Comparisons between Swedish students and Chinese students in computer science

Xuewen Huang
Abstract

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This thesis presents some results concerning similarities and differences between Chinese and Swedish Computer Science students in how they view their studies. The results are drawn from interviews with both Chinese and Swedish students studying Computer Science at Uppsala University, as well as from literature surveys. Of interest have been to study the impact of cultural and educational background, Eastern or Western countries, on their attitudes towards their Computer Science studies. The study reports on dreams before starting their studies, the approach to problem solving, how they communicate with other students, and how they understand and reason about plagiarism. The results show that social factors and the cultural divide between Eastern and Western cultures strongly influences the attitudes investigated. Differences and similarities are reported in the thesis.

Key words: Comparisons, West and East, Classroom climates, Collaborative learning, Faculty-student & student student interaction, Plagiarism.
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Chapter 1

Introduction

1.1 Introduction

With the development of educational reforms and high-technology (computer science and information technology), increasing importance has been attached to computer education research. What is computer education research (CER)? Fincher and Petre [1] show that the CER is an aggregate based on investigative focus, such as:

1. Student understanding
2. Animation, visualization and simulation
3. Teaching methods
4. Assessment
5. Educational technology
6. Transferring professional practice into the classroom
7. Incorporating new developments and new technologies
8. Transferring from campus-based teaching to distance education
9. Recruitment and retention
10. Construction of the discipline

They proposed ten subfields for CER, with each of these subfields standing up well in its own right. Moreover, Valentine [2] categorizes the CER as types of endeavor, i.e.:

1. experimental: including any sort of scientific analysis
2. Marco Polo: the application of a new curriculum, language, or course
3. philosophy: attempts to generate debate on philosophical grounds
4. tools: software tools developed to assist with aspects of teaching/learning or assessment
5. nifty: innovative, interesting ways to teach abstract concepts
He discusses how to endow CER with an explicit definition from experimental, philosophy and tools aspects, respectively. However, no matter how the CER is defined, it actually describes the relationships among the educational system, learners and teachers. For our students, how to become excellent learners is especially significant.

Some students choose astronomy as their majors, since they enjoy seeing the sparkling stars when sitting on the lawn at night; some students have dreams to become an outstanding architect, therefore they choose architecture; moreover, some students prefer computer science or medicine, with consideration of obtaining a decent job easily after graduation. With the point of view for problem-solving, some students like solving problems by themselves, because they hope to foster an ability of individual thoughts; however, some other students prefer to work as a group, they consider that collaboration can save much time, make more friends and learn a lot from each other. Through these examples, it obviously reports that different students have different choices and thoughts. Therefore, the research of similarity and differences for the different students is a very interesting and necessary topic.

1.2 The definition of study

Nowadays, there are a large number of articles about comparisons of pedagogy between eastern countries and western countries; however, “study” is a more universal and concerning topic for students.

What is study? As we know, learning is an ancient and also eternal topic. Because of different historical conditions and point of views of researches, it also forms diverse conceptions of learning through discussions of authority at all times and all over the world. This several definitions are obviously representative:

1) In ancient China, the human being is conditioned to divide the learning into two parts: “study” and “practice”. The study is imitation, which means obtaining knowledge, the practice is review and training, which consolidates knowledge.
The earliest person who combines “study” with “practice” is Confucius, he said: when you are in studying process, if you can always practice them, it will also be a very happy thing.

2) “Learning” is a kind of acquirement of experience and transformation of behavior. Encyclopedia says: learning is a process that human beings and animals gain individual experiences of actions in their lives.

3) “Learning” is a way that information is processed. It is a whole process of learners obtaining and outputting information to get understanding of whether something is correct or not through feedback and evaluations.

4) “Learning” is a functional theory. It explains that people can get the knowledge and skills from readings, listening and researching.

5) “Learning” is also an understanding. The researchers think that learning is the process by which people master human social experiences and that the students learning is a special form of understanding.

6) “Learning” is an activity. The learning under some external factors, such as teachers and books is a self-improvement, self-educated social activity.

7) “Learning” is instinctive aspiration for knowledge. It is a most simple, ordinary, essential expression of people.

8) “Learning” is a process to produce effects.

The 8 definitions of learning above basically show that for the students, the 1, 3, 4, 6, 7, 8 viewpoints are more practical. “Learning” is a process, in which students can obtain knowledge and experience from teachers, books, themselves and with the accumulations of knowledge and experience, students’ self-abilities will be upgraded increasingly to bring some important effects for their futures.

1.3 Background

In this paper, we mainly focus on the survey of 45 students in computer science program from China and Sweden. Most of them have more than 4 years studying
experience in computer science. This thesis compares similarities and differences between Chinese students and Swedish students from three main aspects (Classroom climates, Collaborative learning and Faculty-Student & Student-Student interaction), it not only explains several reasons why the number of males in computer science is much higher than the females’; what their feelings in the class and after class are, but also illuminates how they communicate with others (students-students & students and teachers) and their attitudes to the “cheating”. Moreover, this paper also brings up a very popular and sensitive topic at present—“Plagiarism”. Through the analysis of attitudes of students towards “Plagiarism”, we can summarize the final conclusions on “Plagiarism”. Consequently, according to the different attitudes and viewpoints of those students, we can conclude that the differences of educational backgrounds and social conditions could cause some essential diversity to the students coming from different areas.

1.4 Outline

The next chapter mainly presents a basic survey aiming at general information for the different students, who are studying in computer science program. Chapter 3 particularly describes what classroom climate is, what the differences between Chinese and Swedish classroom climates are and how different students feel in the class. Chapter 4 introduces different behaviors between Swedish students and Chinese students from the collaborative learning aspect and shows their similarities and diversities. Chapter 5 presents the favorite formats for Swedish students and Chinese students to communicate with teachers and other students, such as e-mails, telephones or face to face. Chapter 6 covers the most popular and sensitive topic—“Plagiarism”. Through an example and some questions, we conclude “where to draw the line”. Finally, the analysis of survey results are presented in Chapter 7 and it also gives some discussions and conclusions.
Chapter 2

The survey of basic information

In this chapter, some elementary surveys are presented about Chinese and Swedish students in computer science to capture some basic information and opinions, in order to pursue more comprehensive research.

2.1 The reasons of choosing computer science

Why can the computer calculate faster and more accurately? How are the colorful and complicated pictures depicted? What exists in intelligent and interesting games? These questions always intensively attract the students’ attentions. Statistically, most Chinese students choose computer science due to their interests and curiosity. At first, Chinese students think that computer science is just for fun, until studying at Uppsala University, they gradually find out computer science is more extensive and useful in many areas, such as medicine, architecture, astronomy, etc. [16] Therefore, the motivations of most students engaging in computer science are more obvious--practicability.

From this survey, although most Chinese students choose computer science originating from their interests to computers, another important factor that leads to chosen CS lies in job-hunting. It is well known that more and more new graduates are facing tremendous pressure in job-seeking, so the competition is rather cruel. In addition, the computer companies need more manpower compared with other fields, so some parents suggest their children to pursue the computer science. From this point, we can obviously see that the family-decision is also a crucial factor for Chinese students to make choices. Comparing with Chinese students, the proportion of Swedish students who choose computer science as their major according to their own desires (Like IT) is much higher (80%) [16]. The Swedish students can freely choose what they like, not considering too many extra factors. It clearly explains that
the different social backgrounds and factors can seriously influence the choices of students.

2.2 The proportion of gender in computer science program

Statistically, the proportion of males is far higher than females in computer science programs. In China, the ratio is basically 2:1 or 3:1; but in Sweden, the proportion incredibly reaches 5:1 even 6:1. [16] From the investigations, the attraction of computer science for females is much lower than males; males prefer to play computer games instead of reading books. During the process of operating computers, males are interested in not only the computer games, chatting and websites, but also some extra abstruse knowledge, such as programming, computer graphics, computer languages and logics, etc. This is the most important reason behind the higher proportion of males pursuing computer science. But in China, although a lot of females don’t like computer science, the pressure of job-hunting compels them to violate their own interests. It explains that ratio is limited to 2:1 or 3:1, not supposedly large differences. Oppositely, Swedish girls can study what they like; hence the result (5:1 or 6:1) comes out. [16] On the other hand, the self-confidence factor cannot be ignored. Some girls think that the computer science is too difficult to achieve excellent achievements as males do in computer field. Therefore, they prefer to invest time and energy in economics, arts and linguistics, instead. They believe that they can exert their advantages and be competitive in these fields. Finally, the diversity of genders is also a main reason. Females tend to be more sensible and males are more rational, so different emotional types also play an important role.
Chapter 3
Classroom Climates

In this chapter, we mainly compare the similarities and differences between Chinese and Swedish classroom climates. At the first, the problem we should consider is “what is the classroom climate”? The classroom climate is defined as the type of environment that is created for students by schools, teachers, and peers. Teachers are always looking forward to create a "positive" classroom climate in which students’ learning is maximized. A good learning surrounding where students feel comfortable, nurtured, and intellectually stimulated is a must for students to reach their potentials. The positive classroom climate boosts students to adapt their basic needs of physical and mental health. [3] Hence, the classroom climate mainly comprise of several relevant aspects for students: contents of lectures, classroom atmosphere and categories of assignments basically.

3.1 Contents of lectures

Most Chinese students, who are investigated state that the knowledge they learn at Uppsala University is more relevant and more advanced as compared with that in China. In China, some information is outdated and irrelevant. Because of the largest population in China, different people have different requirements for information-learning. If the knowledge is updated too fast, some students with weak receptivity cannot master the advanced knowledge and skills very fast, which means that they cannot easily adapt the demands and development of the society and will be eliminated by society at last. Therefore, the educational level in China must keep a relative equilibrium for the speed of information-updating. Another clear reason is that the educational degrees and the levels of social development for western countries are much higher than in the eastern countries. In addition, with the
appearances of some cooperative organizations, such as the EU, communicating and interchanging advanced information among the western countries are more convenient. Most investigated Swedish students think the contents they learn in lectures are advanced; the content is close to modern high-technology and they also believe that what they learn will be practical and useful in the future.

3.2 Classroom atmosphere:

3.2.1 Atmosphere of lectures

According to my survey, most students (Both Chinese students and Swedish students) think that a typical computer class that is engaging or boring completely depends on teachers and contents of class, but not relies on the western or eastern cultures or educational backgrounds. So we can assume a formula: a teacher full of passion + an absorbing lecture or lab = a perfect class. Naturally, if the atmosphere of class is engaging, more and more students will be eager to take this course. Therefore an extensive and excellent study atmosphere can be formed. But everything has always another opposite facet, both in China and Sweden. Some teachers only pay attention to the impartation of knowledge, but neglect teaching method. Consequently, it directly leads to the boring class conditions, resulting in the sharp decline of the number of students.

Another aspect of class atmosphere, whether the class atmosphere is strict or free, contains two meanings: one is the atmosphere of class; the other is freedom of selecting courses. For the first point, it is discrepant to different countries, for instance, in China; the number of the students is too large for teachers to communicate with each student immediately. Generally, the main format is that the teachers impart knowledge facing all students in class in China, except asking some questions aiming at some students sometimes. Another important point, students can’t interrupt teachers optionally since teachers don’t have too much time to discuss with every student. So we can say the class atmosphere in China is strict. On the contrary
in Sweden, the number of the students is smaller so the time is more abundant for teachers to communicate with students, even to each student. It’s beneficial for students to ask some questions in time and for teachers to know the extents students master. So the atmosphere is quite free in Sweden.

### 3.2.2 The freedom of selecting courses

From my personal experience and the investigations to some Chinese students, most courses are compulsory (70%-80%, even 100%) in China, which make the students have no chances to select their favorite subjects. Especially, the students in computer science have to learn some irrelevant courses, such as “Marxism philosophy”, “Basis of law” and “Theory of Deng Xiaoping”, etc. It’s a waste of time! Students should choose suitable courses based on their desires and interests. At Uppsala University, all computer courses are elective, so the students can freely choose courses what they like. Undoubtedly, it’s a better choice.

### 3.3 Categories of assignments

Nearly all Chinese students investigated [16] state that they have experienced the same tasks, such as labs, assignments and written exams in both China and Sweden. The differences are that there exist fewer seminars and presentations in China comparing to Sweden and the assignments in Sweden are more interesting, practical and difficult than China. In China, most assignments pay more attentions to the understanding of concepts, research of theory, not the practical applications of knowledge; therefore, the written exams become the main formats for testing students’ abilities and levels. This case results in judging a student is good or not, only according to his/her scores and prevails on students to concentrate on the scores of exams and sequentially neglect other aspects’ trainings. It seriously goes against definition of comprehensive developments. In Sweden, it strongly emphasizes the combination of theory and practice, and teaches the students how to exert knowledge
and abilities of practical operations neatly. For example, teachers always take some interesting examples to make the knowledge more vivid, giving the students a more intuitive understanding to remember. Another aspect, the students have abundant lab-chances to implement their own opinions by computers. In seminars, students can freely exert their imaginations and creativities, communicate their ideas with others, study and share others’ opinions. Also, the presentations can foster students’ team-work spirits and presentation skills.

3.4 The attitudes towards correctness of assignments

Different students have various standards towards assignments’ correctness, Ben-David Kolikant, Y. [4] examined students’ definition of correctness as reflected by their decisions whether certain programs are correct. That implies the different students have their relative definitions of correctness in accordance with their own different thoughts and tolerance, since their understandings towards correctness are inherently different from that of professionals. Although sometimes students distinctly find the results are not what they expected, they still persist in the correctness of results since the slight errors are unavoidable as parts of programming reality. Hence, the existence of notion of relative correctness is noticeable.

From the table 1 in appendix A, we can obviously see the majority of Swedish students who are investigated (12/15) have very high demands for the correctness of assignments they hand in, reaching surprisingly 80%, and none of them hope merely 60% correctness. For Chinese students investigated, only one thirds persists in the 100% correctness, most Chinese students choose the 80% correctness. In their opinions, the few slight errors can be allowable under the conditions of not affecting the whole correctness. The 10% Chinese students amazedly accept the 60% correctness, which means a simple pass seems to be enough for them. The main reason causing these inherent differences is the inadequate study habits.
Edwards [5] find that some students are used to be careless to the assignments. They conclude on the correctness through calculating the program only once or twice and when some errors are shown in the results, they always attempt to switch them formally to satisfy the demands of assignments. Similarly, Fleury [6] found that the students' viewpoints on programming are different than that of professors. The students would like to evade some complex problems, whereas those professors, who deeply know that it’s impractical to avoid complexity, tend to bring certain excellent suggestions to solve those complicated problems. Therefore, when some students faced complicated assignments, it’s possible for them to choose avoidance or give an imprecise answer, instead. From the students’ points of view, the correctness can’t be considered as a theoretical concept, but an idea about what the results mean for themselves. Furthermore, the diversity of the social and cultural backgrounds also plays an important role and leads to this big difference between Swedish and Chinese students.[16] Under the pressure of ruthless competition, it’s not allowable for most Chinese students to understand every detail of knowledge within the limited time. Most Chinese students have to start the following courses to obtain enough credits for graduation on time, even though they haven’t mastered the entire course content yet. In contrast, the Swedish students have plenty of time to engage in what they like and do much more profound research about what they are interested in. They can also execute a program many times in order to get the best valid and satisfied outputs. Actually, this is a cultural clash; therefore, it is not difficult to comprehend why the Swedish students have much higher understandings and requirements of correctness, compared with Chinese students.

3.5 The attitudes towards results of assignments and exams

Karavirta, V., Korhonen, A., & Malmi, L. [7] found that different students use different resubmission policies in automatic assessment systems in accordance with their attitudes towards results of assignments and exams and those students can be
divided into five key types: passers, ordinaries, iterations, ambitious, talented. These five categories can be found in Table 2 in Appendix.

From my survey [16], the different students have the different demands for results of assignments and exams. Some students are eager to learn more knowledge and obtain the perfect results, such as a full score; some students only want to get a reasonable score to satisfy their own demands; some students just hope to have a passing grade in order to get enough credits as soon as possible to graduate from university. Therefore, we introduce the table 2, which is obtained in accordance with different attitudes of Swedish and Chinese investigated students, towards results of assignments and exams, and these investigated students can be divided into five main types: Passers, Ordinaries, Iterations, Ambitious and Talented.

The table 2 indicates that the number of passers for investigated students is very small between Swedish students and Chinese students. It explains that only a passing grade cannot satisfy the students’ requirements for grades of assignments and exams at all, especially for Swedish students. None of Swedish students investigated wants to be a passer; this fact shows that the Swedish students have higher demands for results of assignments and exams. Comparing with passers, the ordinaries play a very significant role, especially for Chinese students, incredibly reaching a half of total numbers. These students are very satisfied with reasonable grades and consider them as an actual method to obtain enough credits as soon as possible, under the condition of less effort. For the number of iterations, that of Chinese students is far higher than Swedish students (7:1). It obviously illustrates that the Chinese students prefer to use automatic assessment systems continually to resubmit their assignments in order to achieve better grades, although it expends abundant time and energy and does not seem to improve their examination grades. This point is also consistent with Chinese educational background. The higher scores they get, the stronger their competitive powers are. By comparing ambitious between Swedish and Chinese students (4:1),
we can easily conclude the Swedish students can get perfect grades more effectively with fewer resubmissions, since they have better study habits and cultural conditions in a certain extent and much more believe themselves than Chinese students. They firmly make sure that the assignments they hand in are good enough so that they don’t have to resubmit them again. In this aspect, it seems to be not ambitious enough for Chinese students. For the numbers of talented, the proportion in Swedish students is as twice as that of Chinese students from table 2. This explains that the Swedish students have higher pertinence for their study purposes and results than Chinese students.¹

From the above aspects we discussed, it shows distinctly that a positive classroom climate makes it possible for students to feel comfortable capturing knowledge, build an outstanding atmosphere and develop a growing professional affiliation with the field. Therefore, the classroom climate is very important and meaningful for students.

¹ Note: these results of the survey just aim at 45 Swedish and Chinese students investigated in computer science program, it might be not illustrate the similar relations or stand for the same opinion in other programs.
Chapter 4

Collaborative learning

In this chapter, we mainly discuss the concepts, types and reasons of collaborations to obtain the students’ opinions towards collaborative learning. What is the collaboration? According to the Wikipedia, the free encyclopedia, it explains that Collaboration is a recursive process where two or more people or organizations work together for common goals — for instance, an intellectual endeavor that is creative in nature by sharing knowledge, learning and building consensus. Collaboration does not require leadership and can sometimes bring better results through decentralization and egalitarianism. In particular, teams that work together can obtain much greater resources, recognition and reward when facing competition for finite resources. [8] For our students, the collaboration is an activity or process that two or more students discuss and solve some problems collaboratively and summarize the conclusions.

4.1 The types of collaborations

The collaborative learning in the class mainly aims at the labs; the students discuss and study with each other on computers. However, most collaboration happen after classes, such as the distributions of an assignments, collections and combinations of relevant materials, the communication of the same and different ideas, etc. Statistically, in Swedish universities, the proportion of collaboration is basically 50%, which means half of tasks need collaboration to be completed. [16] Therefore, the labs, assignments, and presentations as a group play important roles. But in China, the chances of collaboration are far less than in Sweden, reaching only 20%. [16] Most assignments are required to be finished individually; the number of the labs, seminars and presentations is not as many as in Swedish universities. It leads to the proportion of collaborative learning is rather low. The main reason is that the diversity of students in China is much larger than Swedish students. An assignment or lab with a
group format easily produces the possibility that every student in the group can attain the same score, although their degrees of knowledge are highly different; and it is unfair for those students who really have abilities to complete tasks. With the time flying, the unfair atmosphere will become much more serious and finally destroy the normal collaboration, even the relationship among the students. Therefore, the individual assignments in China are more popular.

4.2 The reasons of collaborations

It is well known that collaboration can enhance the working efficiency. Generally, students in computer science program are positively encouraged to collaborate to accomplish a tremendous project, which not only reduces working time and pressure, but also helps students learn from each other. Moreover, collaboration, as an important communication way, in banking, IT and finance are more widely used. The team-spirit is just gradually formed from those simple collaborations in labs, seminars to complicated business development and corporation policy. Hence, the collaboration plays a key role both in studying and working.
Chapter 5

Faculty-student & student-student interaction

In this part, we chiefly describe how to communicate with faculty when the students have some questions and what roles the faculties and teaching assistances play respectively during their teaching process. Consequently it shows the relations between teachers-students and students-students and explains that the attitudes and encouragements from teachers have vital effect on students’ progress.

5.1 The relation of faculty-student

Most investigated students think that the relations between faculty and students are teachers and students in classes and good friends after classes. They can discuss some problems together and learn from each other. The teachers show what they know to students and instruct students to exhibit their own abilities. Another aspect, the students can obtain some help and good suggestions from faculty when they face problems in their studies. Diversity between Chinese and Swedish universities is that the teachers have stronger control over students in China. Generally speaking, the students must obey the teachers, supervisions and arrangements of department. In Swedish universities, the faculty is more pleasant and approachable and the students are more responsible for their behaviors. Usually, the students need to solve the problems by themselves, but they still have enough chances to communicate with teachers when they really have difficulties. Therefore, the relations between faculty and students in Sweden are more friendly and free.

5.2 The relation of student-student

The relations of student-student are basically the same both in Chinese and Swedish universities; they are classmates and good friends. The only difference is that because of the largest number of students in China, the competitions among the
students become more and more cutthroat. Hence, the competitors have played a crucial role around the Chinese students. Another aspect, when students feel that they are treated chillily as a member of a group, they are more likely to leave this program. On the contrary, when students feel that they belong both academically and socially, they are more likely to be retained and to succeed in the major.

5.3 The communications between faculty and students

Statistically, e-mail seems to be the most universal medium of choice in both China and Sweden. The most important reason is that it’s more flexible and not intrusive; most students are much more likely to send an e-mail to teachers and teaching assistances than to make a phone call or to drop by an office. The faculty could answer your questions when they have time and it can save much time and avoid some unnecessary trouble. Also, as students, they also prefer to receive some announcements by e-mails whenever possible, since they can easily write back or read it again later. Face-to-face is second only to e-mail, but also has a high proportion in terms of communications between teachers and students, especially in China. The survey reports that many Chinese students would like to talk or discuss some problems with teachers face-to-face. They think this form is more direct and easier relative to other approaches and they can easily fix the problems and not cause misapprehensions. The same reason exists; Chinese faculty also likes to assign the homework or to publish some important information in classes. But in Swedish universities, the students should make an appointment in advance if they want to have a short meeting with professors. The main reason causing this difference is that most Chinese teachers focus on teaching: teaching students how to study, how to master knowledge, even how to get along with others. Generally, the teachers have enough time to communicate with students, to discuss some problems and talk some extracurricular activities, such as financial news, sports and other popular topics. Therefore, the Chinese teachers look more like good friends for students, although
they are so strict in classes. But the Swedish faculty not only pays attention to teaching, also more attention to their research. They have large numbers of other tasks to complete every day except teaching so their spare time for students is limited. If the faculty has some important messages to inform, they will put the information on the course homepage or relevant website, such as www.studentportalen.uu.se, or send an e-mail to the course group. Therefore, the network is the better channel for Swedish students to communicate with faculty.

5.4 The role of teaching assistant

Exactly speaking, the teaching assistant is a connection between teachers and students. Because the teaching assistants are similar in age to students, it’s easier for them to communicate with students than faculty. Another crucial aspect, the professors always have a lot of other important things to accomplish each day, for instance, attending some necessary meetings, preparing for publishing papers and doing some academic research, etc, which makes time bestowed upon students limited. However, on the one hand, the teaching assistants can reduce faculties’ daily workload and help professors handle parts of teaching tasks, such that correcting the labs and assignments; on the other hand, the teaching assistants also show students some good suggestions and valuable experience to help them clarify unclear points to understand better the contents in lectures. The difference between China and Sweden is that the role of teaching assistant seems to be not obvious in China. The students used to discuss with teachers, not the teaching assistants, so some teaching assistants have been replaced by normal faculties gradually, even in some departments, the positions of teaching assistants have been cancelled. Therefore, the teaching assistants are the best choices for the students in Sweden, but in China the fact is opposite.

5.5 The effect of encouragements

Most students from the survey have experienced the encouragements from the
teachers, including only an oral encouragement. Someone says: the encouragement is always a good incentive for study; it explains that encouragements always take some positive effects for students. The encouragements not only enhance the confidence of students, also boost up students’ ambitions that “I believe I can fly”. Also the praise is a kind of confirmation of students’ hardworking effort; it will actively promote students to make a greater progress, especially the encouragements for females in computer science program are significant. Through the descriptions of graphs, it clearly manifests the ratio of female students in computer science program is descending gradually year by year.

From graph 1, we can see obviously that the number of female students in computer science has declined to 5,575 from 14,693 during 5 years, from 2001 to 2005. It adequately makes out that the females’ interests toward computer science are reducing gradually.

The graph 2 reflects the same instance from another angle. The proportion of females pursuing computer science is slightly higher than that of choosing architecture design and undecided, located on the last but two, and far drop behind that of other fields, such as mathematics, physical science and engineering, etc. Another aspect, the female students in mathematics program have the highest math average score, reaching the 624 point. After that are females in physical science and engineering programs, the average scores are 589 and 577 points, respectively. The average score of females in computer science program is lower than other programs, correspondingly. It is just higher than that of architecture design and undecided programs. This case illustrates that those female students who are good at mathematics prefer to choose the mathematics, physical sciences and engineering, even foreign language and philosophy as their majors, rather than choose the computer science. Therefore, we have started to lose some excellent female students gradually. This instance demands us to make the recruitment a low-hanging fruit and enhance our competitiveness to retain them. Research shows that when faculty
encourages students (especially females) to persist in the courses, they are less likely
to drop out of the courses, and faculty can guide students to become members of
discipline. In chapter 2 of this thesis, we have discussed that the ratio between males
and females is around 5:1 in computer science program of Sweden, owing to the
reason of lack of interests. Hence, an easy “very good” or “good solution” can
courage females to pay more attention to the course, increase their interests on
computer science, complete some labs and assignments better gradually, and make
sure that they can also obtain the same accomplishment as the males. Thus, it can be
seen that a positive encouragement, even a tiny praise can largely enhance students’
enthusiasm, build up their confidence, and carry profound weight for their future.
Furthermore, some educational researchers also suggest to link educational materials
and curricular plans to students’ existing interests, knowledge and experience.
Teaching contents in appealing styles and building on actual abilities can reduce the
barriers of entry and level the playing field for those with limited experience.
Chapter 6

Plagiarism

According to the Wikipedia, the free encyclopedia: plagiarism, as defined in the 1995 *Random House Compact Unabridged Dictionary* Plagiarism is an ignominious theft of submitting other authors’ original language and thoughts as one’s own work. Within academia, plagiarism by students, professors, or researchers is considered academic dishonesty or fraud, and plagiarists are subject to severe punishment, up to and including expulsion. [10] According to the Merriam-Webster Online Dictionary, to "plagiarize" means [11]

- to steal and pass off (the ideas or words of another) as one's own
- to use others’ work without consent
- to commit literary theft
- to present as a new and original idea or product derived from an existing source.

In other words, plagiarism is a behavior of fraud. It involves both stealing someone else's work and lying about it afterward. For our students, the plagiarism is handing in someone else’s work as evidence that you yourself have met the learning outcomes and therefore, you deserve credits for the learning. [12]

6.1 The results of plagiarisms

For those people who are plagiarized, no creativity exists at all, the intellectual property can’t be protected, copies are everywhere and their hardworking effort is cheekily robbed. For individuals who plagiarize others’ thoughts or research results, this is an immoral, not responsible and disgraceful behavior, Some plagiarists deliberately cheat, which seriously undermines the value of all students’ awards, and when plagiarists are caught, they will also lose reputation and credibility within
academia and industry fields themselves, even must undertake a severe punishment.

The internet is developing faster and faster, for those plagiarizing, copying and pasting from one web page to another becomes much easier, especially in this modern society. Equitable environment can’t be guaranteed at all, and authorship was doubted. These unpleasant atmospheres have already badly influenced the normal developments to academia, journalism and other relevant fields. Therefore, detecting plagiarism has become an important and arduous task now.

6.2 The trend of plagiarism

This is a most divergent problem. Statistically, the proportions supporting “growing”, “shrinking” and “keeping the same or I don’t know” are surprisingly similar. [16] With the fast development of internet, it’s much easier for people to find some relevant information which they are interested in. Hence, one third of students consider that the trends of plagiarisms around us are increasing rapidly. Some students are lazy to collect materials on their own or intend to filch others’ outcomes directly, driven by their greedy human nature, although it’s a very immoral act. Most plagiarists make use of the spare time to pursue some their favorite activities, such as having a party, playing computer games, even travelling. These ignominious behaviors are strictly regarded as a breach of academic ethics and should be eliminated completely.

However, some students hold the opposite opinions. High-technology is applied widely all over the world; the modern equipments can easily and accurately capture the plagiarisms and be propitious to fight against cheating so as to largely reduce the trends of plagiarism. Another aspect, those people who support the descending trends believe that the quality and consciousness of human beings are being enhanced obviously relative to before and people have started to take more responsibilities for their personal actions and they are getting to realize the plagiarism also do harm for themselves actually.
In addition, some students feel that the trends of plagiarisms are unchanged around them from the past to the present, according to their observations and experience. They believe that there exist plagiarisms everywhere. The plagiarisms existed in the past still exist at present and will continue to the future.

Finally, the thoughts of students who don’t care whether the plagiarisms are “growing” or “shrinking” are also to pay close attentions. These students only take account of their own behaviors, not attach importance to others’ at all so as to show “I don’t know”.

6.3 The reasons of plagiarisms for students

The main reasons of plagiarizing others’ work are showed as follows: [16]

1) It’s much easier to finish assignments, to pass the exams and to get a high score.
   For instances, some students wish to save plenty of time for what they would like to do, such as playing computer games on the Internet, having a party with friends at the weekend etc. They are eager to obtain the high score without any effort; they are also not reconciled to fall behind others driven by the vanity. Therefore, the temptation of catching up by turning in someone else’s work can be strong.

2) Personal habits or the influence of environment.
   Originating from the individual habits, some students are always busy on something they are interested in every day, don’t plan and arrange their study properly until it’s too late for them to complete assignments when they remember. Also some students are used to plagiarize other’s assignments and exams as their own results already and they have over-reliance on others’ work. Spending less time and energy to gain the biggest harvest leads to them to plagiarize repeatedly. Moreover, fear of failure for some students is also a main reason to plagiarize. They are always worried about others’ laughs and distains when fail in exams. Hence, they take a risk at all costs to plagiarize others’ work for the sake of their
alleged reputation. The results are miserable sometimes in this case. Of course, we should not also neglect another important aspect— the environmental factor. When some students find some other students did the plagiarisms and obtained much avail, usually they are misadvised easily and given some negative impacts. Driven by the enticements, they also start to attempt to plagiarize, and are not aware of the serious effects for their future. Moreover, the teachers’ behaviors and attitudes also play a significant role to students’ growth. In China, it’s not strict to control the plagiarisms; even some professors in universities also engage in some plagiarisms taking some reputations and social status into account. It not only violates and spoils the equity of academic researches badly, also declaredly insults the occupation as a teacher who takes the responsibilities to educate. Thus, it can be seen that the external conditions have some decisive meanings to guide students

3) The pressure of graduation and work.

The last but not the least reason is the pressure of graduations and employments prevail on some students to plagiarize. This phenomenon is much more serious in Chinese universities considering for large population. Statistically, many students step into colleges or universities for earning a degree, hunting a job and pushing all the right buttons to finish successfully. Courses are treated like computer programs or fast food operations. The competitions among students are singularly severe; hence the jagged qualities of students and imbalance of education change more obvious. Some weak students plagiarize someone’s work in order to get enough credits to graduate from universities on time; those students who want to obtain high scores through plagiarizing others’ outcomes hope to acquire a perfect job after their graduations. Under so much pressure of graduations and employments, it seems not to be so strange for students to plagiarize.
6.4 The reasons for not plagiarize factors

Every coin has two sides. When some students are accustomed to plagiarism and never get tired of it, other students are still absorbed in their studies. According to the Sheard and Martin Dick [13], the central reasons for these students not choose to plagiarize are as followed:

1) Want to know what the work is worth. The purpose of study is not only pursuing the high scores, it is also mastering the intrinsic value of knowledge and understanding why you study. For instance, how are the beautiful graphics made by the computer programming? Why can the computer calculate a great number of data so fast and accurate and how can people in different districts or countries communicate with each other on the internet? The students owning the real research-spirits are high on exploring the computer world and they disdain plagiarist strongly and consider it as a disgraceful behavior; moreover, the behavior of plagiarism also seriously goes against their beliefs.

2) Pride of the work. When the students make great effort to accomplish an assignment or a hard exam, they always appreciate their own work and happily taste the joy of success. They believe what they experienced will be very meaningful for their further careers.

3) Can get the good scores without plagiarism. A lot of students think that “No pains, no gains”. Hence, they prefer to trust themselves rather than plagiarize others’ work.

4) Against moral value. Some students think plagiarism is a moral problem. You will lose your reputation and credibility if you are caught, and it’s also unfair and irresponsible for other students.

5) Penalties if caught are high. A main reason for those students who dare not plagiarize is the rigorous punishment. They will have to face a serious warning, even a kick-out of school to a certain extent, if they are caught during the plagiarism. Therefore, we can conclude the severe penalties have a great effect
on restricting the plagiarisms.

6.5 How to distinguish plagiarisms? Is it easy or hard?
For this discussion, different students give different answers. Half of the investigated students [16] think it is difficult to distinguish plagiarisms from originals, since the copy technology is so advanced that few people or organizations would like to spend much time and energy to distinguish between real and fake. Hence, distinguishing plagiarism will become a long-term and arduous task. However, some other students consider it very easy thing to catch the plagiarisms, owing to the extensive applications of modern tools and methods, and the plagiarisms have essential differences comparing with originals.

6.6 The measures to reduce plagiarisms
The most important measure is the instruction. Make students be exactly aware of what constitutes plagiarism and understand the conception of plagiarism definitely. Tell students how to consult other people’s work without stealing it, teach students how to search relevant materials, think about and solve the problems by themselves, what the result of the plagiarism will be, and help those students to find the real reasons why they plagiarize. Furthermore, the university has to set up a very hard line. No one can be allowed to pass a class using stolen work and students who have plagiarized twice must face expulsion from the studies. The suggested measures are:

1) Add more individual homework and assign paper topics/types that have not ready-made answers on the internet. If there's nothing, or not much on a topic, students will have to do by their own thinking or researching. It will stretch students’ imagination. Don't assign the same topics semester after semester and increase some face-to-face tests, exams and open-ended questions. Don’t jump in with “the only answer”. Finally, take severe the punishments.

2) Some students think that the students should be endowed with more time to study
and reduce their pressure so that they can proficiently master knowledge and skills to achieve all the assignments. Only controls and punishments can’t solve the problem essentially.

6.7 Eliminate plagiarisms, easy or hard?
Firstly, fewer students think it’s easy to remove plagiarisms gradually, unless all organizations take some effective measurements and every student can always continue the struggles against the plagiarisms consciously. But 95% of investigated students [16] consider that it’s very difficult to eliminate plagiarisms completely. The reason seems to be very obvious: if it’s easy to eliminate plagiarisms completely, then why we still discuss them in this paper. In this high-speed rhythm society, there are many information sources generated day by day. Although they have stolen other’s outcomes from the internet successfully, it’s so hard to be tracked and captured, hence it provides people with much more convenient chances to copy others’ work, spending less time and gaining satisfied results. Secondly, people’s brains are very complex, which make different people have different opinions, and these thoughts completely depend on their individual personalities, moralities, purposes, experiences, cultures and surroundings, etc. Driven by these complicated factors, people start to attempt plagiarisms. Consequently, it is a tough and time-consuming process to educate people to eliminate plagiarisms completely.

6.8 The attitudes to plagiarisms
Most investigated students think that the punishment is necessary; otherwise, it’s absolutely unfair to those who devote plenty of time and energy to work into their degrees and works. [16] Moreover, the punishment is also a good approach to limit, reduce and eliminate plagiarism finally. But whether to take severe punishments or not, it should lie on the motivations and the results of plagiarism. When you forbid something strictly, it definitely reflects some social problems, and hence you should
punish them gradually. The 70% of students [16], who are investigated think that for
the first time, a warning is more suitable and efficient as compared to a severe
punishment for those students with the main purposes of gaining the high scores or
enough credits, a second chance for students to correct mistake is very important.
However, for the second time, it’s out of question, taking a severe punishment is
inevitable. Of course, several students support that it’s obligatory to severely punish
those people who plagiarized others. They believe that only severe punishments can
take a frightening effect and completely eliminate the plagiarisms. The reputation of a
university depends on the public people’s impression to academic level and qualities
of students. Those students, who plagiarize, without doubt, will devalue the degrees
and produce bad influences to university. Thus, those plagiarists should be expelled
from the university. In addition, under the circumstances of understanding the serious
results of plagiarisms, for those professors who still continue to plagiarize others’
fruits of wisdom, public condemnation and severe enough punishment are strongly
suggested. They should take more responsibilities for their inglorious behaviors,
comparing with those young students.

6.9 The example: Plagiarism or not?
The below paragraph is the description about a case, which is a title of research
named “What kinds of solutions can we find for the problem of plagiarism?” by Jude
Carroll [12]: the teacher assigns students a homework and emphasizes her requests,
please judge whether those items are considered ‘plagiarisms’ or not, according to
your analysis so that discover the boundary between ‘plagiarism’ and
‘non-plagiarism’. Please explain your judgments.

“Where to draw the line”
The teacher says: ‘Choose Company A, Company B or Company C. You must
investigate the advertising campaign that company used in the past two years. Write a
report to evaluate the campaign’s impact and to make recommendations for future campaigns in that company.

Do your own work! Hand in an individual report.

Suppose three students do what are listed below and they do it in this order. You decide: Does the work each student hands in meet the requirement to ‘do your own work and hand in an individual report’? If not, when does the student cross the line between sharing and co-operating and start making something that does not match this requirement? That means where to draw the line for you to distinguish ‘Plagiarism’ or ‘Non-plagiarism’

1. The three students discuss the task with other students.
2. They look at the past examples of similar student reports. They discuss together what is good and bad about the order students’ work.
3. Each one chooses Company B then discovers the other two have done the same. They decide to share ideas.
4. They decide to all do a bit of research on advertising campaigns in general. They all look for information but agree to really go into depth on one aspect. (One researches how to measure impact, another looks at design, another looks especially at cost etc). Everyone makes notes.
5. They report orally to each other on advertising campaigns in general and their special subject. They tell each other about useful sources of information they used to find the special information and which general sources were especially good.
6. They exchange research notes on what they have found so far, including sources.
7. The one person who is really good at information retrieval collects information on company B’s advertising campaign(s). He shares what he finds.
8. One organizes the report structure, makes headings and gives others a copy.
9. They share out the writing of each section. Each writes two sections. Everyone
contributes to the ‘conclusion’ section.

10. They combine the sections. Each student takes the draft away and writes an individual version of the final report. No person changes more than 5% of the other students’ work.

11. Each student submits his final report and signs a statement that this is ‘an individual report and my own work’.

Few investigated students think that each item from one to eleven is a plagiarism [16], since the teacher said: “Do your own work! Hand in an individual report”. It means that everyone should collect relevant information, analyze data and complete individually, without any help from others, any discussions and communications are prohibited strictly, and anything involved to cooperation will be regarded as a plagiarism. The example above shows that what the three students did is cooperation actually; one student should not work on one aspect, but work on the whole thing. It violates the individual rule, although they all choose the same company B as their research.

However, this kind of extreme point can’t be accepted by most students. The attitudes of most investigated students are that the boundary between ‘Plagiarism’ and ‘Non-Plagiarism’ is really difficult to define. [16] A proper discussion or communication is allowed, and not considered as a plagiarism. Of course, this cooperation should happen before writing their individual report. The students can collect some relevant information and data together, although they have the same topic, because the information is free and the team-work is always encouraged. Every student as a part of a group can learn much more knowledge, they can also share some general information, sources, even some basic thoughts, but it is not permitted to copy someone else’s analysis, contents and results directly, they must do their own analysis about the special data and draw conclusions by themselves. Therefore, the simple cooperation, such as collections for some raw data, is admitted by most investigated students.
But a main disagreement among the students happens around ‘item 7’. Where to draw the line to distinguish ‘Plagiarism’ or ‘Non-Plagiarism’ should it be, is it before ‘item 7’ or after ‘item 7’?

Some students, who are investigated think that the ‘item 7’ should not be considered to be a plagiarism, since the information is free and it’s always granted for students to collect information together, although someone contributed more materials than the others. As long as each member of group can propose their own opinions, this behavior is not regarded as a plagiarism. According to the definition of plagiarism, it is the "use or close imitation of the language and thoughts of another author and the representation of them as one's own original work, without any consent", and the one person who is really good at information retrieval willingly collects information on company B’s advertising campaign and shares what he finds, hence, this instance can’t be judged a plagiarism.

On the opposite, some other investigated students insist on the ‘item 7’ is a plagiarism behavior. In their opinions, studying as a group is fine, and should even be encouraged. Up to item 6, this was just a well organized study group, working together to learn the material needed for the course. But they crossed the line when they started to share work on this particular assignment-‘item 7’. Sharing information gathered on background materials is fine, but sharing information gathered on the specific topic (company B advertising campaign) is obviously not allowed according to the assignment rules.[16] Thus, ‘item 7’ should be concluded a plagiarism absolutely.

As my point of view, I would like to support the latter comparatively. Original data collections, preparations and discussions together are permitted, however, for those particular aspects on assignments; we’d better select and analyze the data separately to elicit our own conclusions and recommendations. Therefore, I suggest the line between Plagiarism and Non-Plagiarism should be drawn before the ‘item 7’.
Chapter 7

The analysis of survey and conclusions

We have discussed the similarities and differences between Chinese and Swedish students in computer science from several representative aspects, such as classroom climate, collaborative learning, relations on faculty-student and student-student, especially the most important and sensitive topic - plagiarism. Through these comparisons between Chinese and Swedish computer science students, it illustrates that their own advantages and disadvantages evidently. The Chinese students have the well-knit basic skill, but lack the creativity, and the enthusiasm for study is weak. On the other hand, Chinese students usually feel tremendous stress in their studies, have very strong over-reliance and lack particular opinions. For Swedish students, they hold very strong creativity and abilities of analyzing problems on their own, but their behaviors are optional compared to Chinese students and lack discipline. But most students, irrespective if they are coming from China or Sweden, have a steady faith of aspiring after knowledge and decision of overcoming all the trouble, although there are some distinct differences in certain aspects. There are several main reasons resulting in the diversities between Chinese and Swedish students.

At first, in Swedish students’ eyes, western cultures place more value on independence and individuality than do Eastern cultures, resulting in an attention bias toward individual objects, with less regard for context and relationships among items. [14]. Therefore, the Swedish students like the individual assignments more; they are used to solve the problem by themselves. In contrast, East Asian cultures emphasize interdependent relationships and monitoring of context, resulting in an attention bias toward contextual, relational processing of information. Hence, they prefer to achieve a task together as a team or a group rather than complete individually.

Secondly, "Asians" and "Westerners" have fundamentally different thought processes. It means that Swedish students think the world can be defined and measured in terms of objects and logic, while Chinese students think in terms of
substances and relationships. [15] Hence, it’s inevitable to produce thought diversity with consideration of two completely different values.

Thirdly, the different educational systems also cause some significant diversity. Comparing with the Swedish universities, the Chinese universities look like some governments, enterprises or small societies, not schools, under the control of administration of government, influence of market economy and all kinds of social phenomenon. “The governments” shows that the hierarchical phenomenon is serious in Chinese universities. Different universities are divided according to administration level and even the academic titles of teachers are also corresponding with administration level. The universities operate with administration mode, the status of science is low and the professors can’t exert important functions. “As an enterprise”, it mainly presents that Chinese teachers’ incomes not only include the basic salary from government, but also have bonus from departments and their own extra gains. Therefore, from every university to every department, even to every teacher, they always attempt every means to obtain more money. “Like small societies” means that everything can be found in Chinese universities and the presidents of the universities usually supervise a lot of affair personally and carefully. However, the western educational systems are completely different. The western universities are also facing the impact of market economy, the penetrations of governmental power and influences of other social factors, but the western universities are not evaluated according to administration level. The teachers, especially professors, play very important roles in the universities’ developments. Of course, the western universities have also the pressure of profits, but the pressure aims at the universities, the presidents of universities mainly pay their attentions to try for academic developments and to enhance teaching quality. Hence, the diversity of different educational systems also strongly influences their students’ attitudes and thoughts.

Finally, the social backgrounds are also a necessary reason leading to the differences. As we known, the western countries have higher standard of living, and almost all the universities are free. Hence, the students’ pressures are correspondingly
lower than Chinese students. In contrast, although China has the largest population in the world, the fee for Chinese universities is rather high, especially those excellent universities, and a lot of students from the poor families have to give up their studies due to lack of money. Therefore, some students are forced to take some extreme measures to achieve their final goals. This is a very cruel fact, and has become the most crucial reason, resulting in the diversity between Swedish and Chinese students.

Therefore, we should overcome our weaknesses by acquiring their strong points, promote the communications between two kinds of cultures, and enhance the global economic development, enrich the standard of living and reduce the social pressures. These constructive suggestions are meaningful for our educational system innovations.
Appendix A: Tables

Table 1: correctness of assignments

<table>
<thead>
<tr>
<th></th>
<th>100% correctness</th>
<th>80% correctness</th>
<th>60% correctness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swedish students (N=15)</td>
<td>N=12</td>
<td>N=3</td>
<td>N=0</td>
</tr>
<tr>
<td>Chinese students (N=30)</td>
<td>N=10</td>
<td>N=17</td>
<td>N=3</td>
</tr>
</tbody>
</table>

Notes: The questionnaires for 45 computer science students coming from Sweden and China on correctness of assignments are as follows:

100% correctness=the results they calculated are completely equal to the expected value

80% correctness=the results they calculated are basically equal to the expected value, but with few slight errors.

60% correctness=the results they calculated have some differences from the expected value, but still satisfy the requirements of assignments.

Table 2:

<table>
<thead>
<tr>
<th></th>
<th>Passers</th>
<th>Ordinaries</th>
<th>Iterations</th>
<th>Ambitious</th>
<th>Talented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swedish students (N=15)</td>
<td>N=0</td>
<td>N=3</td>
<td>N=1</td>
<td>N=8</td>
<td>N=3</td>
</tr>
<tr>
<td>Chinese students (N=30)</td>
<td>N=3</td>
<td>N=15</td>
<td>N=7</td>
<td>N=2</td>
<td>N=3</td>
</tr>
<tr>
<td>Total (N=45)</td>
<td>N=3</td>
<td>N=18</td>
<td>N=8</td>
<td>N=10</td>
<td>N=6</td>
</tr>
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</tbody>
</table>

Notes: This table presents the attitudes of 45 students come from Sweden and China, towards results of assignments and exams.

**Passers:** the students who don’t spend much time and energy in the courses and don’t want to reiterate many times to improve their grades. Instead, their goals are to complete all the courses within minimum effort.

**Ordinaries:** their demands for grades of assignments and exams are slightly higher than Passers’, although they don’t aim at the best grades. They are satisfied with a reasonable grade, without too much effort.

**Iterations:** they are loyal fans of automatic assessment systems. They use the resubmission continually to obtain excellent grades, although sometimes the results are not what they expected. Hence, it can be considered to be a waste of resources occasionally.

**Ambitious:** they aim at excellent grades of assignments and exams and could achieve their goals with considerably fewer resubmissions than Iterations. But compared with Ordinaries, they use more resubmission to obtain better results.

**Talented:** “Look before you leap” often runs through their thoughts. They clearly know what they are doing, thus, they always yield double results with only a half of effort, using the least iteration to achieve the best results.
Appendix B: Graphs

Graph 1: Example: Interest in CS declining in US, female interest declining at faster rate. [9]

This graph shows that the changes and trends for female students, who are interested in computer science from 2001 to 2005.

Graph 2:

2006 Average SAT Math Scores by Intended Major
(All U.S. Test Takers)
References:


[9] Lecia J. barker Draft Site Visit Talk by Lecia (ppt) NCWIT Extension Services-Sample Student Experience of the Major Survey Results.


