

Awareness, attitude and perception  
of plagiarism among students and  
teachers at Stockholm University

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AWARENESS, ATTITUDE AND PERCEPTION OF PLAGIARISM AMONG STUDENTS  
AND TEACHERS AT STOCKHOLM UNIVERSITY

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<sup>1</sup> This thesis corresponds to 20 weeks of full-time work for each of the authors.



## Abstract

The department of Computer and Systems Sciences (DSV) at Stockholm University has experienced an increasing in the amount of international students that enrolled in the programs as well as an increasing in the worry about the issue of plagiarism in campus and online courses.

The main purpose of this thesis was to investigate if the awareness, attitudes and perception of plagiarism among students and teachers were equivalent in writing and programming assignments as well as how online and classroom teaching impacted in the issue of plagiarism.

The research consisted of paper and online surveys as well as semi-structured interviews. In total, there were 71 participants (47 students and 24 teachers) in the first phase of the research, text plagiarism and 101 participants (97 students and 4 teachers) in the second phase of the research, code plagiarism.

The main results obtained show that the issue of plagiarism was not entirely clear both for students and teachers. Students and teachers from both groups (code and text plagiarism) had the same opinion in many topics such as the one regarding having clear information about what is allowed and not allowed, but in some other topics their opinion diverged greatly, for instance combining pieces of code taken from a book or internet was totally acceptable in programming while the same did not apply in writing assignments. These results were taken into account to consider the possibility that even though plagiarism was a common issue, there were some differences on what is allowed and not allowed in terms of code and text plagiarism.

The thesis ends with a discussion about the results obtained from the research, presents some recommendations to how to deal with plagiarism and provides the reader with some future work suggestions.

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## Table of contents

1. Introduction.....	1
1.1 Problem.....	2
1.2 Goal.....	3
1.3 Purpose.....	3
1.4 Method.....	3
1.5 Limitations.....	4
2. Extended background.....	5
2.1 Plagiarism.....	5
2.2 Text plagiarism.....	8
2.3 Code plagiarism.....	9
2.4 Educational systems.....	10
2.4.1 Online teaching.....	11
2.4.2 Classroom teaching.....	11
2.5 Learning models.....	12
2.5.1 Imitation.....	12
2.5.2 Collaboration.....	12
3. Case Study.....	14
4. Results.....	22
4.1 Awareness of plagiarism.....	23
4.1.1 Campus code plagiarism x Online code plagiarism.....	23
4.1.2 Code plagiarism x Text plagiarism.....	27
4.2 Attitude towards plagiarism.....	32
4.2.1 Campus code plagiarism x Online code plagiarism.....	33
4.2.2 Code plagiarism x Text plagiarism.....	40
4.3 Perception of plagiarism.....	43
4.3.1 Campus code plagiarism x Online code plagiarism.....	43
4.3.2 Code plagiarism x Text plagiarism.....	46
5. Analysis.....	50
6. Conclusion.....	55
6.1 Suggestion for future work.....	57
7. References.....	58

<i>Appendix 1 – Table result for how to increase knowledge about plagiarism and awareness of plagiarism (programming students) .....</i>	<i>64</i>
<i>Appendix 2 – Table result for how to increase knowledge about plagiarism and awareness of plagiarism (code and text plagiarism - students) .....</i>	<i>65</i>
<i>Appendix 3 – Table result for most effective ways to prevent plagiarism (programming course students) .....</i>	<i>66</i>
<i>Appendix 4 – Table result for most common reasons for someone to plagiarize (programming course students) .....</i>	<i>67</i>
<i>Appendix 5 – Table result for most effective ways to prevent plagiarism (code and text plagiarism - students) .....</i>	<i>68</i>
<i>Appendix 6 – Table result for most common reasons for someone to plagiarize (code and text plagiarism - students) .....</i>	<i>69</i>
<i>Appendix 7 - Text plagiarism survey (students) .....</i>	<i>70</i>
<i>Appendix 8 – Text plagiarism survey (teachers) .....</i>	<i>75</i>
<i>Appendix 9 – Code plagiarism survey (students) .....</i>	<i>82</i>
<i>Appendix 10 – Code plagiarism survey (teachers).....</i>	<i>87</i>
<i>Appendix 11 – Data comparison code plagiarism (students).....</i>	<i>93</i>
<i>Appendix 12 – Data comparison code and text plagiarism (students).....</i>	<i>101</i>

## Table of figures

<i>Figure 1 – Collaboration to copying continuum (Culwin &amp; Lancaster, 2001).....</i>	<i>6</i>
<i>Figure 2 – Plagiarism transformations (Jones, 2001).....</i>	<i>10</i>
<i>Figure 3 – Internet programming I course website (Wijkman, 2010).....</i>	<i>16</i>
<i>Figure 4 – Distribution per no. of students who might have plagiarized.....</i>	<i>23</i>
<i>Figure 5 - Distribution of no. of times discussed a possible alleged plagiarism (up) and to whom was discussed (bottom).....</i>	<i>24</i>
<i>Figure 6 - Distribution of answers for an existence of policy for dealing with plagiarism (up) and for if ever plagiarized (bottom).....</i>	<i>25</i>
<i>Figure 7 – Distribution per no. of students who might have plagiarized.....</i>	<i>27</i>
<i>Figure 8 - Distribution of no. of times discussed a possible alleged plagiarism (up) and to whom was discussed (bottom).....</i>	<i>28</i>
<i>Figure 9 - Distribution of answers for an existence of policy for dealing with plagiarism (up) and for if ever plagiarized (bottom).....</i>	<i>29</i>
<i>Figure 10 – Categorization of issues into plagiarism, cheating, not plagiarism or cheating, or uncertain</i>	<i>39</i>
<i>Figure 11 – Categorization of issues into plagiarism, cheating, not plagiarism or cheating, or uncertain</i>	<i>42</i>



## Table of tables

<i>Table 1 – Courses perspective (Wang, 2011)</i> .....	21
<i>Table 2 – Student respondents’ perspective (Wang, 2011)</i> .....	21
<i>Table 3 – Teacher respondents’ perspective (Wang, 2011)</i> .....	21
<i>Table 4 – Most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department</i> .....	26
<i>Table 5 – Top three most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department</i> .....	26
<i>Table 6 – Most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department</i> .....	30
<i>Table 7 – Top three most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department</i> .....	31
<i>Table 8 – Most voted options about the most effective ways to prevent plagiarism</i> .....	43
<i>Table 9 – Top three most voted options about the most effective ways to prevent plagiarism</i> .....	43
<i>Table 10 – Most voted options about the most common reasons for someone to plagiarize</i> .....	45
<i>Table 11 – Top three most voted options about the most common reasons for someone to plagiarize</i> .....	45
<i>Table 12 – Most voted options about the most effective ways to prevent plagiarism</i> .....	46
<i>Table 13 – Top three most voted options about the most effective ways to prevent plagiarism</i> .....	47
<i>Table 14 – Most voted options about the most common reasons for someone to plagiarize</i> .....	48
<i>Table 15 – Top three most voted options about the most common reasons for someone to plagiarize</i> .....	48

# 1. Introduction

With the globalization a need for being in touch with other cultures has increased. This situation boosted and facilitated people to go abroad and have international experiences. Universities started to have more and more exchange students and therefore education started to be adjusted to fit into the international scenario.

Technology has improved and grown so quickly that information became easily accessible by everyone from everywhere through the internet which makes the issue of plagiarism even more challenging to the academic corpus (e.g. teachers, lectures, tutors etc.) in the digital era.

Plagiarism is to make use of someone else's ideas, work, information etc. without giving proper attribution to the author. This issue is known for many years and it has always been a challenge for the teachers at universities and all schools.

Before the internet era, plagiarizing something was tiresome because students would most likely copy text by hand from a book, an encyclopedia, newspaper etc. With the development of internet this hard work is now simplified and replaced by two simple commands "ctrl+C" and "ctrl+V", the famous "copy and paste". On one hand, the internet has provided easy access to a huge amount of information and therefore facilitating the whole "copy and paste" tendency. On the other hand, it has also contributed for the creation of software tools for detecting plagiarism.

Educational systems are also changing with the internet. Before the development of the internet, the educational system was based on the traditional approach consisting of teachers and students physically in a classroom, radio, correspondence base. Nowadays, this reality has slightly changed and many universities provide online courses as well as distance courses.

With all the noticeable changes in the educational system to adapt to the digital era, an interesting question to consider is how the courses (online or campus) are designed, how they deal with potential plagiarism, how the students and teachers perceive this issue and is there any correlation

between the learning models for how to write an assignment and how to program with respect to the issue of plagiarism.

A research project about code plagiarism in online and campus course as well as text plagiarism was conducted by the department of Computer and Systems Science (DSV) and this thesis investigates if the awareness, attitudes towards and perception of plagiarism among students and teachers are equivalent in writing and programming as well as how the behavior of online and classroom teaching impact in the issue of plagiarism.

This thesis is organized in the following way: section 1 describes the research problem, the goal and purpose of this work and also the method used, section 2 overviews what is plagiarism (including code and text), the online and traditional approaches of educational systems and learning models, section 3 presents the results of the research conducted at the DSV, section 4 discusses the results presented in the previous section, the last section summarizes the conclusions of the work and also gives some suggestion for future work.

## **1.1 Problem**

The diversity of students in universities, not only in Swedish Universities, has increased and so the amount of material available on the internet. Thus, the challenge of teaching and approach the issue of plagiarism became even higher to the academics (Flint, Macdonald & Clegg, 2006).

The DSV department has experienced an increasing in the amount of international students that enroll in the master courses as well as an increasing in the worry about the issue of plagiarism not only in the campus courses offered but also in the online courses which nowadays a total of 24 courses are available.

The way the courses (online and campus) are designed certainly has an impact on how plagiarism is perceived by students and teachers in the department. Moreover, what the differences and similarities between text and code plagiarism are.

## **1.2 Goal**

The goal of this thesis is to provide to Stockholm University a better understanding on teachers and students' awareness of plagiarism, attitudes towards plagiarism and perception of plagiarism in the context of writing and programming assignments. As well as to identify how the campus and online courses structure (type of assignments, type of examinations, information about plagiarism given to students etc.) to some extent impacts in the issue of plagiarism both in writing and programming assignments.

## **1.3 Purpose**

The purpose of this thesis is to investigate if the awareness, attitudes towards and perception of plagiarism among students and teachers are equivalent in writing and programming assignments as well as how online and classroom teaching impact in the issue of plagiarism. In this way, Stockholm University can be provided with a better understanding of how plagiarism is perceived by students and teachers in the context of writing and programming assignments which will facilitate to pinpoint what in the teaching model can be improved.

## **1.4 Method**

A set of data was collected through conduction of surveys (paper-based and online) among students and teachers at the DSV department as well as interviews with the teachers and an analysis about the results was made with support of existent literature. This research made usage of both qualitative and quantitative methods.

The surveys were based on a Swedish survey created by Uppsala University in 2005. It had two goals: one covering text plagiarism and the other covering code plagiarism.

The survey about text plagiarism was conducted online and had a total of 47 students (from Master programs) and 24 teachers as participants. And for the code plagiarism, a paper-based survey was applied to campus course students, an online survey was applied to online course students and a structured interview was done with the teachers from both campus and online

courses. A total of 69 campus course students (from Bachelor programs), 28 online course students (mostly from Bachelor programs) and 4 teachers participated in the research.

## **1.5 Limitations**

Unfortunately, the response rate in the online surveys was not so high compared to the amount of students in the DSV department and therefore the data collected could just be considered as an indication.

## 2. Extended background

### 2.1 Plagiarism

The act of using someone else's work, idea, etc. - without giving the author the deserved credit for it - for one's own benefits is known as plagiarism.

Plagiarism is defined in many different ways by authors involved in the academia area. Many definitions can be found, but below a few examples are presented:

- "Unacknowledged copying of documents or programs" (Joy & Luck, 1999 pp. 129-133)
- "The presentation of another person's ideas or material as if it were one's own" (Culwin & Lancaster, 2000)
- "The sub-mission of part or all of another person's work as if it were ones own, without the knowledge of the author, and with intention to deceive" (Irving, 2004)

Plagiarism is one of many types of academic misconduct. Other examples are:

- Collusion – when students work collaboratively and submit similar versions of the assignment that supposed to be produced individually
- Cheating – behave dishonestly by for example, bringing material not allowed to an exam

Overall, plagiarism can be categorized into four types:

- a) "Complete Plagiarism" – complete copy from one or more sources
- b) "Copy and paste" – use information from digital sources
- c) "Word Switch" – copy a part of text and do slight changes
- d) "Self-plagiarism" – reuse of your previous work and submit it in a new assignment (Vij, Soni & Makhdumi, 2009)

Collaboration in an educational environment is supposed to be a fruitful phase during the learning process. Discussion of ideas is important, sometimes the student will have a better insight of the assignment when he/she externalizes and share his/her thoughts with someone else. Therefore, collaboration is usually encouraged. However, the challenge is how to make sure that

collaboration does not lead to plagiarism. Culwin & Lancaster (2001) has suggested a diagram that presents the continuum from collaboration to copying (Figure 1)

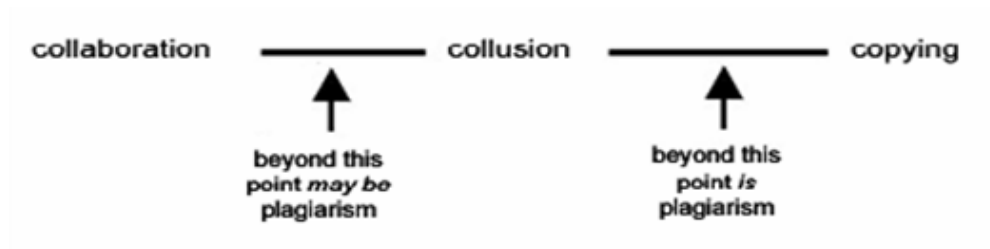


Figure 1 – Collaboration to copying continuum (Culwin & Lancaster, 2001)

In theory the definition of plagiarism seems to be straightforward, but in practice it is not.

Plagiarism itself can be related to factors such as culture of writing/programming, student situation (personal aspects such as having a scholarship), type of examinations, type of assignments (course structure), information about plagiarism provided to students and detection tools.

There are several studies in the area of plagiarism that point out the reasons for someone to plagiarize, for instance:

- Lack of time
- Lack of skills
- Lack of interest
- Achievement of higher grades (Sheard, Carbone & Dick, 2002)
- Poor assignment design
- Less contact with the teacher due to large class size
- Lack of knowledge about what is acceptable due to cultural differences (Relph & Randle, 2006)

According to Carroll (2004) “Students will be less able to plagiarise if teachers change the assessment task and change what they ask students to submit for assessment each time the course runs.” If students plagiarize, the guilty can not be put exclusively on them. Carroll (2004) also mentions that when the course is perceived as uninteresting by the students, there is a higher chance that they will eventually cheat.

Students should be taught and trained about what is accept and what is not properly as well as what the consequences are in case of misconduct. If they think that there is a small chance to be caught or that the punishment is soft, for sure they will find a way to cheat (Grijalva, Kerkvliet & Nowell, 2006).

The development of the internet for the past decades made possible the spread of information (any information) worldwide. Thus, almost everything is possible to be found in the internet, from articles and papers presented/published in prestigious conferences, journals to websites with texts written by anonymous persons.

The truth is that the internet is today the most common ally of students when it comes to research vehicle for their assignments. On one hand, it is fascinating that technology developed itself in such a way that gives everyone the chance to access the largest collection of data in the world, but on the other hand, the usage of it is not always done in the proper way by the end-users, in this way facilitating the occurrence of plagiarism. It has always happened, but the difference is that nowadays the process for committing plagiarism is easier than it used to be due to the easy access to electronic data. Students do not seem to be concerned to produce their assignments by using “copy and paste” from the internet, maybe because they think that everything on the internet can be commonly used which it is to some extent acceptable with a little remark that all the information on the internet was thought, created and written by someone who spent time doing it and therefore needs to be recognized for that or because they do not find references to the text source.

When it comes to detection tools, there are several ones currently available in the market both for text and code plagiarism. Turnitin<sup>2</sup> is a very popular tool used world-wide for detection of text plagiarism. As for code detection JPlag<sup>3</sup> and MOSS<sup>4</sup> are the most commonly used ones. There are several others detection software, but it will not be discussed further since it is not the scope of this thesis. Nevertheless, what all the detection tools have in common is that they search for

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<sup>2</sup> Turnitin - <http://turnitin.com/static/index.php>

<sup>3</sup> JPlag - <https://www.ipd.uni-karlsruhe.de/jplag/>

<sup>4</sup> MOSS - <http://theory.stanford.edu/~aiken/moss/>



similarities against the files submitted for the detection as well as external sources (on the web or in the software tools' internal database).

There are several websites offering the production of assignments based on specifications. In such cases, software detection may fail to catch plagiarism since the assignments are custom produced (D' Souza, Hamilton & Harris, 2007). The use of detection tools helps teachers to catch more easily the guilty students, becoming very handy especially when the size of the classes is big (Hamblem & Parker, 1989 pp. 94-99).

However, such tools should not be playing the main role but rather a complementary aid to the educators. The education taught at the department should be the one assessed because maybe the issue is not only about plagiarism but that students are being evaluated on certain skills that they did not receive any teaching on (Levin, 2006). The problem with those tools is that it does not prevent plagiarism but catches it after it has occurred (Beute, Van Aswegen & Winberg, 2008 pp. 201-205).

As presented by Eisner & Vicinus (2008) the temptation to use detection tools by teachers is to some extent similar to the temptation to buy assignments on paper mills/rent a code websites. This action can be associated to panic which may make students to buy ready assignments solutions when they feel confused and teachers may turn to detection tools when they have given repeated assignments from previous years or when they do not participate in the writing/programming process with the student.

## **2.2 Text plagiarism**

To write a text is more than put words together. It involves understanding of the type/genre of text to be written as well as the grammar of the language used. To learn how to write effectively, it requires practice in order to develop an understanding of all writing aspects such as grammar, spelling, punctuation, syntax and structure. Having a basic understanding of the language (in which the text should be written) in terms of differences between writing and speech is important for both teachers and students (Knapp & Watkins, 2005). In order for someone to be able to

produce a text, lot of reading is needed so one has inspiration and support for expressing his/her ideas and arguments.

Learn how to express ideas through words is in itself a challenge, and do this in a foreign language is even more difficult due to many reasons, for instance, limitation of the language vocabulary and grammar differences if compared to one's mother tongue. According to Carroll (2007), "Many international students 'borrow' the words of native authors through lack of confidence in their own abilities to write correct, clear English".

A research on this area of English as second language pointed out that a group of Chinese students borrowed more words when producing a text than the group of native English speaking students. And that the latter group made usage of references more than the group of Chinese students (Ling, 2004 pp. 171-200).

Text plagiarism is associated with social, cultural and personal aspects. For instance, to understand why plagiarism happens, it is necessary to collect some information such as where does the student come from, what kind of education does s/he have and what is his/her level of proficiency in English.

## **2.3 Code plagiarism**

According to Lancaster & Tetlow (2005) "Programming is a skill often compared to riding a bicycle; it is not something that can be picked up by merely reading about it, instead it requires practice." A very typical way of learning how to programming is to "imitate", for instance, how to use condition statements such as if, while, switch loops, it is natural to just copy an existent example in order to absorb and understand the logic of it. The challenge is when to perceive the crossing point from imitation to plagiarism.

Programming plagiarism can be defined as the act of reusing program structure and language syntax from someone else which can be another student or resources - internet, book etc. (Burrows, Tahaghoghi & Zobel, 2004). There are a few scientific investigations that present a set

of levels that can possibly be used by students when committing plagiarism. These levels vary from lexical changes (i.e. comments, identifiers, indentation, reordering etc.) to structural/logical changes (Lancaster & Tetlow, 2005). An example can be seen in figure 2 (Jones, 2001):

1. Verbatim copying.
2. Changing comments.
3. Changing white space and formatting.
4. Renaming identifiers.
5. Reordering code blocks.
6. Reordering statements within code blocks.
7. Changing the order of operands/operators in expressions.
8. Changing data types.
9. Adding redundant statements or variables.
10. Replacing control structures with equivalent structures

Figure 2 – Plagiarism transformations (Jones, 2001)

Considering the transformation levels suggested by Jones (2001), an assumption to make is that transformations on the level 1 to 6 would be more commonly done by beginner's programmers, perhaps first-year students since transformations on the level 7 to 10 would require more programming knowledge. It can be assumed then that alterations done by beginners would be easier to detect due to less complexity (Verco & Wise, 1996).

With programming assignments, oral examination about the program created as well as request of real-time modifications or remove errors purposefully added to the program would be a good approach for assessment (Hamblem & Parker, 1989 pp. 94-99, Jones, 2001).

The attribution to someone else's idea in writing should be the same in programming which in this case can be easily done with line of comments in the code.

## 2.4 Educational systems

In the past, one of the typical fashions of educational system was the traditional one where students and teachers happened to be located in a real classroom. The fast development of technology has changed the way of teaching, bringing it to a new level: online learning.

An issue when it comes to online and traditional classes is the size of the class (i.e. how many students enrolled in the course) as well as the amount of teachers/assistants involved in the assessment. This lessens the chances of detecting plagiarism if it occurs (Boywer & Hall, 1999).

No matter if the classes are taught in the traditional way – in a physical classroom with a teacher – or in the online way, the issue of plagiarism still exists. At a first glance, the issue of plagiarism sounds more vulnerable to occur in online classes than traditional ones. But it turns out that the world wide web plays bigger role in online classes than in traditional ones due to the easy accessibility to detection and deterrence of plagiarism (Heberling, 2002).

An interesting question would be to understand how online and campus courses are designed and at the same time how the issue of plagiarism is approached by teachers.

#### **2.4.1 Online teaching**

The internet has not only contributed to the change in the way research is done but also in the way that education itself is given. More and more we see that the education is moving towards the digital world and one example of that is the online courses. The classes in such courses are in a sense more flexible than the classroom ones, especially when it comes to time since the student can follow the lectures whenever suits their schedule best. All that is needed for a student participating in online courses is a computer with internet connection.

What characterizes the online educational systems is that the teaching and all interaction among students and teachers happen online. All the communication, lectures, delivery of assignments etc. are done electronically.

#### **2.4.2 Classroom teaching**

The classroom teaching has two remarkable moments: one before the development of internet and one after. That is because before the internet era, all the assignments, tests, class material were paper-based (i.e. books, compendiums) and nowadays with the digital era, the delivery of data is done electronically.

A good practice that will definitely minimize the possibility of students to plagiarize is to create some steps for the assessments. For example, with written assignments, the production process could be divided into several drafts, in this way the teacher could assist more closely the student and easily notice if discrepancies in the language exist.

## **2.5 Learning models**

### **2.5.1 Imitation**

In certain cultures, like the Chinese one, “follow the expert” is a learning method. Quoting without making any type of reference to the original source is according to Eisner & Vicinus (2008) “a way of acknowledging the greatness of the expert’s ideas”.

For Solomon (1996 pp. 279-307), this type of learning model is the first of three defined domains: “everyday” where people learn from experience of their ancestors.

Imitation is part of any learning. This is usually how children learn how to speak, to write. They try to reproduce the info they are following from a model. And the same methodology is applicable by students when learning how to write a scientific text or a program. The imitation method should act as a start up for one to develop the reasoning.

In programming, to learn how to use certain commands/classes one can simply copy a ready code example and from it try out new approaches.

### **2.5.2 Collaboration**

The literally meaning of the word collaboration is two or more persons working together to reach a common goal. This method enriches the learning because possibilities that people share and discuss their ideas with others. Sometimes when one externalizes what are in his/her minds, it contributes for a better reasoning and therefore a clear understanding about the topic of the discussion.

There are different ways to communicate during collaboration, such as face-to-face or mediated by computers. This aspect will not be covered in this thesis. The focus will be on the concept of collaboration itself.

In the educational environment, group work is a common activity. Discussion involving different minds supposedly increases the quality of the work. Moreover, it helps students to understand the diversity in thinking and reasoning of students to find solutions to problems. Collaborative working helps students to develop their own way of thinking (Arvaja *et al.*, 2000 pp. 455-466).

Peer revision in writing process where students revise and give feedback on each other's work is a valuable and effective method to develop the writing. In this way, according to Slavin (1996 pp. 43-69), "if students learn how to evaluate other's writing, they will become better writers themselves".

### 3. Case Study

The research was divided into two parts: text plagiarism and code plagiarism. These two categories were chosen for the study because we wanted to have an idea on how the students and teachers at the DSV department faced the issue of plagiarism and therefore to see what level the DSV department was regarding this issue to even facilitate what improvements could be made and what measures could be taken. Even though the process of writing a text and a program are different, the issue of plagiarism exists in both. Therefore, the main idea with the comparison was to pinpoint the similarities and differences between them and correlated the learning models and the course structure with the issue of plagiarism.

A set of questions regarding text plagiarism was applied to students (from Master programs) and teachers and the same set of questions slightly adjusted fulfill the programming purposes was applied to students (from Bachelor programs) and teachers of programming campus and online courses.

The main idea for choosing to make the comparison between programming campus and online courses and afterwards code and text plagiarism was to investigate if the course structure (type of assignments, type of examinations, information about plagiarism given to students etc.) impacted in the issue of plagiarism.

The collection of data was performed using both online and paper-based surveys. For the first group (text plagiarism), an online survey was conducted where a total of 47 students (from Master programs) and 24 teachers participated in the study. For the second group (code plagiarism), it was divided into online course students and campus course students. Online and paper-based surveys were conducted respectively where a total of 69 campus course students (from Bachelor programs) and 28 online course students (mostly from Bachelor programs) participated in the study. The majority of the participants in code plagiarism survey were from Europe while the majority of the participants in text plagiarism survey were from Asia (see Appendix 12). With the teachers of this group, a paper-based survey was conducted followed by

a recorded interview, having a total number of 4 teachers who participated in the study. To keep the anonymity of the teachers, references to them will be made as Teacher A, B, C and D where Teacher A and D are from programming online courses and B and C from programming campus courses. The reason why it was used structured interviews with teacher was to grasp in more details their thoughts about the issue of plagiarism as well as to clarify doubts that they could have had about the questions in the survey. In this way, it was possible to know and understand better what opinions they had regarding the issue of plagiarism.

The surveys were based on a Swedish survey created by Uppsala University in 2005. In this way, the design itself was kept, however some adjustments were made in order to adapt to the English language and to the context of programming for the survey used for the code plagiarism study.

The invitation for the survey in the first group (text plagiarism) was done via email. Approximately 500 students and 100 teachers were invited to answer the online survey, but considering the fact that some emails have bounced, automatic out of office messages were sent back or people had not answered to it, at the end a total amount of 71 individuals among invited teachers and students participated in the survey.

Based on the previous experience, the research group decided to approach the second group (code plagiarism) with paper-based surveys for campus course students and teachers. With the online course students, for obvious reasons, online survey was applied. A total of 69 students in the campus course and 157 students in the online course were invited to answer the survey. At the end a total of 69 campus course students and 28 online course students participated in the survey.

The programming courses, in which the survey was applied, were Internet programming I-IV (Internetprogrammering) and Algorithms and data structure (Algoritmer och datastrukturer). When the research was conducted, Internet programming and Algorithms and data structure courses were taught during spring 2010 (VT2010) and in Swedish.

The programming online course, Internet programming was given by the Department of Computer and System Sciences (DSV) at Stockholm University and was available both for



mostly Bachelor students. This course's goal was to teach the student about different types of programming for internet application (Internetprogrammering I - IV, 2010).

According to the website of the department (Internetprogrammering I, 2010a, Internetprogrammering I - Course segmentinformation, 2010b), the learning was based on assignments; a certain area was divided into sub-areas and tasks for each of them, reducing in this way the complexity. The structure of the website used for the course was to some extent simple. There was a menu on the left side of the page holding all the content of the course website (Figure 3).

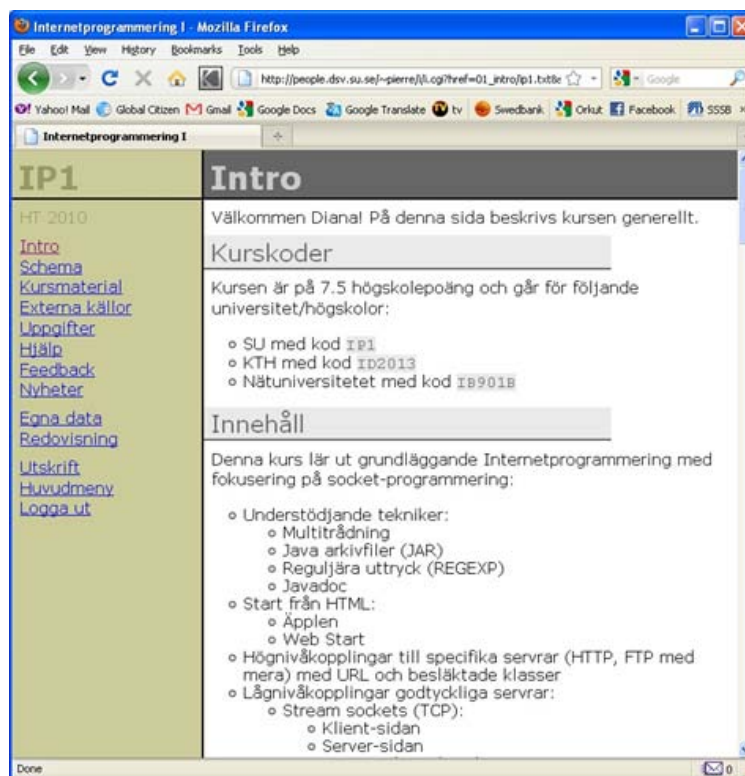


Figure 3 – Internet programming I course website (Wijkman, 2010)

The student should work independently but have continuous and direct support from distance mentoring. The tutoring was done via e-mail and news for two six-week period with availability of 1 to 7 hours.

The assessment in the course was based on tasks and it was divided into three parts:

- Part 1: Introductory fixed assignments
- Part 2: Advanced less fixed assignments

- Part 3: A summarizing free assignment (apprentice test) and possibly extra assignments

All the assignments should be done individually, but the students were allowed to discuss and brainstorm with each other about different solutions on a general level. The course also motivated students by offering a prize for the ones who completed the final assignment (apprentice test) in the five weeks after the course has started.

The “way of learning” how to program was presented in the course website (Wijkman, 2010) as following:

- The student should collect information about the area that the assignment is about. To do that, the student is encouraged to look at books, newspapers and/or tutorials and papers available on the internet
- After all the needed information was collected, the student should have a better understanding of the area in study and therefore the next step is to test some of the examples that s/he found in her/his research. When the student sees the theory learnt in practical terms it is easier to understand. However, it points out that one should not write code directly but instead create a minimal executable piece (using its one code style) so one understands the area in study

There were two ways of communication: email and news. The first one, email, was used for direct contact with the teacher/tutor, the second one, news, was used as a forum by all the students in the course.

The delivery of the assignments was done placing the files at DSV’s computer using a file transfer program (i.e. WinSCP) to transfer the files to the student DSV’s account. Once the files were placed correctly, the student should then report it in the “Redovisning” page in the course website.

After a close look at the course website, it was possible to notice that the issue of plagiarism was never discussed or presented which means that students were not informed about it and also easily another student could perform all the assignments without being caught. The teacher of the

online courses mentioned during the interview that an in-house detection tool was used in order to measure similarities.

The programming campus course, Algorithms and data structure was given on programs at Stockholm University and KTH and was available for Bachelor students on second year. This course aimed to teach students to evaluate effectiveness of two or more solutions for one problem, create reusable components, propose and implement algorithms and data structure as part of the problem solution etc. (Algoritmer och Datastrukturer - Course segmentinformation, 2010).

The student could choose if wanted to do the assignments alone or in groups of 2-3 persons which could be changed from one assignment to the other. Tutoring was available every day from 12 to 13, except on Mondays.

The assessment in the course was divided into two parts:

- Continuous evaluation – a number of weekly assignments and a seminar (individual and group)
- Home exam

The issue of plagiarism was raised in two moments: in the course booklet and at the first lecture. In the course booklet (Åkerblom & Bergström, 2010), there was a section regarding plagiarism check. It mentioned that all the submission would be checked for plagiarism. Also, it explained how it would be the process, i.e. the email in which receives the submission would automatically send the submissions to an automated plagiarism detection program where the solution submitted would be compared against other submissions as well as external sources. If any signs of plagiarism was found or that three persons worked together to complete the assignment, this would be reported as cheating. Additionally, one of the teachers mentioned that always during the first lecture of the course, plagiarism and DSV “rules of conduct”<sup>5</sup> were discussed with the students. In the course booklet no examples of plagiarism or consequences in case the student was convict were mentioned. According to one of the teachers, discussion about having automatic tool to check source plagiarism has taken place, however the problem was that such tools give too much information which was impossible to get around.

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<sup>5</sup> DSV Honor code and the rules for examination: <http://dsv.su.se/student/hederskodex>

The delivery of the assignments should be done individually, via email and in PDF format. A confirmation that the submitted data has been successfully uploaded to the server could be requested by sending an email to a specific email address.

During the individual seminars, students perform peer reviewed on each others work, making comments and grading it. The main purpose of this was that the students would have the opportunity to give and receive feedback. Moreover, feedback on weekly assignments was also given to the students by the teacher. In the group seminar, the group was composed by students who evaluated each others work in the individual seminar and not students who were in the group for the discussion of the week assignment. In this seminar, the group discussed the group member's solution for the week assignment. Oral presentation to ensure that the student was the one doing the assignment was only applied in cases where higher score was requested.

The text plagiarism survey was applied on Master students in 2008, but since Scientific communication and research methodology course is mandatory for all the students from Master programs, a brief description of this course syllabus will be taken as example to illustrate the course structure.

Scientific communication and research methodology was given during autumn 2008 at Stockholm University and was available for Master students. The goal of this course was to teach students on how to understand and make correct and proper referencing to and citing from scientific literature, how to find relevant literature, how to work with scientific literature (analyze, compare and criticize), discuss different methodologies as well as compose a report (Scientific communication and research methodology - Course segmentinformation, 2008).

The course was divided into four examinations:

- An oral presentation of research proposal
- An oral presentation of final report
- A final report

- An individual opposition report – students should critically examine and analyze one of the papers written in the course.

Since the class was relatively large (197 students), it was divided into two groups. Six teachers were involved in this course having three teachers responsible for each group. The assignments were mandatory to be done individually. Collaboration was allowed on a level of discussion during the lectures.

There was an English test (called Fitness test) which all students should have performed in order to be able to write the report. In this way, it guaranteed that the students writing the report had a reasonable knowledge in the English language.

The issue of plagiarism was raised in several lectures, also links to web information were given and more information was available in the book used as course literature. Teachers discussed with students what plagiarism was and what the consequences were in case the student is caught.

The delivery of the assignment was done via email First Class (FC). An online detection tool (Turnitin) was used for checking any signs of plagiarism in the submitted reports.

Based on Wang (2011) report, the research can be presented considering three different perspectives: courses, student and teacher respondents as it is showed in Table 1, 2 and 3.

Group	Content	Case	Course	Teaching	Level	Teaching	Year
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		Study		Mode		Language	
1°	Text Plagiarism	Study A	Scientific communication and research methodology	Campus	Master	English	2008
2°	Code Plagiarism	Study B	Algorithms and data structure	Campus	Bachelor (2nd year)	Swedish	2010
		Study C	Internet programming	Online	Bachelor	Swedish	2010

Table 1 – Courses perspective (Wang, 2011)

Group	Content	Case Study	Students	Demography	Survey Method	Studying Mode	Level	Year
1°	Text Plagiarism	Study A	47	Asia	Online	Campus	Master	2008
2°	Code Plagiarism	Study B	69	Europe	Paper	Campus	Bachelor (2nd year)	2010
		Study C	28	Europe	Online	Online	Bachelor	2010

Table 2 – Student respondents' perspective (Wang, 2011)

Group	Content	Case Study	Teachers	Survey Method	Teaching Mode	Level	Year
1°	Text Plagiarism	Study A	24	Online	Campus	Master	2008
2°	Code Plagiarism	Study B	2	Interview	Campus	Bachelor	2010
		Study C	2	Interview	Online	Bachelor	2010

Table 3 – Teacher respondents' perspective (Wang, 2011)

## 4. Results

The results were divided into three categories:

- Awareness – here was to measure how aware students and teachers were in relation to the issue of plagiarism. If they knew about any students who might have plagiarized, If they knew about an existence of a written policy for dealing with plagiarism, if they ever plagiarized, if they have discussed the possibility that a student may have plagiarized as well as how the knowledge about plagiarism and the awareness of plagiarism in their department could be increased
- Attitude – here was to measure what attitude students and teachers have towards the plagiarism. A set of issues were presented to students and teachers and asked them to categorize the issues into plagiarism, cheating, not plagiarism or cheating, or uncertain.
- Perception – here was to measure how students and teachers perceive the issue of plagiarism. What would be the most effective ways to prevent plagiarism as well as what would be the most common reasons for someone to plagiarize.

The results were presented as in the following sub-sections:

1. Awareness of plagiarism
  - a) Campus code plagiarism x Online code plagiarism
  - b) Code plagiarism x Text plagiarism
2. Attitude towards plagiarism
  - c) Campus code plagiarism x Online code plagiarism
  - d) Code plagiarism x Text plagiarism
3. Perception of plagiarism
  - e) Campus code plagiarism x Online code plagiarism
  - f) Code plagiarism x Text plagiarism

## 4.1 Awareness of plagiarism

### 4.1.1 Campus code plagiarism x Online code plagiarism

The students were asked if they knew of any students who they thought might have plagiarized and as it can be seen in the figure 4, 39% of the online course students pointed out that knew none students who might have plagiarized. And for campus course students, 41% knew at least 3 persons that might have plagiarized.

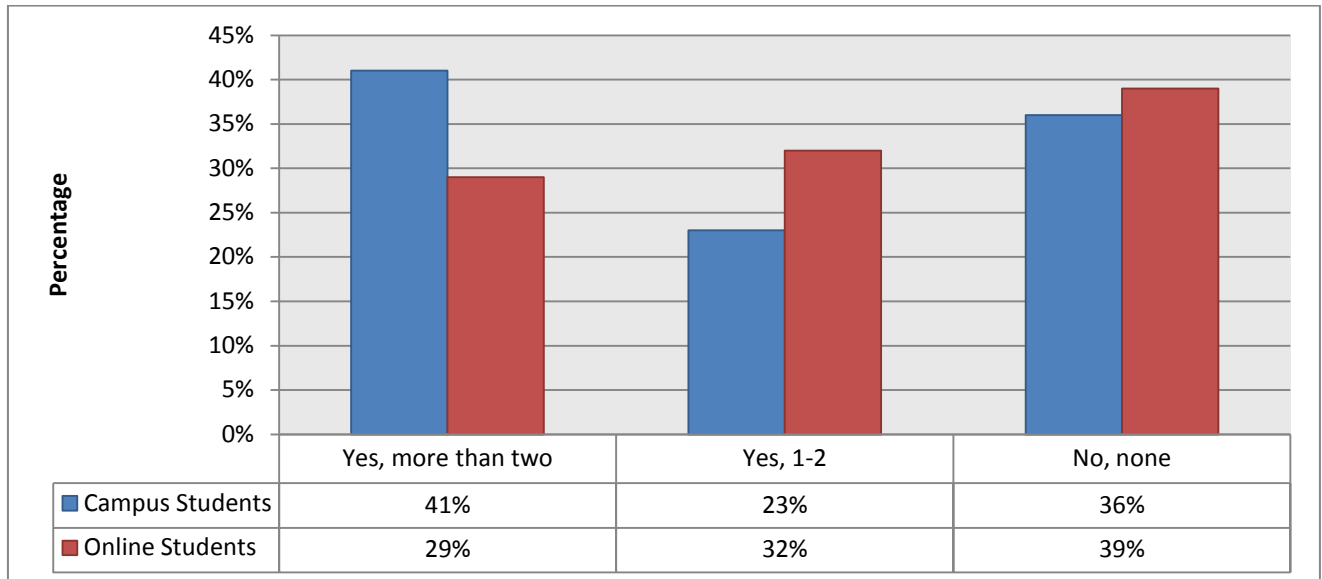


Figure 4 – Distribution per no. of students who might have plagiarized

When asked if at any time the students have discussed the possibility that a student may have plagiarized, more than half of the campus and online students answered “No, never”. Additionally, if it happened to have a discussion about it, they would often do with other students. This might indicate that the students do not know how to deal with the issue of plagiarism or that they do not want to trigger any gossip (Figure 5).



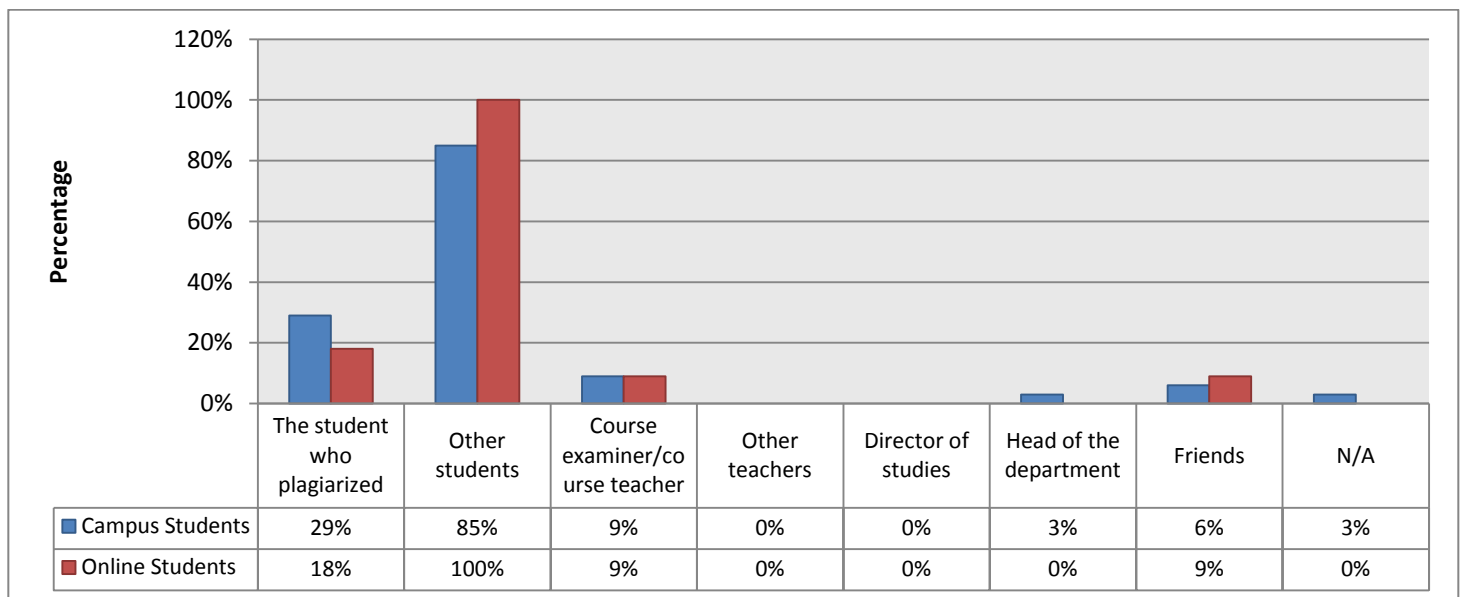
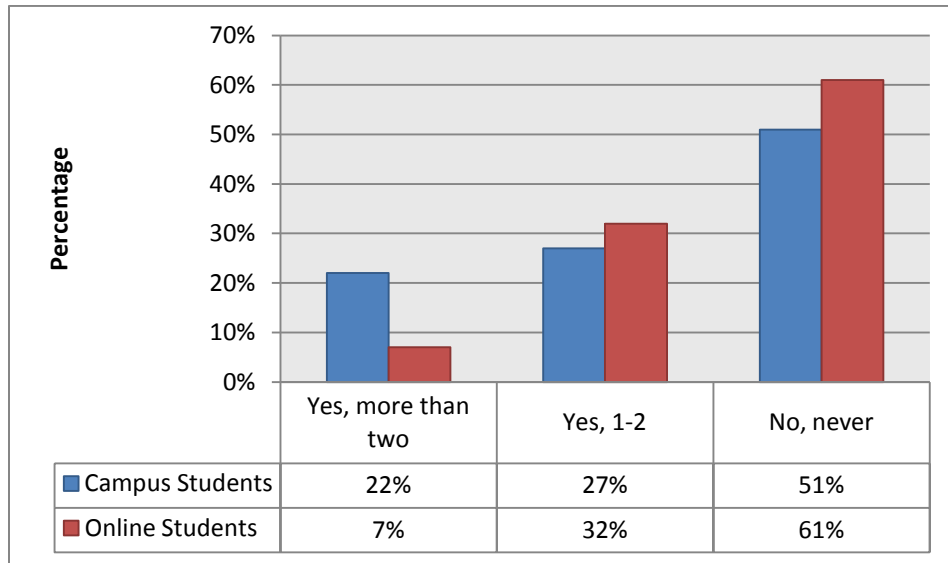


Figure 5 - Distribution of no. of times discussed a possible alleged plagiarism (up) and to whom was discussed (bottom)<sup>6</sup>

Even though the majority of the students claimed that they knew about the existence of a written policy for dealing with plagiarism, there was still an uncertainty regarding if they have ever plagiarized (Figure 6).

<sup>6</sup> This question in the survey allowed multiple choices

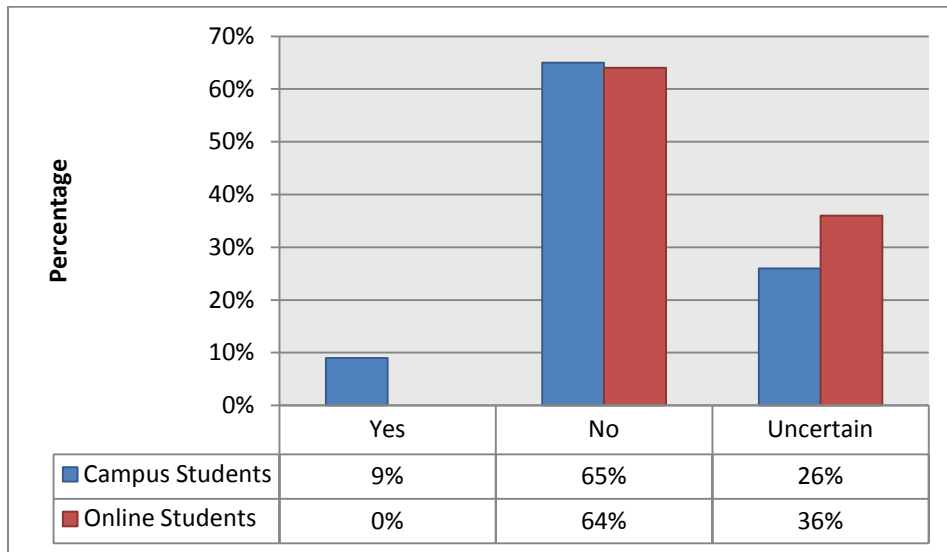
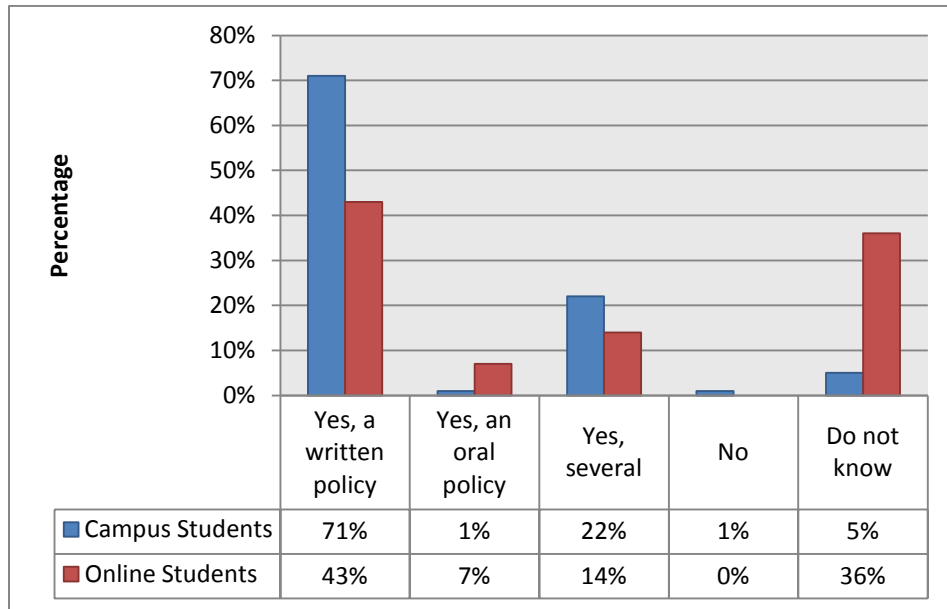


Figure 6 - Distribution of answers for an existence of policy for dealing with plagiarism (up) and for if ever plagiarized (bottom)

From the graphs it seems that campus course students are more aware of plagiarism policies. The fact that 36% of online course students did not know about an existence of policy for dealing with plagiarism and also that were uncertain if ever plagiarized shows that there is a lack in the information delivered from the teachers to the students about plagiarism. Here, there is a possibility that the policy on how to deal with plagiarism is not entirely clear to the students, or

that the teachers are not explaining to the students what is allowed and not allowed or that the students do not bother to read the policy.

The students were presented with a table with some options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department. The entire table is shown in Appendix 1. Table 4 shows the five most voted options by the campus course students and by the online course students:

Rank	Campus Students	%	Online Students	%
1	Informing students that checks for plagiarism will be made	51	Informing students that checks for plagiarism will be made	61
2	Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	46	Integrating information about plagiarism into education	54
3	Encouraging public debate and discussion about plagiarism within the university	33	Encouraging public debate and discussion about plagiarism within the university	50
4	Integrating information about plagiarism into education	32	Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	46
5	Information about plagiarism via the school's website or department	25	Information about plagiarism via the school's website or department	29

Table 4 – Most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department

The top three most voted among campus and online course students is shown in table 5:

Rank	
1	Informing students that checks for plagiarism will be made
2	Integrating information about plagiarism into education
3	Encouraging public debate and discussion about plagiarism within the university

Table 5 – Top three most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department

It is noticeable that *Informing students that checks for plagiarism will be made* was one of the options that both campus and online course students agreed on. Online students commented that “Incorporating clear guidelines as to how assignments may and may not be completed into the course documentation together with illustrating example” would be an option. This might answer our previous assumption regarding why students were uncertain if they have plagiarized. For campus students it seems that a way to increase the knowledge about plagiarism and the awareness of plagiarism in their department would be students being informed regarding the consequences of plagiarism. This can be assumed from one of the comments made by campus students: “If you cheat you are out of the course”.

#### 4.1.2 Code plagiarism x Text plagiarism

The students were asked if they knew of any students who they thought might have plagiarized and as it can be seen in the figure 7, 53% of the students (text plagiarism) pointed out that knew none students who might have plagiarized. And for programming course students more than 60% acknowledged that fact.

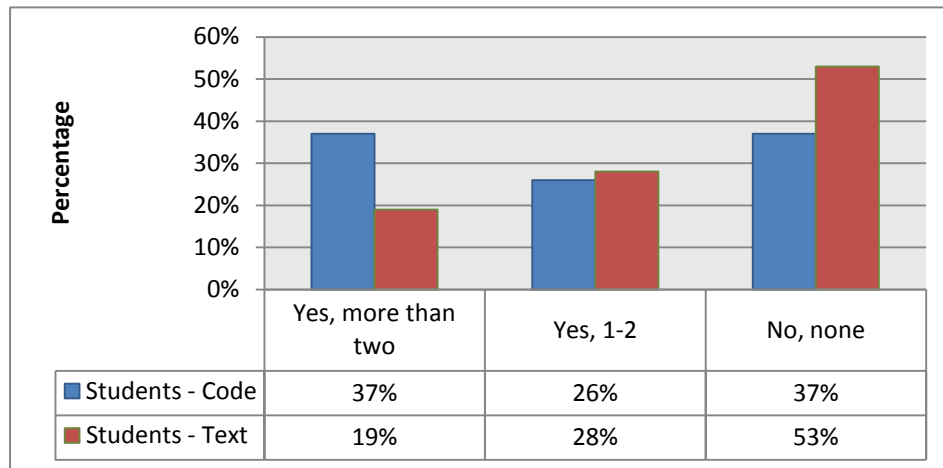


Figure 7 – Distribution per no. of students who might have plagiarized

When asked if at any time the students have discussed the possibility that a student may have plagiarized, more than half of the students from both groups (code and text plagiarism) answered “No, never”. Additionally, if it happened to have a discussion about it, they would often do with other students. This might indicate that the students do not know how to deal with the issue of plagiarism or that they do not want to trigger any gossip (Figure 8).

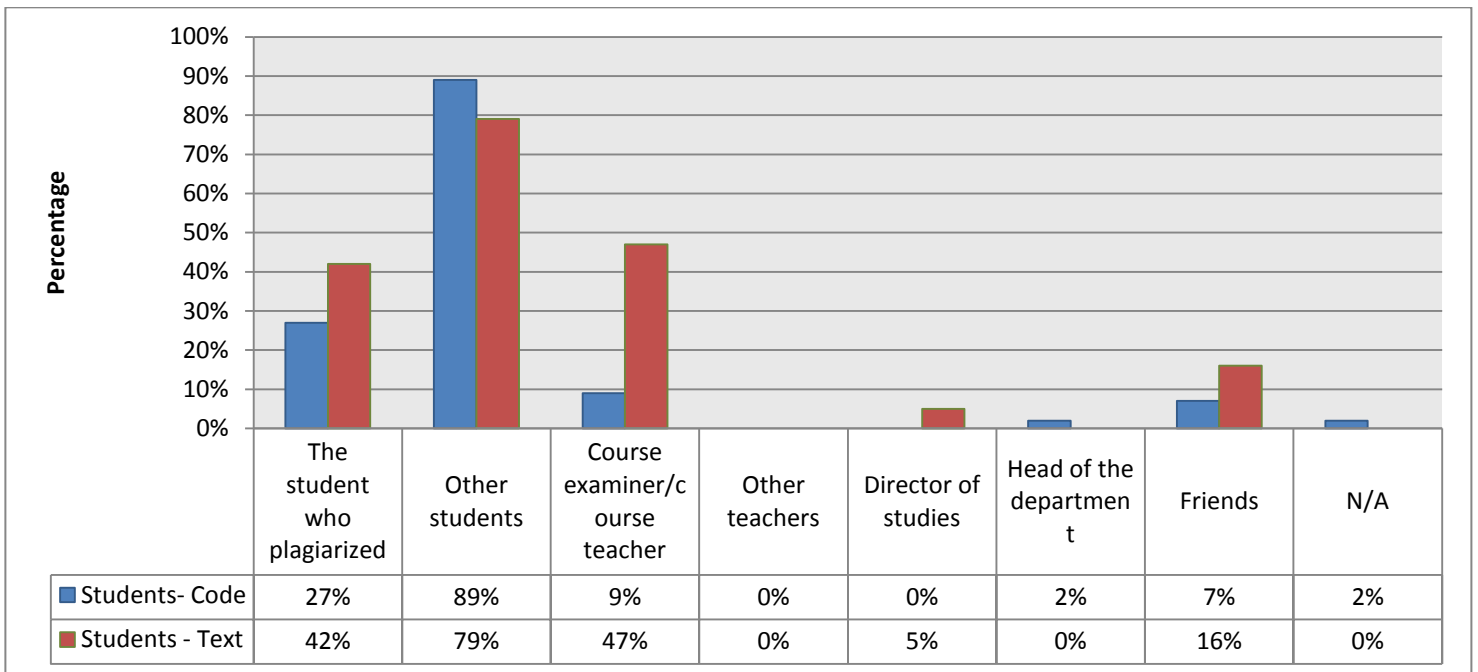
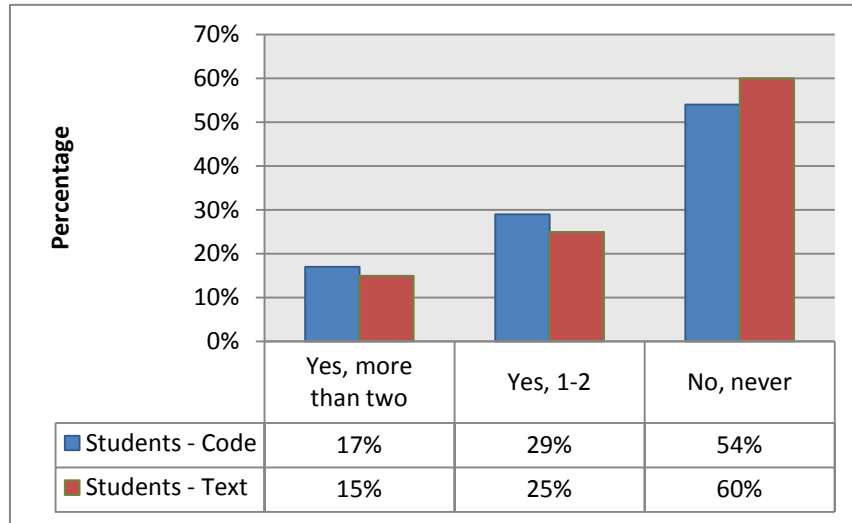


Figure 8 - Distribution of no. of times discussed a possible alleged plagiarism (up) and to whom was discussed (bottom)<sup>7</sup>

A few teachers commented that they have also discussed with colleagues from other universities and higher education establishments or handled it differently in different cases.

<sup>7</sup> This question in the survey allowed multiple choices.

Even though the majority of the students claimed that they knew about the existence of a written policy for dealing with plagiarism, there was still an uncertainty regarding if they have ever plagiarized (Figure 9).

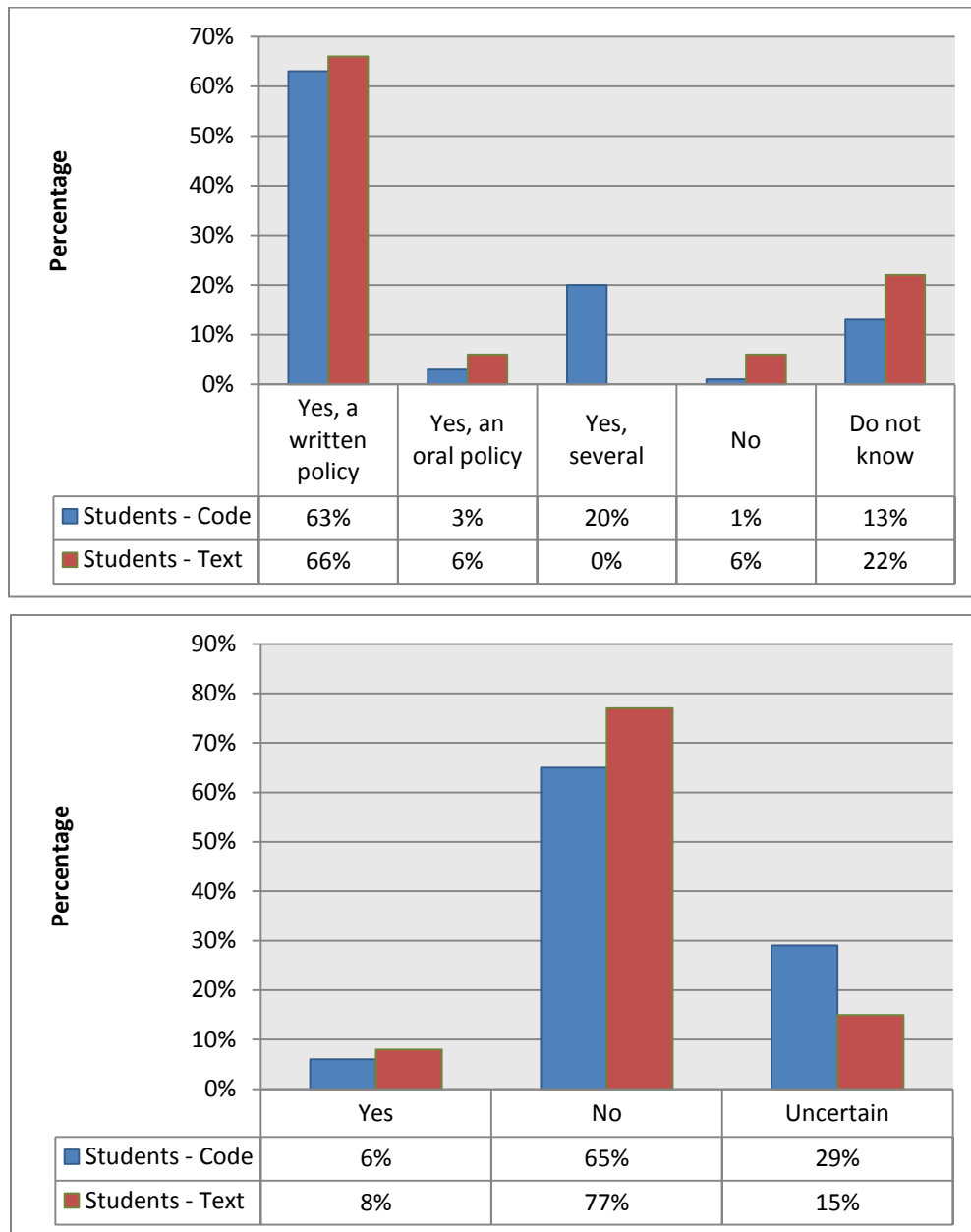


Figure 9 - Distribution of answers for an existence of policy for dealing with plagiarism (up) and for if ever plagiarized (bottom)

From the graphs it seems that programming course students are more aware of plagiarism policies, 86% reported that there was a policy for dealing with plagiarism. However, 29% shown

uncertainty about if they have ever plagiarized. This shows that there is a lack in the way information about plagiarism is delivered from teachers to the students. Here, there is a possibility that the policy on how to deal with plagiarism is not entirely clear to the students, or that the teachers are not explaining to the students what is allowed and not allowed or that the students do not bother to read the policy.

The students were presented with a table with some options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department. The entire table is shown in Appendix 2. Table 6 shows the five most voted options by programming course students and other students:

<b>Rank</b>	<b>Students – code plagiarism</b>	<b>%</b>	<b>Students – text plagiarism</b>	<b>%</b>
1	Informing students that checks for plagiarism will be made	54	Information about plagiarism via the school's website or department	45
2	Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	46	Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	43
3	Integrating information about plagiarism into education	38	Informing students that checks for plagiarism will be made	36
	Encouraging public debate and discussion about plagiarism within the university	38		
4	Information about plagiarism via the school's website or department	26	Organizing information sessions regarding plagiarism for both teachers and students	34
5	Informing teachers about what actions can be taken when plagiarism is detected	21	Integrating information about plagiarism into education	30

Table 6 – Most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department

The top three most voted among programming course students and other students is shown in table 7:

<b>Rank</b>	
1	Informing students that checks for plagiarism will be made
2	Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...
3	Information about plagiarism via the school's website or department

Table 7 – Top three most voted options about how to increase the knowledge about plagiarism and the awareness of plagiarism in their department

It is noticeable that *Informing students that checks for plagiarism will be made* was one of the options that both group of students (code and text plagiarism) agreed on.

The interesting result here is that more than 50% of programming course students valued the option *Informing students that checks for plagiarism will be made* against 36% of the other group of students (text plagiarism).

In the structured interview conducted with programming course teachers, none of them pointed out that Information about plagiarism via the school’s website or department as an option to increase the awareness and knowledge about plagiarism and according to them this is actually worthless since nobody reads it anyway. However, 21% of the teachers who participated in the text plagiarism survey considered this as a valid option (Razera et al., 2010). Both groups of teachers had the same opinion regarding the clear key policy documents which also were pointed out by the students.



## 4.2 Attitude towards plagiarism

A set of 9 and 14 issues in the code and text plagiarism surveys respectively were given to the students and teachers so that they could classify each into plagiarism, cheating, not plagiarism or cheating, or uncertain. Due to slight differences in the issues, only 8 issues will be considered for the comparison and they are:

- 1) *Code*: To buy a ready code solution from a so-called "rent a coder" (an Internet site which sells code) and hand the assignment in as if it was yours  
*Text*: To buy an essay from a so-called "paper mill" (an Internet site which sells papers) and hand the paper in as if it was yours
- 2) *Code*: To submit a complete solution, that you took from someone else anonymously, as if it was yours  
*Text*: To submit someone else's work as if it was yours
- 3) *Code*: To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours  
*Text*: To submit an essay that a friend wrote and gave you the permission to use it as if it was yours
- 4) *Code*: To literally take part of the assignment solution from a book or internet and submit it in as yours  
*Text*: To literally take a piece of text from a book and submit it in as yours without indicating a source
- 5) *Code*: To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers  
*Text*: To take a piece from a known source, then make some small language changes in the text, but only indicate the source (i.e. no reference in the text)
- 6) *Code*: To use most of the content from someone else's original code but reorder code blocks  
*Text*: To use most of the content from someone else's original text but change the order. There is a reference in the text (e.g. Sjögren, 1999) and the original source appears in a list

7) *Code*: To extract your main logic from a code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on

*Text*: To extract your main points from a text you read, but write it in your own words. The new version looks different, both in detail and because it uses different examples. A reference to the text (e.g. Sjögren, 1999) is used and the original source is listed in the bibliography

8) *Code*: To write a code by copying the majority of an assignment from a friend's assignment and add some of your own work to it

*Text*: To write a paragraph by bringing together shorter pieces of 10-15 words from a number of various sources and add some of your own words to form a paragraph. All original sources listed in the list without reference to the text

#### **4.2.1 Campus code plagiarism x Online code plagiarism**

The graphical representation of each issue is presented in figure 10. For most of the issues, the majority of campus and online course students seemed to share the same opinion regarding what plagiarism was and what was not. For example, the issues 6 and 7 categorized as plagiarism by the majority of the students while the issue 8 was not. However, an intriguing result can be seen, for example issue 2 and 3 both cases were about submission, but in issue 2 they considered more a case of plagiarism than in the issue 3.

Another interesting fact was in the issue 10 where online course students reported that two students collaborating on an assignment meant to be completed individually was cheating, while campus course students thought this was not plagiarism or cheating.

Overall, online course students seemed to be more precise on their answers; it did not float considerably among the four categories. For instance, in issue 1, campus course students floated a bit in all the categories even though having the majority in just one. However, it was also clear that both campus and online students had some difficulties to distinguish plagiarism and cheating categorization.

One of the online course teachers, Teacher A, pointed out on issue 4 that “the divide line between plagiarism and cheating depends on if the student knows what is the correct way of doing it or not. If s/he knows that, then it is cheating, otherwise would be plagiarism”. For the same issue one of the campus course teachers, Teacher B, commented that “it totally depends on what the student takes, how important it is or what the limitations of the assignments are”.

On issue 5, one of the campus course teachers, Teacher B, mentioned that “there are assignments that the student is supposed to do that and then it will be ok”. Another campus course teacher, Teacher C, discussed that “taking code from several places would be fine in the following circumstances:

- a) if done in a mature way
- b) write something about what makes these parts of the code to work together
- c) state that these pieces of code were taken from different places
- d) state what the student has done themselves

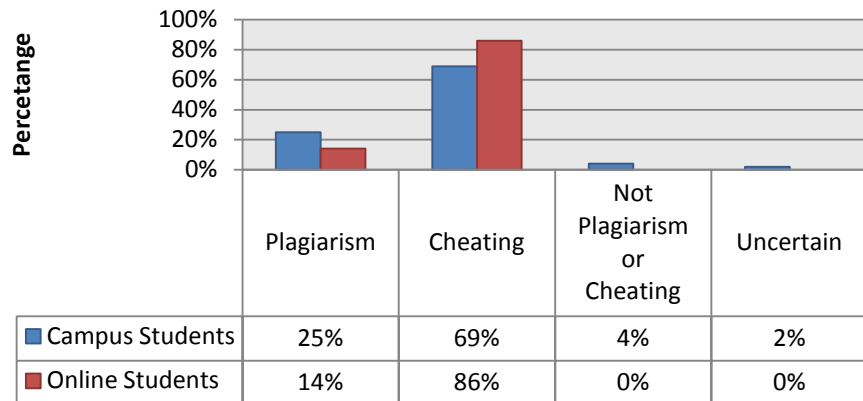
That is just the way that you would expect someone to work, for real. That is how an experienced programmer at least is supposed to work”.

And one of the online course teachers, Teacher A, mentioned that this issue “depends on the number of pieces: the more different pieces and the different sources they are, it will go towards not plagiarism”.

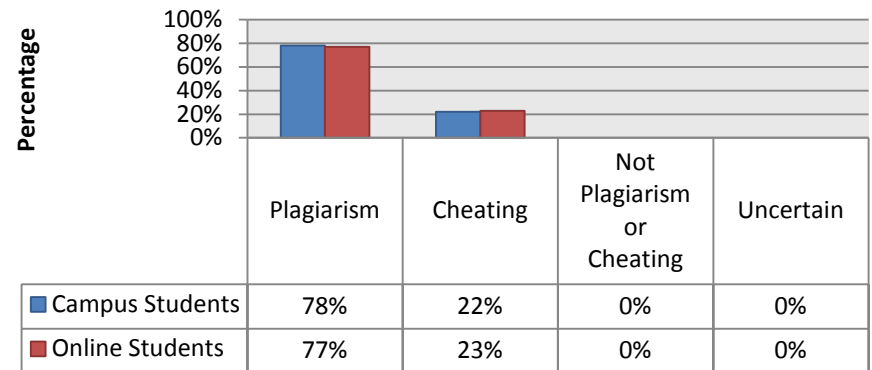
On issue 10, Teacher B (campus course) pointed out that “it would be fine if both students knew the answers to the assignment, but when one of the students has more strong programming background and knowledge than the others then it is considered a case of cheating because the less skilled students just tagged along”. Teacher C (campus course) mentioned that “it entirely depends on the attitude the students have towards collaboration. It always depends on how and why they collaborate. If it is to learn more then it is good to have someone to discuss with. Moreover, programming is a social activity. To learn to do that, students need to talk about coding”.

On issues 13 and 14, one of online course teachers, Teacher A, commented that “it depends entirely on how what the student asks, if the student asks for the complete solution then it is cheating otherwise would be ok”. For one of the campus course teachers, Teacher B, “It depends on what the student asks. If he asks for a full solution, then it is definitely cheating”.

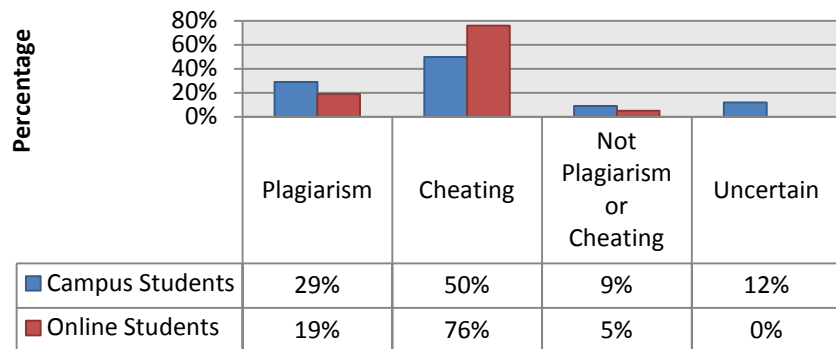
**ISSUE 1 - To buy a ready code solution from a so-called "rent a coder" (an Internet site which sells code) and hand the assignment in as if it was yours**



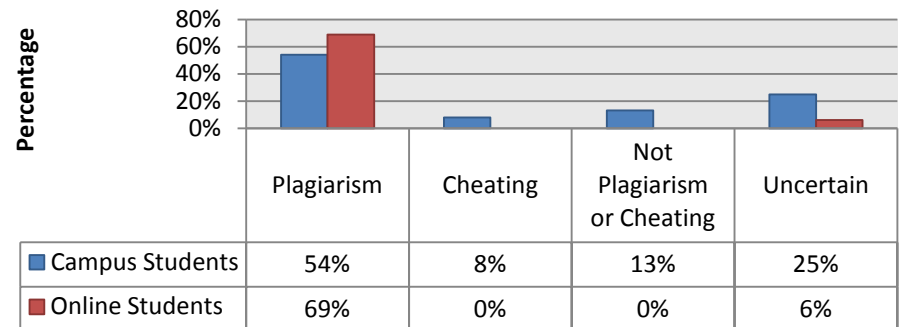
**ISSUE 2 - To submit a complete solution, that you took from someone else anonymously, as if it was yours**



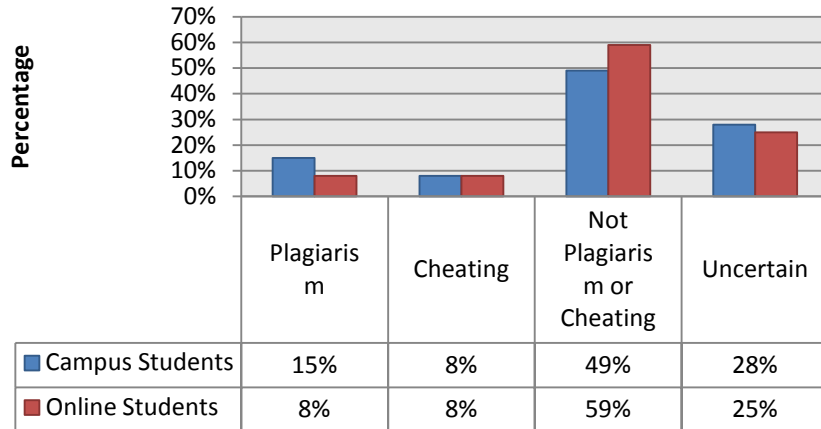
**ISSUE 3 - To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours**



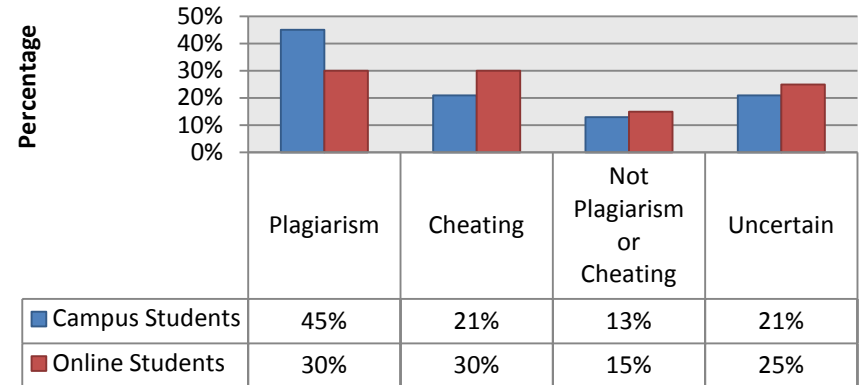
**ISSUE 4 - To literally take part of the assignment solution from a book or internet and submit it in as yours**



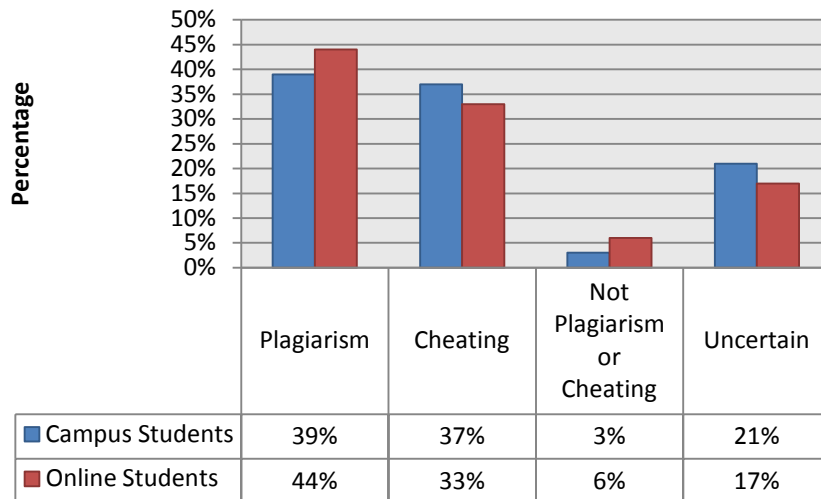
**ISSUE 5 - To make the assignment solution by combining pieces of code taken from a book or internet**



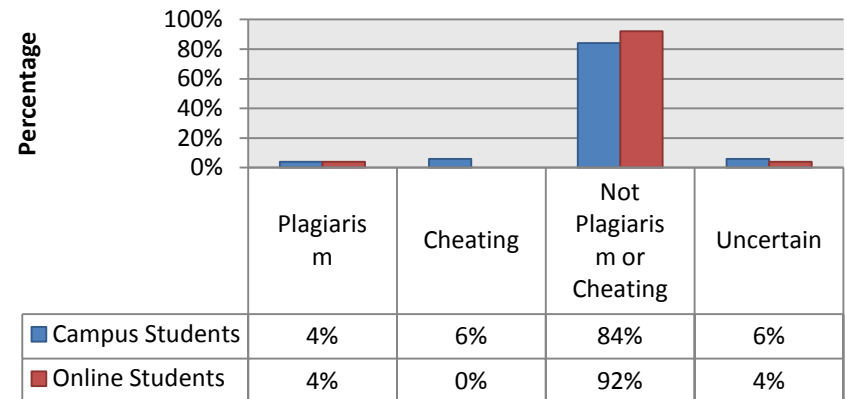
**ISSUE 6 - To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers**



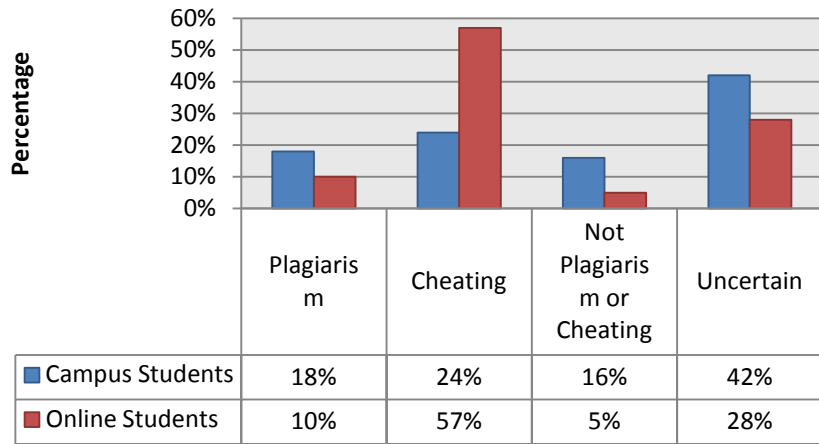
**ISSUE 7 - To use most of the content from someone else's original code but reorder code blocks**



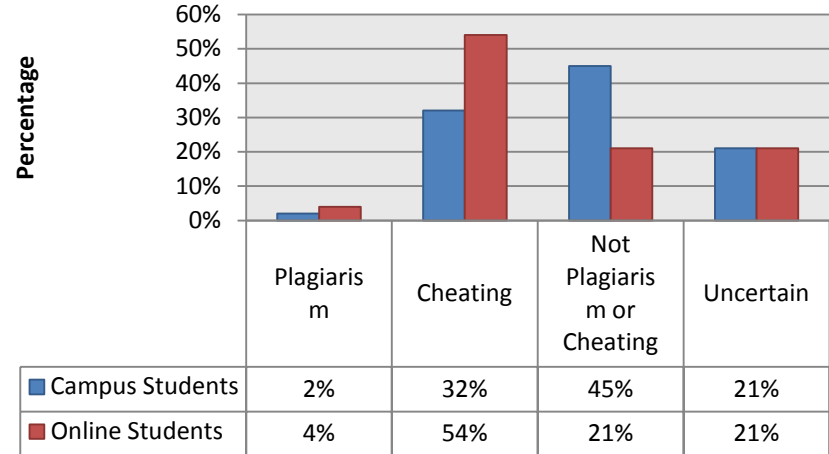
**ISSUE 8 - To extract your main logic from a code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on.**



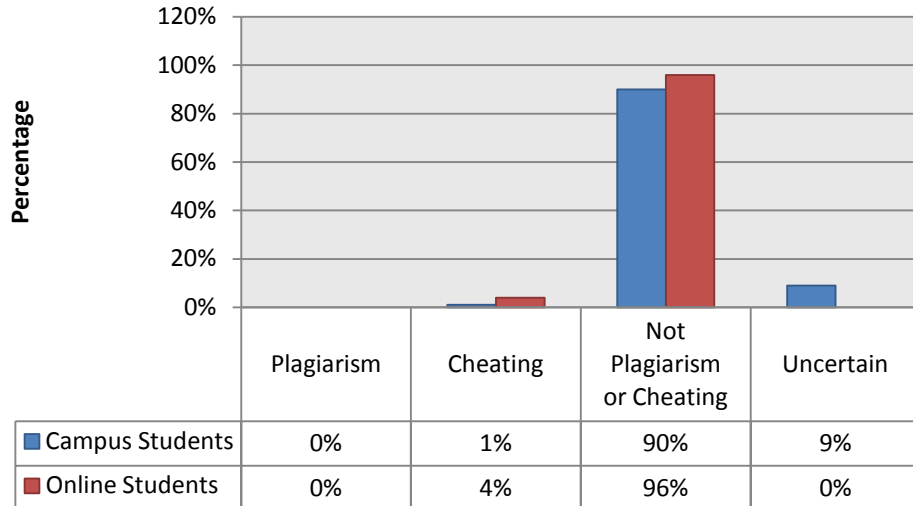
**ISSUE 9 - To write a code by copying the majority of an assignment from a friend's assignment and add some of your own work to it**



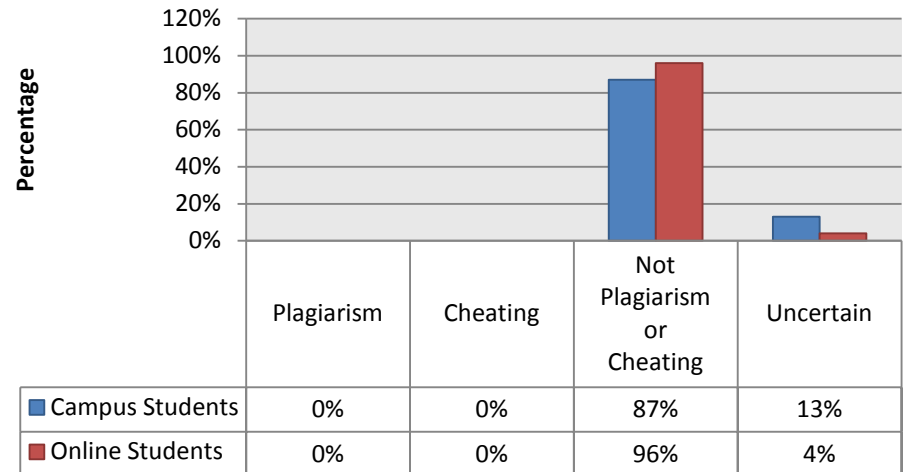
**ISSUE 10 - Two students collaborating on an assignment meant to be completed individually**



**ISSUE 11 - Showing assignment work to the lecturer for guidance**



**ISSUE 12 - Showing assignment work to a lecturer (e.g. teacher assistant, personnel unrelated to the course) for guidance**



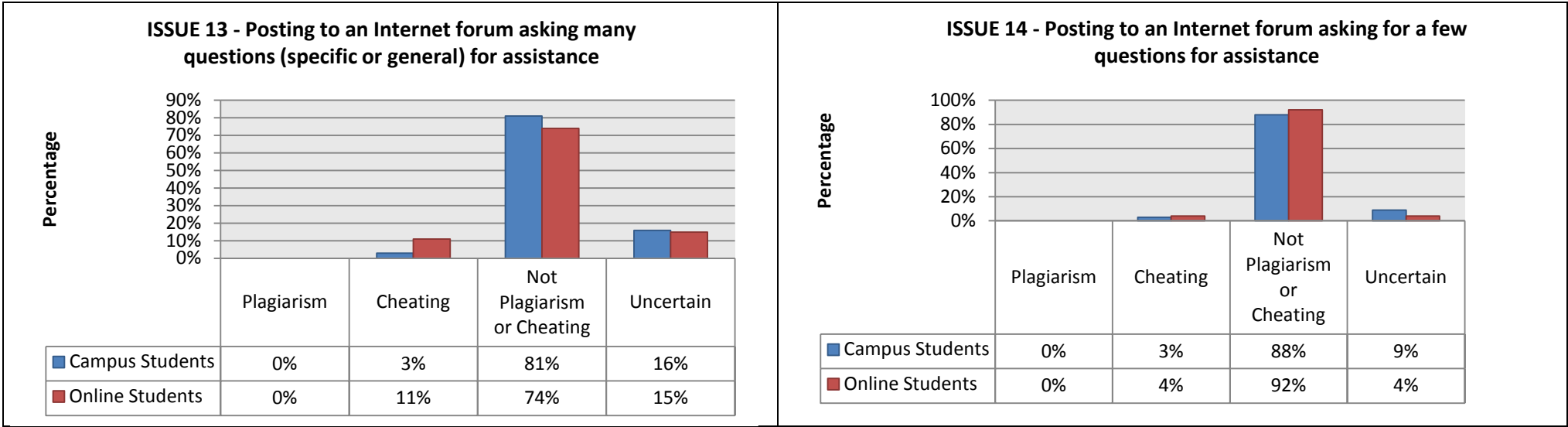


Figure 10 – Categorization of issues into plagiarism, cheating, not plagiarism or cheating, or uncertain

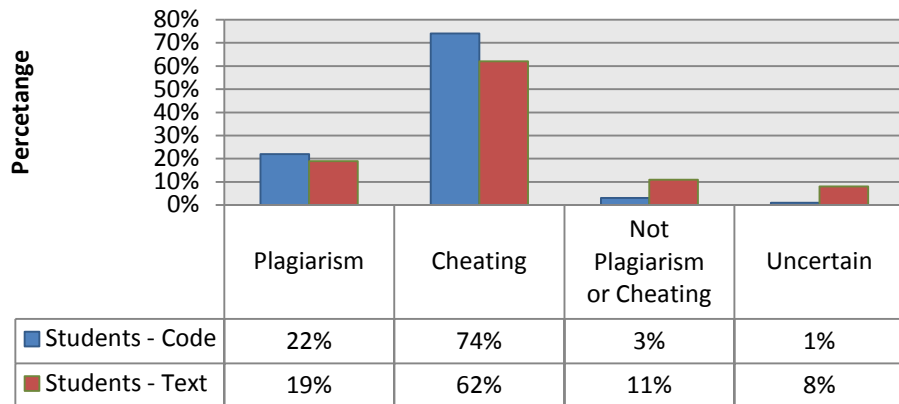


#### **4.2.2 Code plagiarism x Text plagiarism**

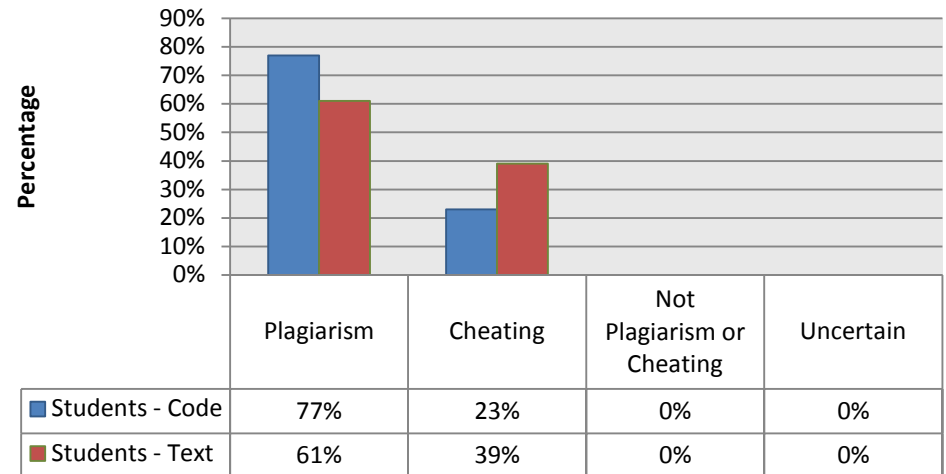
The graphical representation of each issue is presented in figure 11. Overall; it was noticeable that both groups of students (code and text plagiarism) seemed to agree about the categorization of the issues regarding what plagiarism was and what was not. For example, the issues 4 and 5 categorized as plagiarism by the majority of the students while the issue 7 was not. However, some slight differences can be visualized such as in issue 8 where the majority of programming course students was uncertain about this issue while text plagiarism students thought it was a matter of plagiarism. Additionally, some paradox was also perceptible, for instance, in issue 2 and 3 where the majority of both groups of students categorized it as plagiarism and cheating respectively.

Both groups of students seemed to have some difficulties categorizing the issues. It was possible to see that the results floated a bit in all the categories even though the majority usually was in just one category. A curious fact was in issue 6 where 40% of programming course students categorized it as plagiarism and 37% as cheating. This possibly means that they do not have clear distinction between plagiarism and cheating.

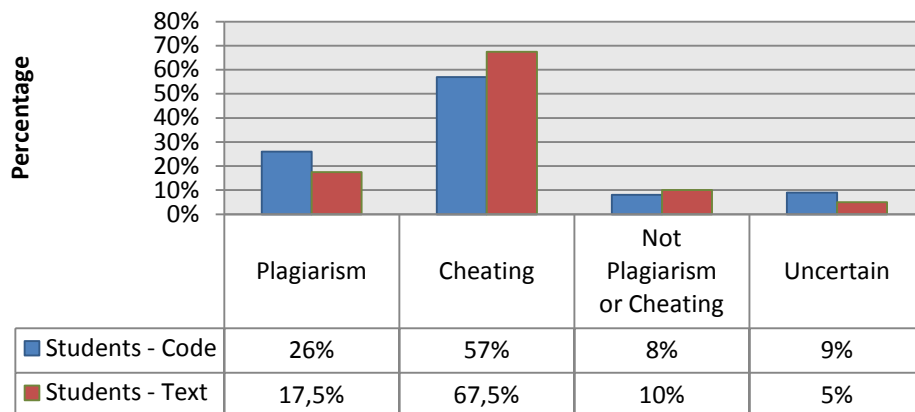
**ISSUE 1 - To buy a ready code solution from a so-called "rent a coder" (an Internet site which sells code) and hand the assignment in as if it was yours/ To buy an essay from a so-called "paper mill" (an Internet site which sells papers) and hand the pape**



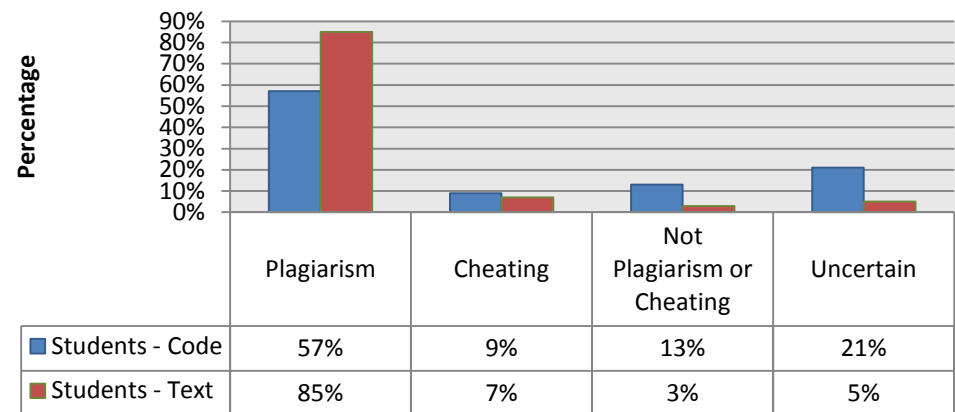
**ISSUE 2 - To submit a complete solution, that you took from someone else anonymously, as if it was yours/ To submit someone else's work as if it was yours**



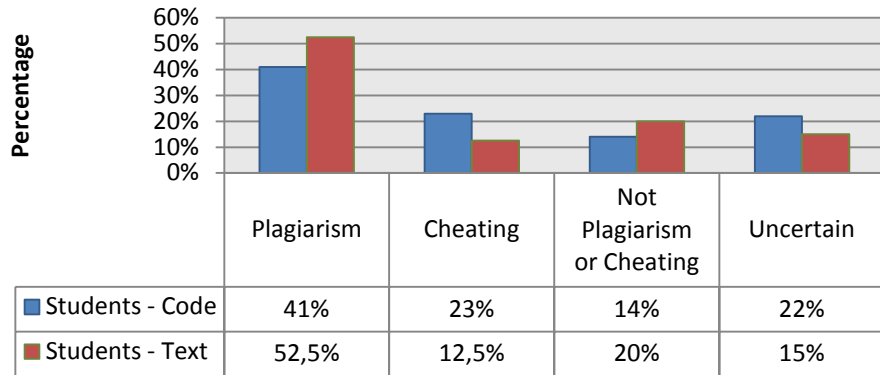
**ISSUE 3 - To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours/ To submit an essay that a friend wrote and gave you the permission to use it as if it was yours**



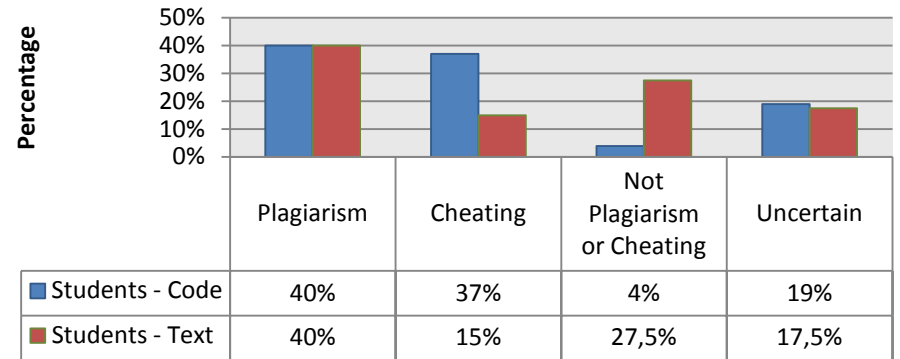
**ISSUE 4 - To literally take part of the assignment solution from a book or internet and submit it in as yours/ To literally take a piece of text from a book and submit it in as yours without indicating a source**



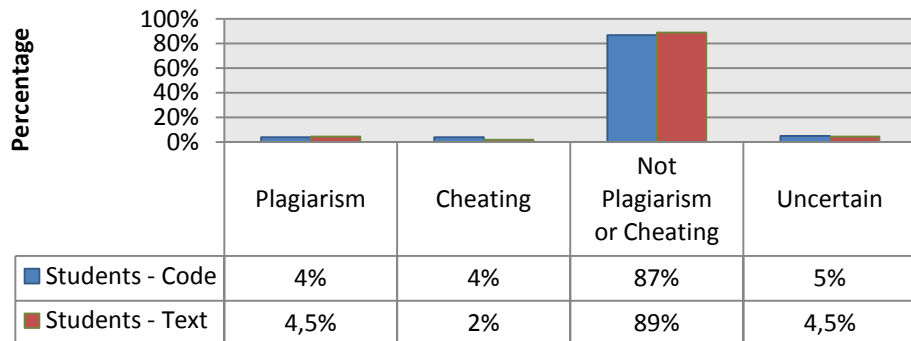
**ISSUE 5 - To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers/ To take a piece from a known source, then make some small language changes in the text, but only indicate the source**



**ISSUE 6 -To use most of the content from someone else's original code but reorder code blocks/ To use most of the content from someone else's original text but change the order. There is a reference in the text (e.g. Sjögren, 1999) and the original sour**



**ISSUE 7 - To extract your main logic from a code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on/ To extract your main points from a text**



**ISSUE 8 - To write a code by copying the majority of an assignment from a friend's assignment and add some of your own work to it/ To write a paragraph by bringing together shorter pieces of 10-15 words from a number of various sources and add some of you**

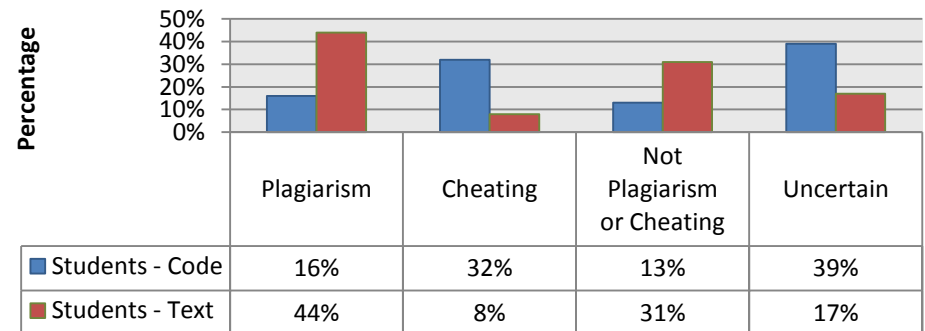


Figure 11 – Categorization of issues into plagiarism, cheating, not plagiarism or cheating, or uncertain

## 4.3 Perception of plagiarism

### 4.3.1 Campus code plagiarism x Online code plagiarism

The students were questioned about what would be the most effective ways to prevent plagiarism.

The entire table is shown in Appendix 3. Table 8 shows the five most voted options by the campus course students and by the online campus course:

Rank	Campus Students	%	Online Students	%
1	Teachers should provide proper time schedule for the assignment so that time pressure is avoided	41	Students should be informed that their work will be checked for plagiarism	61
	Students should be informed that their work will be checked for plagiarism	41		
2	Teachers should tell what is allowed and not allowed through education and open discussions	38	Teachers should openly discuss plagiarism with students	54
3	Students should receive proper instructions on assignments in time so that time pressure is avoided	36	Teachers should tell what is allowed and not allowed through education and open discussions	50
4	Teachers should openly discuss plagiarism with students	33	Electronic plagiarism detection tools should be used	46
5	Assignments should be formulated in a clear way	28	Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	43
	Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	28		

Table 8 – Most voted options about the most effective ways to prevent plagiarism

The top three most voted among campus and online course students is shown in table 9:

Rank	
1	Students should be informed that their work will be checked for plagiarism
2	Teachers should openly discuss plagiarism with students
3	Teachers should tell what is allowed and not allowed through education and open discussions

Table 9 – Top three most voted options about the most effective ways to prevent plagiarism

The majority of campus and online course students believed that a way to prevent plagiarism was *Students should be informed that their work will be checked for plagiarism*. It seems that they

will follow the rules and do a proper work just because they know that their work would be checked for plagiarism.

Online and campus course students commented that receiving more help with the assignments would be another way to prevent plagiarism. Additionally, clear examples on what is allowed and not allowed for the assignment should be made available to the students as part of the course documentation.

Campus course students commented that group projects should not be allowed in the first course and that other ways to teach the students how to program should be part of the teaching methodology. Online course students, on the other hand, commented that cases of discovered plagiarism should be publicized so as to show other students that people do actually get caught for misconduct.

For one of the online course teachers, Teacher D, “teacher should make good interesting courses that contain elements of free individual assignments”. In this way, a combination of individual assignments and system for checking for plagiarism would be the most effective way to prevent source code plagiarism. For one of online course teachers, Teacher A, “teacher should put the effort to make assignments that are hard to plagiarize”.

When asked the students about the reasons for someone to plagiarize, the five most voted options are shown in the Table 10. The entire table is shown in Appendix 4.

<b>Rank</b>	<b>Campus Students</b>	<b>%</b>	<b>Online Students</b>	<b>%</b>
1	The student thinks that programming is too difficult	54	The student is lazy	71
	The student thinks that the assignment is too difficult	54		
2	The student lacks time	49	The student lacks interest in the topic of study	57
3	The student is lazy	43	The student has doubts regarding and/or underestimates his/her own abilities	46
4	The student has doubts regarding and/or underestimates his/her own abilities	38	The student thinks that programming is too difficult	43

	The student lacks interest in the topic of study	38	The student thinks that the assignment is too difficult	43
			The student lacks time	43
5	The student does not understand that studying is aimed at independent and critical thinking	35	The student does not understand that studying is aimed at independent and critical thinking	32

Table 10 – Most voted options about the most common reasons for someone to plagiarize

The top three most voted among campus and online course students is shown in table 11:

Rank	
1	The student is lazy
2	The student lacks interest in the topic of study
3	The student thinks that programming is too difficult
	The student thinks that the assignment is too difficult

Table 11 – Top three most voted options about the most common reasons for someone to plagiarize

Overall, campus and online course students had the same opinion regarding the reasons for someone to plagiarize. What was different was the importance level, for example, for online course students the most common reason was that the student is lazy, while for campus course students it is a mix of programming and assignments being too difficult.

When students think that the assignment is too difficult, they tend to either give up or leave it until the last minute to do it, which generates the time pressure panic contributing the students to plagiarize. According to (Chester, G., 2001), “it is human nature to leave until last the things we either consider hard or unpleasant.”

Campus course students commented that more time should be given to students in order to have time to do the assignments correctly. Additionally, they claimed that they did not receive enough help from the teachers in order to accomplish what was asked in the assignments. Another common reason for someone to plagiarize according to campus course students was that students have not learnt enough to code the assignments by themselves.

Online course students commented that if the course was not relevant (from a student’s perspective), it would definitely become a reason for someone to plagiarize.

Programming course students mentioned that a competition among students with respect to grades was not really a reason for plagiarism but rather the laziness of the student.

According to campus teachers, Teacher B and C, the problem is that students do not know from where to start, they do not have the ability to estimate how much time is needed to do the assignment and end up panicking and trying to find a “quick fix”.

#### 4.3.2 Code plagiarism x Text plagiarism

The students were questioned about what would be the most effective ways to prevent plagiarism. The entire table is shown in Appendix 5. Table 12 shows the five most voted options by programming course students and text plagiarism students:

Rank	Students - code	%	Students - text	%
1	Students should be informed that their work will be checked for plagiarism	46	Students should learn what is allowed and not allowed through education and open discussions	64
2	Teachers should tell what is allowed and not allowed through education and open discussions	41	Electronic plagiarism detection tools should be used	57
3	Teachers should openly discuss plagiarism with students	39	Students should be informed that their work will be checked for plagiarism	55
			Teachers should openly discuss plagiarism with students	55
4	Students should receive proper instructions on assignments in time so that time pressure is avoided	34	Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem	51
5	Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	32	Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	45

Table 12 – Most voted options about the most effective ways to prevent plagiarism

The top three most voted among programming course students and text plagiarism students is shown in table 13:

Rank	
1	Students should learn what is allowed and not allowed through education and open discussions
2	Electronic plagiarism detection tools should be used
3	Students should be informed that their work will be checked for plagiarism

Table 13 – Top three most voted options about the most effective ways to prevent plagiarism

The majority of programming course students and 55% of the other group of students (text plagiarism) believed that a way to prevent plagiarism was *Students should be informed that their work will be checked for plagiarism*. It seems that they will follow the rules and do a proper work just because they know that their work will be checked for plagiarism.

For 64% of students (text plagiarism), *Students should learn what is allowed and not allowed through education and open discussions* was an effective way to prevent plagiarism while for programming course students this was not an attractive option for prevention. In fact, programming course students mentioned that “the focus should be more on pedagogical teaching and being close to the students. A feeling of security and self-esteem within the course is more important than being scared about accusations etc.”

A few students (text plagiarism) commented that the submission of assignments should be done in phases to minimize the odds that a final submission is plagiarized.

Some teachers (text plagiarism) commented that rules exist but are just not used. Also, when students have been convicted of plagiarism, it should be openly communicated to the other students and teachers.

In the structured interview conducted with programming course teachers, none of them mentioned “*Electronic plagiarism detection tools should be used*” as an effective way to prevent



plagiarism, while 17% of the teachers who participated in the text plagiarism survey considered this as a valid option (Razera et al., 2010).

When asked the students about the reasons for someone to plagiarize, the five most voted options are shown in the Table 14. The entire table is shown in Appendix 6.

Rank	Students - code	%	Students - text	%
1	The student is lazy	52	The student lacks knowledge about what is allowed and what is not allowed	51
2	The student thinks that programming is too difficult	51	The student is lazy	49
	The student thinks that the assignment is too difficult	51		
3	The student lacks time	47	The student does not understand that studying is aimed at independent and critical thinking	43
4	The student lacks interest in the topic of study	43	The student has doubts regarding and/or underestimates his/her own abilities	32
5	The student has doubts regarding and/or underestimates his/her own abilities	40	The student lacks interest in the topic of study	23

Table 14 – Most voted options about the most common reasons for someone to plagiarize

The top three most voted among programming course students and text plagiarism students is shown in table 15:

Rank	
1	The student is lazy
2	The student lacks knowledge about what is allowed and what is not allowed
	The student thinks that programming is too difficult
	The student thinks that the assignment is too difficult
3	The student lacks time

Table 15 – Top three most voted options about the most common reasons for someone to plagiarize

Students (text plagiarism) believed that *The student lacks knowledge about what is allowed and what is not allowed* was a common reason for plagiarism while programming course students perceived the fact that *The student is lazy* as a reason for such behavior.

According to a student's (text plagiarism) comment, "Students from EU know tricks and can pass easily. Students from poor countries need to spend their time for money/survival quest, not having time enough to study and consequently losing motivation and cheating". Additionally, if the university does not enforce anti-plagiarism rules, it encourages the student to plagiarize.

A few teachers (text plagiarism) mentioned that "The students' perspective of what the studies are for does not match teachers' perspectives. Also, students do not see anything wrong with copying text".

In the structured interview conducted with programming course teachers, the majority of them mentioned that the most common reason for someone to plagiarize was that *The student believes plagiarism is worthwhile, for example, it results in better grades* while 17% of the teachers who participated in text plagiarism survey shared the same opinion about it. However, the majority of text plagiarism teachers and 50% of the code plagiarism teachers agreed *The student does not understand that studying is aimed at independent and critical thinking* as the most common reason for plagiarism (Razera et al., 2010). Moreover, both groups are in alignment with each other for the fact that students lack knowledge about what is allowed and not allowed both in written and programming assignments.

## 5. Analysis

Overall, the results showed that the issue of plagiarism was not entirely clear and defined for students and teacher for that matter. There was an uncertainty on how to deal with the issue from both sides.

Considering the structure presented in the results, the analysis can be done as it follows:

a) Awareness of plagiarism

It seems to have some inconsistencies regarding the existence of policy for dealing with code plagiarism. According to the results, programming students reported that they were aware of an existence of policy; however, the programming teachers mentioned that there was not a specific policy for code plagiarism. Additionally, the issue of plagiarism seems to not be an open-discussed topic, since students usually discuss it mostly with other students. One of the programming course teachers mentioned that the issue of plagiarism was not addressed specifically for programming plagiarism, but as a general issue.

In figure 4, graph presenting the distribution per no. of students who might have plagiarized, showed that the majority of programming online students answered that they did not know any students who they thought might have plagiarized. This can be explained, maybe, due to the fact that programming campus students are more in contact with other students than online students due to physical presence at the classes.

In figure 6, graph presenting the distribution of answers for an existence of policy to deal with plagiarism, showed that 36% of programming online course students “Do not know”. This might possibly have to do with the design of the website for programming online courses; students did not find any information regarding plagiarism on the course website. Actually, according to section 3. *Case Study*, the issue of plagiarism was never discussed or presented which means that students were not informed about it. In figure 9, graph presenting the same distribution but for code

plagiarism x text plagiarism, showed that even though programming students in general were more aware about policies than text plagiarism students, they were also more uncertain if have ever plagiarized. This might indicate that they do not have a clue what is allowed or not.

When it comes to measures on how to increase awareness of plagiarism, it was noticeable in table 4 that both programming campus and online course students were aligned.

b) Attitude towards plagiarism

What can be implied from the results is that the issue of plagiarism is known from students and there has been some discussion about plagiarism in general terms. Also, it was noticeable that the limitations of plagiarism in programming were very fuzzy; there was no clear division line between what was allowed and not allowed. For instance, in section *Attitude towards Programming* → *Campus code plagiarism x Online code plagiarism*, the graph referring to issue 6 (Two students collaborating on an assignment meant to be completed individually) showed clearly the difference in opinions (54% of online course students thought it was cheating and 45% of campus course students thought it was not plagiarism or cheating). This might be explained by the fact that the campus course teachers incentivize students to discuss code and assignments with each other because they, teachers, believe that programming is a social activity. Additionally, it is also relevant to point out that approximately 20% of the campus and online course students were uncertain about the classification for this issue. Here it is possible to see that it is not clear to the students from which moment the collaboration crosses the line and becomes plagiarism.

One of the programming online course teachers, Teacher A, pointed out on issue 4 (*To literally take part of the assignment solution from a book or internet and submit it in as yours*) that “the divide line between plagiarism and cheating depends on if the student knows what is the correct way of doing it or not. If s/he knows that, then it is cheating, otherwise would be plagiarism”. For the same issue one of the programming

campus course teachers, Teacher B, commented that it totally depended on what the student took, how important it was or what the limitations of the assignments were. It seems that from an online teacher point of view if the student is aware that issue 4 is a scenario that it is not allowed and still does it, then it is cheating, but if the student is not aware of it, then it is plagiarism. But from a campus teacher perspective what will define this scenario as plagiarism or not it will depend on the background of the assignment.

On issue 5 (*To make the assignment solution by combining pieces of code taken from a book or internet*), it was noticeable that the majority of the programming campus course and programming online course students reported it as “Not Plagiarism or Cheating”. The teachers seemed to agree based on their comments. This means that combining pieces of code from different sources is allowed and not considered as plagiarism. According to Raymond (1999), “good programmers know what to write. Great ones know what to rewrite (and reuse)”.

Programming course students mentioned that to use some code written by other people was acceptable as long as the student completely understood it. They even remarked that “one should not reinvent the wheel all the time”.

Considering that the participants in text plagiarism survey were Master students and that their nationality was spread out over 16 countries (Razera et al., 2010) it is reasonable to consider that they possibly had a different education system in their home country from Stockholm University, or perhaps the issue of plagiarism was not a well-discussed topic in their home universities.

#### c) Perception of plagiarism

In table 8 was presented the most voted options about the most effective ways to prevent plagiarism and 50% of programming online course students voted *Teachers should tell what is allowed and not allowed through education and open discussions* as an way to prevent plagiarism. One of the comments stated that examples as to what

are regarded as plagiarism on every given assignments should be made available to students and that these examples should be part of the course documentation. Given the fact that no examples or even information about plagiarism were available in the website of the course, this indicates one of the needs that programming online course students have.

Programming campus course students claimed that they did not receive enough help from the teachers in order to accomplish what was asked in the assignments. Even though tutoring was available every day from 12 to 13, except on Mondays, it did not look like it was enough for the students.

According to Nichols (1996 pp. 467-476), “Individuals will tend to avoid activities they believe are beyond their capabilities”. And this can be clearly noticed in table 14 where it shows the 5 most voted options about reasons for someone to plagiarize. Both code plagiarism and writing plagiarism students expressed that *The student has doubts regarding and/or underestimates his/her own abilities* as a common reason for plagiarism.

A study conducted by Lancaster (2003) points out that the two main reasons for students to plagiarize according to the tutors’ belief in programming assignments were due to students’ disorganization or difficulty to learn how to program. These reasons were both present in the five most voted reasons for someone to plagiarize chosen by programming campus and online course students. It seems that for students, the reason for someone to plagiarize nowadays is more about time optimization than a learning matter.

A few teachers pointed out that giving students access to detection tools was not a good idea, because they would probably find a way to overcome and master the tool.

Independently of the learning model that a student is taught, both learning how to write an assignment and how to program request practice. Thus, a student will really learn how to write/program properly after writing lots of texts/programs (Sanders, 1997).

## 6. Conclusion

In the digital era, acquisition and delivery of data can be simple and fast especially with the internet as a highly efficient vehicle. Therefore, new options are available for students who want to plagiarize. The development of internet also contributed for the creation of tools to detect plagiarism. However, such tools should not be playing the main role but rather a complementary aid to the educators.

The issue of plagiarism, as mentioned before, is related to factors such culture of writing/programming, student situation (personal aspects such as having a scholarship), type of examinations, type of assignments (course structure), information about plagiarism provided to students and detection tools. A great difference when comparing code plagiarism x text plagiarism is related to the learning model. For instance, combining pieces of code taken from a book or internet is totally acceptable in programming while the same does not apply in writing assignments.

Both code plagiarism and text plagiarism students expressed the need to have clearer information about plagiarism (what is allowed and not allowed), for instance, have examples as to what are regarded as plagiarism on every given assignments. From the research, it was possible to see that there is a lack of clarity from the academia side. For example, in the website of the programming online course there was no information whatsoever about plagiarism.

One of the common reasons for someone to plagiarize cited in the results was the lack of interest in the topic of study therefore it is responsibility of the teachers to make sure to design the course in an attractive way. Moreover, the involvement should also come from the academia part; the recycling of assignments every time the course is given is a sign of teacher's lack of involvement in the education as well as a temptation for students to commit plagiarism by for example getting a copy of the solution from previous course students.



The change should come from the top, i.e. from the teachers. The department needs to make sure that all the teachers have a clear understanding about the issue of plagiarism, what are the limitations on both written and programming assignments and so on.

The teachers should not just rely on detection tools but also work on spread the knowledge of what is allowed and not allowed, as well as guide the student during the whole learning (writing or programming) and more important always give feedback on students' work.

Independently of writing or programming, one's ideas should always be referenced properly. One way to ensure that is providing clear guidance to the students by teaching them and making sure that they understand the correct way to attribute credits for information, ideas that were produced by others. If the student has been given with all the support, does understand clearly the meaning of plagiarism and still for whatever reason choose to do it anyway then it is a personal ethic issue. If someone goes to a store and shoplifts, knowing that this is an illegal behavior and does it anyway, punishment will certainly occurred. The same applies with plagiarism.

A good practice that will definitely minimize the possibility of students to plagiarize is to create some steps for the assessments. For example, with written assignments, the production process could be divided into several drafts, in this way the teacher could assist more closely the student and easily notice if discrepancies in the language exist. For programming assignments, oral examination about the code should be ideal. This would eliminate the suspicious that the program was not coded by the student who submitted it.

One of the teachers (Teacher A) pointed out that an important problem in the programming course is group work vs. individual assignment. Work collaboratively is fruitful for students' learning but the system demands the teachers to examine students individually. How to deal with it, it is not entirely clear from a teacher's perspective. Another problem pointed out by Teacher B is that the classroom size is very large and this makes impossible to keep an eye on everyone. Additionally, apply individual assignments in these cases are not ideal otherwise will be impossible to correct all the assignments.

## **6.1 Suggestion for future work**

An interesting idea for analyzing further this subject would be to make an experiment with first-year programming students and third-year programming students to see if the assumption, regarding plagiarism occurrence level being high in the first-year programming students than in other programming students, is correct. Another approach could be to compare different cultures students based on their learning models and how they deal with plagiarism and see if there is a strong relation. According to Eisner & Vicinus (2008) the attitude toward plagiarism is probably cultural-related.

In addition, a comparison among two courses where one of them divide the assessment into stages, for instance, the production of each part of a scientific report is based on drafts in combination with close teacher x student interaction and the other course's assessment is not divided into stages.

Another topic would be to compare code plagiarism and text plagiarism within the same population (e.g. Master/Bachelor students) as well as by gender. According to Caruana, Ramaseshan & Ewing (2000 pp. 23-30), male students tend to be more involved in plagiarism.

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## Appendix 1 – Table result for how to increase knowledge about plagiarism and awareness of plagiarism (programming students)

Option	Campus Students	Online Students
Information about plagiarism via the school's website or department	25%	29%
Integrating information about plagiarism into education	32%	54%
Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	46%	46%
Informing teachers about the problems	22%	14%
Informing teachers about what actions can be taken when plagiarism is detected	19%	25%
Informing students that checks for plagiarism will be made	51%	61%
Organizing information sessions regarding plagiarism for both teachers and students	16%	25%
Encouraging public debate and discussion about plagiarism within the university	33%	50%

## Appendix 2 – Table result for how to increase knowledge about plagiarism and awareness of plagiarism (code and text plagiarism - students)

Option	Students – code	Students - text
Information about plagiarism via the school's website or department	26%	45%
Integrating information about plagiarism into education	38%	30%
Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	46%	43%
Informing teachers about the problems	20%	23%
Informing teachers about what actions can be taken when plagiarism is detected	21%	15%
Informing students that checks for plagiarism will be made	54%	36%
Organizing information sessions regarding plagiarism for both teachers and students	19%	34%
Encouraging public debate and discussion about plagiarism within the university	38%	28%

## Appendix 3 – Table result for most effective ways to prevent plagiarism (programming course students)

Option	Campus Students	Online Students
Assignments should be formulated in a clear way	28%	32%
Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	28%	43%
Teachers should provide proper time schedule for the assignment so that time pressure is avoided	41%	36%
Teachers should tell what is allowed and not allowed through education and open discussions	38%	50%
Teachers should openly discuss plagiarism with students	33%	54%
The students' course workload should be reduced	12%	4%
Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem	25%	32%
Students should learn what is allowed and not allowed through education and open discussions	10%	29%
On every course and examination the students should be informed about the rules regarding plagiarism	19%	21%
The penalty for those who committed plagiarism should be more severe	15%	7%
Electronic plagiarism detection tools should be used	25%	46%
Students should be informed that their work will be checked for plagiarism	41%	61%
Students should receive proper instructions on assignments in time so that time pressure is avoided	36%	29%

## Appendix 4 – Table result for most common reasons for someone to plagiarize (programming course students)

Reason	Campus Students	Online Students
The student does not understand that studying is aimed at independent and critical thinking	35%	32%
The student has doubts regarding and/or underestimates his/her own abilities	38%	46%
The student thinks that programming is too difficult	54%	43%
The student thinks that the assignment is too difficult	54%	43%
The student lacks knowledge about what is allowed and what is not allowed	13%	25%
The student lacks interest in the topic of study	38%	57%
The student lacks time	49%	43%
The student believes plagiarism to be worthwhile, for example, it results in better grades	20%	29%
Assignments and writing exams' descriptions are unclear	8%	14%
The course demands are too high	20%	11%
The course has not been good enough to encourage the student to deliver the assignments	7%	7%
There is a competition among students with respect to grades	0%	0%
The student is lazy	43%	71%

## Appendix 5 – Table result for most effective ways to prevent plagiarism (code and text plagiarism - students)

Option (Code/Text)	Students - code	Students - text
Assignments should be formulated in a clear way/ Assignments should be formulated differently	29%	23%
Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	32%	45%
Teachers should tell what is allowed and not allowed through education and open discussions	41%	19%
Teachers should openly discuss plagiarism with students	39%	55%
The students' course workload should be reduced	9%	13%
Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem	27%	51%
Students should learn what is allowed and not allowed through education and open discussions	15%	64%
On every course and examination the students should be informed about the rules regarding plagiarism	20%	34%
The penalty for those who committed plagiarism should be more severe	12%	32%
Electronic plagiarism detection tools should be used	31%	57%
Students should be informed that their work will be checked for plagiarism	46%	55%
Students should receive proper instructions on assignments in time so that time pressure is avoided	34%	40%

## Appendix 6 – Table result for most common reasons for someone to plagiarize (code and text plagiarism - students)

Reason (Code/Text)	Students - code	Students - text
The student does not understand that studying is aimed at independent and critical thinking	34%	43%
The student has doubts regarding and/or underestimates his/her own abilities	40%	32%
The student lacks knowledge about what is allowed and what is not allowed	16%	51%
The student lacks interest in the topic of study	43%	23%
The student lacks time	47%	17%
The student believes plagiarism to be worthwhile, for example, it results in better grades	23%	19%
Assignments and writing exams' descriptions are unclear / Examinations are poorly worded	8%	4%
The course demands are too high	18%	13%
There is a competition among students with respect to grades	0	13%
The student is lazy	52%	49%

# Appendix 7 - Text plagiarism survey (students)

## Student Inquiry - Plagiarism

### Background:

The present survey belongs to a research project called “Plagiarism” conducted at K2lab - at the department of computer and systems sciences, the DSV, Stockholm University and Royal Institute of Technology.

In particular, the goal of this project is to investigate the issue of plagiarism from a developmental perspective so as to:

- a) identify how plagiarism is perceived and understood by students
- b) provide teachers with guidelines for dealing with plagiarism from a learning point of view.

In a second step, the idea is to also identify other preventive measures of more technical and organizational nature.

### About the survey:

The survey is composed by mostly alternative questions. . The only persons, who will handle the submitted surveys, are working on the DSV project team and the results will be presented after they are compiled so that your individual survey information will not be identifiable.

Responsible for the project is Harko Verhagen

Any question or comments on the survey should be addressed to Harko Verhagen  
verhagen@dsv.su.se, DSV department

### Background Data

1. Which country do you come from?
2. How old are you?
3. Sex
  - Female
  - Male
4. What master degree program are you taking?

DSV master programs:

- Computer and Systems Science
- Information Security
- ICT for development

KTH master programs:

- Communication Systems
- Design and Implementation of ICT Products and Systems
- Engineering and Management of Information Systems
- Information and Communication Security
- Interactive Systems Engineering
- Nanotechnology
- Photonics
- Software Engineering of Distributed Systems
- System-on-Chip Design

5. How many semesters have you studied in Sweden?

- 1 semester or less
- 2-3 semesters
- 4 semesters or more
- Comments: \_\_\_\_\_

6. Which of the following do you think, in your own opinion, is plagiarism, cheating, not plagiarism or cheating, or are you uncertain? Select one or more options. Categorize each of the following into plagiarism, cheating, not plagiarism or, if you are uncertain, please specify.

	Plagiarism	Cheating	Not plagiarism	Uncertain
To buy an essay from a so-called "paper mill" (an Internet site which sells papers) and hand the paper in as if it was yours				
To submit someone else's work as if it was yours				
To submit an essay that a friend wrote and gave you the permission to use it as if it was yours				
To literally take a piece of text from a book and submit it in as yours without indicating a source				
To take a piece from a known source, then make some small language changes in the text, but only indicate the source (i.e. no reference in the text)				
To use most of the content from someone else's original text but change the order. There is a reference in the text (e.g. Sjögren, 1999) and the original source appears in a list.				



To write a paragraph by bringing together shorter pieces of 10-15 words from a number of various sources and add some of your own words to form a paragraph. All original sources listed in the list without reference to the text				
To extract your main points from a text you read, but write it in your own words. The new version looks different, both in detail and because it uses different examples. A reference to the text (e.g. Sjögren, 1999) is used and the original source is listed in the bibliography.				
To quote a paragraph as well as to italicize it and cite the source with a PAGE REFERENCE in the text, in a footnote and in the bibliography.				
Other				

7. Do you know of any students who you think might have plagiarized?

- Yes, more than three
- Yes, 1-2
- No, none

8. Have you at any time discussed the possibility that a student may have plagiarized?

- Yes, more than three times
- Yes, 1-2 times
- No, never

9. If you answered yes to question 8: Whom did you discuss this alleged plagiarism with? Select all the options that apply:

- The student who plagiarized
- Other students
- Course examiner/course teacher
- Other teachers
- Director of studies (studierektor)
- Head of the department
- Other, \_\_\_\_\_

10. Have you ever plagiarized?

- Yes
- No
- Uncertain

11. Has the problem of plagiarism been addressed during your studies?

- Yes
- No
- Do not know

12. Is there, as far as you know, a policy for dealing with plagiarism at your institute?

- Yes, a written policy
- Yes, an oral policy
- No
- Do not know

13. What do you think are the most common reasons for someone to plagiarize? Select up to four of the relevant options below:

- The student does not understand that studying is aimed at independent and critical thinking
- The student has doubts regarding and/or underestimates his/her own abilities
- The student feels that he/she cannot express anything as well in his/her own words.
- The student does not know how to write scientifically
- The student lacks knowledge about what is allowed and what is not allowed.
- Examinations are poorly worded
- The course demands are too high
- There is a competition among students with respect to grades
- The student wants to pass the course at any price (performance requirements from financial supplier, near graduation)
- The student believes plagiarism to be worthwhile, for example, it results in better grades
- The student lacks motivation
- The student lacks interest in the topic of study
- The student sees plagiarism as an easy way out especially today, with the spread of computers and the Internet
- The student lacks time.
- The student is lazy.
- Other \_\_\_\_\_

14. Which of the options below do you consider the **most** effective ways to prevent plagiarism? Select up to four of the options below that apply:

- Assignments should be formulated differently
- Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge
- Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem
- Students should have better knowledge about academic writing, for example, by attending a course in academic writing
- Students should learn what is allowed and not allowed through education and open discussions

- Teachers should learn what is allowed and not allowed through education and open discussions
- On every course and examination the students should be informed about the rules regarding plagiarism
- Teachers should openly discuss plagiarism with students
- The penalty for those who committed plagiarism should be more severe
- Electronic plagiarism detection tools should be used
- Students should be informed that their work will be checked for plagiarism
- The students' course workload should be reduced
- Students should receive proper instructions on writing assignments in time so that time pressure is avoided
- Other \_\_\_\_\_

15. How the knowledge about plagiarism and awareness of plagiarism in your department should be increased? Select up to four options that apply:

- Information about plagiarism via the school's website or department
- Integrating information about plagiarism into education
- Developing clear key policy documents containing answers to questions such as, for example "what is plagiarism?", "how is plagiarism detected?", "what steps should be taken?", "what is the penalty if a student has plagiarized?", etc..
- Informing teachers about the problems
- Organizing information sessions regarding plagiarism for both teachers and students.
- Introducing tools that can help detect plagiarism
- Informing teachers about what actions can be taken when plagiarism is detected.
- Addressing plagiarism in a mandatory introduction course for teachers before they are allowed to teach at university
- Addressing plagiarism in a course for teachers about teaching at the university (högskolepedagogik)
- Addressing plagiarism in a mandatory introduction course for students on what it is like to study at university, expectations, rules, etc.
- Discussing plagiarism in a pedagogical seminar
- Discussing plagiarism at different levels, from undergraduate to PhD studies
- Informing students that plagiarism actually exists in order to raise awareness
- Informing students that checks for plagiarism will be made
- Adapting teaching methods so students are encouraged to use other strategies when writing assignments
- Encouraging public debate and discussion about plagiarism within the university.
- Other \_\_\_\_\_

16. Please feel free to mention other ideas and views on plagiarism below:

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*Thank you for your cooperation!*

# Appendix 8 – Text plagiarism survey (teachers)

## Teacher Inquiry - Plagiarism

### Background:

The present survey belongs to a research project called “Plagiarism” conducted at K2lab - at the department of computer and systems sciences, the DSV, Stockholm University and Royal Institute of Technology.

In particular, the goal of this project is to investigate the issue of plagiarism from a developmental perspective so as to:

- a) identify how plagiarism is perceived and understood by students
- b) provide teachers with guidelines for dealing with plagiarism from a learning point of view.

In a second step, the idea is to also identify other preventive measures of more technical and organizational nature.

### About the survey:

The survey is composed by mostly alternative questions. . The only persons, who will handle the submitted surveys, are working on the DSV project team and the results will be presented after they are compiled so that your individual survey information will not be identifiable.

Responsible for the project is Harko Verhagen

Any question or comments on the survey should be addressed to Harko Verhagen  
verhagen@dsv.su.se, DSV department

### Background Data

1. Which country do you come from?
2. How old are you?
3. Sex
  - Female
  - Male
4. What part of the ICT School do you belong to or program do you teach?

DSV master programs:

- Computer and Systems Science
- Information Security
- ICT for development

KTH master programs:

- Communication Systems
- Design and Implementation of ICT Products and Systems
- Engineering and Management of Information Systems
- Information and Communication Security
- Interactive Systems Engineering
- Nanotechnology
- Photonics
- Software Engineering of Distributed Systems
- System-on-Chip Design
  
- Not a master teacher
- Not a teacher

If other, please specify:

5. How many semesters of teaching experience do you have:

- 1 semesters or less
- 2-3 semesters
- 4 semesters or more
- Comments: \_\_\_\_\_

6. How many courses have you taught?

- 0 courses
- 2 courses or less
- 3-6 courses
- 7 courses or more
- Comments: \_\_\_\_\_

7. Which of the following do you think, in your own opinion, is plagiarism, cheating, not plagiarism or cheating, or are you uncertain? Select one or more options. Categorize each of the following into plagiarism, cheating, not plagiarism or, if you are uncertain, please specify.

	Plagiarism	Cheating	Not plagiarism	Uncertain
To buy an essay from a so-called "paper mill" (an Internet site which sells papers) and hand the paper in as if it was yours				
To submit someone else's work as if it was yours				
To submit an essay that a friend wrote and gave you the permission to use it as if it was yours				

To literally take a piece of text from a book and submit it in as yours without indicating a source				
To take a piece from a known source, then make some small language changes in the text, but only indicate the source (i.e. no reference in the text)				
To use most of the content from someone else's original text but change the order. There is a reference in the text (e.g. Sjögren, 1999) and the original source appears in a list.				
To write a paragraph by bringing together shorter pieces of 10-15 words from a number of various sources and add some of your own words to form a paragraph. All original sources listed in the list without reference to the text				
To extract your main points from a text you read, but write it in your own words. The new version looks different, both in detail and because it uses different examples. A reference to the text (e.g. Sjögren, 1999) is used and the original source is listed in the bibliography.				
To quote a paragraph as well as to italicize it and cite the source with a PAGE REFERENCE in the text, in a footnote and in the bibliography.				
Other				

8. Do you know of any students who you think might have plagiarized?
- Yes, more than three
  - Yes, 1-2
  - No, none
9. Have you, as a teacher, seen signs of plagiarism in a student's work?
- Yes, more than three times
  - Yes, 1-2 times
  - No, never
10. Have you at any time discussed the possibility that a student may have plagiarized?
- Yes, more than three times

- Yes, 1-2 times
  - No, never
11. If you answered yes to question 10: Whom did you discuss this alleged plagiarism with? Select all the options that apply:
- The student who plagiarized
  - Other students
  - Course examiner/course teacher
  - Other teachers
  - Director of studies (studierektor)
  - Head of the department
  - Other \_\_\_\_\_
12. If you answered yes to question 10: Was there any evidence that the plagiarism actually occurred?
- Yes, in all cases
  - Yes, in some cases
  - No, never
  - Do not know
13. If you answered yes to question 12: What was the penalty?
- Suspension 6 months
  - Suspension 4-5 months
  - Suspension 2-3 months
  - Suspension up to 1 months
  - Warning
  - The submitted work was rejected
  - The submitted work had to be supplemented
  - Personal discussion with examiner
  - Personal discussion with director of studies
  - Personal discussion with head of department
  - Other \_\_\_\_\_
14. Have you ever plagiarized (e.g. as a student, teacher or scientist)?
- Yes
  - No
  - Uncertain
15. How do you detect plagiarism? What makes you suspicious? Select up to four of the options below that apply:
- The language varies greatly in level (language, grammar, style, etc.) in different parts of the work
  - There are remnants of, for example, Internet-formatting of text
  - There are dated references (such as "at the upcoming millennium ...")
  - Footnotes etc. shift in style
  - The level of work is too high compared with previous work

- The level of work is too high in relation to the student level (for example, A-course)
- There are anachronisms, such as obsolete language
- The electronic plagiarism detection program “shows a red flag”
- "This sounds familiar ... “ / ”I have read that before ..." type of feeling
- The student submits the completed essay without ever having made contact during course or process
- Other \_\_\_\_\_

16. What do you think is the most common reason for someone to plagiarize? Select up to four of the options below that apply:

- The student does not understand that studying is aimed at independent and critical thinking
- The student has doubts regarding and/or underestimates his/her own abilities
- The student feels that she/he cannot express anything as well in his/her own words.
- The student does not know how to write scientifically.
- The student lacks knowledge about what is allowed and what is not allowed.
- Examinations are poorly worded.
- The course demands are too high.
- There is a competition among students with respect to grades.
- The student wants to pass the course at any price (performance requirements from financial supplier, near graduation).
- The student believes plagiarism to be worthwhile, for example, it results in better grades.
- The student lacks motivation.
- The student lacks interest in the topic of study.
- The student sees plagiarism as an easy way out especially today, with the spread of computers and the Internet.
- The student lacks time.
- That student is lazy.
- Other \_\_\_\_\_

17. Is the problem of plagiarism addressed at your institute?

- Yes, both for teachers and students
- Yes, for teachers
- Yes, for students
- No
- Do not know

18. Is there, as far as you know, a policy for dealing with plagiarism at your institute?

- Yes, a written policy
- Yes, an oral policy
- No
- Do not know



19. Which of the options below do you consider the **most** effective ways to prevent plagiarism? Select up to four of the options below that apply:

- Assignments should be formulated differently
- Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge
- Students should get better training in the type of assignments where plagiarism usually occurs to give them better self-esteem
- Students should have better knowledge about academic writing, for example, by attending a course in academic writing
- Students should be learn what is allowed and not allowed through education and open discussions
- Teachers should learn what is allowed and not allowed through education and open discussions
- Students should be informed at every examination where there is a risk of plagiarism
- Teachers should openly discuss plagiarism with students
- The penalty for those who committed should be severe
- Electronic plagiarism detection tools should be used
- Students should be informed that their work will be checked for plagiarism
- The students' course workload should be reduced
- Students should receive proper instructions on writing assignments in time so that time pressure is avoided
- Other \_\_\_\_\_

20. How the knowledge about plagiarism and awareness of plagiarism at your department should be increased? Select up to four of the options below that apply:

- Information about plagiarism via the school's website or department
- Integrating information about plagiarism into education
- Developing clear key policy documents containing answers to questions such as, for example, "what is plagiarism?", "how is plagiarism detected?", "what steps should be taken?", "what is the penalty if a student has plagiarized?", etc..
- Informing teachers about the problems
- Organizing information sessions regarding plagiarism for both teachers and students
- Introducing tools that can help detect plagiarism
- Informing teachers about what actions can be taken when plagiarism is detected
- Addressing plagiarism in a mandatory introduction course for teachers before they are allowed to teach at university
- Addressing plagiarism in the course for teachers about teaching at the university ("högskolepedagogik")
- Addressing plagiarism in a mandatory introduction course for students on what it is like to study at university, expectations, rules, etc.
- Discussing plagiarism in a pedagogical seminar
- Discussing plagiarism at different levels, from undergraduate to PhD studies
- Informing students that plagiarism actually exists to raise awareness
- Informing students that checks for plagiarism will be made
- Adapting teaching methods so students are encouraged to use other strategies when

- writing assignments
- Encouraging public debate and discussion about plagiarism within the university
- Other\_\_\_\_\_

21. Please feel free to mention other ideas and views on plagiarism below:

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*Thank you for your cooperation!*

# Appendix 9 – Code plagiarism survey (students)

## Student Inquiry - Plagiarism

### Background:

The present survey belongs to a research project called “Plagiarism” conducted at K2lab - at the department of computer and systems sciences, the DSV, Stockholm University.

In particular, the goal of this project is to investigate the issue of plagiarism from a developmental perspective so as to:

- a) identify how plagiarism is perceived and understood by students
- b) provide teachers with guidelines for dealing with plagiarism from a learning point of view.

In a second step, the idea is to also identify other preventive measures of more technical and organizational nature.

### About the survey:

The survey is composed by mostly alternative questions. . The only persons, who will handle the submitted surveys, are working on the DSV project team and the results will be presented after they are compiled so that your individual survey information will not be identifiable.

Responsible for the project is Harko Verhagen

Any question or comments on the survey should be addressed to Harko Verhagen  
verhagen@dsv.su.se, DSV department

### Background Data

1. Which country do you come from?
2. How old are you?
3. Sex
  - Female
  - Male
4. What type of programming course are you enrolled in?
  - Online
  - Campus

5. Which of the following do you think, in your own opinion, is plagiarism, cheating, not plagiarism or cheating, or are you uncertain? Select one or more options. Categorize each of the following into plagiarism, cheating, not plagiarism or, if you are uncertain, please specify.

No.		Plagiarism	Cheating	Not plagiarism	Uncertain
1	To buy a ready code solution from a so-called "rent a coder" (an Internet site which sells code) and hand the assignment in as if it was yours				
2	To submit a complete solution, that you took from someone else anonymously, as if it was yours				
3	To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours				
4	To literally take part of the assignment solution from a book or internet and submit it in as yours				
5	To make the assignment solution by combining pieces of code taken from a book or internet				
6	To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers				
7	To use most of the content from someone else's original code but reorder code blocks				
8	To extract your main logic from a code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on.				
9	To write a code by copying the majority of an assignment from a friend's assignment and add some of your own work to it				
10	Two students collaborating on an assignment meant to be completed individually				
11	Showing assignment work to the lecturer for guidance				
12	Showing assignment work to a lecturer (e.g. teacher assistant, personnel unrelated to the course) for guidance				

13	Posting to an Internet forum asking many questions (specific or general) for assistance				
14	Posting to an Internet forum asking for a few questions for assistance				
15	Other				

6. Do you know of any students who you think might have plagiarized in programming courses?

- Yes, more than two
- Yes, 1-2
- No, none

7. Have you at any time discussed the possibility that a student may have plagiarized in programming courses?

- Yes, more than two times
- Yes, 1-2 times
- No, never

8. If you answered yes to question 7: Whom did you discuss this alleged source code plagiarism with? Select all the options that apply:

- The student who plagiarized
- Other students
- Course examiner/course teacher
- Other teachers
- Director of studies (studierektor)
- Head of the department
- Other, \_\_\_\_\_

9. Have you ever plagiarized in a programming course?

- Yes
- No
- Uncertain

10. Has the problem of source code plagiarism been addressed during your programming course?

- Yes
- No
- Do not know

11. Is there, as far as you know, a policy for dealing with source code plagiarism at your school?

- Yes, a written policy
- Yes, an oral policy
- Yes, several
- No
- Do not know

12. What do you think are the most common reasons for someone to plagiarize in a programming course? Select up to four of the relevant options below:

- The student does not understand that studying is aimed at independent and critical thinking
- The student has doubts regarding and/or underestimates his/her own abilities
- The student thinks that programming is too difficult
- The student thinks that the assignment is too difficult
- The student lacks knowledge about what is allowed and what is not allowed
- The student lacks interest in the topic of study
- The student lacks time
- The student believes plagiarism to be worthwhile, for example, it results in better grades
- Assignments and writing exams' descriptions are unclear
- The course demands are too high
- The course has not been good enough to encourage the student to deliver the assignments
- There is a competition among students with respect to grades
- The student is lazy
- Other \_\_\_\_\_

13. Which of the options below do you consider the **most** effective ways to prevent source code plagiarism? Select up to four of the options below that apply:

- Assignments should be formulated in a clear way
- Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge
- Teachers should provide proper time schedule for the assignment so that time pressure is avoided
- Teachers should tell what is allowed and not allowed through education and open discussions
- Teachers should openly discuss plagiarism with students
- The students' course workload should be reduced
- Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem
- Students should learn what is allowed and not allowed through education and open discussions
- On every course and examination the students should be informed about the rules regarding plagiarism
- The penalty for those who committed plagiarism should be more severe
- Electronic plagiarism detection tools should be used
- Students should be informed that their work will be checked for plagiarism
- Students should receive proper instructions on assignments in time so that time pressure is avoided
- Other \_\_\_\_\_

14. How should the knowledge about plagiarism and awareness of plagiarism in your department be increased? Select up to four options that apply:

- Information about plagiarism via the school's website or department
- Integrating information about plagiarism into education
- Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?”, etc..
- Informing teachers about the problems
- Informing teachers about what actions can be taken when plagiarism is detected.
- Informing students that checks for plagiarism will be made
- Organizing information sessions regarding plagiarism for both teachers and students.
- Encouraging public debate and discussion about plagiarism within the university
- Other \_\_\_\_\_

15. Please feel free to mention other ideas and views on plagiarism below:

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*Thank you for your cooperation!*

# Appendix 10 – Code plagiarism survey (teachers)

## Teacher Inquiry - Plagiarism

### Background:

The present survey belongs to a research project called “Plagiarism” conducted at K2lab - at the department of computer and systems sciences, the DSV, Stockholm University and Royal Institute of Technology.

In particular, the goal of this project is to investigate the issue of plagiarism from a developmental perspective so as to:

- a) identify how plagiarism is perceived and understood by students
- b) provide teachers with guidelines for dealing with plagiarism from a learning point of view.

In a second step, the idea is to also identify other preventive measures of more technical and organizational nature.

### About the survey:

The survey is composed by mostly alternative questions. The only persons, who will handle the submitted surveys, are working on the DSV project team and the results will be presented after they are compiled so that your individual survey information will not be identifiable.

Responsible for the project is Harko Verhagen

Any question or comments on the survey should be addressed to Harko Verhagen  
verhagen@dsv.su.se, DSV department

### Background Data

1. Which country do you come from?
2. How old are you?
3. Sex
  - Female
  - Male
4. What type of programming course are you teaching?
  - Online
  - Campus



5. How many times have you been a teacher in a programming course?

- 2 courses or less
  - 3-6 courses
  - 7 courses or more
  - Comments: \_\_\_\_\_
- 

6. Which of the following do you think, in your own opinion, is plagiarism, cheating, not plagiarism or cheating, or are you uncertain? Select one or more options. Categorize each of the following into plagiarism, cheating, not plagiarism or, if you are uncertain, please specify.

No.		Plagiarism	Cheating	Not plagiarism	Uncertain
1	To buy a ready code solution from a so-called "rent a coder" (an Internet site which sells code) and hand the assignment in as if it was yours				
2	To submit a complete solution, that you took someone else anonymously, as if it was yours				
3	To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours				
4	To literally take part of the assignment solution from a book or internet and submit it in as yours				
5	To make the assignment solution by combining pieces of code taken from a book or internet				
6	To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers				
7	To use most of the content from someone else's original code but reorder code blocks				
8	To extract your main logic from code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on.				
9	To write code by copying the majority of an assignment from a friend's assignment and add some of your own work to it				
10	Two students collaborating on an				

	assignment meant to be completed individually				
11	Showing assignment work to the lecturer for guidance				
12	Showing assignment work to a lecturer (e.g. teacher assistant, personnel unrelated to the course) for guidance				
13	Posting to an Internet forum asking many questions (specific or general) for assistance				
14	Posting to an Internet forum asking for a few questions for assistance				
15	Other				

7. Do you know of any students who you think might have plagiarized in a programming course?

- Yes, more than two
- Yes, 1-2
- No, none

8. Have you, as a teacher, seen signs of plagiarism in a student's work?

- Yes, more than two times
- Yes, 1-2 times
- No, never

9. Have you at any time discussed the possibility that a student may have plagiarized in a programming course?

- Yes, more than two times
- Yes, 1-2 times
- No, never

10. If you answered yes to question 9: Whom did you discuss this alleged plagiarism with? Select all the options that apply:

- The student who plagiarized
- Other students
- Course examiner/course teacher
- Other teachers
- Director of studies (studierektor)
- Head of the department
- Other \_\_\_\_\_

11. If you answered yes to question 9: In how many cases are you convinced that the plagiarism occurred actually occurred?

- Yes, in all cases

- Yes, in some cases
- No, never
- Do not know

12. If you answered yes to question 11: What was the penalty?

- Suspension 6 months
- Suspension 4-5 months
- Suspension 2-3 months
- Suspension up to 1 months
- Warning
- The submitted work was rejected
- The submitted work had to be supplemented
- Personal discussion with examiner
- Personal discussion with director of studies
- Personal discussion with head of department
- Other \_\_\_\_\_

13. Have you ever plagiarized in a programming course?

- Yes
- No
- Uncertain

14. How do you detect plagiarism in a programming course? What makes you suspicious? Select up to four of the options below that apply:

- The context varies greatly in level (different style, different choices of names, different solutions to similar problems etc.) in parts of the work
- There are remnants of, for example, different indentation
- Comments shift in style and level of abstraction
- The level of work is too high compared with previous work
- The level of work is too high in relation to the student level (for example, A-course)
- The electronic plagiarism detection program "shows a red flag"
- "This sounds familiar ... " / "I have seen that before ..." type of feeling
- The student submits the completed assignment without ever having made contact during course or process
- Other \_\_\_\_\_

15. What do you think is the most common reason for someone to plagiarize in a programming course? Select up to four of the options below that apply:

- The student does not understand that studying is aimed at independent and critical thinking
- The student has doubts regarding and/or underestimates his/her own abilities
- The student thinks that programming is too difficult
- The student thinks that the assignment is too difficult
- The student lacks knowledge about what is allowed and what is not allowed
- The student lacks interest in the topic of study

- The student lacks time
- The student believes plagiarism to be worthwhile, for example, it results in better grades
- Assignments and writing exams' descriptions are unclear
- The course demands are too high
- The course has not being good enough to encourage the student to deliver the assignments
- There is a competition among students with respect to grades
- The student is lazy
- Other \_\_\_\_\_

16. Is the problem of plagiarism in programming course addressed at your institute?

- Yes, both for teachers and students
- Yes, for teachers
- Yes, for students
- No
- Do not know

17. Is there, as far as you know, a policy for dealing with source code plagiarism at your institute?

- Yes, a written policy
- Yes, an oral policy
- No
- Do not know

18. Does your institution use an automatic tool to check all submitted source code for indications of copying?

- Yes
- No

19. If you answered yes to question 18. Which checking system is used?

- A public service such as MOSS, JPlag
- A service developed and/or operated in house
- A part of an integrated teaching environment
- Other \_\_\_\_\_

20. Which of the options below do you consider the **most** effective ways to prevent plagiarism? Select up to four of the options below that apply:

- Assignments should be formulated in a clear way
- Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge
- Teachers should provide proper time schedule for the assignment so that time pressure is avoided
- Teachers should tell what is allowed and not allowed through education and open discussions
- Teachers should openly discuss plagiarism with students
- The students' course workload should be reduced
- Students should get better training in the type of assignments where plagiarism usually

- occurs to give them better self esteem
- Students should learn what is allowed and not allowed through education and open discussions
- On every course and examination the students should be informed about the rules regarding plagiarism
- The penalty for those who committed plagiarism should be more severe
- Electronic plagiarism detection tools should be used
- Students should be informed that their work will be checked for plagiarism
- Other \_\_\_\_\_

22. How should the knowledge about plagiarism and awareness of plagiarism in your department be increased? Select up to four options that apply:

- Information about plagiarism via the school's website or department
- Integrating information about plagiarism into education
- Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?”, etc..
- Informing teachers about the problems
- Informing teachers about what actions can be taken when plagiarism is detected.
- Informing students that checks for plagiarism will be made
- Organizing information sessions regarding plagiarism for both teachers and students.
- Addressing plagiarism in a mandatory introduction course for teachers before they are allowed to teach at university
- Addressing plagiarism in a course for teachers about teaching at the university (högskolepedagogik)
- Addressing plagiarism in a mandatory introduction course for students on what it is like to study at university, expectations, rules, etc.
- Encouraging public debate and discussion about plagiarism within the university
- Other \_\_\_\_\_

23. Please feel free to mention other ideas and views on plagiarism below:

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*Thank you for your cooperation!*

## Appendix 11 – Data comparison code plagiarism (students)

**Total number of campus course students: 69**

**Total number of online course students: 28**

1. Which country do you come from?

Country	Campus Students (quantity)	Online Students (quantity)
Sweden	62	28
Turkey	1	-
Russia	1	-
Pakistan	1	-
Iran	1	-
Burundi	1	-
NA	2	-

2. How old are you?

Age Range	Campus Students	Online Students
19	10	-
20-29	55	22
30-39	1	4
40-49	-	1
50-65	-	1
NA	3	-

3. Sex

Sex	Campus Students	Online Students
Male	53	22
Female	16	6

4. Which of the following do you think, in your opinion, is plagiarism, cheating, not plagiarism or cheating, or are you uncertain? Select one or more options. Categorize each of the following into plagiarism, cheating, not plagiarism or cheating, or if you are uncertain, please specify.

**Total number of campus course students: 69**

**Total number of online course students: 28**

	Plagiarism		Cheating		Not Plagiarism or Cheating		Uncertain	
	Campus Students	Online Students	Campus Students	Online Students	Campus Students	Online Students	Campus Students	Online Students
To buy a ready code solution from a so-called “rent a coder” (an Internet site which sells code) and hand the assignment in as if it was yours	13	3	36	19	2	0	1	0
To submit a complete solution, that you took from someone else anonymously, as if it was yours	38	10	11	3	0	0	0	0
To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours	16	4	28	16	5	1	7	0
To literally take part of the assignment solution from a book or internet and submit it in as yours	33	11	5	2	8	2	15	1
To make the assignment solution by combining pieces of code taken from a book or internet	10	2	5	2	33	14	19	6

To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers	27	6	13	6	8	3	13	5
To use most of the content from someone else's original code but reorder code blocks	23	8	22	6	2	1	12	3
To extract your main logic from a code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on.	3	1	4	0	57	25	4	1
To write a code by copying the majority of an assignment from a friend's assignment and add some of your own work to it	12	2	16	12	11	1	28	6
Two students collaborating on an assignment meant to be completed individually	1	1	21	15	30	6	14	6
Showing assignment work to the lecturer for guidance	0	0	1	1	62	27	6	0
Showing assignment work to a lecturer (e.g. teacher assistant, personnel unrelated to the course) for guidance	0	0	0	0	60	27	9	1
Posting to an Internet forum asking many questions (specific or general) for assistance	0	0	2	3	56	20	11	4



Posting to an Internet forum asking for a few questions for assistance	0	0	2	1	61	26	6	1
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5. Do you know of any students who you think might have plagiarized in programming courses?

No. of Student	Campus Students	Online Students
Yes, more than two	28	8
Yes, 1-2	16	9
No, none	25	11

6. Have you at any time discussed the possibility that a student may have plagiarized in programming courses?

No. of Time	Campus Students	Online Students
Yes, more than two	15	2
Yes, 1-2	19	9
No, never	35	17

7. Whom did you discuss this alleged source code plagiarism with? Select all the options that apply (If you answered yes to question 6):

**Total responded (campus course students): 34**

**Total responded (online course students): 11**

Who	Campus Students	Online Students
The student who plagiarized	10	2
Other students	29	11
Course examiner/course teacher	3	1
Other teachers	0	0
Director of studies	0	0
Head of the department	1	0
Other (comment): Friends	2	1
Other (comment): NA	1	-

8. Have you ever plagiarized in a programming course?

Answer	Campus Students	Online Students
Yes	6	0
No	45	18
Uncertain	18	10

9. Has the problem of source code plagiarism been addressed during your programming course?

Answer	Campus Students	Online Students
Yes	54	13
No	5	10
Do not know	10	5

10. Is there, as far as you know, a policy for dealing with source code plagiarism at your school?

Answer	Campus Students	Online Students
Yes, a written policy	49	12
Yes, an oral policy	1	2
Yes, several	15	4
No	1	0
Do not know	3	10

11. What do you think are the most common reasons for someone to plagiarize in a programming course? Select up to four of the relevant options below:

Reason	Campus Students	Online Students
The student does not understand that studying is aimed at independent and critical thinking	24	9
The student has doubts regarding and/or underestimates his/her own abilities	26	13
The student thinks that programming is too difficult	37	12
The student thinks that the assignment is too difficult	37	12
The student lacks knowledge about what is allowed and what is not allowed	9	7
The student lacks interest in the topic of study	26	16
The student lacks time	34	12
The student believes plagiarism to be worthwhile, for example, it results in better grades	14	8
Assignments and writing exams' descriptions are unclear	4	4
The course demands are too high	14	3
The course has not been good enough to encourage the student to deliver the assignments	5	2
There is a competition among students with respect to grades	0	0
The student is lazy	30	20

12. Which of the options below do you consider the **most** effective ways to prevent source code plagiarism? Select up to four of the options below that apply:

Option	Campus Students	Online Students
Assignments should be formulated in a clear way	19	9
Teachers should have more time to develop good exams and tasks that require critical thinking and	19	12

analysis and not just to test factual knowledge		
Teachers should provide proper time schedule for the assignment so that time pressure is avoided	28	10
Teachers should tell what is allowed and not allowed through education and open discussions	26	14
Teachers should openly discuss plagiarism with students	23	15
The students' course workload should be reduced	8	1
Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem	17	9
Students should learn what is allowed and not allowed through education and open discussions	7	8
On every course and examination the students should be informed about the rules regarding plagiarism	13	6
The penalty for those who committed plagiarism should be more severe	10	2
Electronic plagiarism detection tools should be used	17	13
Students should be informed that their work will be checked for plagiarism	28	17
Students should receive proper instructions on assignments in time so that time pressure is avoided	25	8

13. How should the knowledge about plagiarism and awareness of plagiarism in your department be increased? Select up to four options that apply:

<b>Option</b>	<b>Campus Students</b>	<b>Online Students</b>
Information about plagiarism via the school's website or department	17	8
Integrating information about plagiarism into education	22	15
Developing clear key policy documents containing answers to questions such as, for example "what is plagiarism?", "how is plagiarism detected?", "what steps should be taken?", "what is the penalty if a student has plagiarized?" etc...	32	13
Informing teachers about the problems	15	4
Informing teachers about what actions can be taken when plagiarism is detected	13	7
Informing students that checks for plagiarism will be made	35	17
Organizing information sessions regarding plagiarism for both teachers and students	11	7

Encouraging public debate and discussion about plagiarism within the university	23	14
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## Appendix 12 – Data comparison code and text plagiarism (students)

Total number of students (code): 97

Total number of students (text): 47

1. Which country do you come from?

Country	Students – code (quantity)	Students – text (quantity)
Sweden	90	4
Turkey	1	-
Russia	1	1
Pakistan	1	12
Iran	1	-
Burundi	1	-
Bangladesh	-	9
Greece	-	7
India	-	1
Ghana	-	1
Norway	-	1
Ukraine	-	1
Mexico	-	1
Poland	-	1
Chile	-	1
France	-	1
Tanzania	-	1
Uzbekistan	-	1
USA	-	1
China	-	3
NA	2	-

2. How old are you?

Age Range	Students – code	Students - text
19	10	-
20-29	77	33
30-39	5	12
40-49	1	2
50-65	1	-
NA	3	-

### 3. Sex

<b>Sex</b>	<b>Students – code</b>	<b>Students - text</b>
Male	75	36
Female	22	11

4. Which of the following do you think, in your opinion, is plagiarism, cheating, not plagiarism or cheating, or are you uncertain? Select one or more options. Categorize each of the following into plagiarism, cheating, not plagiarism or cheating, or if you are uncertain, please specify.

Code/Text	Plagiarism		Cheating		Not Plagiarism or Cheating		Uncertain	
	Code Students	Text Students	Code Students	Text Students	Code Students	Text Students	Code Students	Text Students
To buy a ready code solution from a so-called "rent a coder" (an Internet site which sells code) and hand the assignment in as if it was yours/ To buy an essay from a so-called "paper mill" (an Internet site which sells papers) and hand the paper in as if it was yours	16	7	55	23	2	4	1	3
To submit a complete solution, that you took from someone else anonymously, as if it was yours/ To submit someone else's work as if it was yours	48	22	14	14	0	0	0	0
To submit an assignment that a friend wrote and gave you the permission to use it as if it was yours/ To submit an essay that a friend wrote and gave you the permission to use it as if it was yours	20	7	44	27	6	4	7	2
To literally take part of the assignment solution from a book or internet and submit it in as yours/ To literally take a piece of text from a book and submit it in as yours without indicating a source	44	35	7	3	10	1	16	2
To take a piece from a book or internet, then make some small changes in the code such as change comments, name of identifiers/ To take a piece from a known	33	21	19	5	11	8	18	6



source, then make some small language changes in the text, but only indicate the source (i.e. no reference in the text)								
To use most of the content from someone else's original code but reorder code blocks/ To use most of the content from someone else's original text but change the order. There is a reference in the text (e.g. Sjögren, 1999) and the original source appears in a list	31	16	28	6	3	11	15	7
To extract your main logic from a code you read, but write it in your own words causing names, identifiers etc. to be different. Clearly stating the source that the structure of the solution is based on. / To extract your main points from a text you read, but write it in your own words. The new version looks different, both in detail and because it uses different examples. A reference to the text (e.g. Sjögren, 1999) is used and the original source is listed in the bibliography	4	2	4	1	82	40	5	2
To write a code by copying the majority of an assignment from a friend's assignment and add some of your own work to it/ To write a paragraph by bringing together shorter pieces of 10-15 words from a number of various sources and add some of your own words to form a paragraph. All original sources listed in the list without reference to the text	14	16	28	3	12	11	34	6

5. Do you know of any students who you think might have plagiarized in programming courses? / Do you know of any students who you think might have plagiarized?

No. of Student	Students – code	Students - text
Yes, more than two	36	9
Yes, 1-2	25	13
No, none	36	25

6. Have you at any time discussed the possibility that a student may have plagiarized in programming courses? / Have you at any time discussed the possibility that a student may have plagiarized?

No. of Time	Students – code	Students - text
Yes, more than two	17	7
Yes, 1-2	28	12
No, never	52	28

7. Whom did you discuss this alleged source code plagiarism with? / Whom did you discuss this alleged plagiarism with? Select all the options that apply (If you answered yes to question 6):

**Total responded (code students): 45**

**Total responded (text students): 19**

Who	Students – code	Students - text
The student who plagiarized	12	8
Other students	40	15
Course examiner/course teacher	4	9
Other teachers	0	0
Director of studies	0	1
Head of the department	1	0
Other (comment): Friends	3	3
Other (comment): NA	1	-

8. Have you ever plagiarized in a programming course? / Have you ever plagiarized?

Answer	Students – code	Students - text
Yes	6	4
No	63	36
Uncertain	28	7

9. Has the problem of source code plagiarism been addressed during your programming course? / Has the problem of plagiarism been addressed during your studies?

Answer	Students – code	Students - text
Yes	67	24
No	15	15
Do not know	15	8

10. Is there, as far as you know, a policy for dealing with source code plagiarism at your school? / Is there, as far as you know, a policy for dealing with plagiarism at your institute?

Answer	Students – code	Students - text
Yes, a written policy	61	31
Yes, an oral policy	3	3
Yes, several	19	0
No	1	3
Do not know	13	10

11. What do you think are the most common reasons for someone to plagiarize in a programming course? Select up to four of the relevant options below:

Reason (Code/Text)	Students – code	Students - text
The student does not understand that studying is aimed at independent and critical thinking	33	20
The student has doubts regarding and/or underestimates his/her own abilities	39	15
The student lacks knowledge about what is allowed and what is not allowed	16	24
The student lacks interest in the topic of study	42	11
The student lacks time	46	8
The student believes plagiarism to be worthwhile, for example, it results in better grades	22	9
Assignments and writing exams' descriptions are unclear / Examinations are poorly worded	8	2
The course demands are too high	17	6
There is a competition among students with respect to grades	0	6
The student is lazy	50	23

12. Which of the options below do you consider the **most** effective ways to prevent (source code) plagiarism? Select up to four of the options below that apply:

<b>Option (Code/Text)</b>	<b>Students – code</b>	<b>Students - text</b>
Assignments should be formulated in a clear way/ Assignments should be formulated differently	28	11
Teachers should have more time to develop good exams and tasks that require critical thinking and analysis and not just to test factual knowledge	31	21
Teachers should tell what is allowed and not allowed through education and open discussions	40	9
Teachers should openly discuss plagiarism with students	38	26
The students' course workload should be reduced	9	6
Students should get better training in the type of assignments where plagiarism usually occurs to give them better self esteem	26	24
Students should learn what is allowed and not allowed through education and open discussions	15	30
On every course and examination the students should be informed about the rules regarding plagiarism	19	16
The penalty for those who committed plagiarism should be more severe	12	15
Electronic plagiarism detection tools should be used	30	27
Students should be informed that their work will be checked for plagiarism	45	26
Students should receive proper instructions on assignments in time so that time pressure is avoided	33	19

13. How should the knowledge about plagiarism and awareness of plagiarism in your department be increased? Select up to four options that apply:

<b>Option</b>	<b>Students –code</b>	<b>Students - text</b>
Information about plagiarism via the school's website or department	25	21
Integrating information about plagiarism into education	37	14
Developing clear key policy documents containing answers to questions such as, for example “what is plagiarism?”, “how is plagiarism detected?”, “what steps should be taken?”, “what is the penalty if a student has plagiarized?” etc...	45	20
Informing teachers about the problems	19	11
Informing teachers about what actions can be taken when plagiarism is detected	20	7

Informing students that checks for plagiarism will be made	52	17
Organizing information sessions regarding plagiarism for both teachers and students	18	16
Encouraging public debate and discussion about plagiarism within the university	37	13