked. Although my KTH colleagues always were very helpful whenever I wondered something, it was still a problem because there are always routines and policies (some of them crucial) you don't know that you don't know³. By contrast, the introduction I received at Williams was very informative, complete, and effectively communicated (and very nice!). Most important information at Williams is readily found on the intranet, whereas the KTH intranet has been in a constant state of chaos ever since I started working there seven years ago (and if you do find a page explaining what you are looking for, most likely the information is outdated). Here KTH has a lot to learn.

Another amazing feature of Williams is the sabbatical system: After 3 years of consecutive teaching, a faculty member is granted a sabbatical semester (alternatively: 1 sabbatical year after 6 years of consecutive teaching), with 75% pay. During this semester/year, the faculty member can either stay at Williams, or visit another university in the US or abroad (but then has to acquire extra funding for travel expenses). Regardless, during this period one does not need to teach, and can focus on doing research and/or reading up on new material. This is a system I would love to see implemented at KTH!

The most enduring impression from my visit is the warmth and openness by which I and my family have been received. I hope that foreign visitors to KTH feel as welcomed as we have felt in Williamstown and at Williams College.

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³ Things have improved; since I started at School of Computer Science and Communication at KTH, there is now an appointed contact person responsible for the introduction of new personnel.

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