

Westfälische Wilhelms-Universität Münster

**Attitudes towards and interests in Computer
Science of Turkish female secondary school
students compared to German female
students.**

Master's Thesis

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To my loved father

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Annotations

- All translations are own, if it is not particularly marked
- students = secondary school students, all others will be marked noticeably
- German students = students from Germany
- Turkish students = students from Turkey
- German boy/males = male student/s from Germany
- Turkish boy/males = male student/s from Turkey
- German girl/females = female student/s from Germany
- Turkish girl/females girl = female student/s from Turkey

Abstract

This master's thesis surveyed especially recent international research on the problem of the low participation of women in Computer Science (CS) and Engineering. Western countries like Germany seem to have this problem, while Middle Eastern countries like Turkey have much more women in CS. The thesis seeks thus to answer the question: How do such great differences come off between those countries? Cultural differences like prejudices of technological professions, especially CS, is seen as one cause.

According to this problem, a study with 671 female and male secondary school students in both countries have been conducted to find differences or similarities between them. The focus of the study was to compare and to find out differences in females' attitude towards CS and Information Technology (IT). For an appropriate reasoning of the results, the recent situation of Turkey and Germany, women's education history, the education systems and CS courses at schools for both countries are examined. Certainly, the results of the study verify significant differences between Turkish females and German females. One of the most important differences is that Turkish female students are more likely to choose CS in higher education (HE) than German female students. Furthermore, students' attendance at CS courses at school, domestic computer use, intention to study in HE, perceptions of CS and students' computer self-efficacy have been explored. This thesis presents and discusses the results of the study.

Summing up, because of comparison of two countries, research is a special one in this field. Further, the findings give an overview of reasons for Germany and some recommendations. More specifically, appropriate actions to increase women's interest and participation in CS are suggested according to the findings.

Zusammenfassung

In dieser Masterarbeit wurden aktuelle Forschungen über das Problem der geringen Teilnahme der Frauen in Informatik und Ingenieurwissenschaften untersucht. Während viele Industriestaaten wie Deutschland sich in höherem Maße mit diesem Problem auseinandersetzen, kann dieses in mittelöstlichen Ländern wie der Türkei nicht als akut beschrieben werden. Deshalb suchte diese Arbeit die Antwort auf die Frage: Wie kommt diese Diskrepanz zwischen den Ländern zustande? Kulturelle Unterschiede, zu denen Vorurteile gegenüber technischen Berufen, insbesondere den Beruf des Informatikers, gehören, wurden als eine Ursache identifiziert.

In Beachtung dieser Problematik wurde in der Türkei und in Deutschland eine Studie mit 671 Schülern und Schülerinnen der Klassen 9 bis 13 durchgeführt, um Unterschiede und Ähnlichkeiten herauszufinden. Dabei war das Ziel den Unterschied in der Einstellung der Schülerinnen zur Informatik und zu den IT Berufen zu finden und zu vergleichen. Im Hinblick auf eine sinnvolle Ursachenforschung der Ergebnisse wurden die aktuellen Situationen, die Geschichte der Bildung der Frau, die Schulsysteme und der Informatikunterricht an den Schulen beider Länder untersucht. Tatsächlich konnte gezeigt werden, dass zwischen den türkischen und den deutschen Schülerinnen signifikante Unterschiede bestehen. Einer der wichtigsten Unterschiede der Untersuchung liegt in der größeren Bereitschaft der türkischen Schülerinnen, Informatik zu studieren. Desweiteren wurden folgende Bereiche untersucht: Teilnahme am Informatikunterricht, häusliche Computernutzung, Absichten auf ein Studium, Einstellung zur Informatik und die Selbstsicherheit im Umgang mit dem Computer. Diese Arbeit stellt die Ergebnisse dar und interpretiert sie.

Zusammenfassend kann man sagen, dass diese Studie wegen des Vergleiches zweier Länder als eine Besondere in dem Forschungsbereich angesehen werden kann. Weiter geben die Ergebnisse einen Überblick über die Gründe der Situation in Deutschland. Zusätzlich werden Vorschläge zur Verbesserung der Situation gegeben, indem unter Rücksichtnahme der Ergebnisse sinnvolle Handlungsmöglichkeiten für die Erhöhung des Interesses und Teilnahme der Frauen an der Informatik gegeben werden.

Özet

Bu yüksek lisans tezi, özellikle Bilgisayar Mühendisliği Bölümü'nde sayıca az olarak okuyan bayanların problemlerini uluslar arası araştırmalarla incelemiştir. Batı ülkelerinden Almanya'da bu problemin bulunduğu görülürken, Orta Doğu Türkiye'de bu bölümde okuyan daha fazla bayan bulunmaktadır. Tez şu soruya cevap aramaktadır: Neden ülkeler arasında böyle büyük bir farklılık bulunmaktadır? Meslekler hakkındaki önyargılar gibi kültürel farklılıklar özellikle Bilgisayar Mühendisliği Bölümü'nde bu problemin bir göstergesidir.

Bu probleme bağlı olarak, 671 kadın ve erkek ortaöğretim öğrencisiyle her iki ülke arasındaki farklılıkları ve benzerlikleri bulmak için çalışma yapılmıştır. Bu çalışmada odaklanılan nokta kadınların Bilgisayar Mühendisliği Bölümü'yle ilgili fikirlerini karşılaştırmak ve fikirleri arasındaki farklılıkları bulmaktır. Sonuçların uygun muhakemesi için; Türkiye ve Almanya'daki şuan ki durum, kadınların eğitim tarihi, ülkelerin eğitim sistemi ve okuldaki bilgisayar dersleri incelenmiştir. Çalışmanın sonuçları Türk ve Alman kadınları arasında belirgin bir fark olduğunu doğrulamıştır. En önemli farklılıklardan biri yüksek öğretimde Türk bayan öğrencilerin Alman bayan öğrencilerden daha fazla bilgisayar bölümünü seçmesidir. Ayrıca, öğrencilerin okulda bilgisayar derslerine katılımı, evde bilgisayar kullanımını, yüksek öğretimde okuma amacı, bilgisayar derslerini kavrama kabiliyetleri incelenmiştir. Bu tez, çalışmanın sonuçlarını ele almaktadır ve sunmaktadır.

Sonuç olarak, tez bu alana ait özel bir çalışmadır. Ayrıca, bulgular Almanya için bazı sonuçlar ve tavsiyeler vermektedir. Çalışmanın sonuçlarına bağlı olarak, özellikle kadınların bilgisayar derslerine ilgisini ve katılımını artırmak için, bazı öneriler verilmiştir.

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List of Abbreviations

BM	Bilgisayar Mühendisliği (Computer Engineering)
BT	Bilişim Teknolojisi (Information and Communication Technology)
CS	Computer Science
HE	Higher Education
ICT	Information and Communication Technology
IT	Information Technology
KIM	Kinder und Medien, Computer und Internet (Children and media, computers and internet)
KMK	Kultusministerkonferenz (The Conference of German Cultural Ministers)
LYS	Lisans Yerleştirme Sınavı (Undergraduate Placement Examination)
MEB	Milli Eğitim Bakanlığı (Minister of National Education)
TÜİK	Türkiye İstatistik Kurumu (Turkish Statistical Institute)
YGS	Yükseköğretime Giriş Sınavı (Transition to Higher Education Examination)
ÖSYM	Öğrenci Seçme ve Yerleştirme Merkezi (Student Selection and Placement Centre)
ÖSYS	Öğrenci Seçme ve Yerleştirme Sınavı (Student Selection and Placement Examination)

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1. Introduction

1.1. Motivation

"Computer Science is male-dominated!" An expression that based on statistics has proved its validity. Surprisingly, there are countries where this sentence is incomprehensible. In Western countries the problem of women's low participation in CS and Engineering is still worrying. A high number of promoting programs have been successfully established in Western countries so far. For at least 30 years this problem has been faced on and many countries worldwide are looking for possible solutions.

Middle Eastern countries like Iran and Turkey do not seem to have such great problems to encourage girls to CS and Engineering, but where is their formula? I was very interested in the different situation, due to my Turkish origin. Further, in recent researches there is almost no comparison between women's education histories of Western and Eastern countries and girls in Turkey and Germany have apparently a different attitude towards computer science.

Thus, this thesis compares the particular situation in Turkey and Germany and discusses the difference between these two countries as examples for one Middle Eastern country and one Western country. In fact, it tries to give some explanation to the problem with the aid of a questionnaire which was handed out to students in secondary schools in Turkey and Germany.

1.2. Aim of the thesis

The goal of the thesis is to answer the question whether there are significant differences in the attitude toward CS of female secondary school students in Turkey compared to those in Germany. And if it is the case, what are the reasons for those? What is their way to approach these topics? Do the CS courses in schools motivate the female students in a special way? Are there big differences in the education system? What could be changed when it comes to promoting programs? Are supporting projects really required? Why do think women, especially in Western countries, that they are not able to understand technology or are less confident with computers?

Which factors seem to be very important for German female students in choosing a profession? How can the results serve as some help for practice? And how one can use them in order to change the situation in Germany?

1.3. Structure

Chapter 2 summarizes with the aid of some international research and further studies the well-known reasons why girls in Western countries do not pursue CS in higher education. Moreover, different solutions and promoting programs are presented. After that, researched cultural differences are listed and discussed with the aim to highlight the recent situations in Germany and Turkey. This chapter ends with a summary which includes deduced hypotheses.

The following chapter describes the concrete situations in Turkey and Germany first by reflecting women's history in both countries. This examination shows the differences of female identity in Turkey and Germany. Additionally, this chapter gives an overview of education systems in Turkey and Germany and the most important differences between them are presented. Further, comparison of the computer science courses at schools indicates the difference of females' computer education. In the same way, at the end of this chapter obtained findings are summarized and hypotheses are listed for the further research.

Next, chapter 4 presents the study in Turkey and Germany which is conducted with a questionnaire and an interview. The comparison is accomplished by examining different gender and country groups. In fact, the study and the results are described very detailed for the female students. To give an analysis of the results, this chapter finishes with the discussion about them.

Finally, the last chapter summarizes the results of the thesis and gives some recommendations and future perspectives.

2. Women in Engineering and Computer Science



Cartoon by Piero Tonin

2.1. The status quo

Gender difficulty in computer science and engineering is a well-known topic, especially in Western countries. A detailed look into statistics shows a low participation of women in CS all over the world. In Denmark for example, there are only 6% (1996) women enrolled in CS, a similar situation can be observed in the Netherlands (6.6%, 1999), Germany (10.5%, 2000) and Switzerland (11.4%, 2001). Galpin has collected these data and 26 more countries in her paper 'Women in Computing around the World'.^[28] The data shows how different the participation of women in technical studies is. For example, in Thailand the percentage of women in CS or equal fields was 55% in 1998. Also in Turkey (20.4%) is a higher perception of women in CS than in Western countries. As a result, Galpin discusses "how societal and cultural factors may affect women's participation" (^[28]). She summarizes that problem very well: "The reasons that women choose to study computing will vary from culture to culture, and from country to country, [...]" (^[28]) Schinzel describes in her research also cultural differences as for participation of women in CS¹.^[?]

¹In comparing the countries there is the problem of surveying the equal statistics. Schinzel and Galpin are both aware of the different university programs and their statistical representation. For example, in most of the European countries there is no difference between mathematics and CS. However, they justify the numbers as a good validity because of the big differences.

Before proceeding to the cultural differences, first of all the recent research in Western countries will be discussed and presented.

2.2. More women required in engineering and CS

Before discussing recent research about problems with the low participation of women in technological occupations it is also important to discuss why we need more women in these sectors.

For example, Prof. Babara Schwarzer (Sociologist at Hochschule Osnabrück) states that it is very important to have more women in our digital environment because of the variety women could bring into this field²[49] In a similar way, Beat Schwab (Microsoft, Switzerland) brings to light that the exclusion of less technophilic men, women in general, seniors and disabled people in technology fields results in the developed products being less applicable and less user-friendly for these people.[22] In the same way, Margolis et al. describe: "Boys invent things, and girls use things boys invent". ([40], p.12)

Moreover, Judith Zimmermann outlines that "women tend to measure their work according to needs and wishes and not producibility"³ ([63], p.34). So through combining those characteristics of women and men that the other sex obviously lacks, the product gets optimized.

2.3. Reasons for the low participation of women in CS

Many researcher try to find out the reasons for this problem. Which factors do influence females' decision to participate in CS classes or to choose CS in higher education?

The list of reasons why females do not choose CS in HE is very complex and numerous. Figure 2.1 summarizes very well the complexity of the factors which influence women.

To pick some of these factors which influence girls in pursuing CS, few of them are mentioned among others: Misconceptions and a wrong image of a computer scientist, boring CS courses in schools, lesser self-confidence in their computing skills and lack of female role models. These factors will be discussed in the following sections more detailed.

²"Es würde unserer digitalen Lebensumwelt gut tun, wenn mehr Frauen daran mitwirken würden. Wir müssen da mehr Vielfalt haben."

³"Gerade Frauen neigen dazu, ihre Arbeit an der Nützlichkeit und Wünschbarkeit zu messen und nicht an der Machbarkeit."

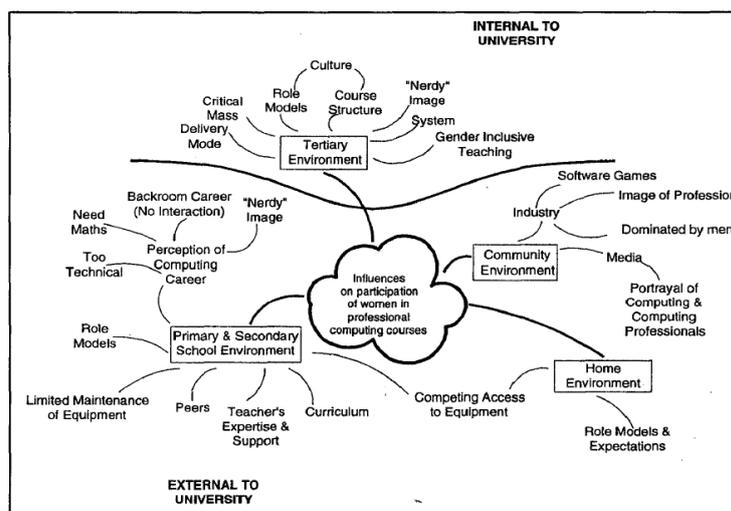


Figure 2.1.: Factors influencing females [15]

Misconceptions and a wrong image of a computer scientist

Early in 1988 Sherry Turkle discovered that the computer has been a cultural symbol which is not suitable with a traditional woman image: "Women look at computers and see more than machines. They see the culture that has grown up around them and they ask themselves if they belong." ([60], p.42).

Still, "[u]nfortunately, computer fields have a geeky image", describes Claudia Morell (director CWIT, an IT company in Germany) in an interview[13]. It seems that in Western countries the image of a 'compulsive programmer' as described by Joseph Weizenbaum in 1976 still exists:

"['compulsive programmers' are] bright young men of disheveled appearance, often with sunken glowing eyes [...] oblivious to their bodies and to the world in which they move. They exist, at least when so engaged, only through and for the computers"([61], p.116)

Furthermore, CS is stereotyped as highly technical rather than creative and as increasing competitive behavior[16]. Clayton et al. have found out that "[g]enerally, the image of ICT [Information and Communication Technology] work is of males working long hours programming in social isolation in what is described as a 'coke and pizza culture'".[16]

As a conclusion, the "Geek mythology" [40] has a very great impact on girls. This picture about a computer scientist does not fit to girls who mostly want to work together with people and for whom the social interaction is very important for choosing an occupation.[63] They do not want to be isolated and seen as a "freak" or "nerd". However, in 'Unlocking the clubhouse' a large study in which CS male and female students are interviewed in HE is presented with the result that in 69% of the female

and 32% of the men who were interviewed do not perceive themselves as a stereotypical computer scientist ([40], p.68). This result shows that the ongoing stereotypes of computer scientist are not current and most girls hold on to a wrong image of the profession.

But why do girls or even boys have a unilateral image of the work in the IT sector? Are domestic or scholastic educations causing this image?

This question cannot be answered in general. The factors of developing these ideas according to CS are almost uncountable and can only be detected for individual cases. Clayton et al. discover that "[s]tereotypes are learned in the home, at school and through the media." [16] Thus, again the culture has a great role and indeed the mass media has a great impact on children. Without any doubt, in Western countries the media plays one great role in disspreading of wrong or rather unilateral image. More specifically, what kinds of images of a computer scientist are being spread in movies, cartoons, commercials, magazines and so on? This problem needs to be revealed and some innovative solutions should be found.

It is important to say that homes are the place where children are educated. Thus, how can the holding up of stereotypes in homes, children's' roots, can be changed? This problem could be solved if children in general come very early in contact with IT. Pretorius et al. suggest that "[l]earners can be educated from an early age on what IT is all about." [50] For example, in a study with Texan students they found out that there is no gender influencing by gender of 4 and 5 years old children. [16] As a result, the ongoing stereotype thinking of technology sectors in females' and boys' mind could be changed in a very efficient way. Somebody, either girl or boy, who grows up in a domestic and social environment, where it is normal to be interested in computer and technology and where nobody thinks or talks about gendering of professions, without reservation would be more likely to choose a profession in the IT sector. Moreover, they would be free of any stereotypical thinking and so they would not be des-interested in CS from an early age on. But this still seems a very nice vision, which cannot come true soon.

Boring CS courses in schools

One more reason for the misconceptions is the CS course in schools. For example, in Germany Humbert describes that the courses are mostly in special computer rooms with tables in rows. Those rooms are not suitable as motivating factors. [33] Moreover, he argues that the topics which are taught are not motivating at all. For instance, programming of computer games is mostly a topic in CS courses. But this

is an interesting project for boys but most girls are discouraged because in many reports like KIM (Kinder und Medien, Computer und Internet)⁴ in Germany it is emphasized that boys use the computer more for gaming than girls.[33] Additionally, a study of Anderson et al. which surveyed senior high school girls compared girls who actually took CS classes with girls who did not take CS courses. One result was that the girls tend to perceive CS courses as boring and in addition they showed a strong aversion to computer.[3]

Another problem in CS courses is explained by Otto. She describes that boys usually get more attention by the teachers in CS courses than girls. In the same way girls are more encouraged in humanities courses.[30] Are the contents and methods of CS courses in general discouraging girls in choosing CS professions? Do they need to be changed?

Lesser self-confidence in their computing skills and a lack of role models

Do girls think that they genetically not suit CS? Indeed, there are many studies which show that girls undervalue their computing skills. For instance, Moorman et al. conducted a study with 941 secondary school students in advanced mathematics and CS courses in 2001/2002.[43] Although girls and boys are equally gifted (comparison of grades in the subjects) in mathematics and CS, all of the students see CS as a more 'male-dominated' field. And both genders think that boys are naturally better in these fields. Apart from that, mothers of most students were technologically incompetent compared to their fathers. This fact indicated that mother as a role model seems to be important when it comes to computer self-efficacy of girls. In another study of Fisher et al. female first year students in CS major were interviewed at Carnegie Mellon University. One result was that the female students reported less confidence in computer experiences and they also felt less prepared in the beginning classes. In addition, one more result was that families of the girls had a great impact on their choice to study CS. Many of them had a mother who was able to use a computer or they were encouraged by their family members.

As for the impact of role models it can be said that female CS teachers increase self-efficacy of girls. This was found out by Papastergiou who surveyed high school students in 2005/2006.[47]

What is more, a study which compared the attitude of ninth-grade school students in Japan and Sweden has the result that girls less like computers, mathematics and sciences, but they rather like languages.[39]

⁴Children and media, computers and internet

On the other side, Corneliussen has conducted interview with 21 women majoring in CS in 2005. The women being interviewed were not worried about expressing their pleasure, joy and addiction, or even love of computers: "I felt in love with the machine".[32] That result indicates that women in CS do like the CS topics at universities. Be that as it may, a common belief for a long time was that girls and boys are genetically different in their mathematic and logical thought skills. Many different studies have disproved this assumption. According to Schinzel there is no evidence for a native attitude and talent for the field of CS.[11] Moreover, Margolis et al. emphasize in 'Unlocking the clubhouse' that it is not possible to generalize the talents of men and women. There are just tendencies which can be found. Margolis et al. describes that "[w]omen are this way and men are that way" ([40]; p.9) is a wrong approach in trying to find solutions.

Blum et al. describes their opinion to this topic in [12] as:

"To say that there are intrinsic male and female differences you have to accommodate for those is absolutely wrong. The implications are that women do not need handholding or a "female friendly" curriculum in order for them to enter and be successful in CS or related fields, nor is there need to change the fields to suit women. To the contrary, curricular changes, for example, based on presumed gender differences can be misguided, particularly if they do not provide the skills and depth needed to succeed and lead in the field. Such changes will only serve to reinforce, even perpetuate, stereotypes and promote further marginalization." (p.110)

Thus, are all the promoting programs doing wrong? The next section will give an overview of some international promoting programs and their efficiency will be discussed.

2.4. Possible solutions

Doubtless, girls need to be more encouraged and supported in order that they are able to discover how "exciting, full of challenges, and providing wonderful terrain for all creative minds regardless of gender"([22], p.7) CS is.

It cannot be denied that there are already many equity programs for girls which aim to encourage girls with different concepts. For instance, Black et al. developed a booklet about women in different CS fields with the title "Tech girls are chic!"⁵. The idea of this print was to show girls role models, because this is a common approach of many supporting programs. The teachers who handed them out were

⁵The title page of this booklet can be found in the appendix.A.1

deeply impressed and they thought that the booklet like this could encourage girls to study CS.[7] Indeed, the booklet is an 'eye-catcher' and all women who tell about themselves are obviously no 'geeks'. Moreover, it emphasizes that CS can be fun and interesting. Because of that a print like this could encourage girls and could give them a 'real' picture about the profession.

Furthermore, Moorman et al. ask 'What is the magic formula' for a right promotion? They suggest that summer workshops for girls could be one solution. Because of the importance of mothers as role models, mother-daughter computer courses, especially for elementary school girls, should be arranged.[43]

One positive example in supporting can be observed at the Carnegie Mellon University (CMU). In 1995 till 1999 CHMU showed an immense increase (from under 10% to over 38%, which is still steady there since) of women enrolling in CS. Some key actions like summer schools for high school teachers and inclusion of students without prior programming experience could be responsible for this change. Moreover, a program named Women@SCS is developed which for example provides mentoring for freshmen and networking.[26] This example indicates that some factors can indeed change the perception of women in CS. In addition, it also shows that these factors should be consequently conducted by all department members.

Another promoting idea is the one-day event 'the BCSWomen Lovelace Colloquium' which is described by Dee et al.[17] The aim of this project is to present role models, work fields and to develop a network especially for undergraduate CS students with industry representatives. Even though this project is developed for CS students and not for school students, it is a good idea to stop the high leaving numbers of women in the first years after enrolling in CS at universities.

Although these kinds of promoting programs can be found in most industrial countries, it should be seen that they also have a contradictory effect on girls. Many girls do not understand why they should be treated as 'special'. Moreover, the opinion about their selection because of their gender and not because of their skills and abilities is wide-spread. "We do not need any private coaching", was one of the sentences I have heard in a scholastic environment. As a result, the programs are also needed to arouse our attention in trying to find solutions for the problem in general. One more reason for that is given by Clayton et al. who argue that supporting programs can only be effective if the stereotypes are eliminated.[16] Once more, Knobelsdorf et al. point out that the stereotypes and concepts of students are already there before starting school and they differ from student to student. To make CS courses and promoting project successful these concepts need to be more researched with the aim of eliminating the stereotypes more and more.[52] To sum up, promoting

programs are a common try to increase the participation of women in CS.

One more interesting way to understand the selection criteria of girls is to investigate why girls choose CS. Answering this question could help to explore factors which actually encourage girls.

In a large study presented in 'Reconfiguring the Firewall' female high school and community college students were surveyed in the USA in three different phases (2002-2005). The researchers investigated, for instance, which girls had interest to enroll in CS studies and the reasons for their choice. Figure 2.2 summarizes their

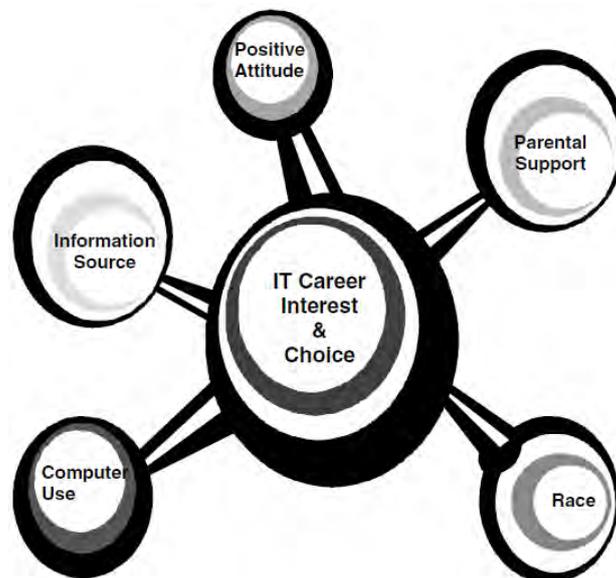


Figure 2.2.: Conceptual model [12]

results in a conceptual model. As a conclusion, they describe a model girl like that: A girl in the USA who pursues CS in HE can be characterized as a girl with a positive attitude towards the IT sector and belongs to an ethnic minority, like Afro-American. Moreover, her decision is encouraged by her parents and the information she knows about the CS profession, because she is determined to learn before in fact making a choice about the profession. Further, she has started at a very early age to use computer and is using it very often in her daily life ([12], p.15-19). The fact that these girls belong to an ethnic minority strengthens again that cultural differences do indeed exist. It is even noticeable for a Diaspora living in a country for several generations. In Germany many foreign female university students are enrolled in technical fields like CS for example.[11]

2.5. Cultural differences

In regions like English-speaking, Scandinavian, German and Dutch-speaking countries, USA and Israel have a low participation of women in CS. Industrially developed countries seem "under developed" with regard to gender ratio.[9] Moreover, Israel is a special country with Israeli-Arabs and Jewish Israelis where Arab females are more likely to choose advanced CS courses in high schools than the Jewish females. One important difference mentioned in the paper is that Arab females want to increase their professional opportunities and also their social status. Consequently, this example shows how important cultural differences are regarding whether girls pursue CS or not.[20]

One more positive example is described by Adams et al.[1]. They have explored the situation in Mauritius because of the great participation of women in CS (2000: 57% of students in CS was female). The fact that Mauritius is developing country they assume that women have not a plenty of options and so they decide to have at least one profession. They state that parents could encourage them or put them even under pressure. Apart from that, the students are separated by gender in the high school which could show a positive influence. Interestingly, negative stereotypes like 'nerd' seem not to exist. The reasons for the high participation could not be investigated completely, thus they agree that this specific case should be more explored by trained sociologists.

As a result, gender imbalance should be seen as a cultural problem, especially for Western countries. The positive examples prove that "the under-representation of women in CS is not a universal problem".[1]

Furthermore, Schinzel presents Turkey, Spain and Portugal as the leading European countries as for admission of women in every section of science and technology. Additionally, Schinzel shows specific cases like in Kuwait and Mauritius, which have 50% percentage female students in higher education in CS. As an equal example for a situation like this, she lists Iran and Turkey also as countries with a high participation of women in CS programs in all degrees. After describing the situation in different countries Schinzel analyzes possible reasons for them. An explanation for the differences in Europe she traces back to different historical background and religious traditions. For instance, in Spain and Portugal the change to a democratic state has had a very important role for the status of women in the society.[9] Furthermore, the overall conditions in a country seem to be very important for the participation of women in work in general, and especially for common 'male' occupations. Moreover, Galpin presents a list of factors which are related to high numbers of women in science across different cultures. Among others she lists "family-friendly soci-

eties (Israel, Mediterranean countries)" and "Perceptions of science as a low-status occupation when compared to disciplines such as engineering (Portugal, Turkey, India)"([28], p.95). Mody et al. explain the situation in Middle east as very challenging for the women. They have to make effort to be respected by men colleagues and moreover, women are taught not to express their opinions in public or show any disagreements with their elders.[42] Without any doubt, the cultural differences are very complex and they cannot be easily generalized. However, Adams et al. suggest understandably:

"Instead of speculating about why our women aren't studying CS, we must visit countries in which women are studying CS, and identify the cultural differences that attract women. Identifying what these countries are doing right will help us identify what we are doing wrong." [1]

Summing up, the problem of the low participation cannot be solved for all countries in the same way. With this in mind, every country should analyze their own specific situation with the aim of finding the most important factors to find a universal solution. However, the investigated cases and reasons of other countries, especially of positive examples, should also receive some attention. Every researched case can help to indicate problems in one's own country.

2.6. The specific situations in Germany and Turkey

As above-mentioned there are different degree programs at universities. In Germany *Informatik* (Informatics) is the common degree program, in which *Bilgisayar Mühendisliği* (Computer Engineering) in Turkey is the common term for the same degree program. For further descriptions and comparison CS⁶ will be used for these degree programs in both countries.

As seen in the last section Turkey is mentioned noticeably often in several references as a positive example as for participation of women in CS and engineering⁷. Chart⁸ 2.3 shows the percentages of female first year students in Engineering and CS in the last 10 years in Germany⁹ and Turkey. Obviously, there are more Turkish first year students in CS as in Germany all the time. For instance, in 2007 the percentage of

⁶In Turkey this includes: Computer Systems, Control Computer, Computer Software (*Bilgisayar, Kontrol ve Bilgisayar, Bilgisayar Yazılımı*) and in Germany: Informatics, Computer Engineering (*Informatik, Ingenieurinformatik/Technische Informatik*)

⁷only mechanical and electrical engineering for both countries

⁸All data for this section are taken from: *Statistisches Bundesamt Deutschland* (<https://www-genesis.destatis.de/genesis/online>) for Germany and Öğrenci Seçme ve Yerleştirme Merkezi (ÖSYM) (<http://osym.gov.tr/belge/1-128/sureli-yayinlar.html>) for Turkey

⁹Foreign or rather students with a foreign nationality are not considered in the percentages.

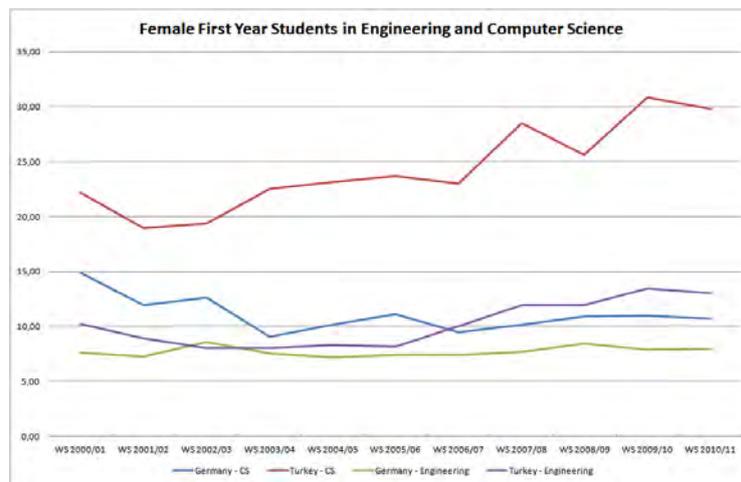


Figure 2.3.: First Year Female Students (own illustration)

female enrolled students was 28,49% and in Germany 10,13%. Thus, in Germany is the percentage almost only the third of the Turkish one. However, in engineering are less female students enrolled than in CS in both countries. In average the participation of women in engineering is in Turkey higher than in Germany. Without a doubt, in both countries is the involvement of women in engineering too less. In fact, it is always under 10% in Germany and under 15% in Turkey.

Furthermore, in Turkey the participation of women in engineering and CS is slowly increasing more and more since 2002. For example, in 2002 the percentage in CS was 19,39% and in 2010 29,84%. Similarly, the participation in engineering was in 2000 8,00% and 13,04% in 2010.

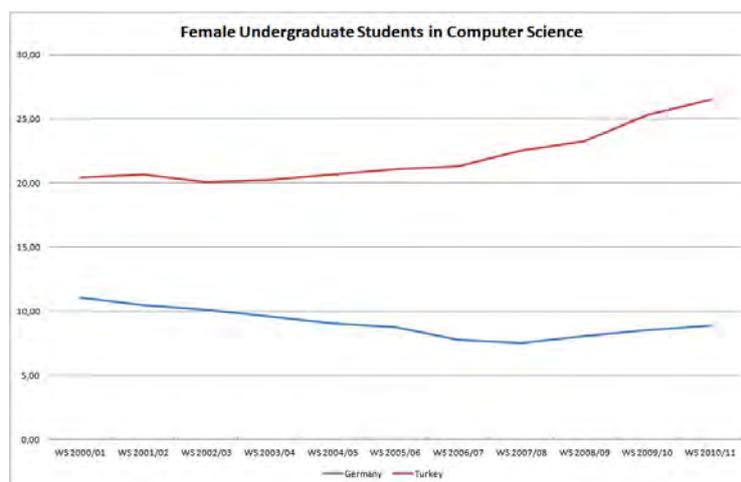


Figure 2.4.: Female Undergraduate Students (own illustration)

The chart 2.4 illustrates the percentage of women in CS in Turkey and Germany for the last 10 years. The difference between the countries is obvious indeed and

constantly different for the last year. While 2010 in Germany only 8.88% women are enrolled in CS, in Turkey 26,52% female students study CS. Since 2002 the participation of women in Germany is always under 10%. Schinzel describes that in the last 40 years the highest percentage of women's participation was in the 70s with 25% in Germany.[?] Compared to Turkey the percentage of women enrolled in CS is always over 20% in the last 10 years and since 2009 even higher than 25%.

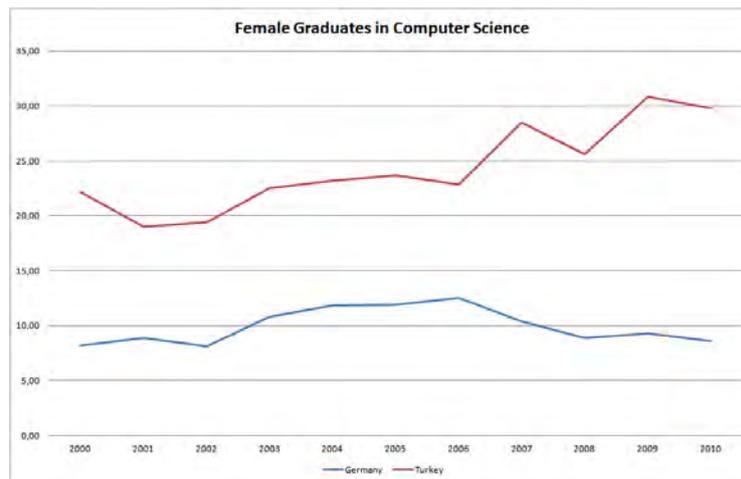


Figure 2.5.: Female Graduate Students (own illustration)

It is also worth to compare the numbers of graduates in CS in both countries. Chart 2.5 presents them together for Turkey and Germany. The situation in these cases is the same again, the percentage of graduates in Turkey are persistently higher than in Germany. Nonetheless, between 2003 and 2007 the percentage of female graduates in CS was over 10% in Germany.

Hence, indeed the participation of Turkish women in CS is constantly higher than in Germany.

Which reasons could be responsible for the higher participation of women in Turkey?

First of all, negative stereotypes of computer-savvy persons do not exist in Turkey. One reason for that could be the less impact of media from Western countries. In fact, Turkish students even do not know any negative terms like 'geek' or 'nerd'. This could be traced to the computer education which has already started in the elementary schools. Moreover, there is less or no correlation between technology and men.[11] Consequently, this shows at least a less negative image of CS or maybe more, it is an example of a society which has a positive attitude to the IT sector and people who work in it. For instance, in a study of Smith et al. where 156 female students (high school, undergraduate, graduate, etc.) were surveyed, most of the girls had a correct image of what an engineer does at work. All of them have

collected the information for example with the aid of family members who work in these fields. One more result of the study was that the female high school students named prestige and high salary, job opportunities as important factors by choosing an occupation. As reasons they stated mainly their talents in math and science. Once again, also high school students had a general knowledge about engineering.[56]

One further study about women in engineering was conducted by Zengin. She has interviewed many different women at universities and also in professional life. For instance, one interviewed women was a female computer programmer. While talking about her professional life she stated that "[. . .] the thing that I produce is a very social thing indeed." Thus, programming is not being seen as technical, but as a social work. This fact is very important and shows that women in Turkey do not associate programming with "unsocial" like women in Germany. On the contrary, engineering professions are indeed seen as technical professions which actually require dealing with more technology and constructions than CS.[62] As a reason Zengin underlines in her paper that the fields of sciences¹⁰ do not exist long times in Turkey like in Western countries. This fact have made these fields as more flexible for women and allowed them to enroll easily.[6]

Further reason is given by Ecevit et al. by emphasizing that gender equality and the political ideology of Turkey play important roles regarding high percentage of women in the Turkish IT sector.[18]

Which reasons are given for the low participation of women in Germany?

Schuster et al. summarize most important reasons why women in Germany do not choose occupations in Engineering and CS. First, women see a higher risk of unemployment in Engineering compared to their male colleagues. Second, girls generally do not know which different sectors exist and what the exact work in these fields actually is, thus practical experiences are missing. Third, the lack of female role models intensifies the already existing stereotypes about technical fields. As a consequence, these stereotypes influence the self-concept of their abilities and technical skills. [54] Because of fears like that most girls still decide very often for female-dominated occupations like teacher.[45]

These reasons were proven in different studies. Such as the study of Nielson et al. which surveyed 160 secondary female school students in Germany illustrates that girls do not choose CS because most of them characterizes it as boring. Additionally, they stated the reasons why they want to work with people, to have interesting and challenging work. Lastly, the girls characterized a computer-savvy person as smart and creative, and as a problem solver.[57] Bath et al. also state that most of the girls

¹⁰Besides, what is quite interesting is the fact that most of Turkish females associate a scientist as "Women in white coat in a lab".([6], p.33)

equalize CS with programming. ([5], S. 831) Furthermore, a study of Schulte et al. presents that students who are not interested in CS think that CS requires special talents and CS is seen as solving of problems. [53]

There is a further study of Koch et a. in which girls and boys were examined about the influence of being negatively motivated in working with computers. As a result, girls attributed a failure more internally and boys more externally if they are negatively influenced¹¹. [37]

Lastly, a study of Schinzel et al. explored the reasons why female CS majors have chosen CS. In fact, these girls were aware of the variety of this sector. Moreover, they characterized CS as interesting and themselves as talented for this occupation. For choosing the profession security of employment and high salary did not seem so important. [51]

To tackle these problems, in Germany many promoting programs are developed. Such as MINT and Girls Go Informatik and so on.¹² Although there are numerous supporting programs, most of them do not succeed so much and the situation in Germany is not changing. In comparison with Turkey there are no special supporting programs in technology for girls, but only for promoting students in education generally.¹³ However, the participation of women in CS in Turkey increases, while in Germany it does not seem to be changed soon.

2.7. Summary

In conclusion, the previous sections described the recent international situation as for participation of women in Engineering and CS and the variety of supporting programs all over the world. Moreover, the specific situation of Turkey and Germany are explained with reasons which are given in literature. In the following chapter these situations will be more explored. More specifically, the history of women's education, the education systems and CS courses in schools will be described.

Before doing so, some hypotheses which were developed within this section are summarized with the aim to compare them in the last chapter of this thesis:

1. If a girl works very often with a computer, her computer self-efficacy and her interest in CS will increase.

¹¹This study is a good example for investigating the computer use and work of females and males which could be conducted in several countries with the goal of comparison.

¹²A list with almost every project can be found in [31]. Some of them are described and evaluated in the thesis of Funk. [27]

¹³But one interesting project of Milli eğitim Bakanlığı (MEB) and UNICEF is "haydi kızlar okula!" which supports girls in the elementary schools to increase the participation of girls in education generally. For further descriptions: <http://haydikizlarokula.meb.gov.tr/>

2. Girls in general are less self-confident with computers.
3. Girls want to work with people and want to be creative in their profession.
4. Female role models, female friends and family members encourage girls in pursuing CS in HE.
5. Students in general have a lack of information about the profession and what a computer scientist actually does at work.
6. In Turkey prestige is an important factor for choosing a profession.
7. Turkish girls have either no misconceptions or less information about the CS profession.
8. German female students have a more negative image of CS than Turkish female students.
9. German students have misconceptions or at least a unilateral idea about the CS profession.
10. German girls are not interested in CS.
11. German students choose their profession because of their interests and talents. High salary and security of employment are less important.

3. Education in Turkey compared to Germany



Cartoon by Marie Marcks¹⁴

To begin with, to expose cultural differences between the two countries requires a look into the history of women's rights, especially in terms of education. Are there significant differences between the histories in Turkey compared to Germany? How have been women influenced in these countries in choosing their occupations? First, the special historical situation of Turkey needs to be reviewed and secondly, in comparison the history of women in Germany.

What about the recent education systems of both countries? Section 3.2 gives an overview, compares the systems and illustrates some big differences.

Furthermore, in section 3.3 some curricula of computer education in Turkish schools and in German schools are exemplary presented and the topics are compared.

Finally, the differences and the topics in the computer education are rated according to the question if there are obvious girls encouraging topics and structures in the education system of Turkey.

¹⁴"Woman is not capable of hard work by nature and therefore she should be ranked a lower wage group."

3.1. History of women's education and their approach to technology

3.1.1. Turkey

Compared to Germany, in Turkey there are more women in academic professions. Berna Zengin assumes that the high participation of women is related to the great changes in the modernization periods in Turkey: *Tanzimat* in the Ottoman period (1839-1876) and after the establishment of the Republic (especially 1923-1935) ([6], p.30). Gündüz presents that European reform policies have influenced the Tanzimat and the new laws have changed especially the public administration and the education system.[64] In 1839 with the letter missive *Hat-i Şerif* the law emphasizes the equality of all citizens. Furthermore, Gündüz describes that the Youngottomans¹⁵ have accepted the importance of giving up the women's oppression for the modernization. They defined women's education as inevitable for the further generations¹⁶. One result was that in schools male and female students of ages 4 to 5 received coeducation until ages 9 to 10.[64]

After the fall of the Ottoman Empire, a modern Republic of Turkey has established in 1923 and Mustafa Kemal Atatürk was the first president. The equality of men and women in the public sphere was an important idea of *Kemalism*¹⁷ ([6], p.30). "As Atatürk indicates education has an important role in the identity change of Turkish Society."([4], p.136) Ayca describes the great impact of the Kemalist Education to the Turkish society. Education is an important issue and the traditional one was the most important problem of the Turkish society, as Atatürk said. The education system in the Ottoman State was not centralized, i.e. every Minister of Education had different programs and it was not national. Besides, Atatürk criticizes the base on traditional methods and values, the irrelevant information which was taught instead of important topics of social life, and the old method of rote learning. In other words, there were a lot of problematic characteristics of the education system in the Ottoman State. In brief, "it [education] was the basic problem".[4] Consequently, it was one of the most important targets of Atatürk to revolutionize the education system in Turkey and so to strengthen the Turkish society. Additionally, the importance of changing the education system can be seen in Atatürk words: "The true salvation of a nation is based on the success in education" (1922) ([4], p.137). About the education of girls he deregulated the discrimination of sex and claimed

¹⁵as "Jungosmanen" in ([64], p.10)

¹⁶as 'mothers' and 'educators' their children" ([64], p.10)

¹⁷also "Republican ideology", "is the principle that defines the basic characteristics of the Republic of Turkey", cf. <http://en.wikipedia.org/wiki/Kemalism>

free education for girls and boys equally. Moreover, he emphasized that the Turkish women need to be more intellectual and virtuous to increase the success of the reform. Likewise, he underlined how essential teachers are by characterizing them as "the most self-sacrificing and respectful people all around the world."([4], p.138).

The Kemalist education¹⁸ caused fundamental changes in the Turkish society and the people, especially the Turkish women, have gained a new identity. Furthermore, "the historical push of women of Turkey into public sphere continues to impact society" ([6], p.34).

Consequently, this modernization encouraged women to take part of higher education¹⁹. Therefore, women identified fully with the idea of working for the progress and modernization. But professional women have still the responsibility of being a wife and "an educated (*biligili*) mother became an inseparable part of their identity" ([6], p.35).

However, Zengin observes that the professional women were mostly from elite families at that time. To gain a higher education the elite women were motivated by their modern families. Additionally, it was fact that the educated women of the elite were more accepted in higher status professions as men of lower classes.

Interestingly, in the Republican ideology, there was not the idea of women's intellectual backwardness argument, which is a significant difference compared to Western countries. Thus, women were awarded to have the same intellectual capacity as men and any difference for men and women in the contents of courses has never existed. Hence, more women are represented in higher academic²⁰ career which could be defined as *the* difference to Western countries.

Technology and women

Ecevit et al. explain that in the late 1960s the public institutions adopt computer-based technology even before the private sector. Women were overrepresented in public institutions; as a result, the women had the chance to get involved with computer technology. Consequently, later women were also demanded in the private sector with increasing of computer technology in all sectors. According to the working environment they state that among all the engineer professions the IT sector promises a hospitable environment for women because "it does not categorically exclude them." [18]

¹⁸These ideas were consented as the Kemalist Reform by the Turkish Parliament in 1920s.[4]

¹⁹Nevertheless there is discrimination in education or academy in particular at the level of practice which is controversial ([6], p.36)

²⁰The numbers of women who graduated at a university is high (35.9% in 2000) However, women in Turkey are still underrepresented in work and education and still mostly women from elite families are educated. [64]

3.1.2. Germany

In general, the education of women in Germany has started with women's movement²¹ in the middle of the 19th century. Kleinau et al. describes that in almost every German region many associations of parents who were interested in education expedited the institutionalization of females' general-education. ([21], p.13) Although girls were free in going to school from 1845 on, most girls and women were educated privately at home and not in institutions. ([21], p.9) Moreover, with some exceptions in 1870s, first women were accepted to visit lectures at some liberal universities in 1895. First official enrollments of women at universities took place from 1900 and 1909. However, women were excluded from most of the fields and from academic career. They were allowed to choose between medicine, national economy and teaching. Thus, women did not also acquire the right to habilitate, but finally after 1920 women were privileged to habilitate as well ([19], p.310-324). Unfortunately, the time of crises in the Weimar Republic was unfavorable to women's academic education. Because of the crisis the male academics worried about their jobs and so they saw women as competitor.

During this (ca. from 1913 till 1920) also the youth movement²² took part in Germany. Klönne summarizes that girls experienced new education with freedom, adventure and self-determination in this time, but it also delves them more into their traditional roles in the society. The movement was characterized by a male-dominant behavior, therefore girls distinguish themselves to the boys by emphasizing their female behavior ([19], p.248-270). As a consequence, women did not earn the same equity like men. The German history was indeed not conducive for increasing women's equity in the German society. With the Third Reich came also the limitation of places for women in higher education. More specifically, women represented only 10% of all university students ([21], p.15). Metz-Göckel describes the education system after the Second World War as a "catastrophe", because it was obsolete and misogynic. Further, she criticizes the mono education which was dominant till 1964. As recently as then a new education reform started in the post-war period. Metz-Göckel explains that then more and more girls had the chance to go into high schools²³. Incidentally, the coeducation has been adopted as a sideline ([55], p.373-385).

Several years later, in 1985 the participation of women and men at universities was balanced. But still, there were only few female professors. As a consequence laws

²¹"Frauenbewegung"

²²"Jugendbewegung"

²³*Gymnasien*

for promoting women were changed in the Framework Act for Higher Education²⁴. Further, Kootz et al. explains since 1994 it is also constitutionally under security. However, women still have difficulties to habilitate because of the majority of male professors and it seems to be constant till now. Kootz et al. argues that the science standards in Germany prefer men if they are more qualified, even a "little bit" more, than women. Consequently, they suggest that the staff structure needs to be changed fundamentally to achieve more women in higher education. Only this could suppress the lack of female professors and hence the lack of female role models at all ([38], p.465-486).

Technology and women

Krüger-Müller summarizes the specific situation of women and technology in Germany. For this purpose she starts her description with a quote from a paper²⁵ of a Management school in Bad Harzburg: "The 'object- and function world' of men is accompanied by the 'emotion world' of women."²⁶ ([25], p.7) She declares this quote as a mystification and as a wrong confrontation in relation to the reality of the German society. Interestingly, she argues first with the experiences of women with technology in everyday life. It is obvious that women are more and more involved in new technology in the household. Everybody sees and knows this fact. But why is this obvious phenomena treated as a naturalness? Do women incline to technology by nature? Krüger-Müller reports about their research in women's self-concept and presents the result that the women have always underestimated themselves in their technology knowledge. Today, this research is 30 years old and if we compare this result to nowadays, the situation has not changed significantly. There are many recent studies which verify this phenomenon. [10; 53] Children still see in their mothers a woman without a talent for understanding technology, but self-evidently they do see this capacity in their fathers. Helga-Krüger explains that this association is not a result of observation how women handle with technology in their household, but rather of the idea of *simple* technology devices for the household.

Furthermore, she describes the situation in the working environment. As a matter of fact, in the electrical, chemical and clothing industry mostly women have been employed. The same development is seen nowadays with the office jobs. The development of technology can be observed here very well. Krüger-Müller brings in that 80% per cent of women have to work with technical devices at that time. Nowadays, after 24 years almost every job requires a good handling with technology devices. Be-

²⁴ *Hochschulrahmengesetz*

²⁵ *Schulungspapier*

²⁶ "Der 'Sach- und Wirkwelt' des Mannes steht die 'Gefühlswelt' der Frau gegenüber."

ing a secretary without computer knowledge does not bear contemplating. Schinzel
precises

"[i]f women stay away from the computer it will considerably decrease their
options in choosing academic education (e.g. in science and engineering)
and impair their future career chances. A deeper gender-based segregation
in the job market will be the consequence." ([29], p.365)

To sum up, Krüger-Müller points out a very important fact: She argues that the
idea of stereotypes develops in very early years. As a fact, the girls connect technical
occupations with men even before they start going to school. Her result or possible
solution for the early appropriating of the wrong idea on themselves is to promote
the interest of girls very early. This could help to change the *mystifical* idea about
women's not being talented in technology.

3.2. Overview of the Education Systems

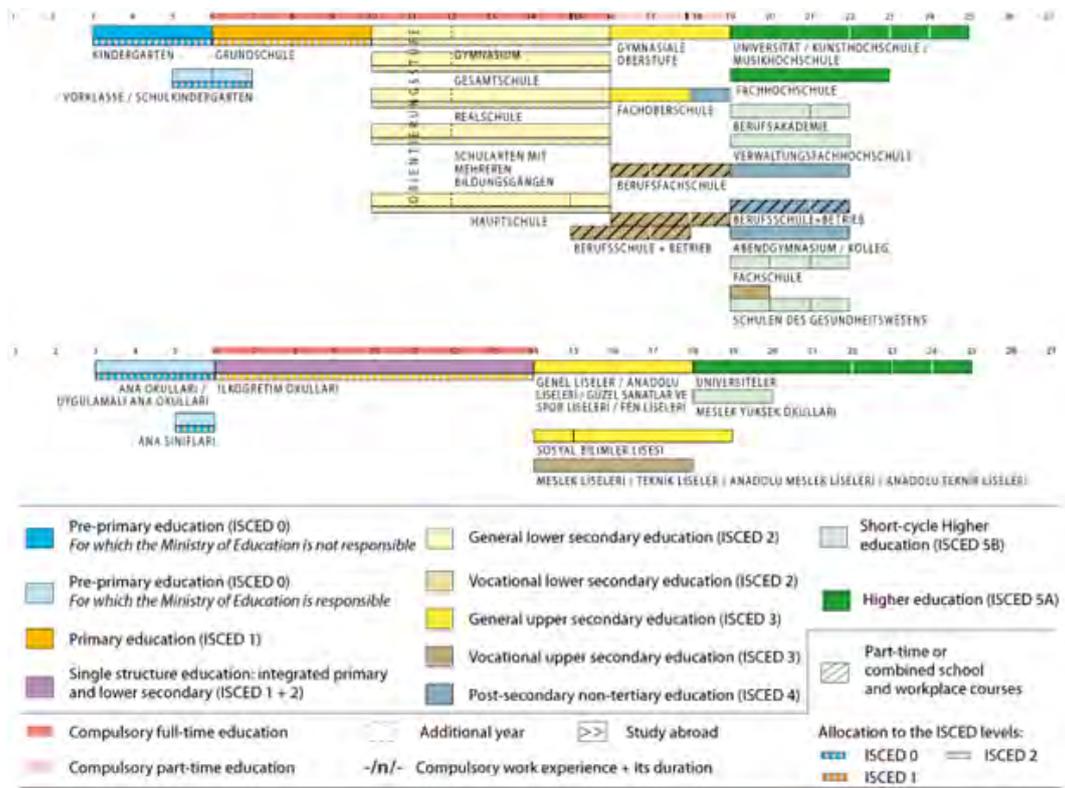


Figure 3.1.: Overview of the education systems [23; 24]

Comparison of the education systems of Germany and Turkey shows some significant differences.²⁷

Whereas in Germany the *Länder*²⁸ have the responsibility for their own education system, in Turkey it is quite different. More specifically, in every province of Turkey public and private schools are under the administrative control of the *Milli Eğitim Bakanlığı* (MEB - Ministry of National Education), who regulates the curriculum and all of the school material. As well as the pre-primary education is under the supervision of MEB. In Germany almost every child²⁹ between third and six years takes part on the pre-primary education. In contrast, in Turkey only 26,2% of children between third and five years, and 64,4% between the ages of five and six attend any pre-primary education in the school year 2010/11³⁰. Especially for children, who live in rural areas and who have disadvantaged background in general, is a

²⁷For this thesis only the general education will be focused. Further information can be found in figure ?? and in [23; 24]. Moreover, the figure ?? can be found in better quality on the CD.

²⁸provinces in Germany

²⁹In 2010: 92,2%

³⁰But since 2009/10 there is a pilot project at 32 provinces, which enables all five years-old children to partake in pre-school education

pre-primary education essential for a further successful learning.

Although compulsory education is eight years for children of the ages six till 14 in Turkey, the net schooling rate is 98% in 2010/11. Accordingly, there are still children, who do not attend any schools. One reason is clearly the great part of rural area in Turkey. For the children in Germany the compulsory education is between six and 15/16³¹ years and if they do not attend a full-time school until the age of 18, a part-time education is obligatory.

Comparing the structure of the education systems in both countries indicates the German system as more complex than the Turkish one. The **elementary schools** are four or six years in Germany, but in Turkey there is an uninterrupted primary and lower secondary education, which lasts eight years. Class teachers teach almost every subject till grade five³² and from then on there are teachers, who are responsible for one subject. In Germany, in elementary schools there are class teachers and in every secondary school they teach at least two subjects. In contrast, Turkish (CS) teachers are subject teachers and at the university they do study just one field. In fact, that is an important difference between the countries. Because of changes in the education system in Turkey, many CS teachers have lost their work at school. In the following section in an excursus there will be presented, how unfortunate the recent situation of CS teachers in Turkey is.

The subjects in primary schools in Turkey are divided in compulsory courses and elective courses:

- **Compulsory core courses (26-28h):**
Turkish, Mathematics, Sciences, Science and Technology, Social Sciences, Civic, History, Foreign Languages, Religion and Ethics, Drawing, Music, Physical Education, Traffic and First-aid Training and Miscellaneous Individual and Various Activities.
- **Elective courses (2-4h):**
Computer Education, Drama, Speech and Writing, A Second Foreign Language, Tourism, Agriculture and Animal Husbandry, and Local Handicrafts.

Because of the single regulation of the *Länder* in Germany the subjects in elementary schools can be summarized generally as follows:

³¹There are different regulations in the *Länder*.

³²In grades four and five there are some subjects (e.g. physical education, music, art, foreign language), which are delivered by subject teachers.

- reading, writing, arithmetic, *Sachunterricht* (introduction to natural and social sciences), art, music, sport and religious education

The Turkish students can select courses from the first grade on. Specifically, the students have the opportunity to choose Computer Education (or IT Technologies) at a very early stage of their education. In contrast, in Germany the students almost do not gain any computer education. But in **secondary schools** the German students can decide to take a *Informatik AG*³³ or in the grades 9 and 10 as an elective course Computer Science (*Informatik*).³⁴

To give an overview of the subjects in secondary schools³⁵ in Turkey, it follows a list of the compulsory general courses and elective field courses, which have especially the task to help students developing individual skills and abilities:

- **Compulsory for all students:** Turkish Language and Literature, Religious Culture and Ethics, History, Geography, Mathematics, Biology, Physics, Chemistry, Hygiene, A Foreign Language and Physical Education
- **Field courses:** natural sciences, literature, mathematics, social sciences, foreign languages, arts or physical education

Indeed, the structure of the German secondary education is more complex than the system in Turkey. In other words, it is difficult to sum up all the subjects, but in general the primary core subjects continue also in lower secondary schools and include at least one foreign language and also natural and social sciences³⁶. Moreover, in the higher secondary schools (*gymnasiale Oberstufe*) the subjects can be summarized in three groups: languages/literature/arts; social sciences; and mathematics/natural sciences/technology.

The secondary schools consist generally of *Hauptschule*, *Realschule*, *Gesamtschule* and *Gymnasium*. The students can leave the lower secondary schools³⁷ with a certificate³⁸ after the ninth or tenth grade, which enable them for example a vocational education. The diploma (*Abitur*) can be received after a successful graduation of the *textitgymnasiale Oberstufe* on a higher secondary school³⁹.

In the same way, in Turkey a diploma of a secondary school (*lise*) is required for entry into higher education. Figure ?? illustrates the different kinds of *lise* and vocational

³³workshops once a week in CS/ computer education, often just optional

³⁴But not every secondary school offers this subject.

³⁵In the academic year 2011/12 the net schooling rate is 69,33 % in secondary education in Turkey.

³⁶curricula depends on the type of institution and of *Länder*

³⁷*Hauptschule*, *Realschule*, *Gesamtschule*

³⁸*Hauptschulabschluss* and *Mittlerer Schulabschluss*

³⁹*Gesamtschule* or *Gymnasium*

schools, which last at least 4 years. Anyone, who has the primary education diploma, has the right to enroll in secondary education without a pre-exam. But privileged schools such some of *Anadolu liseleri*, *Fen liseleri*, *Sosyal bilimler lisesi*⁴⁰ can only be attended after passing the centralized exam. After a successful graduation of a *lise* the students have the opportunity to take an entrance exam⁴¹. Furthermore, this exam determines the university and the field they will study. Before taking the exam the students needs to list their favorite universities and the fields in which they want to enroll. The results of their exams determine which university and program will accept them. To enroll in the best universities they need a high score on the exam. Consequently, it is very difficult to change the major after accepting one major.[56]

Compared to Germany this situation here is unthinkable. Equally, a diploma of a high school (*Abitur*) is required for higher education, but that is not the only option. Mainly, figure ?? shows all of the possible ways to enter higher education and all kinds of schools in Germany. In contrast, in Turkey most of the fields in higher education can only be studied at the universities. Accordingly, for students in Turkey it is more difficult to enter higher education because of the entrance exam. As a result, there is a great competition amongst students. Specifically, most of the students attend preparing courses in private institutions (*dershane*). These institutions are often very expensive. As a result, students of wealthy families can afford this more often to their children as working class families. However, there are some private and nation supporting programs⁴² for students from destitute families or for students, who achieve excellent grades in the high school and high points in the centralized exam.[24] That is a reason why students are highly under pressure in Turkey.

On the whole, the education systems in both countries indicate some big differences. As has been noted, the students in Turkey need to succeed very early and so they are more pressurized than students in Germany. This leads to the assumption that the students in Turkey are more fixed to enroll in higher education by all means without thinking about own talents and interests than German students.

⁴⁰Anatolian high schools, Science high schools, Social science high schools, etc.

⁴¹*Yükseköğretime Giriş Sınavı* (YGS) and *Lisans Yerleştirme Sınavı* (LYS)

⁴²Here is a list of some supporter: <http://www.turkstudent.net/cat/52>, more information of the national scholarship for higher education students: <http://www.yok.gov.tr/en/content/view/550/237/> and for general information: [24]

3.3. Computer Science at Turkish and German schools

First of all, it needs to be clarified how the countries name the computer education courses at schools. In Turkey it is named as "Bilgi Teknolojileri ve İletişim" (BT) which can be translated as "ICT - Information and Communication Technology", so it is exactly the same term like in the American use term "ICT". In comparison, in Germany usually the term "Informatik" is used. An accurate translation would be "Informatics", but informatics is usually used for the science of information in academic area. Because of that, for the further section the expression "Computer Science" will be used for courses in Germany.

As seen in the last section, Germany has interior different education systems depending on the *Länder*. For the study which is described in chapter 4 schools from North Rhine-Westphalia (NRW) were selected. Therefore, in this section the CS courses in NRW are examined.

To clarify, the following section only gives one brief overview of the CS courses in Turkey and Germany. The description shall show briefly differences of the contents in both countries.

3.3.1. Turkey

To recap, ICT can be elected from the first grade on in Turkey. In the elementary school students have the chance to gain computer education for all 8 years. In the grades four and five the lesson hours are two per week for ICT and in all other grades one hour per week. In the same way, students can choose an ICT course at high school in all grades. Of course, only if the school appoints ICT teachers. This regulation was valid till 21.07.2010. Because of the reorganization of the subjects in primary education ICT is no more an important subject in schools. Only in grades six till eight students can choose ICT as an elective course.⁴³ Nevertheless, since this change is very recent, the curricula are explained in the following with the purpose of comparison to German curricula. Incidentally, there are no public statistics about the participation of students in ICT in Turkey.

MEB provides all the contents of the courses in schools, hence the ICT course curricula which is used for further description is taken from their website written in 2006.[58; 59]

Interestingly, a detailed look into the curricula and the lesson schedules shows the importance of Atatürk for the education. In several topics he is used as a subject for

⁴³By the way, before this regulation ICT was a compulsory subject. This change has had a great impact on the recent situation of ICT teachers. In an excursus 3.3.1 their situation is explained.

the lesson. More specifically, in one example search engines in the internet are the main subject for the lesson in which the students should search about Atatürk and collect information about his life.

What are the contents of ICT in Turkey?

The curricula is influenced immensely by American curricula⁴⁴.

To begin with, in general students learn in ICT Basic Operations and Concepts (*Temel İşlemler ve Kavramlar*), Use of Information Technologies (*Bilişim Teknolojileri'nin Kullanımı*) and Advanced Applications in Information Technologies (*Bilişim Teknolojileri'nde İleri Uygulamalar*) in primary education.

The contents in particular are listed below in English and as well in Turkish. The ICT education is separated in eight sections (grades one till eight). Naturally, from grade to grade the contents become more advanced.

First grade:

- Information around Me (*Çevremdeki Bilgiler*)
- My Computer (*Bilgisayarım*)
- My Colored World (*Renkli Dünyam*)
- I am starting to Write (*Yazmaya Başlıyorum*)

Second grade:

- Technology and Me (*Teknoloji ve Ben*)
- I paint (*Resim yapıyorum*)
- World of Words (*Kelimelerin Dünyası*)
- Technological Tools (*Teknolojik Araçlar*)

Third grade:

- Information and Technology (*Bilgi ve Teknoloji*)
- I organize my Writing (*Sayfalarımı Düzenliyorum*)
- Information and Searching (*Uzaktaki Bilgiler*)
- I collect Data Algorithm etc. (*Veri Topluyorum*)

Fourth grade:

- Computer System (*Bilgisayar Sistemi*)
- Creating Tables (*Tablo Oluşturma*)

⁴⁴Most literature cited as source in the curricula are from the USA.

- I present my Information (*Bilgilerimi Sunuyorum*)
- I share my Information (*Bilgilerimi Paylaşıyorum*)
- I collect Data (*Veri Topluyorum*)

Fifth grade:

- Internet Websites (*İnternet Adresleri*)
- I start Publishing (*Yayıncılığa Başlıyorum*)
- My Calculations (*Hesaplamalarım*)
- I organize Data (*Verileri Düzenliyorum*)
- I prepare a Presentation (*Sunu Yapıyorum*)

Sixth grade:

- Communication (*İletişim*)
- My Address Book (*Adres Defterim*)
- I present my Information (*Bilgilerimi Sunuyorum*)
- I present my School (*Okulumu Tanıtıyorum*)
- I Calculate (*Hesaplama Yapıyorum*)

Seventh grade:

- Touch Typing (*On parmak*)
- I compare my Calculations (*Hesaplarımı Karşılaştırıyorum*)
- My Database (*Veritabanım*)
- I create a Website (*İnternet Sitesi Yapıyorum*)

Eighth grade:

- Information Systems (*Bilişim Sistemleri*)
- I create a Website (*İnternet Sitesi Yapıyorum*)
- I create a Program (object-oriented) (*Program Yapıyorum*)

In the following, the contents of the second grade are exemplarily explained.

Technology and Me

Students learn in this section what technology actually is and which technology devices they already know. Moreover, the teacher discusses all about using technology devices and about the attention students need when they handle with electronic devices. Furthermore, students learn the best position to sit in front of a computer with the goal to awaken them for their body awareness while working with a computer.

I paint

In this unit students improve their skills with the handling of the mouse for painting works on the computer. One task is that students should create a picture in the Mondrian style like in figure 3.2. This helps them to draw straight lines, rectangles and to fill them with color. The next topic in this unit is talking about hidden things in their household and then the possibility to hide files on the computer. Afterwards, students learn actually with a computer how to hide them.

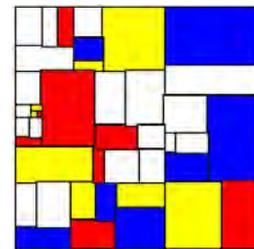


Figure 3.2.: Mondrian Style [2]

World of Words

With a word processor students study all possible converting for a word including copy and paste. Further, the students receive as one possible task a cartoon with empty speech balloons. Students should create a talk with their partner and write this in the word processor. After that, they should print and glue the texts on the cartoon.

Technological Tools

Firstly, students gain some knowledge about how technology devices work. They specify the different commands of all day devices and should recognize that these commands can repeat. With this introduction, students receive several tasks to split different processes like "find the treasure on an island". Moreover, they learn to guess the results of a command sequence.

To sum up, the contents of ICT in primary schools are encased completely in students' everyday life. Most of the topics are very playful and the tasks boost their creativity, thus the subjects are very motivating. On the other hand, the majority of

the tasks is to improve their computer use skills and ICT seems to be more 'media' understanding and using.

In addition, the contents of ICT courses in secondary school are listed next.

- Basic concepts of information technology (*Bilgi teknolojisinin temel kavramları*)
- Using a computer and manage it (*Bilgisayar kullanma ve yönetme*)
- Word-processing software (*Kelime işlem programı*)
- Electronic spreadsheet program (*Elektronik tablolama programı*)
- Data base program (*Veri tabanı programı*)
- Presentation program (*Sunu programı*)
- Internet and communications (*İnternet ve iletişim*)

The curriculum describes the detailed topics of each topic. For instance, in the unit Data base program students learn all about data bases, how to construct one and how to use it. Moreover, they learn to access exciting data with different commands. Again, the presented lesson schedules are all with topics related to students' everyday life.

Excursus: Recent situation of the ICT teachers in Turkey

On July 21st, 2010 the MEB in Turkey change the system of the primary schools by decreasing the total lesson hours of ICT for all grades. ICT is now only in grades 6 till 8 as an elective course available. Consequently, all ICT teachers have had only a few hours per week to teach. This caused a high unemployment of ICT teachers because the teachers in Turkey are specialized for one field⁴⁵. As a result, the work field for ICT teachers has been removed. In many cases, the few number of the ICT lessons are taught by other teachers who has some computer skills. All this reasons have raised a high discussion in Turkey. For more than one year the ICT teachers demonstrates usually and collect signatures as many as possible with the aim to convince the MEB. In an internet interview⁴⁶ an ICT teacher explains that the government now emphasizes religious education and Arabic lessons. Another teacher⁴⁷ argues that the importance of an ICT education is that students who would gain ICT all over the school years, they could understand technology and computers very well. Because of that she thinks that ICT teacher should teach the

⁴⁵In contrast, in Germany teachers of secondary schools have to study at least 3 subjects.

⁴⁶cf. A.7, ll. 2-4

⁴⁷cf. A.7, ll. 14-19

courses and not any other teachers.

To sum up, there is still riot because of this change in Turkey and hopefully, this radical decision could be revised. Otherwise, this could have a negative impact on females' attitude towards CS in the future because of a lack of early computer familiarization.[48]

3.3.2. Germany

In general, students in Germany in grades 9 till 13 (or rather 12) can choose CS as an elective course or in the *gymnasiale Oberstufe* as one specialized course. Some schools also offer volunteer workshops in CS for students from grade five on. But this depends on the equipment and if they have a CS teacher. Schulte et al. illustrates the participation of girls in CS courses as very low. For instance, in 2005/06 the percentage of girls in the grades 12 and 13 together was only 0.2% in Berlin.[53]

Therefore, Humbert criticizes the curricula of CS in Germany. He argues that the topics are not interesting enough to encourage girls to participate in CS.[33] But what are the contents of the CS courses in NRW? In the following the specifications of CS for the *Abitur*[44] of *Kultusministerkonferenz* (KMK - The Conference of German Cultural Ministers)[36] from 2006 are discussed. The public curricula are only for the *gymnasiale Oberstufe* specified.

The KMK defines the following three topics as the general contents for CS in basic and specialized courses:

- Basic modeling techniques (*Grundlegende Modellierungstechniken*)
- Interaction with computer science and systems (*Interaktion mit und von Informatiksystemen*)
- Possibilities and limitations of computational methods (*Möglichkeiten und Grenzen informatischer Verfahren*)

In short, students learn in a CS course all important and basic principles of CS. For example, in the unit 'Possibilities and limitations of computational methods' students explore the Neumann computer model for identifying the functionality of a computer system. Moreover, they should learn to evaluate methods by their efficiency and relevance in applying. One more topic students learn is the principled and practical limits of predictability. Lastly, social, ethical and legal issues like the impact of computers on work life are topics of this unit.

On the contrary, the curricula in Germany are not as strict specified as in Turkey. The CS teachers in Germany have a greater scope than teachers in Turkey. Therefore,

the curricula include all the topics which should be taught, but the concrete lesson schedules are up to the teacher. In the following the topics of the *Abitur* exam are presented.

- Databases (*Datenbanken*)
- Computers and networks (*Rechner und Netze*)
- Software Development (*Software-Entwicklung*)
- Languages and automata (*Sprachen und Automaten*)
- Computer science, people and society (*Informatik, Mensch und Gesellschaft*)

Summing up, it is hardly possible to compare the curricula of both countries. Firstly, in Turkey there are much specified lesson contents and materials which are compulsory for the teacher. Secondly, the education system has some great differences. Regarding the implementation of the lessons, there are different structures and goals to be mentioned. However, the curricula in Turkey seem to be very motivating for students till grade 8 because the topics for example are chosen in a very child-friendly way. Perhaps this has a positive influence to females' attitude towards CS. Lastly, the biggest difference between the countries is that students in Turkey gain very early computer education.

3.4. Summary

As I have shown, women's education in Turkey and Germany differs highly. In Germany women have had to fight with bad conditions caused by the special history. There was never a moment in the history of Germany which gave the women a special status. On the contrary, the beginning of Turkish Republic has given women a very special importance which still encourages women in being educated.

The comparison of the education systems indicates one huge difference in enrolling to HE. Because of the entrance exam Turkish students are always under pressure if they want to enter a university. This pressure could be the reason that students sometimes choose or have to choose a field which was not their preferred one. Moreover, the university in Turkey offers almost every field in higher education. In contrast, the German system offers lot of more options for students to gain HE.

Finally, the CS courses in both countries indicate a lot of differences which do not allow comparing the curricula equally. Nonetheless, Turkish CS curricula demonstrate a variety of contents for a CS course which is intended very creatively.

Now some hypotheses are listed which are emerged within this chapter:

3. Education in Turkey compared to Germany

1. Turkish girls are in general more encouraged to enroll in HE by society than German girls.
2. Turkish girls gain earlier computer education than German girls, thus the computer self-efficacy of Turkish girls is higher.
3. Because of the difficulty to enroll in HE, Turkish students try to achieve a prestigious field to study.

4. Study in Turkey and Germany

4.1. Aim of the study

This study was conducted on a large sample in Turkey and Germany. Secondary school students were interviewed or surveyed. The goals of the study are

1. to verify or invalidate the afore-mentioned hypotheses in chapters 2 and 3
2. to investigate students' attendance at CS courses at school and also their frequency of computer use at home
3. to examine students' intention to study at HE level in general and if they would pursue CS
4. to explore students' perceptions of CS and the IT profession
5. to identify students' computer self-efficacy⁴⁸

Certainly, the results of female students will be compared at first. After that, a comparison of the results as for the countries will be examined separately. Finally, German students and Turkish students will be compared.

The interview was conducted with the aim of exploring whether there are any understanding problems in the questionnaire and at the same time, to investigate the perspective to CS.

4.2. Description of the sample

The research consists of a questionnaire including an interview has been conducted in public secondary schools in Turkey and Germany which were not selected randomly. The high schools (*Anadolu liseleri*) in Turkey are both in İstanbul Fatih. One of the schools was the "Cağaloğlu Anadolu Lisesi", which is in cooperation with Germany and is known as one of the prestigious high schools of İstanbul⁴⁹. The second high

⁴⁸"Computer self-efficacy describes to an individual's belief about their ability to be successful when using computers." [28]

⁴⁹Istanbul has had 1129 high schools in 2010. [41]

school was the "Çemberlitaş Anadolu Lisesi", which is not as big as Cağaloğlu and has no cooperation to another country.

For the sample in Germany it was chosen 3 different secondary schools (*Gymnasium*, *Gesamtschule*), one of them is a female high school (*Mädchengymnasium*), in Münster and Neubeckum. In these schools CS is a part of the subjects of grades 10 to 13 *gymnasiale Oberstufe* and this was the reason why they are chosen.

There have been surveyed 192 girls and 166 males (5 did not answer) in Turkey at the age of 13 to 18 ($M=15.27$). At the same time in Germany 157 girls and 156 males (4 did not answer) at the age of 14 till 19 ($M=16.81$) have participated in the survey. Because of the type of the secondary schools, most of the students aim at HE. But not every student has already decided what field he or she actually will choose in HE; this is also based on the average ages of the students. The families show a great variety in Turkey, as well in Germany. Thus, the students have been surveyed are throughout from different social background. Besides, one female, Turkish student (age 16) was interviewed for further examination.

The studies have taken place from November 2011 till January 2012 during one school hour without the presence of the researcher⁵⁰.

4.3. Description of the method

For the development and the analysis of the survey several previous studies[34; 14; 47] were used. SPSS statistical package⁵¹ was employed for all analyses.

All collected data of closed questions were evaluated by descriptive statistics (frequencies, means). The answers of the open-ended questions were collected into different categories according to specific topics.

To analyze the differences among students independent samples *t-tests* were used, Pearson correlation and one-way analysis of variance (ANOVA) was used to explore the relationships between different categories (one dependent and one independent). The ANOVA was used in the case of 'intention to study CS' (dependent category) compared to 'encouraged by a person or several persons' (independent category). For comparison between two groups (e.g. Germany and Turkey) the independent *t-test* were conducted on one dependent variable.

In closing, there were some questionnaire with less than 10% answering; these were deleted with the aim not to distort the results.[46; 8]

⁵⁰Because of time pressure, especially in Turkey, the researcher could not be present in every class and so the teachers handed out the questionnaires to the students.

⁵¹IBM SPSS Statistic 20

4.4. Description of the questionnaire and the interview

The questionnaire⁵² is arranged in six groups similar to Papastergiou ([47]) and collects qualitative and also quantitative data. For some questions a 4-point Likert-type was used, without a neutral answer option to *force* the students to form an opinion. The values of the answer options were always '0' for 'no', '1' for 'yes' and for the multiple choice every selected item rated with '1'. For the Likert-type questions it was defined: '4' for 'very important' or 'strongly agree', '3' for 'important' or 'agree', '2' for 'not important' or 'disagree' and '1' for 'not important at all' or 'strongly disagree'.

Firstly, some biographical data, like gender, age and within open-ended questions some information (professions of parents etc.) of the family, were requested.

Secondly, students' attendance at CS courses at school was investigated by asking them if they currently attend any CS courses and how many years they have been taught in CS. Moreover, in this group the students were asked if they learned any programming languages and in case of a positive answer, which ones they have learned through an open-ended question. In addition, gender ('mostly male', 'male and female at equal percentages' and 'mostly female') of the CS teachers was surveyed as well.

Thirdly, students' frequency of computer use at home was explored with closed questions, whether they have a computer at home, whether they have one just for themselves and how often ('every day', 'several days per week', 'once a week' and 'several times in a month') they use the computer. Moreover, the students were asked whether they have any rules for using the computer and which family members ('brother/s', 'sister/s', 'father' and 'mother') are familiar with using the computer, and nor who uses it mostly. Lastly, they were surveyed in case of that they do not have any computer at home, where ('in the school', 'at friends', 'at relatives' and in Turkey separated: 'at cyber-café's') they usually use it and how often.

Fourthly, data about students' intention to study (CS) at HE level were collected by asking them first in a 4-point Likert-type ('very important', 'important', 'not important' and 'not important at all') question to rate different items ('High salary', 'Varied tasks', 'Career opportunities', 'To work with people', 'Prestige', 'Autonomy', 'Creativity' and 'To do something meaningful') according to their future job. Afterwards the question "Are you intended to apply for a university?" was asked and in which fields ('Humanities', 'Natural Sciences', 'Mathematics, Computer Science', 'Law, Economics', 'Engineering', 'Medicine' and 'Other') they are mostly interested in. Further, the closed question if they would pursue HE studies in CS was asked, where they had the options 'Yes', 'No, and 'Maybe' for answering. Additionally, they

⁵²Samples of the questionnaire are presented in the appendix A.2 in Turkish, German and English.

had the possibility to describe determining factors for their decision, the opinion of their parents and friends in three open-ended questions. Furthermore, the students were asked if they have been encouraged or discouraged by a person or several persons ('Parents', 'Siblings', 'Friends', 'CS teachers' and 'Other adults'). Lastly, the questions whether they think there is a good chance to get a job upon graduation in CS and if they could give some reasons (open-ended) for their opinion were asked. Fifthly, students' perception of CS and the IT profession was examined with the help of four questions. First, the open-ended question about their impression of what a CS major learns was asked. Then the students should mark different characteristics of a person, who often works with a computer. There was a scale PositiveAttitude which is designed for measuring the degree for someone's positive attitude towards computer associated person. While higher scores (-5 to 6) demonstrate higher positive attitude towards a computer associated person, negative scores indicate lower positive attitude. The last two questions in this fifth group were 4-point scaled ('strongly agree', 'agree', 'disagree' and 'strongly disagree'). The students were asked which features ('Is creative', 'Is competitive', 'Is interesting', 'Is difficult', 'Is well-paid', 'Is prestigious', 'Offers one the opportunity to engage in a variety of fields' and 'Demands that one engages in computer programming') can be attributed to IT profession. All aspects, besides 'Demands that one engages in computer programming', were summed⁵³ up for measuring the attitude to the IT profession. The possible scores were between 7 and 28, whereas higher scores indicate a more positive attitude to the IT profession and low scores a less positive one. The last question presented five statements to the students, like 'There should be more women in CS', which they could rate on the same 4-point scale. Similarly, the answers were calculated⁵⁴ for measuring the attitude towards women's suitability to CS. Equally, high scores (between 5 and 20) show a more positive attitude and on the other hand low scores a less positive one, i.e. students with a low score think that CS is not so much appropriate for women as for men.

Finally, students' computer self-efficacy was explored by asking the students to rate 10 different statements, like 'I enjoy working with computers', on the same 4-point scale. For the calculation of self-efficacy five positive⁵⁵ and five negative⁵⁶ statements were given. The possible achievable scores were between 10 and 50. Further, higher scores indicate greater computer self-efficacy and low scores less self-efficacy.

Incidentally, the open-ended questions are collected and summarized in categories. Mostly, one respond fits to more than one category.[47]

⁵³as the only negative aspect: 'Is difficult'

⁵⁴as the only positive feature was chosen: 'There should be more women in CS'

⁵⁵6a, 6c, 6e, 6g and 6i

⁵⁶6b, 6d, 6f, 6h and 6j

The interview⁵⁷ starts with a quote of Edsger W. Dijkstra: 'Computer science is no more about computers than *astronomy* is about telescopes.' The interviewee will be asked what she thinks about the quote and what this means according to CS.

In order to find out more differences, the interview guide consists a diverse kind of questions, which are not possible to survey with the questionnaire. The questions of the interview were developed by using [34; 35]. The questions can be grouped in: (1) CS in school and experiences, (2) knowledge about professions in technology/engineering and existing of any prejudice in male/female professions, (3) idea of the profession of CS, (4) CS in family and encouraging persons, (5) prestige of CS, (6) wishes about the future job, (7) most important reasons for choosing a profession.

4.5. Results of the survey

4.5.1. Comparison of results - Turkish female students and German female students

Students' attendance at CS courses at school

Among⁵⁸ the 349 female students in total, 116 (73.9%) German girls are currently attending a CS course and only 4 (2.1%) of the Turkish girls. Then again, the Turkish girls have attended 2.73 years CS courses in average and German girls 1.42 years.

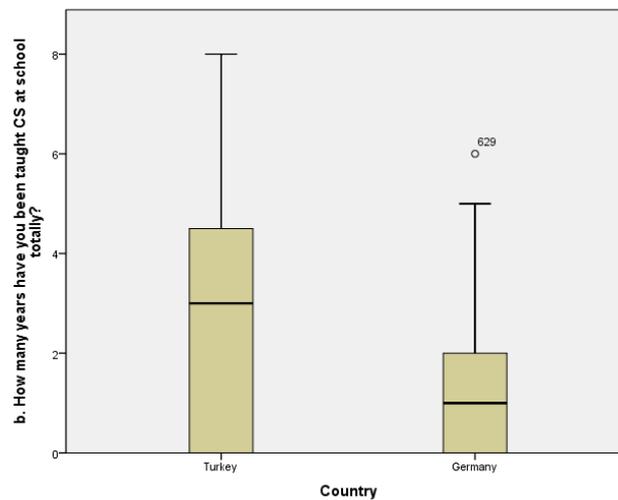


Figure 4.1.: Female students' attendance at CS courses in years

⁵⁷The interview guideline can be found in the appendix A.4.

⁵⁸All frequencies with the charts can be found in the appendix A.3. Only selected data is used for this section!

Chart 4.1 shows the distribution of data for Germany and Turkey including box plots. The difference is statistically significant ($t(328)=6.092$, $p<0.001$.) An almost insignificant number (2.6%) of Turkish girls responses the question "Have you learned any programming language?" with 'Yes'. By contrast, 45.9% of the German girls has dealt with at least one programming language. Equally, this difference is significant ($t(-24.656)=4.107$, $p<0.001$), but in this case to the opposite direction. Although the Turkish girls have attended more years of CS courses, almost no girl ($M=0.04$) has learned any programming languages. Among the few answers, all of the 5 girls responded that 'Word, Excel, etc.' are programming languages. By contrast almost every girl in Germany ($M=0.92$) knew one. Table 4.1 presents the most responded languages with their frequencies. In Germany Java and Delphi are the most responded languages. Interestingly, many students named HTML as a programming language.

Moreover, there is no significant difference when it comes to the gender of CS teachers. In Germany 53.2% of the girls and 43.7% of the Turkish girls have had mostly male teachers. The percentage (6,4%) of German girls, who have had male and female CS teachers at equal percentages, is not quite as the Turkish females' percentage (30.2%). A large number of German girls (40.4%) states that they have had mostly female CS teachers and 26.2% of the Turkish girls.⁵⁹ However, there could not be found a positive correlation between 'mostly female CS teachers' and 'I would pursue CS in HE'. Incidentally, this sample detected only one girl, who would opt CS and who had mostly female teachers. To examine if there were any encouraging persons, also CS teachers, there was an explicit question about encouraging and discouraging in the fourth question group.

	Germany		Turkey	
	female	male	female	male
<i>Word/Excel/Powerpoint/Openoffice</i>	0	0	5	4
Delphi [EOS]	35	43	0	1
Pascal	0	4	0	0
Java [Greenfoot, BlueJ, Karol, Scratch]	96	99	0	1
Logo	2	2	0	7
HTML	10	36	0	7
SQL	2	8	0	0
C/C#/C++	1	4	0	4
VB	0	3	0	5

Table 4.1.: Programming languages students know

⁵⁹But this result should not astonish, because 49.04% of the girls in Germany are from the *Mädchengymnasium* (high school for girls), which only has two female CS teachers for the grades 10 till 13. That is the reason, why this result is specific for this sample.

Students' frequency of computer use at home

Almost every girl (99.4%) in Germany has a computer at home and only slightly fewer the girls in Turkey (97.3%) have one at home.⁶⁰ On the contrary, just the half (49.2%) of the Turkish girls has one for themselves and 94.2% of the German girls owns a computer. The difference is statistically significant ($t(-10.893)=657.079$, $p<0.001$). In addition, testing if there is any correlation between owning a computer and having higher scores in computer self-efficacy gives a positive result ($F(1.294)=23.732$, $p<0.001$). In order to find a correlation between owning a computer and pursuing CS in HE, did not show any significant differences.

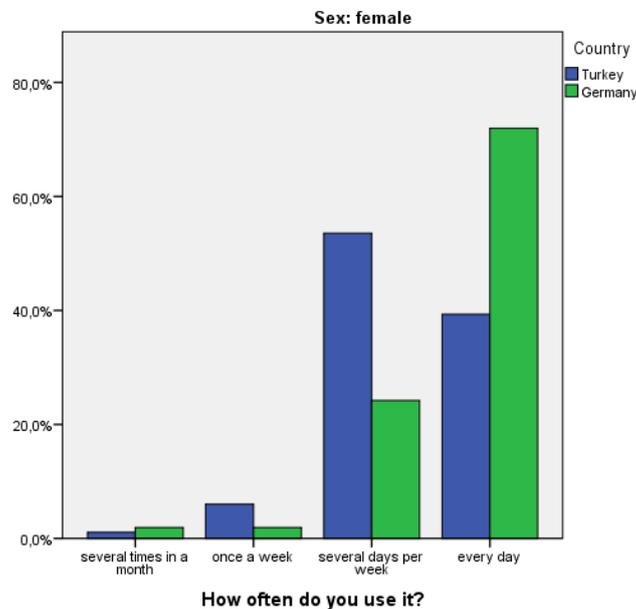


Figure 4.2.: Female students' computer use

Interestingly, the percentage of German girls (72.0%) using a computer daily is much higher than the Turkish girls (39.3%). However, 53.6% of the Turkish girls uses the computer several days per week and 24.2% of the German girls. Chart 4.2 presents the complete results. The difference in the frequency of the daily computer use is significant ($t(2.143)=-5.155$, $p<0.001$). An ANOVA was conducted to explore if there is a positive relationship between the daily computer use and pursuing CS in HE. And indeed, there is a positive correlation ($F(1.177)=10.313$, $p=0.002$). An ANOVA was conducted and the correlation is positive and significant as well ($F(1.293)=20.134$, $p<0.001$).

There is no significant difference in having any rules for using the computer at home.

⁶⁰Only a tiny percentage of both groups uses the computer outside of the home. The concrete data can be found in the appendix A.3

At least, 21.1% of the Turkish girls has rules for computer using and 14.8% of the German girls.

Finally, 344 (98.57%) of the girls have at least one family member who knows how to use a computer. Interestingly, there is only in the case of the mother a significant difference ($t(-3.644)=55.718$, $p<0.001$). A high percentage of the German females' mothers (87.1%) and 66% of the Turkish girls know how to use a computer. To analyze if mothers who know to use a computer posed as a role model, an ANOVA was conducted. The correlation between 'mother knows how to use a computer' and 'I would pursue CS in HE' is indeed positive and highly significant ($F(1.327)=19.621$, $p<0.001$). In fact, 57 of all Turkish and German girls would pursue CS and 55 of them have a mother with computer skills. Thus, if the mother of a girl is able to work with a computer, the girl will be more likely to choose CS. Compared to 'father knows how to use a computer' there was no significant correlation. As the family member who uses the computer mostly, the Turkish girls named brother with the percentage of 38.1% and in contrary, the German girls named father with almost the same percentage of 37.3%.

Students' intention to study (CS) at HE level

The comparison of how important the items 'High salary', 'Varied tasks', 'Career opportunities', 'To work with people', 'Prestige', 'Autonomy', 'Creativity' and 'To do something meaningful' according to the future job shows great differences between both countries. For instance, all items except 'To work with people' and 'Creativity' are significantly different (all with $p<0.001$). The means of the different items shows that almost every item seems to be very important for the Turkish girls. Only 'Varied tasks' is with a mean-difference of 0.37 more important for German girls ($M=3.29$) than for the Turkish girls ($M=2.92$). One most obvious difference is the attitude to the item 'Prestige'. A high percentage of the Turkish girls named 'Prestige' as 'important' (35.9%) or 'very important' (57.1%). On the contrary, for the German girls 'Prestige' is 'not important' (43.9%) or 'important' (45.2%) and only for 8.4% of them it is 'very important'. For both countries are the items 'To work with people' and 'Creativity' similarly important, to be more specific the mean-differences are 0.08 and 0.15.

Furthermore, there is also a significant difference ($t(3.262)=58.812$, $p=0.001$) with regard to the questions if they intend to apply for HE. Almost every Turkish girl (99.5%) wants to apply for a university, that is quite different from the German girls with 92.2%, who intend to enroll in HE.

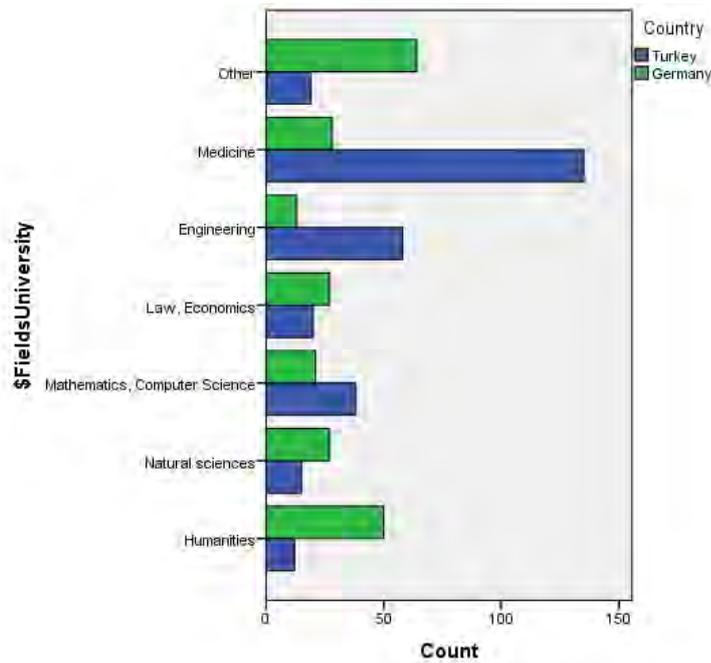


Figure 4.3.: Female students' preferences in fields of study

Chart 4.3 shows the different fields the girls are interested in. There are some differences between the countries. Except 'Mathematics, CS' and 'Law, Economics' all differences between the Turkish girls and the German girls in chosen fields are significant ('Natural sciences': $p=0.009$ and all others: $p<0.001$). Interestingly, a very high percentage (71.4%) of the Turkish girls is interested in 'Medicine', in contrast, only 19.7% of the German girls would pursue 'Medicine'. An ANOVA test was conducted to check if there is a positive correlation between 'Medicine' and 'Prestige'. The results show indeed a positive relationship between these items ($F(1.338)=53.804$, $p<0.001$). More girls choose 'Medicine' if 'Prestige' is 'important' or 'very important' for them. The same test was carried out with the fields 'Engineering' and 'Mathematics, CS'. However, there is no correlation for 'Mathematics, CS' and 'Prestige'. But interestingly, 'Engineering' is also in positive correlation to 'Prestige' ($F(1.338)=14.815$, $p<0.001$) as it is the case with 'Medicine'. A close look into the data shows indeed that 30.7% of Turkish girls would pursue 'Engineering' in HE. In contrast, only 9.2% of the German girls would choose 'Engineering'. Although there is no significant difference in 'Mathematics, CS' between the countries, in this sample the Turkish girls (20.1%) are more likely to choose this field than the German girls (14.8%). As mentioned before, 'Prestige' seems very important for the Turkish girls and the positive correlation shows that they highly value professions of a doctor, engineer and mathematician/computer scientist. In addition, the interviewed Turkish girl admits that the status of the university is also very important

for her. She would prefer a prestigious university (cf. A.6, ll. 122-131).

	Country		Total
	Turkey	Germany	
No	133 (71.9%)	123 (86.0%)	256 (78.0%)
Maybe	8 (4.3%)	7 (4.9%)	15 (4.60%)
Yes	44 (23.8%)	13 (9.1%)	57 (17.4%)
Total	185 (100%)	143 (100%)	328 (100%)

Table 4.2.: Female students responses of 'Would you pursue HE studies in CS?'

Understandably, there is also a significant difference in choosing CS in HE ($t(3.582)=53.379$, $p<0.001$). According to 143 German girls only 13 (9.1%) would pursue CS in HE. Again in contrast, 44 (23.8%) of 185 Turkish girls stated to choose CS in HE. As presented in table 4.2, almost the same percentage of Turkish and German girls has not decided yet.

	Germany	Turkey
Good career opportunities	7 (53.9%)	9 (39.1%)
Interested/ talented in CS	13 (100%)	9 (39.1%)
Fun and demanding	7 (53.9%)	4 (17.4%)
High prestige	1 (7.7%)	0 (0.0%)
creative/ impressive	0 (0.0%)	2 (8.7%)
Total	13 (100%)	23 (100%)

Percentages and totals are based on respondents.

Table 4.3.: Female students' reasons for choosing CS

	Germany	Turkey
Not interested in CS/ technology	67 (63.8%)	13 (52.0%)
Not talented/ No attending in CS courses	18 (17.1%)	1 (4.0%)
Too much work with a computer	8 (7.6%)	0 (0.0%)
Interested in other fields	18 (17.1%)	9 (36.0%)
Want to work with people	6 (5.7%)	5 (20.0%)
Too complicated/ boring	9 (8.6%)	1 (4.0%)
Total	105 (100%)	25 (100%)

Percentages and totals are based on respondents.

Table 4.4.: Female students' reasons against choosing CS

The students gave a huge number of different reasons for their decision to pursue/ or not to pursue CS in HE. Tables 4.3 and 4.4 summarize these reasons in groups with their frequencies. Interestingly enough, a very high percentage of the German

girls described their reasons for or against pursuing CS. Many of them are *not interested in CS/ programming or in technology*, 67 (63.81%) of 105 the girls stated this. Further, *no having any talent in mathematics or CS* and *working too much with a computer* seem to be also very important reasons against choosing CS. Additionally, 6 girls are more interested in working with people. Thus, at least these girls think that CS is a job with "no contact with people"⁶¹.

All of the 13 German girls, who want to choose CS in HE, gave some reasons for their choice. Every girl affirmed to be highly *interested in CS* or to see themselves as *talented in CS*. Moreover, *fun* (7=53.85%) and *good career opportunities* (7=53.85%) are also very essential reasons for choosing CS.

On the other hand, unfortunately only a small number of the Turkish girls responded to these open-ended questions. However, similarly the most stated reason not to pursue CS was *no interest in CS or technology* (13=52%). Interestingly, no Turkish girl claimed that computer scientists sit too much in front of computers. Especially 5 (20%) Turkish girls respond that they want to help people or rather they want to study Medicine. Finally, *Good career opportunities* (9=39.13%) and *interest in CS and technology* (9=39.13%) are the most frequently mentioned motivations to study CS for the Turkish girls.

	Germany	Turkey
They support me in my decision	83 (79.8%)	43 (69.4%)
No idea/ We do not talk about this	12 (11.5%)	12 (19.4%)
They do not care	7 (6.7%)	7 (11.3%)
My parents want that I choose CS	2 (1.9%)	3 (4.8%)
They do not want that I choose CS	0 (0.0%)	1 (1.6%)
They want that I study medicine	0 (0.0%)	8 (12.9%)
Total	104 (100%)	62 (100%)

Percentages and totals are based on respondents.

Table 4.5.: Thoughts of female students' parents

In addition, the girls have been surveyed about the opinions of their parents and friends on choosing/ not choosing CS. The responses are summarized in 4.5 and 4.6. Similarly, German and Turkish females' parents do mainly support their decisions. At least, there are 2 German girls and 3 Turkish girls who are actually encouraged to study CS. One respond of a German girl was: "My father would be very happy if I choose CS in HE."⁶² On the contrary, 8 Turkish girls answered that their parents encourages them to pursue medicine. Once more, medicine seems to be a favored profession in Turkey. In a similar way, the answers about the females' friends'

⁶¹original quote: "kein Menschenkontakt"

⁶²original quote: "Mein Vater würde sich sehr freuen, wenn ich Informatik studieren würde."

	Germany	Turkey
They support me/ They would like it	37 (48.1%)	27 (57.5%)
They would be surprised	2 (2.6%)	0 (0.0%)
They think CS is boring	14 (18.2%)	5 (10.7%)
They do not care	18 (23.4%)	11 (23.4%)
No idea/ We do not talk about this	3 (3.9%)	1 (2.1%)
It is my decision	0 (0.0%)	3 (6.4%)
Total	77 (100%)	47 (100%)

Percentages and totals are based on respondents.

Table 4.6.: Thoughts of female students' friends

thoughts show that most of their friends support them. Five German girls and only one Turkish girl obviously replied that their friends would think that choosing CS is "weird" or "boring". One German girl answered that her friends think that she is a "freak" because she has decided to study CS. According to negative terms like "nerd", "freak" and "geek", the interviewed girl admits that she does not any of them. In Turkey they do not use these words, but computer-savvy persons are characterized by being very diligent (cf. A.6, ll. 50-61).

Besides the opinion of both parents and friends, the girls had the opportunity to state if they had been encouraged or discouraged in their decision to study CS. There is a statistically significant difference ($t(4.985)=102.563$, $p<0.001$) between the countries. The Turkish girls in general have been more supported than German girls. 44 among 107 Turkish girls (41.1%) had been encouraged by at least one person. A more detailed look into the frequencies shows that the girls, who are intended to pursue CS in HE, are mostly encouraged. As seen before there are 44 Turkish girls, who could imagine studying CS; and 20 (45.45%) girls of them have been encouraged by at least one person. This situation seems to be similar to the German females'. There are 13 German girls, who would choose CS and 4 (30.77%) of them have been supported to study CS. There is a positive correlation between choosing CS in HE and being encouraged. An ANOVA was conducted and the correlation is significant ($F(1.234)=39.859$, $p<0.001$). At least 10 Turkish girls and 17 German girls, who would not pursue CS, have been advised against it. Although there were exactly two Turkish and German girls, what was rather unexpected, they would still choose CS.

Not only the percentage of encouraged girls is important, also the exact encouraging persons are interesting to know. In this sample encouraging persons are mainly the parents. Almost every encouraged Turkish girl (88.4%) and 52.9% of the German girls have been supported by her parents. The second important group of encourag-

ing persons is friends for the Turkish girls with a percentage of 46.5%. In contrast, the German girls named other adults as encouraging in 41.2% of the cases. Interestingly, dissuading persons in both countries are mainly the friends. In fact, 58.3% of the Turkish girls and 55.0% of the German girls named their friends as discouraging persons. Furthermore, there is no significant difference between the countries when it comes to discouraging. However, an ANOVA shows no significant correlation between not choosing CS and discouraging by one or more persons. All the other percentages of encouraging and discouraging persons are presented in table 4.7.

	Encouraging Persons			Discouraging Persons		
	Country		Total	Country		Total
	Turkey	Germany		Turkey	Germany	
Parents	38 (88.4%)	9 (52.9%)	47	2 (16.7%)	9 (45.0%)	11
Siblings	13 (30.2%)	4 (23.5%)	17	3 (25.0%)	5 (25.0%)	8
Friends	20 (46.5%)	3 (17.6%)	23	7 (58.3%)	11 (55.0%)	18
CS teachers	8 (18.6%)	2 (11.8%)	10	2 (16.7%)	1 (5.0%)	3
Other adults	19 (44.2%)	7 (41.2%)	26	6 (50.0%)	9 (45.0%)	15
Total	43	17	60	12	20	32

Percentages and totals are based on respondents.

Table 4.7.: Female students' encouraging and discouraging persons

Finally, the girls have been surveyed about their idea about good job chances for CS graduates. The results of this question are astonishing as compared with the results above. A significant high number of German girls (93.6%) believe in having good job chances with a graduation upon CS, on the contrary, 65.5% of the Turkish girls believe that. In fact, there are just five Turkish girls, who would choose CS and do not believe in having good career prospects. A *t*-test shows a significant difference between the countries ($t(-5.785)=201.832, p<0.001$). At this point, for all of these five girls 'Prestige' is important or very important and three of them are of the opinion that an IT profession 'is prestigious'. Although the Pearson correlation displayed a low positive relationship between choosing CS and believing in good job opportunities, the ANOVA did not show any significance.

The question about views, why they think that an IT profession has or has not good prospects, was open-ended and especially the German girls gave numerous responds. In table 4.8 the most responded thoughts are summarized and grouped according to countries. The most frequently mentioned reasons for good chances are that computer scientists are in great demand because of the importance of technology in future. Secondly, girls in both countries answered that computers are very important for our daily life and in different work fields. Interestingly, 13.72% (7 of 51) of the Turkish girls do not think that there are good chances to get a job

because of high unemployment of IT experts in Turkey. No German girl gave this respond. Again, these results are astonishing because Turkish girls, who think about bad chances getting a job, would decide CS for all that.

	Germany	Turkey
For:		
Good career opportunities	17 (15.5%)	7 (13.7%)
Computers are important in our work	31 (28.2%)	11 (21.6%)
Technology gains more and more importance	25 (22.7%)	9 (17.7%)
They are needed / modern profession	34 (30.9%)	11 (21.6%)
Only few people, who study CS/Future job	5 (4.6%)	2 (3.9%)
CS teacher	4 (3.6%)	0 (0.0%)
Against:		
No variety	2 (1.7%)	4 (7.8%)
Too many people in IT/ no money	0 (0.0%)	7 (13.7%)
Total	110 (100%)	51 (100%)

Percentages and totals are based on respondents.

Table 4.8.: Female students' reasons for and against good chances in IT

Students' perceptions of CS and the IT profession

The results of this question group are a kind of surprising because most differences between these countries are statistically speaking very highly significant. Before presenting the results of the question about describing a person, who works very often with a computer, the idea about the topics of a CS major are listed in table 4.9. Once more, comparison between the countries demonstrates again significant differences. Most of German girls have at least one idea about the topics in CS. Compared to Turkey, only few girls know about some detailed subjects in CS. In order to demonstrate, 109 German girls associated CS with programming; in comparison only 19 Turkish females' responds show programming as a CS topic. At least 25 German girls and only one Turkish girl think that CS majors learn much about mathematics and logic. 25 of the Turkish girls in particular have absolutely no idea about topics of CS studies. The interviewed Turkish girl associated CS with programming, data and numbers and so on. However, she would not choose CS because she is not interested in and thinks that a special intelligence is needed for this profession (cf. A.6, ll. 11-16). Furthermore, she believes that the IT profession offers the possibility to have a people-related work (cf. A.6, ll. 73/74).

In almost all features German and Turkish girls differ significantly. In detail, all following features are very highly significant ($p < 0.001$) in comparison: 'intelligent',

	Germany	Turkey
Programming	109 (83.9%)	19 (32.8%)
Mathematics/ Logic	25 (19.2%)	1 (1.7%)
Computer use	37 (28.5%)	16 (27.6%)
Software use	6 (4.6%)	1 (1.7%)
Problem solving	9 (6.9%)	0 (0.0%)
Databases	2 (1.5%)	0 (0.0%)
Computer repairing	2 (1.5%)	1 (1.7%)
English	0 (0.0%)	1 (1.7%)
Websites	0 (0.0%)	1 (1.7%)
Teaching	0 (0.0%)	1 (1.7%)
No idea	5 (3.8%)	25 (43.1)
Total	130 (100.0%)	58 (100.0%)

Table 4.9.: Female students' ideas about CS

'interesting', 'creative', 'open-minded', 'diligent' and 'act with self-assurance', also the difference in 'unilaterally interested' is highly significant ($p=0.004$).

As shown in the table 4.10 the differences in the frequencies are very obvious. Table 4.10 presents the results of the t -tests and the diverse means between the countries. To sum up, the 157 German girls imagine a computer expert as more intelligent, unilaterally interested and diligent than Turkish girls do. On the other hand, the Turkish girls picture a person with good computer skills as more open-minded, interesting, creative and more likely to act with self-assurance than German girls do. Both countries would describe a computer-savvy person in almost equal percentages as introverted, unsociable, unworldly and grumpy. With a mean score of 0.52 points the Turkish girls have a shade higher positive attitude towards computer experts than German girls with 0.44 points in average, but this difference is not significant. In addition, an ANOVA detected a positive relationship between pursuing CS and positive attitude towards a computer associated person. The correlation is highly significant ($F(1.326)=8.214$, $p=0.004$).

At a later time the positive attitude towards the IT profession was analyzed. Both countries differ significantly in almost every item except the last two. Table 4.11 presents the results of the t -tests Also the measured scale shows a significant difference ($t(2.291)=5.893$, $p=0.023$) between the Turkish and German girls. The Turkish girls have with a mean of 19.16 points a higher score than the German girls with 18.39 points. A more detailed look into the data displays that the German girls regard an IT profession in being competitive, difficult and well-paid more than the Turkish girls. Moreover, the German girls stated more than the Turkish girls that an IT job offers one the opportunity to engage in a variety of fields and that the

	Country	N	Mean	t-test	p
introvert	Turkey	191	0.53	$t(1.184)=0.054$	0.237
	Germany	157	0.46		
intelligent	Turkey	191	0.35	$t(-7.027)=3.404$	0.000
	Germany	157	0.70		
open-minded	Turkey	191	0.24	$t(3.53)=53.774$	0.000
	Germany	157	0.10		
unsociable	Turkey	191	0.31	$t(1.676)=11,438$	0.095
	Germany	157	0.23		
unworldly	Turkey	191	0.31	$t(1.964)=15.775$	0.050
	Germany	157	0.22		
interesting	Turkey	191	0.51	$t(7.227)=142.554$	0.000
	Germany	157	0.17		
unilaterally interested	Turkey	191	0.27	$t(2.891)=28.365$	0.004
	Germany	157	0.41		
act with self-assurance	Turkey	191	0.25	$t(4.268)=82.102$	0.000
	Germany	157	0.08		
grumpy	Turkey	191	0.13	$t(1.533)= 9.33$	0.126
	Germany	157	0.08		
diligent	Turkey	191	0.25	$t(-4.194)=49.946$	0.000
	Germany	157	0.46		
creative	Turkey	191	0.47	$t(2.708)=23.38$	0.007
	Germany	157	0.32		

Table 4.10.: Female students' perception of a computer-savvy person

	<i>t</i> -test	<i>p</i>	Germany		Turkey	
			N	<i>M</i>	N	<i>M</i>
Is creative	$t(4.156)=2.413$	0.000	155	2.7	184	3.04
Is competitive	$t(-4.734)=15.304$	0.000	152	2.88	183	2.49
Is interesting	$t(5.201)=0.16$	0.000	155	2.34	183	2.82
Is difficult	$t(-6.167)= 1.065$	0.000	152	3.25	180	2.7
Is well-paid	$t(-2.936)=19.239$	0.004	150	3.07	178	2.84
Is prestigious	$t(3.058)=0.214$	0.002	150	2.53	175	2.79

Table 4.11.: Female students - Characteristics of an IT profession

profession demands from someone to engage in computer programming, but in these items the difference between the countries is not significant. Otherwise, the Turkish girls correlate an IT occupation with being creative, interesting and significantly more prestigious than German girls. Similarly, the interviewed Turkish girl thinks that special talents are required for the CS profession and this fact makes it very prestigious (cf. A.6, ll. 37/38). Still, she further names that CS could not be as prestigious as 'Medicine' (cf. A.6, l. 44).

	<i>t</i> -test	<i>p</i>	Germany		Turkey	
			N	<i>M</i>	N	<i>M</i>
Men are more likely to succeed in the IT profession than women.	$t(-4.18)=3.749$	0.000	152	2.39	180	1.98
Women have problems to establish themselves in IT jobs.	$t(6.334)=25.426$	0.000	154	1.79	179	2.37
Men are by nature more inclined towards CS than women.	$t(2.711)=8.901$	0.007	154	1.82	179	2.08

Table 4.12.: Female students' statements to suitability of women in CS

Lastly, the girls were surveyed if they agree to some statements regarding to CS as an appropriate field for men and women. Table 4.12 presents the computed data in the *t*-tests and the means. The scale of someone's attitude, how much CS is suitable for women, does not show significant differences between Turkey and Germany. But both countries identify a mean score of almost 15, which means that German and Turkish girls are of the opinion that women fit as well as men in a CS profession. For instance, German girls ($M=2.39$) agree more than the Turkish girls ($M=1.98$) that 'Men are more likely to succeed in the IT profession than women'. Conversely, more than German girls ($M=1.82/ M=1.79$) the Turkish girls ($M=2.08/ M=2.37$) concur as for the statement 'Men are by nature more inclined towards CS than women' and 'Women have problems to establish themselves in IT jobs'. Besides, the Pearson correlation detected some high positive correlations between the statements. For instance, girls who agreed with 'Men are by nature more inclined towards CS than women' mostly also agreed to 'Men are more likely to succeed in the IT profession than women' and 'CS is a science more appropriate for men than for women'. But these girls also show lower scores in computer self-efficacy than girls who did not agree that men are talented by nature for CS.

In the interview the Turkish girl does not see great differences between men's and women's talents, but the actual differences seem to show that men are more inclined in physics and mathematics and girls seem to have more social skills. Moreover, she also thinks that girls do have talents in CS. It depends on the personality of the girl (cf. A.6, ll. 25-31).

Students' computer self-efficacy

In general, the German girls have in average higher computer self-efficacy (30.11) than Turkish girls (28.41). An ANOVA was conducted to detect a positive relationship between pursuing CS and high computer self-efficacy. Indeed, the correlation is significant ($F(1,286)=11.696, p=0.001$). Table 4.13 demonstrates the scores in self-efficacy divided into choosing CS, not choosing CS or maybe choosing CS grouped in countries.

Would you pursue CS in HE?	Computer self-efficacy	
	Turkey	Germany
No	27.72	29.79
Maybe	28.67	36.50
Yes	30.89	32.00

Table 4.13.: Mean values of female students' self-efficacy

On the contrary, the German girls who have not decided yet, indicate the highest score in computer self-efficacy. However, also the score of the girls, who decided studying CS, is with 32 higher than the score of the Turkish girls who would pursue CS in HE.

4.5.2. Comparison of results - German male and female students

The last section presented the results of German female students compared to Turkish female students. Of course, it is also worth to take a look into the complete sample. Subsequently, in this section German male and female students will be briefly⁶³ compared with the aim to verify or disprove the before mentioned hypotheses.

In this sample 87.0% of the males and 74.8% are currently attending CS courses. Consequently, most of them have learned at least one programming language. Table 4.1 also presents the responds of the males. In contrast, males in Germany have been taught in CS more years in average than girls. A comparison of the computer use at home shows no significant differences between males and girls. Nevertheless, there are some high significant differences in the importance of future job related items. For instance 'High salary' seems to be more important for males than for girls. Similarly, 'Career opportunities' and 'Prestige' are also more important for males than for girls. On the contrary, girls named 'To work with people', 'Creativity' and 'To do something meaningful' as more important than males. Table 4.14 displays the

⁶³Again, the complete results (frequencies) can be found in the folder *Results* on the CD.

values of conducted t -test on the items grouped in genders.

	t -test	p	male M	female M
High salary	$t(3.466)=19.358$	0.001	3.35	3.13
Career opportunities	$t(2.468)=0.187$	0.014	3.42	3.24
Prestige	$t(2.096)=0.467$	0.037	2.77	2.59
To work with people	$t(-4.671)=0.031$	0.000	2.86	3.30
Creativity	$t(-4.008)=4.370$	0.000	2.70	3.08
To do something meaningful	$t(-2.736)=3.737$	0.007	3.29	3.51

Table 4.14.: German students - Profession features

Chart 4.4 presents the numbers of responds per field grouped in male and female. Except 'Law, Economics' all differences are highly significant. To sum up, girls would pursue 'Humanities' and 'Medicine' more than males. On the other hand, males are more likely to choose 'Natural sciences', Mathematics, CS' and 'Engineering' than girls.

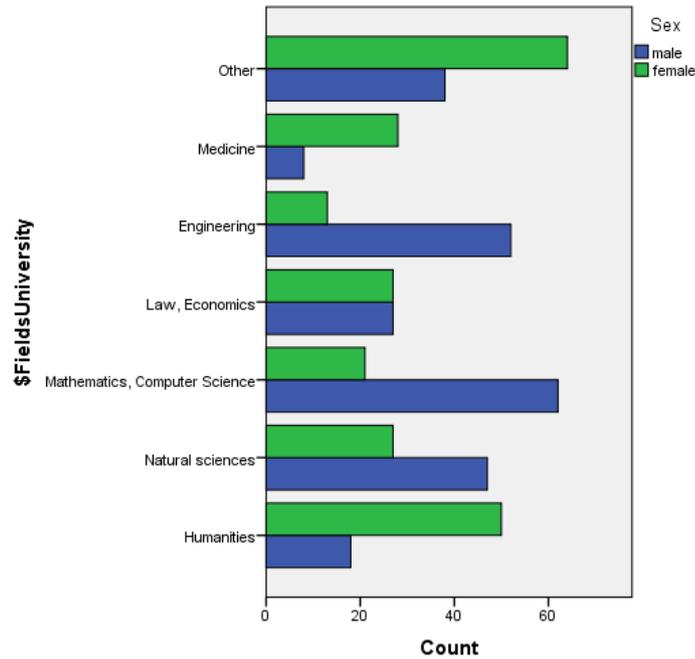


Figure 4.4.: German students' preferences in fields of study

Further, males ($M=0.59$) are more likely to pursue CS in HE than girls ($M=0.23$) and again the difference is highly significant ($t(4.291)=48.585$, $p<0.001$). Table 4.15 presents the numbers and percentages of students who intend/ do not intend and intend to choose CS in HE. Like German girls, males have given several reasons for

choosing CS. They have mainly stated features like fun, interest, talent, money and good future job opportunities.

	Sex		Total
	male	female	
No	88 (61.5%)	123 (86.0%)	211 (73.8%)
Maybe	25 (17.5%)	7 (4.9%)	15 (11.2%)
Yes	30 (21.0%)	13 (9.1%)	43 (15.0%)
Total	143 (100%)	143 (100%)	286 (100%)

Table 4.15.: German students' responses of 'Would you pursue HE studies in CS?'

Moreover, males and girls have been equally encouraged or discouraged in choosing CS. The *t*-test does not show any significant differences.

Furthermore, the results of the question about the characteristic of computer associated person show significant differences in 'introverted' ($t(-3.790)=42.151, p<0.001$), 'unworldly' ($t(-2.966)=38.302, p=0.003$) and 'act with self-assurance' ($t(3.528)=56.569, p<0.001$). In fact, girls ($M=0.46, M=0.22$) think that computer experts are more 'introverted' and 'unworldly' than males ($M=0.26, M=0.10$) do. In contrast, males ($M=0.22$) characterize a computer associated person as one who 'acts with self-assurance' more than girls ($M=0.08$) do.

As expected, males ($M=19.37$) have a higher positive attitude towards the IT profession than girls ($M=18.39$) and the difference is highly significant ($t(3.213)=0.156, p=0.001$). In detail, girls ($M=2.34, M=2.70$) think an IT occupation is less 'interesting' and 'creative' than males ($M=2.90, M=3.03$) do. Interestingly, males ($M=3.44$) agree less strongly than girls ($M=3.74$) that an IT job 'demands that one engages in computer programming'. But both groups show a high agreement to this statement. It is quite obvious that girls see the IT profession as more suitable for women than men. In fact, girls have in average a score of 14.85 at the scale of women's suitability and males 13.58 and the difference is highly significant ($t(-3.809)=3.293, p<0.001$). For example, males agree more to the statements 'Men are more likely to succeed in the IT profession' and 'Men are by nature more inclined towards CS than women' than girls. On the contrary, girls think that 'There should be more women in CS' more than males do. Consequently, it is not surprising that males ($M=33.64$) have a higher self-efficacy than girls ($M=30.11$). The difference is again significant ($t(6.183)=0.060, p<0.001$).

4.5.3. Comparison of results - Turkish male and female students

This section summarizes the differences between male and female students in Turkey. With regard to Germany, the students in Turkey show less differences regarding to all questions.

According to CS courses at school males ($M=2.84$) and girls ($M=2.73$) have been taught CS almost of equal length. In contrast, there is a highly significant difference ($t(3.260)=53.217$, $p=0.001$) between males and girls related to the question if they have learned any programming language. In fact, males ($M=0.18$) stated more often that they know a programming language than girls ($M=0.04$). With a significant difference ($t(2.665)=2.566$, $p=0.008$), Turkish males ($M=3.51$) use the computer in average more than Turkish girls ($M=3.31$).

Similar to the results of Germany, males and girls have different preferences according to their future profession. Table 4.16 presents the results of the conducted t -tests. For the Turkish girls are 'Varied tasks', 'Career opportunities', 'To work with people' and 'To do something meaningful' are more important than for the males. On the other hand, males are more interested in 'High salary' than girls.

	t -test	p	male M	female M
High salary	$t(3.264)=19.358$	0.001	3.54	3.35
Varied tasks	$t(-3.358)=6.137$	0.001	2.66	2.92
Career opportunities	$t(-3.004)=20.050$	0.003	3.50	3.70
To work with people	$t(-3.097)=0.343$	0.002	2.97	3.22
To do something meaningful	$t(-3.381)=28.723$	0.001	3.50	3.22

Table 4.16.: Turkish students - Profession features

Almost every student in Turkey wants to enroll in HE, so there is no significant difference between males and girls, whereas there are some differences as for the fields they are interested in. males are more likely to choose 'Mathematics, CS' and 'Engineering' and girls are more likely to opt 'Medicine'. Chart 4.5 shows the frequencies of all fields grouped as per gender.

Once more, the intention to pursue CS in HE is similar to the German case. Turkish males ($M=0.79$) would rather choose CS than girls ($M=0.52$). Detailed numbers are presented in table 4.17. The difference between males and girls is significant ($t(2.820)=1.953$, $p=0.005$). The most stated reasons for choosing CS of the males are that they either interested in CS or the good job opportunities.

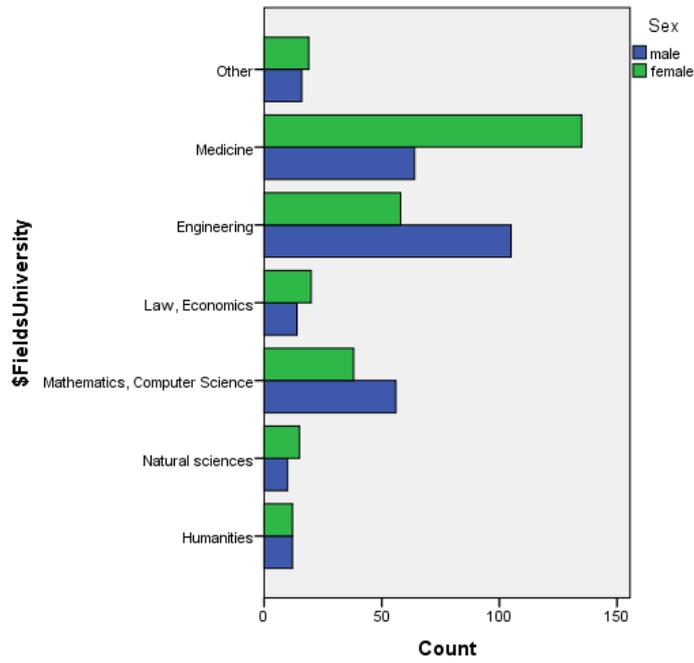


Figure 4.5.: Turkish students' preferences in fields of study

	Sex		Total
	male	female	
No	75 (51.0%)	133 (71.9%)	208 (62.7%)
Maybe	28 (19.0%)	8 (4.3%)	36 (10.8%)
Yes	44 (29.9%)	44 (23.8%)	88 (26.5%)
Total	147 (100%)	185 (100%)	332 (100%)

Table 4.17.: Turkish students' responses of 'Would you pursue HE studies in CS?'

According to the characteristics of a computer associated person Turkish males and girls have almost the same opinion. Only in the character 'introverted' could be founded as significant difference ($t(-2.873)=10.021, p=0.004$). Girls ($M=0.53$) think that computer experts are 'introverted' more than males ($M=0.38$) do. In addition, males ($M=20.36$) have in average a higher positive attitude to the IT profession than girls ($M=19.16$). More specifically, males agree more strongly to the statements that IT occupations are 'creative', 'competitive' and 'well paid' than girls. Conversely, Turkish girls characterize an IT job as 'demanding that one engages in computer programming'. The detailed results of the t -test are displayed in table 4.18.

	t -test	p	male		female	
			N	M	N	M
Is creative	$t(2.626)=2.775$	0.009	150	3.26	184	3.04
Is competitive	$t(5.039)=3.046$	0.000	148	2.94	183	2.49
Is well-paid	$t(2.382)=3.602$	0.018	152	3.05	178	2.84
Demands that ones engages in computer programming	$t(-2.156)=7.169$	0.032	149	3.49	179	3.66

Table 4.18.: Turkish students - Charactersitics of an IT profession

Furthermore, Turkish males do not believe strongly that women are suitable for CS. A low score of 11.76 shows the different attitude towards the suitability of women to the girls with a score of 14.37 and the difference is significant ($t(-7.672)=1.890, p<0.001$). In fact, males and girls differ significantly in their opinion about almost all of the statements. For instance, the males agreed mostly to the statement 'Men are by nature more inclined towards CS than women' and the girls mostly disagreed. All the results which are conducted with t -tests are listed in table 4.19.

	t -test	p	male		female	
			N	M	N	M
CS is a science more appropriate for men than for women.	$t(4.647)=0.783$	0.000	150	2.58	180	1.98
Men are more likely to succeed in the IT profession than women.	$t(8.299)=5.666$	0.000	150	2.83	180	1.98
Women have problems to establish themselves in IT jobs.	$t(3.349)=2.529$	0.001	154	1.79	179	2.37
Men are by nature more inclined towards CS than women.	$t(7.242)=0.123$	0.000	154	1.82	179	2.08

Table 4.19.: Turkish students' statements to suitability of women in CS

Finally, the comparison in the self-efficacy of males and girls shows again a significant difference ($t(4.742)=1.132$, $p<0.001$). The males with a score of 31.48 have higher self-efficacies than girls with 28.41. Once more, this result is similar to the results of the German students.

4.5.4. Results and discussion - Male students and Female students

In the following sections the results of gender comparison will be presented and discussed⁶⁴. This section only gives an overview of the obvious differences and all other results can be found in the appendix on CD.

First eye-catching difference is that respectively more males (25.5%) intend to study CS than girls (17.4%). This difference is highly significant ($t(4.474)=25.306$, $p<0.001$). Table 4.20 presents all the results according to this question.

	Sex		Total
	male	female	
No	163 (56.2%)	256 (78.0%)	419 (67.8%)
Maybe	53 (18.3%)	15 (4.6%)	68 (11.0%)
Yes	74 (25.5%)	57 (17.4%)	131 (21.2%)
Total	290 (100%)	328 (100%)	618 (100%)

Table 4.20.: Male and female students' responses of 'Would you pursue HE studies in CS?'

In the following lines the differences are briefly described. It is important to note that all of them are significant⁶⁵.

In average the males have had more years CS courses ($M=2.63$) than girls ($M=2.12$) and have learned more often programming languages. According to the characteristics of a computer-savvy person girls think that he or she is more introverted or unworldly than males. This fact indicates females' negative perception towards CS. On the other side, males would describe an IT profession as more creative, competitive, interesting and well-paid than girls, while girls think that programming is very important for the IT profession. Obviously, males (19.86) associate higher positive features to CS than girls (18.82).

As expected, there is great difference between males and girls according to the suitability of women in CS. Girls think more than males that CS is suitable for women.

⁶⁴The focus of the thesis is the comparison between the countries. Thus, the comparison of the genders and the countries are only briefly presented. Exceptionally, the discussion is within the presenting of the results.

⁶⁵For detailed information about the t -tests take a look at the folder *Results* on the CD.

Further, males use more often a computer and thus, they have higher scores in computer self-efficacy than girls. In fact, males have had an average score of 32.60 and girls 29.22. These findings confirm the previous researches.

The data also suggest that girls prefer for their future jobs features like varied tasks, to work with people, creativity, to do something meaningful and males rather prefer high salary. Moreover, girls are more interested in the humanities and medicine and males are interested in natural sciences, mathematics/CS and engineering.

These findings are consistently substantiated by previous researches and they show that the differences are significant. Thus, it may be assumed that there are some male and female features. Females like more people-oriented professions and males like to have a high salary.

4.5.5. Results and discussion - Turkish students and German students

Lastly, both countries are compared for investigation of significance differences in total. The brief comparison is conducted without grouping in genders. All results with frequencies and charts can be found in the appendix A.3.

One obvious difference is the attitude towards 'Prestige' ($t(14.321)=0.756, p<0.001$). As shown in chart 4.6 for the Turkish students prestigious professions are important or rather very important. The opinion of German students differs because most of them stated 'Prestige' either as 'important' or 'not important'.

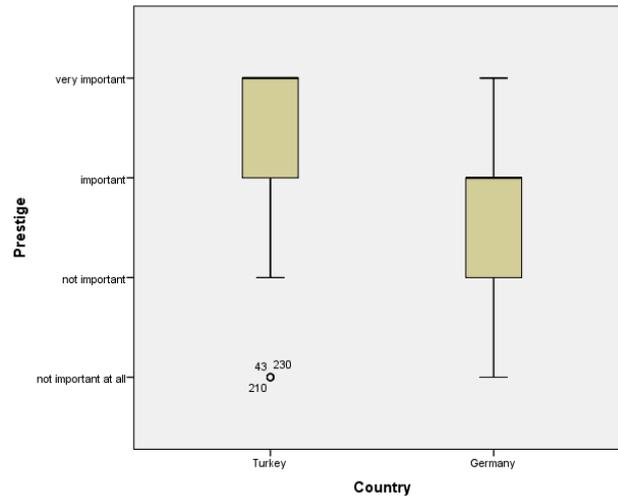


Figure 4.6.: Turkish students' preferences in of study

	Sex		Total
	male	female	
No	209 (62.6%)	214 (73.8%)	423 (67.8%)
Maybe	37 (11.1%)	33 (11.4%)	70 (11.2%)
Yes	88 (26.3%)	43 (14.8%)	131 (21.0%)
Total	334 (100%)	290 (100%)	624 (100%)

Table 4.21.: Students' responses of 'Would you pursue HE studies in CS?'

When it comes to the intention to study CS, Turkish students are more likely to pursue CS in HE than German students. Table 4.21 presents the detailed frequencies. Some differences between the favored fields at the university can be indicated. Turkish students would pursue 'Engineering' and 'Medicine' more often than German students. In contrary, German students are more likely to choose 'Humanities' and 'Natural sciences' than Turkish students.

To sum up, a Turkish student would characterize a computer expert as 'introverted', 'open-minded', 'unsociable', 'unworldly', 'interesting', 'act with self-assurance', 'grumpy' and 'creative' more than a German student. On the other hand, German students are more likely to characterize a computer associated person as 'intelligent', 'unilaterally interested' and 'diligent' more than Turkish students.

Moreover, German students agreed that an IT profession 'is competitive', 'is well-paid' and 'is difficult', whereas Turkish students correlate with an IT job more 'creativity', 'prestige' and 'interesting'. Thus, Turkey and Germany both indicate a high positive attitude to CS, but Turkish students (19.74) have a higher score than German students (18.89).

Both countries are of the same opinion that women are suitable for CS, while German students (14.20) stronger believe in that than Turkish students (13.19). Lastly, the German students are more confident in working with computers than Turkish students. In fact, the score in self-efficacy is 31.86 for the German students and 29.74 for the Turkish students.

These interesting findings between both countries may be traced back to the fact that there are special cultural differences. For instance, the selection criteria of German and Turkish students seem different. Prestigious professions are very important for Turkish females and males. Positive image of an IT profession and lack of prejudices is well-rooted among Turkish students. This can be explained by the early computer education and also by less impact of common media from Western countries, e.g. Hollywood.

4.5.6. Discussion

The results of the study show several differences between Turkish female students and German female students. Firstly, a significant number of Turkish females want to apply for HE. This result can be explained by means of women's importance in the Turkish history. Moreover, to have the highest education possible seems very important for Turkish women.

The most important difference is that Turkish females are more likely to opt for HE in CS. Therefore, the findings suggest the same as the recent situation in both countries and confirm the data which have been represented in 2.6. Although the participation of Turkish women in CS is constantly increasing, women are still underrepresented in the fields of technology.

The incentives for choosing CS are good career opportunities and interest in CS for Turkish and as well as for German females. In contrast to the previous researches the German females of present study would pursue CS because of intrinsic motivation like having interest in CS. However, the extrinsic motivation of career opportunities is the second most stated reason. On the other hand, Turkish females named both as equally important. This finding reflects that Turkish females are more influenced by extrinsic motivation which is in accordance to earlier research. Both groups have stated that they do not want to choose CS because of lack of interest in CS or technology. Moreover, they also named not to be talented enough for CS. Especially German females state not to be interested in working with computers or sitting in front of a computer. This indicates for the first time females' misconception of CS, which is often mentioned in prior researches. Interestingly, no Turkish girl affirmed that computer scientists sit too much in front of computers. This strengthens the hypothesis that Turkish females have more a neutral and positive image or no image at all of a computer scientist.

Although Turkish females attend more years CS in school than German females, they mostly do not know what a programming language actually is. The reason could be that ICT lessons in Turkey emphasize the computer use more than programming and other complex topics of CS. Even though German females are more self-confident in working with computers, more Turkish females would prefer CS in HE. This could be caused by females' daily computer use. German females use the computer more often than Turkish females and moreover, most German females own a computer for themselves. Further, a higher frequency of computer use increases the wish to study CS in HE. As expected, the daily computer use also raises the computer self-efficacy. In the same way, owning a computer increases the self-efficacy. It is also important

to note that a higher computer self-efficacy increases the probability to choose CS. In other words, it is valid that if a girl is more self-assured with computers, she will be more likely to pursue CS. As seen in 2 these results confirm earlier research indications.

Additionally, if females were more encouraged, they would study CS or would have the heart to choose CS with higher probability. Alike mothers who are able to use a computer act indirectly as a role model. The findings show that the majority of females who would pursue CS have a mother who possesses some computer skills. Furthermore, it is more common that there is at least one male computer user in the students' family environment.

Regarding to the aspects of the future job, all females have agreed in desiring to work with people and the possibility of being creative within their job. Turkish females see prestige as important to very important. Many of them intend to study medicine which is in a positive correlation with prestige. Moreover, they also associate engineering and mathematics with prestige. In accordance to the findings medicine seems to be a very wished and prestigious profession for Turkish females. On the contrary, German females are more interested in the humanities. With respect to the other fields, Turkish females and German females would choose mathematic/CS and law/economics with the same probability.

An interesting outcome is that although more Turkish females would pursue CS, they also think they do not have a good chance in getting a job. Ironically, this result shows that these females do not care about job security. It may be assumed again that prestige plays an important part in Turkish females' selection of a profession. Further, the ambivalent results of the Turkish females may indicate that they have other selection criteria for a profession than German females.

One remarkable country difference is the idea about the topics which a CS major studies. Almost every German girl associates CS with programming and only a few of the Turkish females have this same association. This result again reflects one more time the unilateral image of a computer scientist. The majority of the Turkish females have no idea about contents. Since there were only a small number of responses regarding Turkish females, further interpretation is inappropriate.

Considering describing a computer expert, German females imagine him or her as an intelligent, unilaterally interested and diligent person. Only a minority of Turkish females imagine the computer expert in the same way. On the other hand, the Turkish females picture a computer-savvy person as more open-minded, interesting, creative and more likely to act with self-assurance. As a result, the Turkish females associate a computer expert with more positive characteristics than German females. Our

focus was to examine the differences in females' attitude towards CS; this present study suggests that Turkish females have a more positive attitude than German females. The Turkish females also hold positive attitudes towards an IT occupation like being creative, interesting and prestigious. As expected, German females see an IT profession as being difficult and more competitive and well-paid. These findings thus reveal that if a girl has a positive attitude towards a computer expert, she will be more likely to enroll in CS studies.

The data also suggest that German and Turkish females have the opinion that women fit as well as men in a CS profession. Furthermore, German females think that on one hand, men have more success than women in CS, but on the other hand, they do not agree that men are by nature more talented in CS than women and they also do not agree that women have any problems to establish themselves in IT related occupations. With respect to our focus, German females do not think that they are less talented than males. Undeniably, if a girl thinks that CS is not suitable for women, she will show lower scores in computer self-efficacy. This can be explained by less self-confidence according to their computer skills compared to males.

To shed light upon the way to the differences between German male and female students the results reveal undoubtedly that males are more likely to choose CS than females. This result confirms the actual participation of men and women in CS. males' reasoning for choosing was almost completely intrinsic like females', but money seems to be important for the German males. This finding is contrary to the hypothesis 11. Nevertheless, students named more intrinsic motivations for pursuing CS than extrinsic. Additionally, German males also would intend to study natural sciences and engineering, while German females prefer the humanities and medicine more than males. An interesting outcome is that high salary, good career opportunities and prestige are more important for German males than females. Working with people, creativity and doing something meaningful are essential for females. These findings are again as anticipated in 2.

Males and females have similarly same unilateral ideas about the topics of a CS major student. Both groups depict CS studies with programming, design and mathematics. Considering in the description of characterizing a computer-savvy person there are not great gender differences, but it should be noted that females label him or her more introverted than males. On the other side, males picture him or her as more unworldly than females and further, males think that he or she acts with self-assurance. females mostly disagree with that positive characteristic. In ac-

cordance to the findings, females see an IT occupation less interesting and creative than males. In addition, females correlate an IT job with programming less than males do. Thus, males would describe the field of CS more positively than females. Lastly, the findings reflect as expected that females do not believe so much in their confidence in working with computers than males. In brief, these findings among German students are not astonishing, because all previous researches substantiate them and almost every hypothesis assigned in 2 is verified.

In the case of Turkey, one finds the same situation regarding to the findings with regard to the intention to study CS. Turkish males would pursue CS in HE with a higher probability than females. The reasons for pursuing CS are for males and females the same. Both groups would opt for CS because of interest and good job opportunities. As a great difference to Germany, many Turkish males have not learned any programming language and in comparison, almost no girl has. These findings also suggest that males and females have different preferences in choosing a profession. females want to have varied tasks and good career opportunities. Similar to German students, females would like to work with people and do something meaningful, while Turkish males are more interested in high salary like the German males. Especially, prestige is for both genders important or very important which shows again that prestigious professions seem to be very important for Turkish students. This result can be traced back to the historical background of Turkey. Prestigious occupations guarantee higher social status. Since still more students of elite families enroll in HE, this finding does not astonish. This is the reason why females would like to choose mainly medicine and males would like pursue mathematics/ CS or engineering.

Turkish females and males have almost the same opinion about the characteristics of computer-savvy person. Only females think that they are more introverted than males. However, males have a higher positive attitude towards an IT profession, which does not mean that females have a negative attitude. It may be assumed that they have rather a neutral opinion about CS. The males only agree more strongly that an IT job is creative, competitive and well-paid. Although females do not have a real impression of what a computer scientist does, they strongly agree that CS demands someone to engage in computer programming. Again similar to Germany, Turkish males do not strongly believe that women are suitable for CS. These findings confirm the afore-mentioned assumptions. The same is valid for Turkish males' higher computer self-efficacy than females'.

On the whole, the gender differences are similar by comparing both countries. However, the differences between the females are obvious. Turkish females have a positive or at least a neutral attitude towards CS, while German females are more likely to have a negative one. This outcome strengthens the assumption that Turkish females intend more to pursue CS than German females. Another great difference is that Turkish females have little or no idea about the work of a computer scientist. On the contrary, German females have misconceptions towards CS or a unilateral idea about it.

Possible weaknesses of the study

While analyzing the data some weaknesses of the study have appeared. Misconceptions of CS have not been researched enough in detail. The open-ended questions were insufficient for appropriate analysis. As a result, a qualitative study could investigate them all in all.

Moreover, in order to explore the attitude towards the IT profession a greater variety of selectable options is necessary. The chosen features did not differ a lot. Further, the background of students should be researched in more detail to find out if there are significant differences in selection criteria for their future job and as well the impact of their parents education.

Incidentally, the question about "Who does use the computer mostly?" should have "me" as one option. Further, the question about the characteristic of a computer-savvy person should also have been a 4-scale Likert-type question because of the difficulty to generalize a person; there have been several students who did not want to mark some of the characteristics.

5. Conclusion

The aim of the thesis was first to examine female secondary school students' attitude towards CS in Turkey and in Germany. Second, the idea was to find reasons for the differences as for participation of women in CS and technological fields between countries and especially between Turkey and Germany. The study should help to investigate the differences for those and further researches were finally to indicate reasons for them.

The discussion about recent researches has identified for Western countries that misconceptions of CS or a negative attitude towards CS, boring CS courses at school, less self-confidence and lack of role models discourage girls in choosing CS in HE. As a result, stereotypes play a great role in forming an opinion about the CS field. Thus, the aim of promoting programs should decrease these stereotypes and misconceptions. As a solution it has been suggested that an early computer education and changes in media could help to increase the participation of women in CS and technology.

The specific situations of Turkey and Germany have shown that women in Turkey are more represented in CS than women in Germany. A close look into women's history of both countries has identified that Turkish women have a very special status in the Turkish society, while German women have always fought for their recent status.

Differences have been also found in the education system and in the CS courses in schools. Difficult conditions in enrolling to HE cause that Turkish students choose sometimes a field they do not mainly prefer. In Turkey CS courses are prepared more as computer education than computer science. However, the contents of the Turkish CS courses seem to be more motivating.

The study has indicated several differences between the countries and the genders. The comparison between the girls suggest that Turkish girls have no stereotypical thinking about CS and rather that they have a positive attitude towards CS. As found out in previous research, German girls have a unilateral image of CS and are likely to have a negative attitude towards CS, even though they mostly consider CS

as an important future profession. As expected, Turkish girls would prefer CS in HE more than German girls, although they possess lower computer self-efficacy than German girls. Differences in females' expectation on their future job show diverse selection criteria in Turkey and Germany. For instance, in Turkey prestige is an important factor which explains Turkish females' positive attitude towards medicine and boys' towards engineering.

Further comparison of the countries in particular reveals that in Turkey regard to CS differences between genders are not as prevailing as in Germany. Thus, certain differences can be referred to culture. More specifically, both countries differ in prejudices towards CS and the IT profession. Hence, stereotypes are cultural phenomena which could be broken down with the aid of purposeful actions.

However, a comparison between genders also indicates several differences. As expected, girls would like to work in people-related professions, while boys are more interested in high salary. It may be assumed that there are indeed some "universal" differences between men and women. Therefore, the following suggestions may be help further researches.

5.1. Recommendations

Coming back to our questions at the beginning: How can the results serve as some help for practice? And how one can use them in order to change the situation in Germany?

These findings suggest several ideas for overcoming the low participation of women in CS. Firstly, promotion in Germany is possible, but it has to begin at an early age in order to circumvent the early adaption of prejudices. One solution could be an early familiarization with computers and basic ideas of CS. For instance, special units in elementary schools or even in the kindergarten could be developed and applied. Secondly, supporting programs should offer more information about technological professions, best as early as possible because in the *gymnasiale Oberstufe* it could be too late to influence girls. Hence, this activity could break down females' stereotypical thinking. In addition, CS courses at school need to be redesigned by changing the contents with more motivating topics and students' context of life should be integrated into the lessons. It is important to note, because of the risk in discouraging girls, special contents should be avoided. Instead of this, the contents should be more interesting for girls and boys.

5.2. Future Perspectives

This thesis deduces several new aspects which should be more explored:

- To identify more cultural or rather "universal" differences more international studies should be conducted as for boys and girls with diverse backgrounds.
- Qualitative studies with girls of different ages could help to identify their perception to CS more specifically.
- To understand cultural differences it is also interesting to explore different selection criteria for students' future profession.
- A detailed examination about stereotypes of children and students could help to identify their root of development and the impact of adults (parents, teacher, etc.).
- The specific situation of students with a migration background is also worth exploring for further investigation. Do they behave like German students or like their peers from their country of origin?
- If Turkish students could enroll easily in HE, would the recent situation be the same in Turkey regarding the participation of women in CS? Clearly, these questions are also open and deserve further research.

In final analysis, equality of gender is still a long progress and I think the process is at full speed nowadays. More target-oriented promoting programs and influence of media will help to improve the positive image of a computer scientist. As a result, it should be hoped for an increasing participation of women in CS and technology.

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A. Appendix

A.1. Promoting Project



Figure A.1.: Cover of the promoting booklet: "Tech girls are chic!"

A.2. Questionnaire

On the following pages the questionnaire, which was used for the research, is presented in English, German and Turkish.

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EvaSys	QUESTIONNAIRE	Electric Paper
Westfälische Wilhelms-Universität Münster Arbeitsbereich Didaktik der Informatik Master of Education Master's Thesis	Fatma Batur "Attitudes towards and interests in Computer Science of Turkish female secondary school students compared to German female students."	

Markieren Sie so: Mark like this and please use a dark pen!

Korrektur: Correct like this!

1. Biographical data

- Sex** male female
- Age** 14 15 16
 17 18 19
- School and City**

Mother: Profession and Highest Graduation

Father: Profession and Highest Graduation

Siblings? How many brothers/sisters? Ages?

Abbreviations: CS = Computer Science and IT = Information Technology

2. Students' attendance at CS courses at school

- a. Are you currently attending any CS course?** Yes No
- b. How many years have you been taught CS at school totally?** 0 [go to 3] 1 2
 3 4 5
 6 7 8
- c. Have you learned any programming language?** Yes No
If yes, which?

- d. Which genders have had your CS teachers?** mostly male male and female at equal percentages mostly female

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3. Students' frequency of computer use at home

- a. Do you have a computer at home? Yes No [go to e]
- b. Do you have one just for yourself? Yes No
- c. How often do you use it? every day several days per week once a week
 several times in a month
- d. Do you have any rules (like hours) for using the computer? Yes No
- e. Which family members do know how to use a computer?
 brother/s sister/s father
 mother
- f. Who does use it mostly? brother sister father
 mother
- g. If you don't have any computer at home, where usually do you use it?
 in the school at friends at relatives
- h. How often do you use it there? every day several days per week once a week
 several times in a month

4. Students' intention to study (CS) at HE level

a. When you think about your future job, what is very important for you? Please give your priorities!

	very important	important	not important	not important at all
High Salary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varied tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Career opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To work with people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prestige	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Autonomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creativity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To do something meaningful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. Are you intended to apply for a university? Yes No [go to 5]

If yes, which fields are the most interesting for you?

- | | | |
|---|---|--|
| <input type="checkbox"/> Humanities | <input type="checkbox"/> Natural sciences | <input type="checkbox"/> Mathematics, Computer Science |
| <input type="checkbox"/> Law, Economics | <input type="checkbox"/> Engineering | <input type="checkbox"/> Medicine |
| <input type="checkbox"/> Other | | |

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EvaSys

QUESTIONNAIRE

Electric Paper

4. Students' intention to study (CS) at HE level
[Fortsetzung]

c. Would you pursue higher education studies in CS? Yes No Maybe

Which factors for your decision could you name?

What do your parents think about this decision?

What about your friends? What do they think about it?

d. Have you been encouraged by a person or several persons? Yes No [go to e]

If yes, who exactly?

Parents Siblings Friends
 CS teachers Other adults

e. Have you been discouraged by a person or several persons? Yes No [go to f]

If yes, who exactly?

Parents Siblings Friends
 CS teachers Other adults

f. Do you think you will have good chances to get a job upon graduation in CS? Yes No

Can you give some reasons?

5. Students' perceptions of CS and the IT profession

a. What is your impression of what a CS Majors learn?

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5. Students' perceptions of CS and the IT profession
 [Fortsetzung]

b. Which characteristics have somebody, who works very often with a computer?

- | | | |
|--|--|--------------------------------------|
| <input type="checkbox"/> introverted | <input type="checkbox"/> intelligent | <input type="checkbox"/> open-minded |
| <input type="checkbox"/> unsociable | <input type="checkbox"/> unworldly | <input type="checkbox"/> interesting |
| <input type="checkbox"/> unilaterally interested | <input type="checkbox"/> act with self-assurance | <input type="checkbox"/> grumpy |
| <input type="checkbox"/> diligent | <input type="checkbox"/> creative | |

c. What do you think? Which aspects are involved in the IT profession?

	strongly agree	agree	disagree	strongly disagree
Is creative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is competitive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is interesting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is difficult	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is well-paid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is prestigious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Offers one the opportunity to engage in a variety of fields	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demands that one engages in computer programming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

d. Do you agree?

'CS is a science more appropriate for men than for women'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'There should be more women in CS'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'Men are more likely to succeed in the IT profession than women'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'Women have problems to establish themselves in IT jobs'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'Men are by nature more inclined towards CS than women'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Students' computer self-efficacy

Do you agree?

a. I enjoy working with computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I often have difficulties, when trying to learn how to use a new computer package.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I am very confident in my ability to use computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Computers are far too complicated for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I find working with computers very easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. As far as computers are concerned, I feel less competent than my classmates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I usually find it easy to learn how to use a new software package.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Computers frighten me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. I consider myself a more skilled computer user than most of my classmates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. I am very unsure of my ability to use computer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you very much for your participation!

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EvaSys	FRAGENBOGEN	Electric Paper
Westfälische Wilhelms-Universität Münster Arbeitsbereich Didaktik der Informatik Master of Education Masterarbeit	Fatma Batur „Einstellungen und Interesse zur Informatik bei Schülerinnen in der Türkei im Vergleich zu deutschen Schülerinnen.“	

Markieren Sie so: Benutze bitte einen dunklen Stift!
Korrektur:

1. Biographische Daten

- Geschlecht** männlich weiblich
Alter 14 15 16
 17 18 19
Schule und Ort

Mutter: Beruf und höchster Abschluss

Vater: Beruf und höchster Abschluss

Geschwister? Wie viele Brüder/ Schwestern? Alter?

2. Wahlverhalten zum Informatikunterricht

- a. Hast du zur Zeit Informatikunterricht?** Ja Nein
b. Wie viele Jahre hattest du bis jetzt Informatikunterricht? 0 [gehe zu 3] 1 2
 3 4 5
 6 7 8
c. Hast du irgendeine Programmiersprache gelernt? Ja Nein
Wenn ja, welche?

- d. Welches Geschlecht hatten deine Informatiklehrer?** fast nur männlich im gleichen Verhältnis männlich und weiblich fast nur weiblich

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3. Nutzung des Computers

- a. Besitzt ihr zu Hause einen Computer?** Ja Nein [gehe zu e]
- b. Besitzt du einen eigenen Computer?** Ja Nein
- c. Wie oft arbeitest du an dem Computer?** Jeden Tag Ein paar Mal die Woche Einmal die Woche
 Ein paar Mal im Monat
- d. Habt ihr zu Hause für die Nutzung des Computers irgendwelche Regeln?** Ja Nein
- e. Wer aus deiner Familie kann den Computer bedienen?**
- Bruder/ Brüder Schwester/Schwestern Vater
 Mutter
- f. Wer benutzt ihn am meisten?** Ich Bruder Schwester
 Vater Mutter
- g. Falls ihr zu Hause keinen Computer besitzt, wo benutzt du ihn am meisten?**
- In der Schule Bei Freunden Bei Verwandten
h. Wie oft benutzt ihn dort? Jeden Tag Ein paar Mal die Woche Einmal die Woche
 Ein paar Mal im Monat

4. Interesse an einem (Informatik-) Studium

a. Was ist für dich wichtig, wenn du an deinen zukünftigen Beruf denkst?

		<i>sehr wichtig</i>	<i>wichtig</i>	<i>nicht wichtig</i>	<i>überhaupt nicht wichtig</i>
Hoher Lohn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unterschiedliche Tätigkeiten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aufstiegsmöglichkeiten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mit Menschen zu arbeiten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ansehen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unabhängigkeit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kreativität	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Etwas sinnvolles zu tun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. Möchtest du studieren? Ja Nein [gehe zu 5]

Wenn ja, welche Bereiche interessieren dich am meisten?

- Geisteswissenschaften Naturwissenschaften Mathematik/ Informatik
 Jura, Wirtschaftswissenschaften Ingenieursberufe Medizin
 Andere

c. Würdest du Informatik studieren? Ja Nein Vielleicht

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FRAGEBOGEN

Electric Paper

4. Interesse an einem (Informatik-) Studium
[Fortsetzung]

Könntest du für diese Wahl ein paar Gründe nennen?

Was denken deine Eltern über diese Entscheidung?

Und deine Freunde, was denken sie darüber?

d. Hat dich jemand aus deiner Umgebung dazu Ja Nein [gehe zu e] motiviert?

Wenn ja, wer hat dich motiviert?

- Eltern Geschwister Freunde
 Informatiklehrer/innen Andere Erwachsene

e. Hat dir jemand aus deiner Umgebung von einem Informatikstudium abgeraten? Ja Nein [gehe zu f]

Wenn ja, wer alles hat dir davon abgeraten?

- Eltern Geschwister Freunde
 Informatiklehrer/innen Andere Erwachsene

f. Glaubst du, dass Informatiker nach dem Studium gute Jobaussichten haben? Ja Nein

Kannst du ein paar Gründe aufzählen?

5. Vorstellungen über den Beruf des Informatikers

a. Was glaubst du, welche Inhalte ein Informatikstudent/in lernen muss?

b. Wie würdest du eine Person charakterisieren, die oft mit einem Computer arbeitet?

- verschlossen intelligent aufgeschlossen
 schüchtern weltfremd interessant
 einseitig interessiert handelt selbstbewusst mürrisch
 fleißig kreativ

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5. Vorstellungen über den Beruf des Informatikers
 [Fortsetzung]

c. Welche Eigenschaften besitzt der Beruf des Informatikers nach deiner Meinung?

	<i>stimme voll und ganz zu</i>	<i>stimme zu</i>	<i>stimme nicht zu</i>	<i>stimme gar nicht zu</i>
kreativ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
konkurrenzfähig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
interessant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
schwierig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gut bezahlt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
angesehen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
bietet die Möglichkeit in verschiedenen Bereichen tätig zu sein	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
setzt Programmierkenntnisse voraus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

d. Stimmst du zu?

"Informatik ist eher für Männer geeignet"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"In der Informatik sollten mehr Frauen tätig sein"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"Männer sind im Vergleich zu Frauen in der Informatik erfolgreicher"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"Frauen können sich in der Informatik nicht behaupten"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"Männer sind in Informatik von Natur aus talentierter als Frauen"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Selbstvertrauen im Umgang mit Computern

Stimmst du zu?

Mir gefällt es mit dem Computer zu arbeiten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich habe beim Benutzen neuer Software oft Probleme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich bin im Umgang mit dem Computer sehr sicher und habe nie Probleme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer sind viel zu kompliziert für mich.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mit dem Computer zu arbeiten fällt mir sehr leicht.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wenn es um Computer geht, fühle ich mich im Vergleich zu meinen Schulkameraden unfähig.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich finde es oft einfach eine neue Software zu bedienen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer machen mir Angst.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich finde, dass ich mit Computern besser umgehen kann als die meisten meiner Schulkameraden.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich bin in meiner Fähigkeit Computer zu benutzen sehr unsicher.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Vielen Dank für die Teilnahme!

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EvaSys	ANKET	Electric Paper
Westfälische Wilhelms-Universität Münster Arbeitsbereich Didaktik der Informatik Master of Education Tez	Fatma Batur „Attitudes towards and interests in Computer Science of Turkish female secondary school students compared to German female students.”	

Markieren Sie so: Bu şekilde işaretle! Lütfen koyu kalem kulan!

Korrektur: Bu şekilde düzelt!

1. Özgeçmişe dahil olan bilgiler

Cinsiyet

Erkek

Kız

Yaş

13

14

15

16

17

18

Okul ve Şehir

Annenin meslek ve eğitim durumu

Babanın meslek ve eğitim durumu

Kardeşler? Kaç erkek kardeş ve ya kız kardeş? Yaşları kaç?

Kısaltmalar: **BT = Bilişim Teknolojisi** ve **BM = Bilgisayar mühendisliği**

2. Öğrencilerin okuldaki BT derslerine katılımı

a. Şu anda herhangi bir BT dersine giriyor musun?

Evet

Hayır

b. Toplamda kaç yıl BT dersi gördün?

0 [3 e geçe bilirsin]

1

2

3

4

5

6

7

8

c. Herhangi bir programlama dilini öğrendin mi?

Evet

Hayır

Evet ise, hangileri?

d. BT öğretmenlerinin hangi cinsiyettendi?

çoğunlukla erkek

eşit oranda kadın ve erkek

çoğunlukla kadın

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3. Öğrencilerin (evde) bilgisayar kullanma sıklığı

- a. Evinizde bilgisayar var mı? Evet Hayır [e ye geçe bilirsin]
- b. Sadece kendine ait bir tane var mı? Evet Hayır
- c. Bilgisayarı ne sıklıkta kullanıyorsun? her gün haftada birkaç-gün haftada bir kez
- ayda birkaç kez
- d. Bilgisayarı kullanmak için herhangi bir kural (saat/ süre gibi) var mı? Evet Hayır

e. Ailende kimler bilgisayar kullanmayı biliyor?

- erkek kardeş(ler) kız kardeş(ler) baba
- anne

- f. En çok kim kullanıyor? erkek kardeş kız kardeş baba
- anne

g. Evde herhangi bir bilgisayara sahip değilseniz, genellikle nerede bilgisayar kullanıyorsunuz?

- okul internet kahvesi arkadaş
- akraba

- h. Ne sıklıkta kullanıyorsunuz? her gün haftada birkaç-gün haftada bir kez
- ayda birkaç kez

4. Öğrencilerin üniversitede (BT/ BM) okuma niyeti

a. Gelecekteki işin hakkında düşündüğünde, senin için önemli olan nedir?

	çok önemli	önemli	önemsiz	çok önemsiz
Yüksek gelir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Değişik görevler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kariyer imkanı	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
İnsanlarla çalışmak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prestij	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bağımsızlık	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yaratıcılık	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anlamlı birşey yapmak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. Üniversite sınavlarına girmeyi düşünüyor musun? Evet Hayır [5 e geçe bilirsin]

Evet ise, en çok hangi branşlar ilginizi çekiyor?

- Sosyal bilimler Doğa bilimi Matematik/ BT ve ya BM
- Hukuk, İktisat Mühendislik Tıp
- Başka

c. Üniversitede BT/ BM seçer miydin? Evet Hayır Belki

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4. Öğrencilerin üniversitede (BT/ BM) okuma niyeti [Fortsetzung]

Bu seçimin için, hangi nedenleri sayabilirsin?

Anne ve Baban bu kararın hakkında ne düşünüyorlar?

Arkadaşların ne düşünüyorlar?

d. Çevrende sana bu konuda destek veren oldu mu? Evet

Hayır [e ye geçe bilirsin]

Evet ise, kimler seni destekledi?

Anne ve Baba

Kardeşler

Arkadaşlar

Bilgisayar/ BT öğretmenleri

Başka yetişkinler

e. Çevrende bu konu hakkında cesaretini kıran kimseler oldumu? Evet

Hayır [f ye geçe bilirsin]

Evet ise, kimler?

Anne ve Baba

Kardeşler

Arkadaşlar

Bilgisayar/ BT öğretmenleri

Başka yetişkinler

f. Sence BT/ BM okuduktan sonra iş bulma olanakların iyi olur mu? Evet

Hayır

Bir kaç neden sayabilir misin?

5. Öğrencilerin BM ve BT dalındaki meslekler hakkındaki fikirleri

a. BT okuyan kişilerin neler öğrendiği hakkındaki izlenimlerin nelerdir?

b. Bilgisayarla çok haşır neşir olan bir kişinin karakteri nasıl olur?

içine kapanık kimse

akıllı

açık görüşlü

çekingen

dünya ile ilgisi olmayan

ilginç

tek taraflı olarak ilgilenen

özgüven ile hareket eden

huysuz

çalışkan

yaratıcı

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5. Öğrencilerin BM ve BT dalındaki meslekler hakkındaki fikirleri [Fortsetzung]

c. Sence BT/ BM mesleği aşağıdaki özellikleri ne kadar içeriyor? Lütfen oyla!

	kesinlikle katılıyorum	katılıyorum	katılmıyorum	kesinlikle katılmıyorum
yaratıcı	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
rekabetçi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ilginç	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
zor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
geliri iyi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prestijli	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
çeşitli alanlarda çalışma fırsatı sunan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
programlama bilmeyi gerektirir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

d. Katılıyor musun? Lütfen oyla!

'BT erkekler için daha uygun bir bilimdir'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'BT dalında daha fazla kadın olması gerekiyor'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'Erkekler BT mesleğinde kadınlara oranla başarılı olmaya daha yatkındırlar'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'Kadınlar BT alanında kendilerini kanıtlıyamıyorlar'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
'Erkekler doğaları gereği BT kadınlardan daha eğilimlidirler'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Öğrencilerin bilgisayara karşı özgüveni

Katılıyor musun? Lütfen oyla!

Bilgisayarda çalışmaktan hoşlanıyorum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yeni bir bilgisayar programı öğrenmeye çalışırken çoğu zaman zorluk çekiyorum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bilgisayar kullanımında kendimden çok eminim ve problem çekmem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bilgisayarlar benim için çok karmaşık.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bilgisayarda çalışmak benim için çok kolay.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bilgisayar konusunda kendimi sınıf arkadaşlarıma oranla yetersiz buluyorum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Çoğu zaman yeni bir yazılımın kullanımını öğrenmeyi kolay buluyorum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bilgisayarlar beni ürkütüyor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kendimi sınıf arkadaşlarıma oranla çok daha yetenekli bir bilgisayar kullanıcısı olarak görüyorum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bilgisayar kullanımına olan yatkınlığımdan emin değilim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ankete katıldığın için çok teşekkür ederim!

A.3. Questionnaire - Overview of the results

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Results

Turkish female students vs. German female students

1. Biographical data

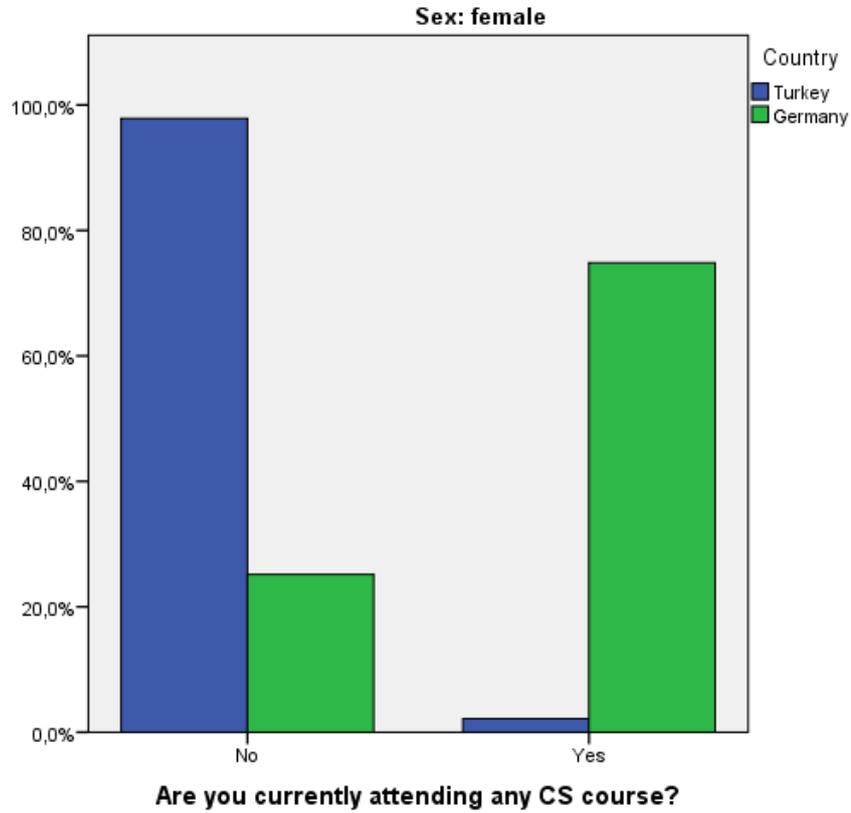
Sex		Country		Total
		Turkey	Germany	
male	Count	166	156	322
	% within Country	46,4%	49,8%	48,0%
female	Count	192	157	349
	% within Country	53,6%	50,2%	52,0%
Total	Count	358	313	671
	% within Country	100,0%	100,0%	100,0%

Age		Country		Total
		Turkey	Germany	
14	Count	50	1	51
	% within Country	26,2%	0,6%	14,7%
15	Count	82	25	107
	% within Country	42,9%	16,0%	30,8%
16	Count	40	52	92
	% within Country	20,9%	33,3%	26,5%
17	Count	16	32	48
	% within Country	8,4%	20,5%	13,8%
18	Count	3	25	28
	% within Country	1,6%	16,0%	8,1%
19	Count	0	21	21
	% within Country	0,0%	13,5%	6,1%
Total	Count	191	156	347
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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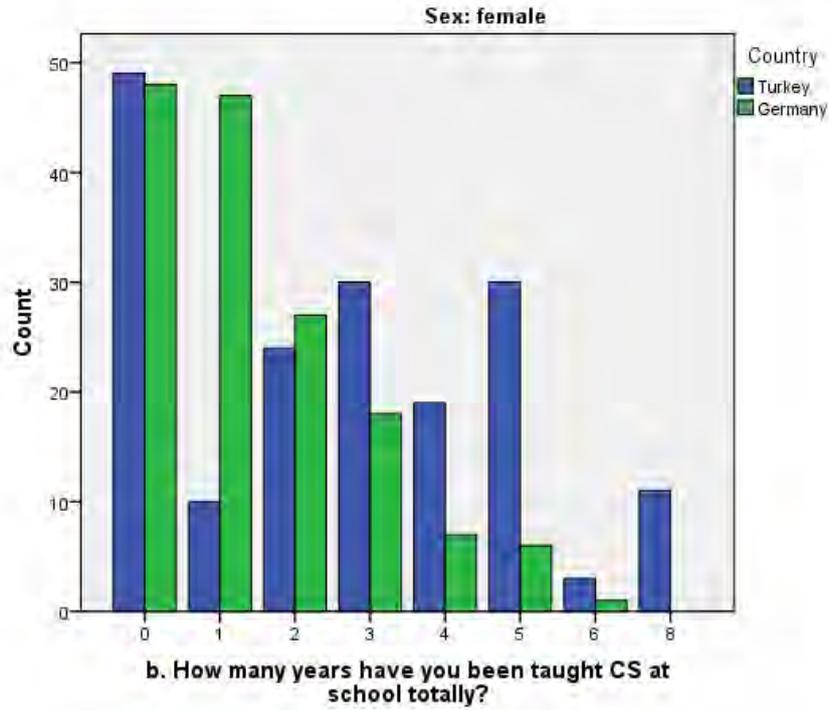
2. Students' attendance at CS courses at school



Are you currently attending any CS course?			Country		Total
			Turkey	Germany	
No	Count	182	39	221	
	% within Country	97,8%	25,2%	64,8%	
Yes	Count	4	116	120	
	% within Country	2,2%	74,8%	35,2%	
Total	Count	344	186	155	
	% within Country	100,0%	100,0%	100,0%	

Turkish female students vs. German female students

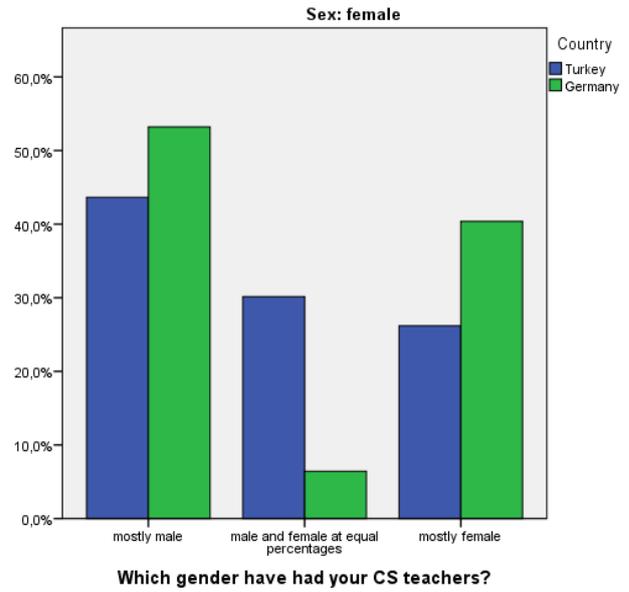
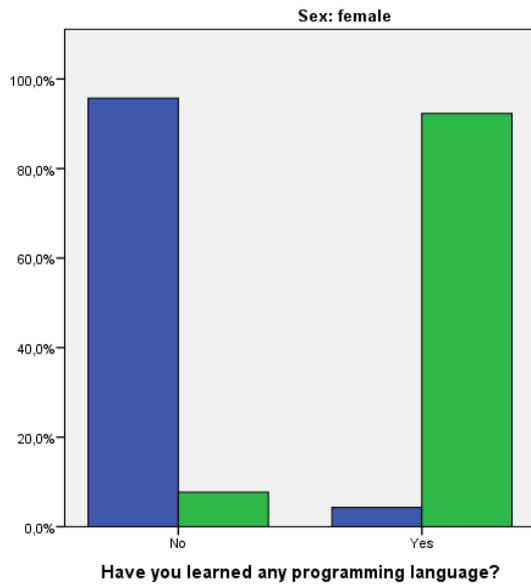
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How many years have you been taught CS at school totally?		Country		Total
		Turkey	Germany	
0	Count	49	48	97
	% within Country	27,8%	31,2%	29,4%
1	Count	10	47	57
	% within Country	5,7%	30,5%	17,3%
2	Count	24	27	51
	% within Country	13,6%	17,5%	15,5%
3	Count	30	18	48
	% within Country	17,0%	11,7%	14,5%
4	Count	19	7	26
	% within Country	10,8%	4,5%	7,9%
5	Count	30	6	36
	% within Country	17,0%	3,9%	10,9%
6	Count	3	1	4
	% within Country	1,7%	0,6%	1,2%
8	Count	11	0	11
	% within Country	6,2%	0,0%	3,3%
Total	Count	176	154	330
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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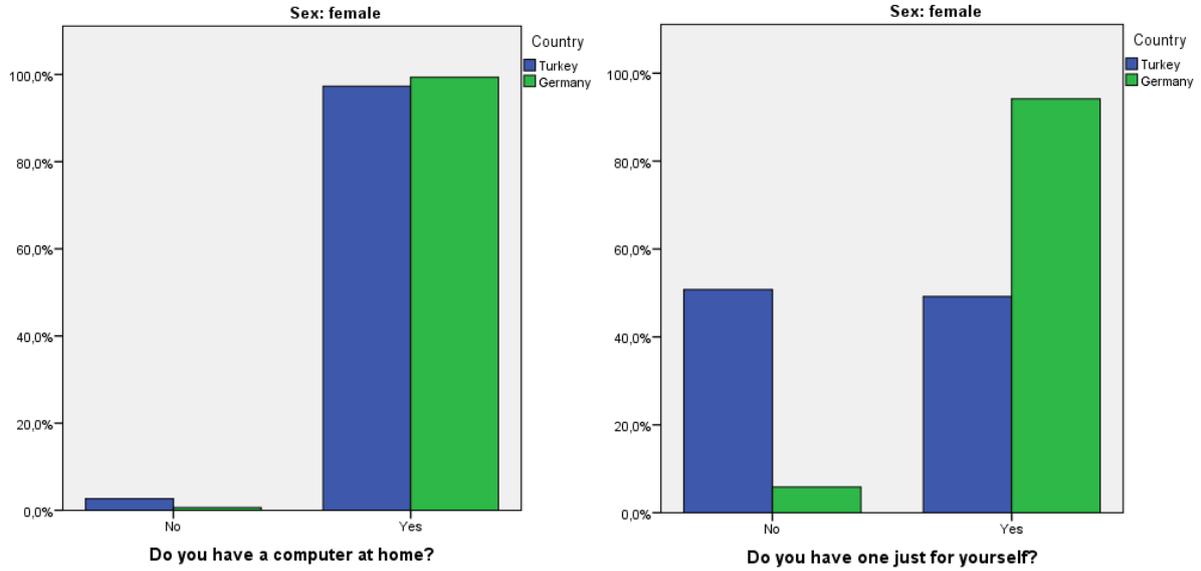
Have you learned any programming language?			Country		Total
			Turkey	Germany	
No	Count	112	6	118	
	% within Country	95,7%	7,7%	60,5%	
Yes	Count	5	72	77	
	% within Country	4,3%	92,3%	39,5%	
Total	Count	117	78	195	
	% within Country	100,0%	100,0%	100,0%	

Which gender have had your CS teachers?			Country		Total
			Turkey	Germany	
mostly male	Count	55	58	113	
	% within Country	43,7%	53,2%	48,1%	
male and female at equal percentages	Count	38	7	45	
	% within Country	30,2%	6,4%	19,1%	
mostly female	Count	33	44	77	
	% within Country	26,2%	40,4%	32,8%	
Total	Count	126	109	235	
	% within Country	100,0%	100,0%	100,0%	

Turkish female students vs. German female students

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3. Students' frequency of computer use at home

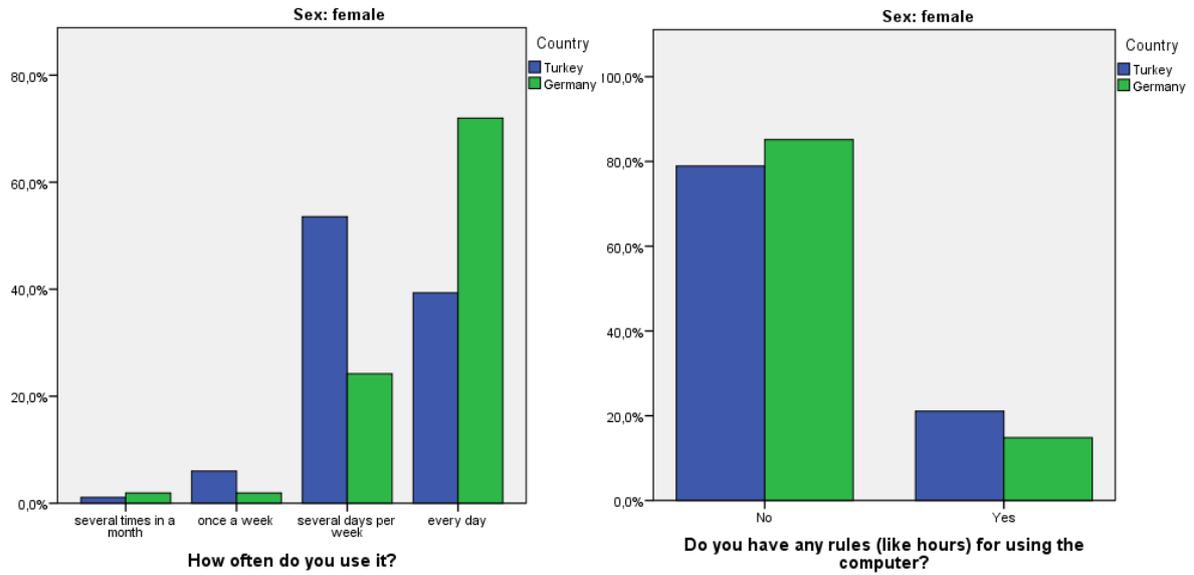


Do you have a computer at home?		Country		Total
		Turkey	Germany	
No	Count	5	1	6
	% within Country	2,7%	0,6%	1,7%
Yes	Count	182	155	337
	% within Country	97,3%	99,4%	98,3%
Total	Count	187	156	343
	% within Country	100,0%	100,0%	100,0%

Do you have one just for yourself?		Country		Total
		Turkey	Germany	
No	Count	95	9	104
	% within Country	50,8%	5,8%	30,5%
Yes	Count	92	145	237
	% within Country	49,2%	94,2%	69,5%
Total	Count	187	154	341
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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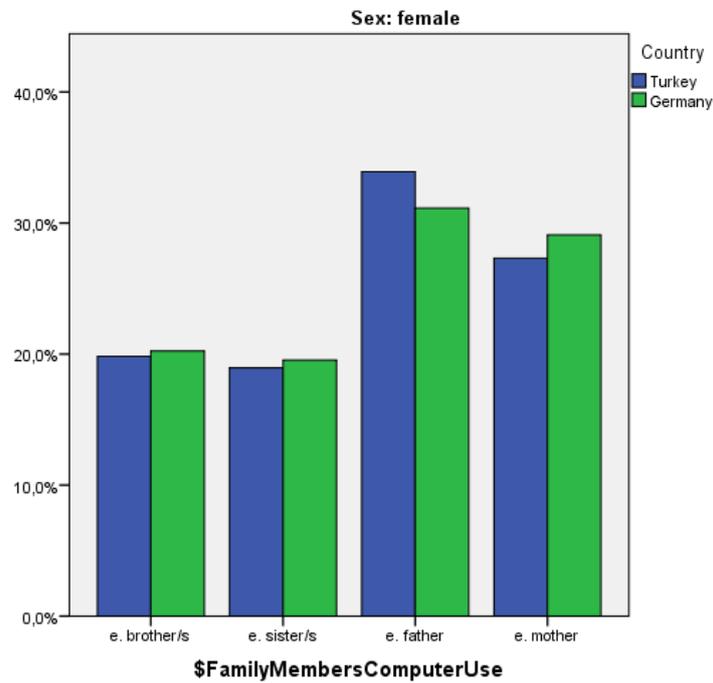


How often do you use it?		Country		Total
		Turkey	Germany	
several times in a month	Count	2	3	5
	% within Country	1,1%	1,9%	1,5%
once a week	Count	11	3	14
	% within Country	6,0%	1,9%	4,1%
several days per week	Count	98	38	136
	% within Country	53,6%	24,2%	40,0%
every day	Count	72	113	185
	% within Country	39,3%	72,0%	54,4%
Total	Count	183	157	157
	% within Country	100,0%	100,0%	100,0%

Do you have any rules (like hours) for using the computer?		Country		Total
		Turkey	Germany	
No	Count	146	132	278
	% within Country	78,9%	85,2%	81,8%
Yes	Count	39	23	62
	% within Country	21,1%	14,8%	18,2%
Total	Count	185	155	340
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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brother/s		Country		Total
		Turkey	Germany	
No	Count	102	68	170
	% within Country	53,1%	43,3%	48,7%
Yes	Count	90	89	179
	% within Country	46,9%	56,7%	51,3%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

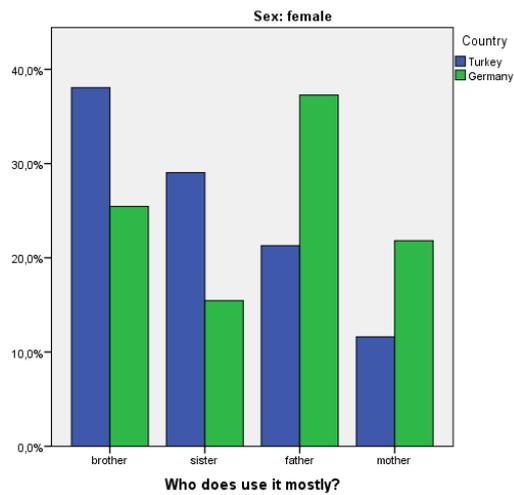
sister/s		Country		Total
		Turkey	Germany	
No	Count	106	71	177
	% within Country	55,2%	45,2%	50,7%
Yes	Count	86	86	172
	% within Country	44,8%	54,8%	49,3%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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mother		Country		Total
		Turkey	Germany	
No	Count	68	29	97
	% within Country	35,4%	18,5%	27,8%
Yes	Count	124	128	252
	% within Country	64,6%	81,5%	72,2%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

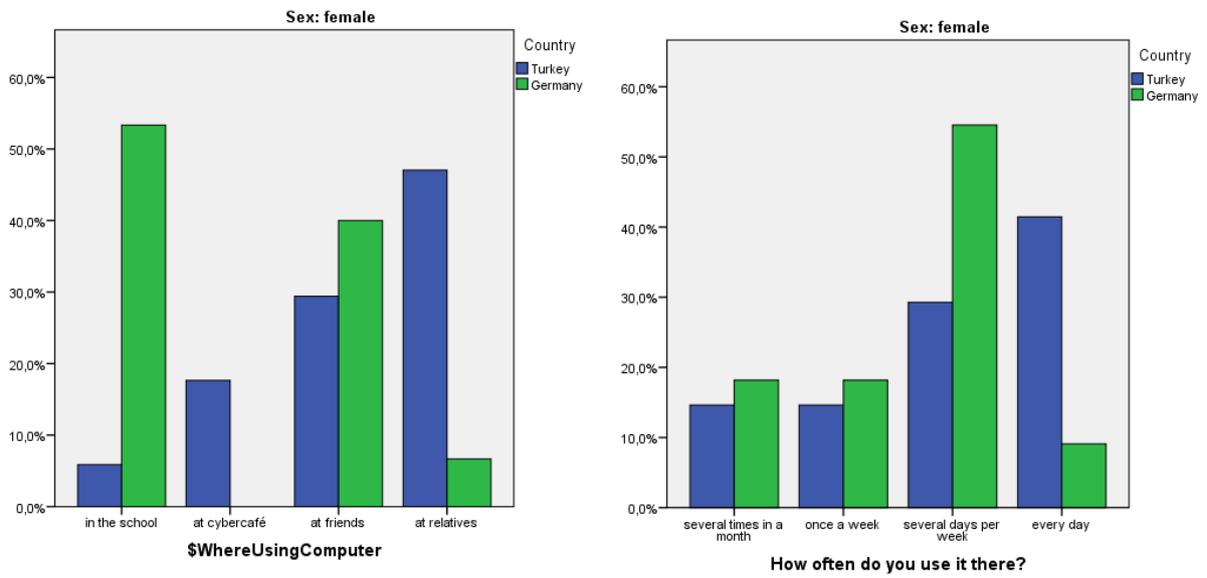
father		Country		Total
		Turkey	Germany	
No	Count	38	20	58
	% within Country	19,8%	12,7%	16,6%
Yes	Count	154	137	291
	% within Country	80,2%	87,3%	83,4%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%



Who does use it mostly?		Country		Total
		Turkey	Germany	
brother	Count	59	28	87
	% within Country	38,1%	25,5%	32,8%
sister	Count	45	17	62
	% within Country	29,0%	15,5%	23,4%
father	Count	33	41	74
	% within Country	21,3%	37,3%	27,9%
mother	Count	18	24	42
	% within Country	11,6%	21,8%	15,8%
Total	Count	155	110	265
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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in the school		Country		Total
		Turkey	Germany	
No	Count	191	149	340
	% within Country	99,5%	94,9%	97,4%
Yes	Count	1	8	9
	% within Country	0,5%	5,1%	2,6%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

at cybercafé		Country	Total
		Turkey	
No	Count	189	189
	% within Country	98,4%	98,4%
Yes	Count	3	3
	% within Country	1,6%	1,6%
Total	Count	192	192
	% within Country	100,0%	100,0%

Turkish female students vs. German female students

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at friends		Country		Total
		Turkey	Germany	
No	Count	187	151	338
	% within Country	97,4%	96,2%	96,8%
Yes	Count	5	6	11
	% within Country	2,6%	3,8%	3,2%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

at relatives		Country		Total
		Turkey	Germany	
No	Count	184	156	340
	% within Country	95,8%	99,4%	97,4%
Yes	Count	8	1	9
	% within Country	4,2%	0,6%	2,6%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

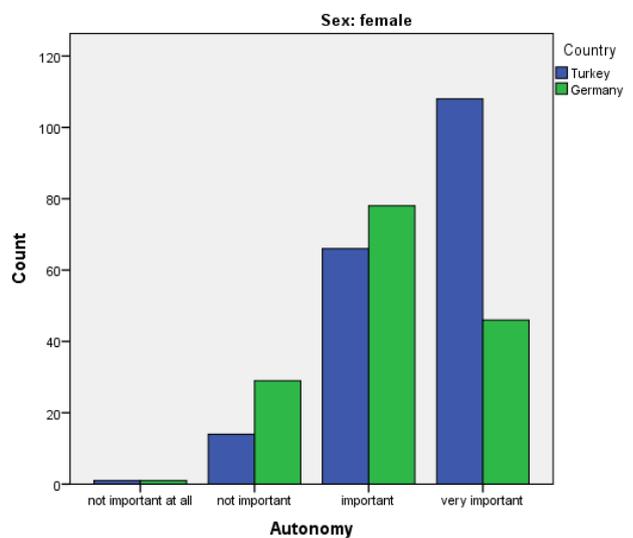
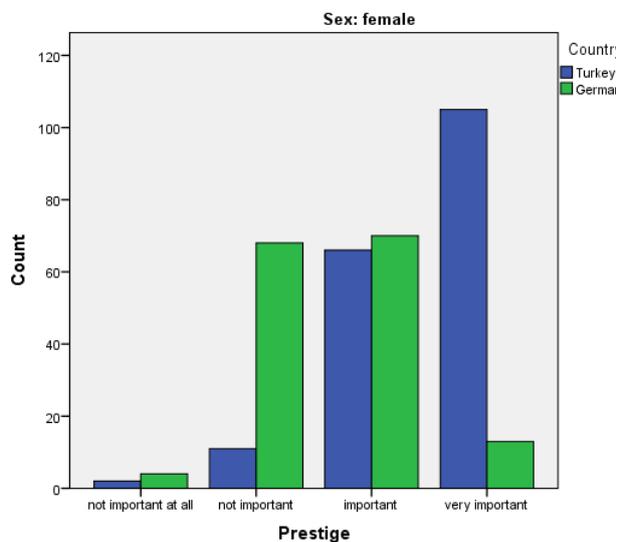
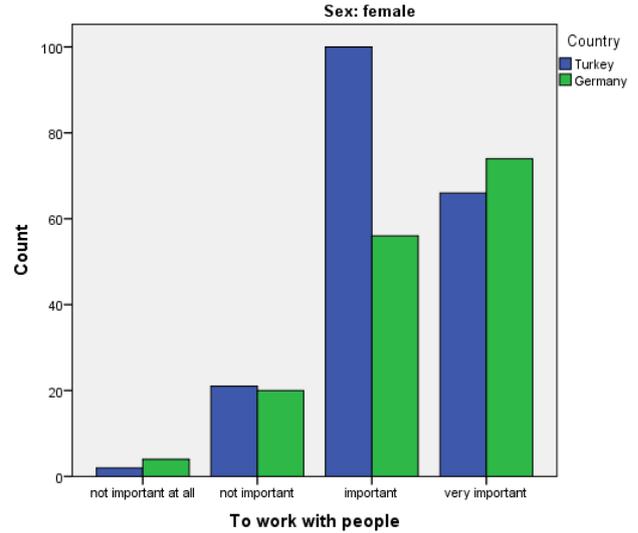
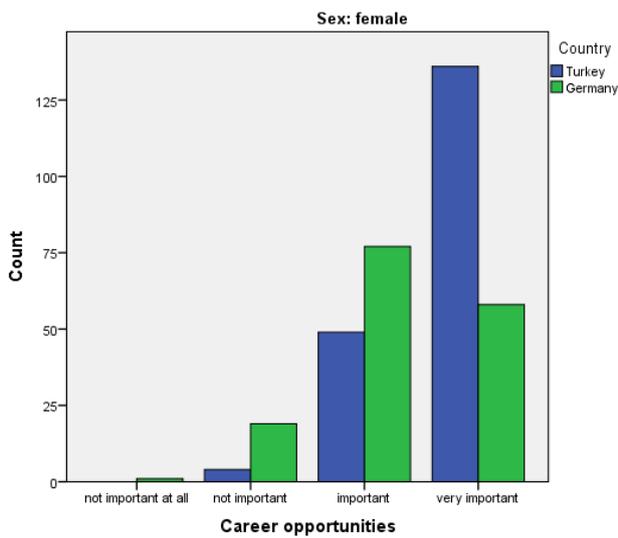
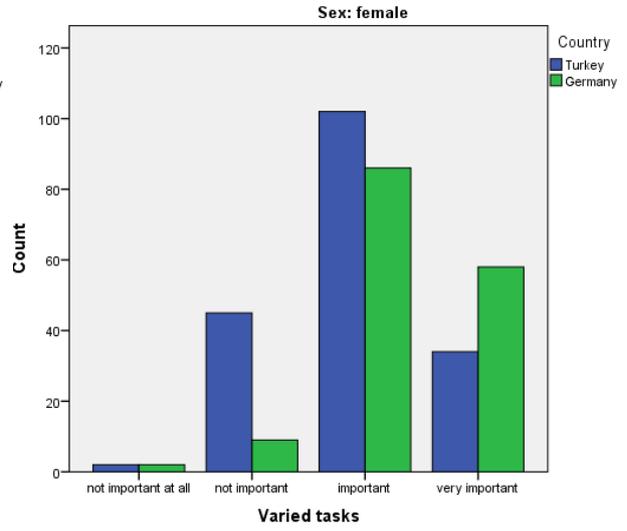
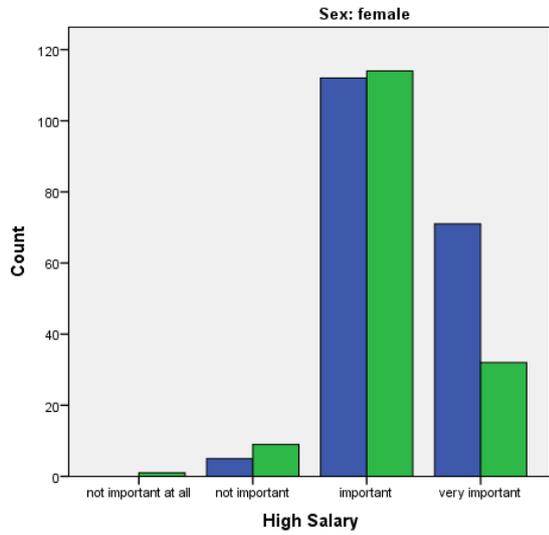
How often do you use it there?		Country		Total
		Turkey	Germany	
several times in a month	Count	34	6	2
	% within Country	26,6%	14,6%	18,2%
once a week	Count	18	6	2
	% within Country	14,1%	14,6%	18,2%
several days per week	Count	38	12	6
	% within Country	29,7%	29,3%	54,5%
every day	Count	38	17	1
	% within Country	29,7%	41,5%	9,1%
Total	Count	41	11	52
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

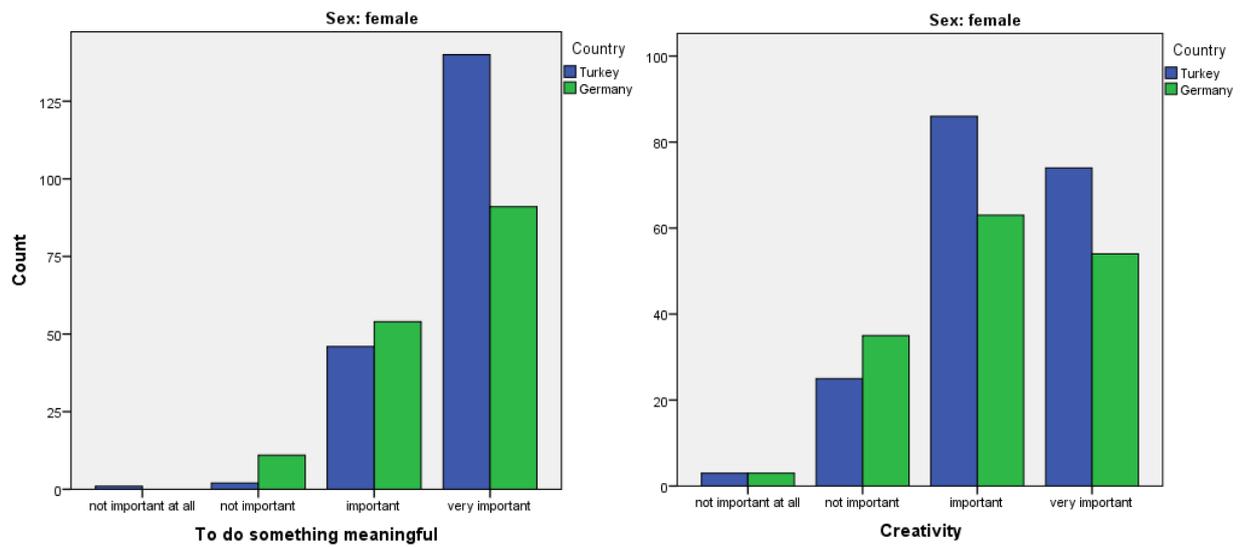
A. Appendix

4. Students' intention to study (CS) at HE level

a. When you think about your future job, what is very important for you?



A. Appendix



High Salary		Country		Total
		Turkey	Germany	
not important at all	Count	0	1	1
	% within Country	0,0%	0,6%	0,3%
not important	Count	5	9	14
	% within Country	2,7%	5,8%	4,1%
important	Count	112	114	226
	% within Country	59,6%	73,1%	65,7%
very important	Count	71	32	103
	% within Country	37,8%	20,5%	29,9%
Total	Count	188	156	344
	% within Country	100,0%	100,0%	100,0%

Career opportunities		Country		Total
		Turkey	Germany	
not important at all	Count	0	1	1
	% within Country	0,0%	0,6%	0,3%
not important	Count	4	19	23
	% within Country	2,1%	12,3%	6,7%
important	Count	49	77	126
	% within Country	25,9%	49,7%	36,6%
very important	Count	136	58	194
	% within Country	72,0%	37,4%	56,4%
Total	Count	189	155	344
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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Prestige		Country		Total
		Turkey	Germany	
not important at all	Count	2	4	6
	% within Country	1,1%	2,6%	1,8%
not important	Count	11	68	79
	% within Country	6,0%	43,9%	23,3%
important	Count	66	70	136
	% within Country	35,9%	45,2%	40,1%
very important	Count	105	13	118
	% within Country	57,1%	8,4%	34,8%
Total	Count	184	155	339
	% within Country	100,0%	100,0%	100,0%

To work with people		Country		Total
		Turkey	Germany	
not important at all	Count	2	4	6
	% within Country	1,1%	2,6%	1,7%
not important	Count	21	20	41
	% within Country	11,1%	13,0%	12,0%
important	Count	100	56	156
	% within Country	52,9%	36,4%	45,5%
very important	Count	66	74	140
	% within Country	34,9%	48,1%	40,8%
Total	Count	189	154	343
	% within Country	100,0%	100,0%	100,0%

Varied tasks		Country		Total
		Turkey	Germany	
not important at all	Count	2	2	4
	% within Country	1,1%	1,3%	1,2%
not important	Count	45	9	54
	% within Country	24,6%	5,8%	16,0%
important	Count	102	86	188
	% within Country	55,7%	55,5%	55,6%
very important	Count	34	58	92
	% within Country	18,6%	37,4%	27,2%
Total	Count	183	155	338
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

A. Appendix

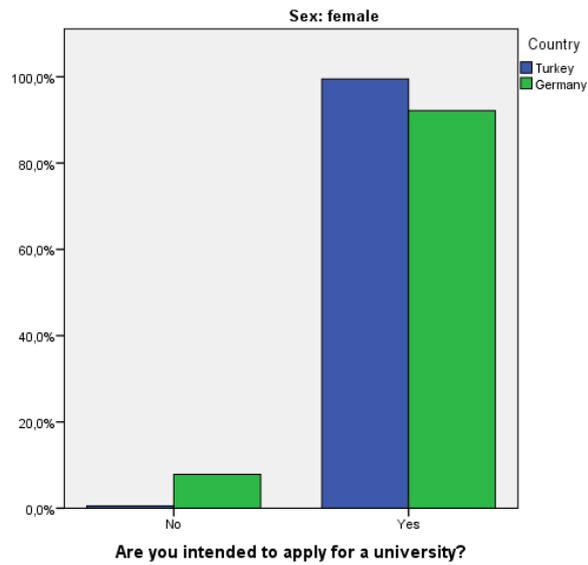
To do something meaningful		Country		Total
		Turkey	Germany	
not important at all	Count	1	0	1
	% within Country	0,5%	0,0%	0,3%
not important	Count	2	11	13
	% within Country	1,1%	7,1%	3,8%
important	Count	46	54	100
	% within Country	24,3%	34,6%	29,0%
very important	Count	140	91	231
	% within Country	74,1%	58,3%	67,0%
Total	Count	189	156	345
	% within Country	100,0%	100,0%	100,0%

Creativity		Country		Total
		Turkey	Germany	
not important at all	Count	3	3	6
	% within Country	1,6%	1,9%	1,7%
not important	Count	25	35	60
	% within Country	13,3%	22,6%	17,5%
important	Count	86	63	149
	% within Country	45,7%	40,6%	43,4%
very important	Count	74	54	128
	% within Country	39,4%	34,8%	37,3%
Total	Count	188	155	343
	% within Country	100,0%	100,0%	100,0%

Autonomy		Country		Total
		Turkey	Germany	
not important at all	Count	1	1	2
	% within Country	0,5%	0,6%	0,6%
not important	Count	14	29	43
	% within Country	7,4%	18,8%	12,5%
important	Count	66	78	144
	% within Country	34,9%	50,6%	42,0%
very important	Count	108	46	154
	% within Country	57,1%	29,9%	44,9%
Total	Count	189	154	343
	% within Country	100,0%	100,0%	100,0%

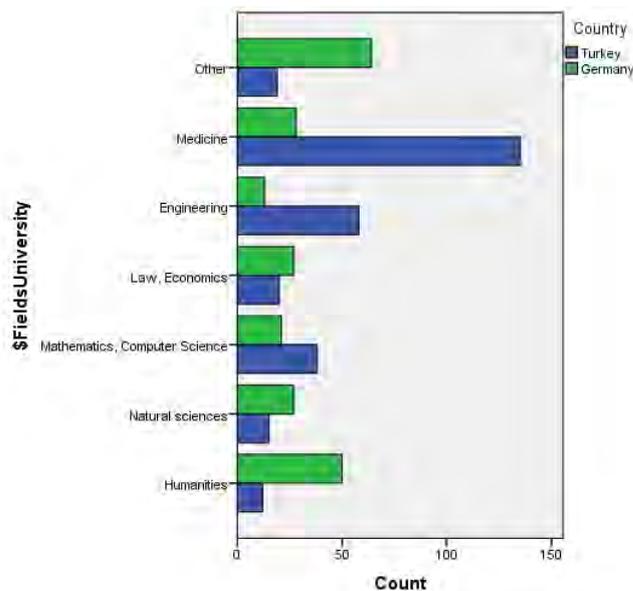
Turkish female students vs. German female students

A. Appendix



Are you intended to apply for a university?		Country		Total
		Turkey	Germany	
No	Count	1	12	13
	% within Country	0,5%	7,8%	3,8%
Yes	Count	189	141	330
	% within Country	99,5%	92,2%	96,2%
Total	Count	190	153	343
	% within Country	100,0%	100,0%	100,0%

If yes, which fields are the most interesting for you?



Turkish female students vs. German female students

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Humanities		Country		Total
		Turkey	Germany	
No	Count	180	107	287
	% within Country	93,8%	68,2%	82,2%
Yes	Count	12	50	62
	% within Country	6,2%	31,8%	17,8%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Natural sciences		Country		Total
		Turkey	Germany	
No	Count	177	130	307
	% within Country	92,2%	82,8%	88,0%
Yes	Count	15	27	42
	% within Country	7,8%	17,2%	12,0%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Mathematics, Computer Science		Country		Total
		Turkey	Germany	
No	Count	154	136	290
	% within Country	80,2%	86,6%	83,1%
Yes	Count	38	21	59
	% within Country	19,8%	13,4%	16,9%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Law, Economics		Country		Total
		Turkey	Germany	
No	Count	172	130	302
	% within Country	89,6%	82,8%	86,5%
Yes	Count	20	27	47
	% within Country	10,4%	17,2%	13,5%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

A. Appendix

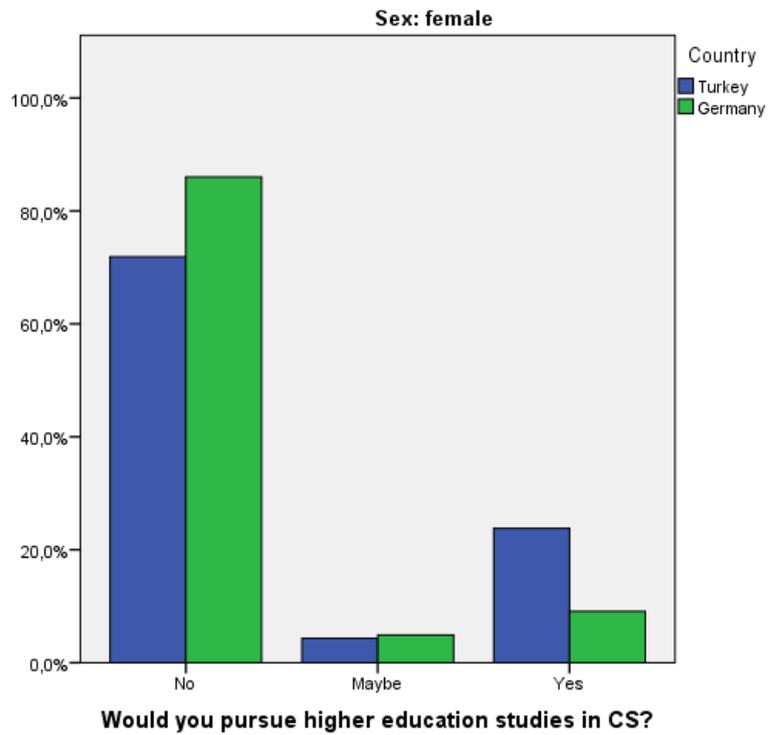
Engineering		Country		Total
		Turkey	Germany	
No	Count	134	144	278
	% within Country	69,8%	91,7%	79,7%
Yes	Count	58	13	71
	% within Country	30,2%	8,3%	20,3%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Medicine		Country		Total
		Turkey	Germany	
No	Count	57	129	186
	% within Country	29,7%	82,2%	53,3%
Yes	Count	135	28	163
	% within Country	70,3%	17,8%	46,7%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Other		Country		Total
		Turkey	Germany	
No	Count	173	93	266
	% within Country	90,1%	59,2%	76,2%
Yes	Count	19	64	83
	% within Country	9,9%	40,8%	23,8%
Total	Count	192	157	349
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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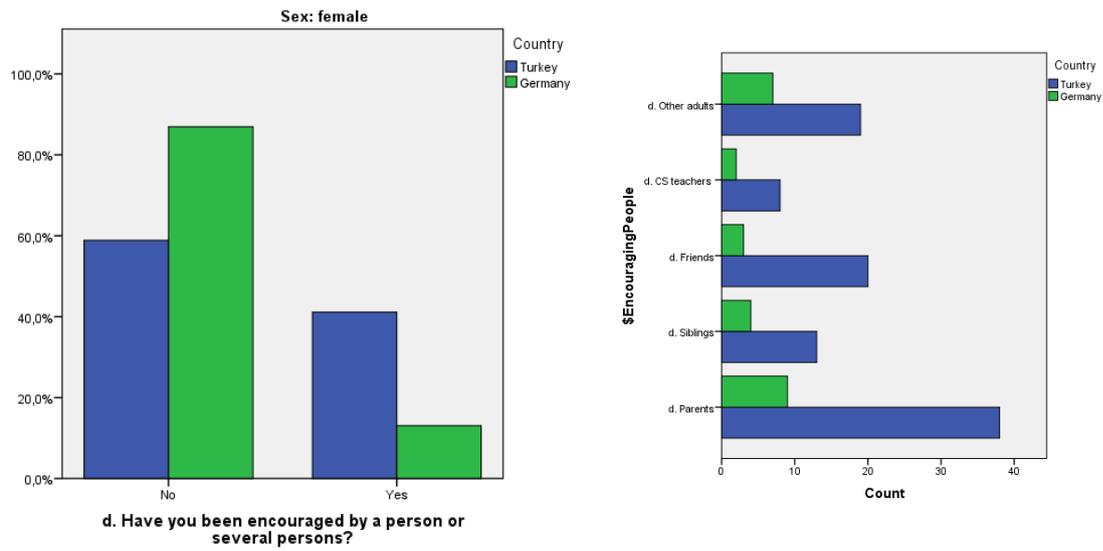


Would you pursue higher education studies in CS?		Country		Total
		Turkey	Germany	
No	Count	133	123	256
	% within Country	71,9%	86,0%	78,0%
Maybe	Count	8	7	15
	% within Country	4,3%	4,9%	4,6%
Yes	Count	44	13	57
	% within Country	23,8%	9,1%	17,4%
Total	Count	185	143	328
	% within Country	100,0%	100,0%	100,0%

Have you been encouraged by a person or several persons?		Country		Total
		Turkey	Germany	
No	Count	63	113	176
	% within Country	58,9%	86,9%	74,3%
Yes	Count	44	17	61
	% within Country	41,1%	13,1%	25,7%
Total	Count	107	130	237
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

A. Appendix



Parents		Country		Total
		Turkey	Germany	
No	Count	151	147	298
	% within Country	79,1%	93,6%	85,6%
Yes	Count	40	10	50
	% within Country	20,9%	6,4%	14,4%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Siblings		Country		Total
		Turkey	Germany	
No	Count	177	152	329
	% within Country	92,7%	96,8%	94,5%
Yes	Count	14	5	19
	% within Country	7,3%	3,2%	5,5%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

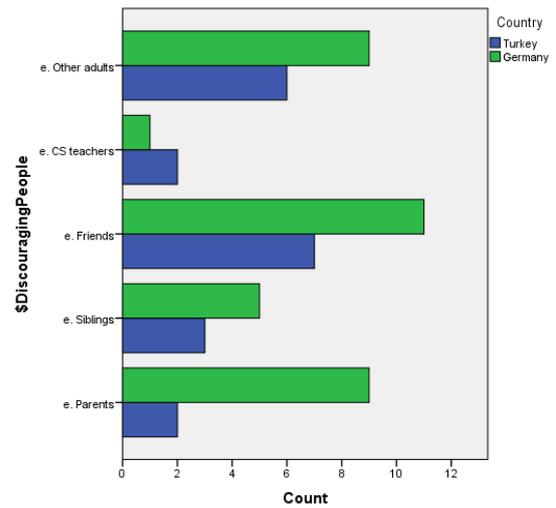
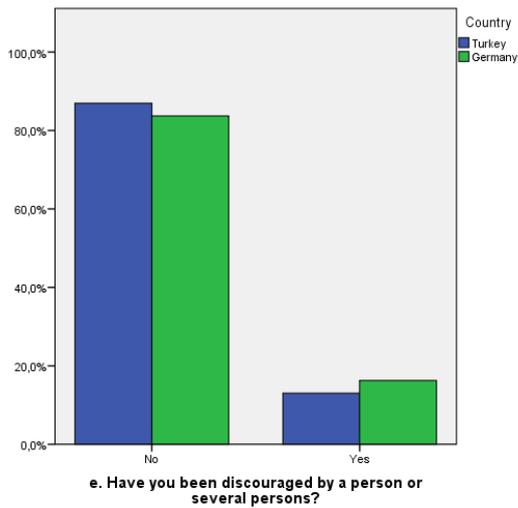
Friends		Country		Total
		Turkey	Germany	
No	Count	169	153	322
	% within Country	88,5%	97,5%	92,5%
Yes	Count	22	4	26
	% within Country	11,5%	2,5%	7,5%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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CS teachers		Country		Total
		Turkey	Germany	
No	Count	182	154	336
	% within Country	95,3%	98,1%	96,6%
Yes	Count	9	3	12
	% within Country	4,7%	1,9%	3,4%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Other adults		Country		Total
		Turkey	Germany	
No	Count	168	149	317
	% within Country	88,0%	94,9%	91,1%
Yes	Count	23	8	31
	% within Country	12,0%	5,1%	8,9%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%



Turkish female students vs. German female students

A. Appendix

Have you been discouraged by a person or several persons?		Country		Total
		Turkey	Germany	
No	Count	80	108	188
	% within Country	87,0%	83,7%	85,1%
Yes	Count	12	21	33
	% within Country	13,0%	16,3%	14,9%
Total	Count	92	129	221
	% within Country	100,0%	100,0%	100,0%

Parents		Country		Total
		Turkey	Germany	
No	Count	189	148	337
	% within Country	99,0%	94,3%	96,8%
Yes	Count	2	9	11
	% within Country	1,0%	5,7%	3,2%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Siblings		Country		Total
		Turkey	Germany	
No	Count	188	152	340
	% within Country	98,4%	96,8%	97,7%
Yes	Count	3	5	8
	% within Country	1,6%	3,2%	2,3%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Friends		Country		Total
		Turkey	Germany	
No	Count	184	146	330
	% within Country	96,3%	93,0%	94,8%
Yes	Count	7	11	18
	% within Country	3,7%	7,0%	5,2%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

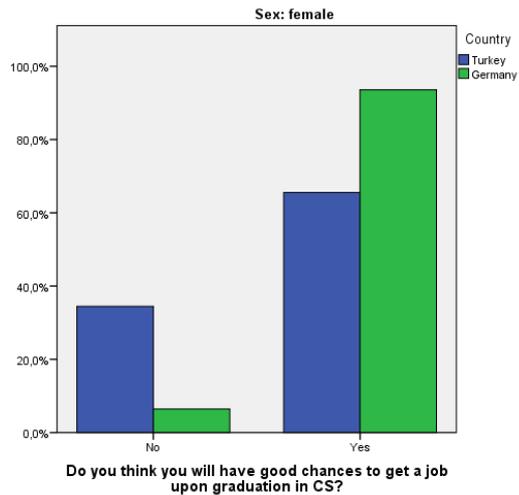
Turkish female students vs. German female students

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CS teachers		Country		Total
		Turkey	Germany	
No	Count	189	156	345
	% within Country	99,0%	99,4%	99,1%
Yes	Count	2	1	3
	% within Country	1,0%	0,6%	0,9%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Other adults		Country		Total
		Turkey	Germany	
No	Count	185	148	333
	% within Country	96,9%	94,3%	95,7%
Yes	Count	6	9	15
	% within Country	3,1%	5,7%	4,3%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

5. Students' perceptions of CS and the IT profession

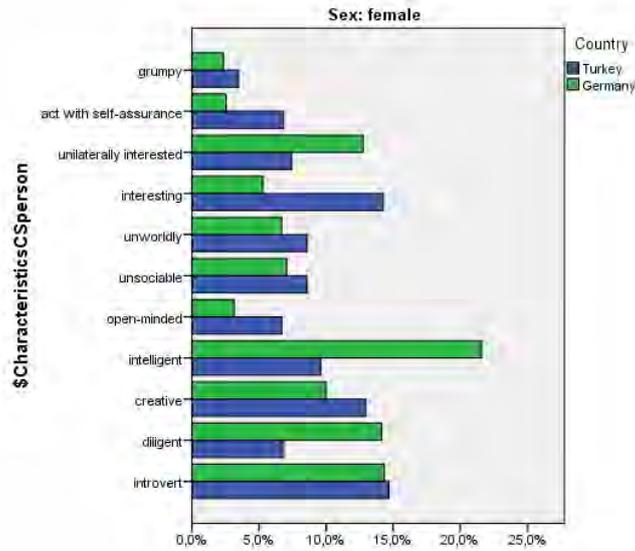


Do you think you will have good chances to get a job upon graduation in CS		Country		Total
		Turkey	Germany	
No	Count	41	9	50
	% within Country	34,5%	6,4%	19,3%
Yes	Count	78	131	209
	% within Country	65,5%	93,6%	80,7%
Total	Count	119	140	259
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

A. Appendix

Which characteristics have somebody, who works very often with a computer?



introvert		Country		Total
		Turkey	Germany	
No	Count	90	84	174
	% within Country	47,1%	53,5%	50,0%
Yes	Count	101	73	174
	% within Country	52,9%	46,5%	50,0%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

intelligent		Country		Total
		Turkey	Germany	
No	Count	125	47	172
	% within Country	65,4%	29,9%	49,4%
Yes	Count	66	110	176
	% within Country	34,6%	70,1%	50,6%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

open-minded		Country		Total
		Turkey	Germany	
No	Count	145	141	286
	% within Country	75,9%	89,8%	82,2%
Yes	Count	46	16	62
	% within Country	24,1%	10,2%	17,8%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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unsociable		Country		Total
		Turkey	Germany	
No	Count	132	121	253
	% within Country	69,1%	77,1%	72,7%
Yes	Count	59	36	95
	% within Country	30,9%	22,9%	27,3%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

unworldly		Country		Total
		Turkey	Germany	
No	Count	132	123	255
	% within Country	69,1%	78,3%	73,3%
Yes	Count	59	34	93
	% within Country	30,9%	21,7%	26,7%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

interesting		Country		Total
		Turkey	Germany	
No	Count	93	130	223
	% within Country	48,7%	82,8%	64,1%
Yes	Count	98	27	125
	% within Country	51,3%	17,2%	35,9%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

unilaterally interested		Country		Total
		Turkey	Germany	
No	Count	140	92	232
	% within Country	73,3%	58,6%	66,7%
Yes	Count	51	65	116
	% within Country	26,7%	41,4%	33,3%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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act with self-assurance		Country		Total
		Turkey	Germany	
No	Count	144	144	288
	% within Country	75,4%	91,7%	82,8%
Yes	Count	47	13	60
	% within Country	24,6%	8,3%	17,2%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

grumpy		Country		Total
		Turkey	Germany	
No	Count	167	145	312
	% within Country	87,4%	92,4%	89,7%
Yes	Count	24	12	36
	% within Country	12,6%	7,6%	10,3%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

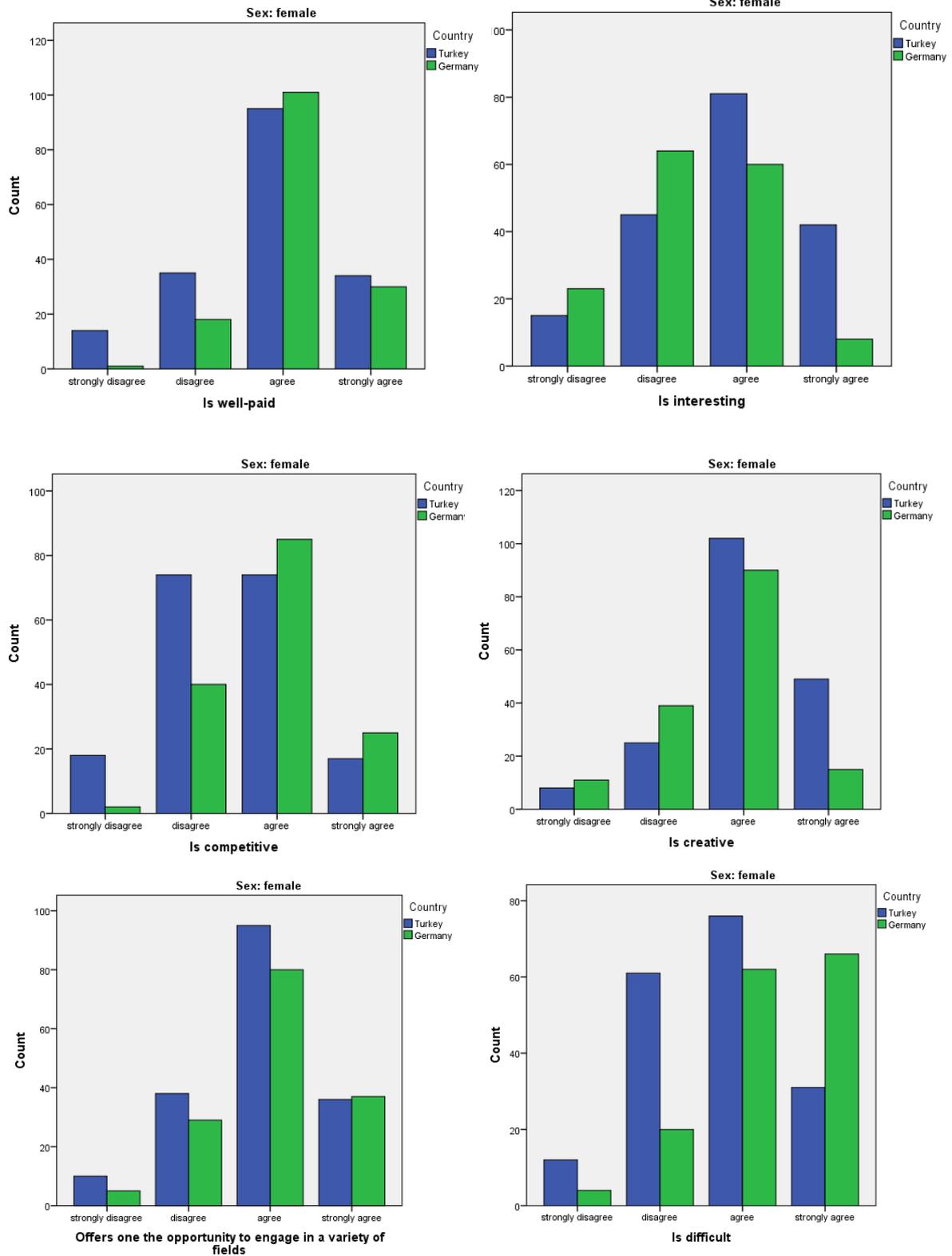
diligent		Country		Total
		Turkey	Germany	
No	Count	144	85	229
	% within Country	75,4%	54,1%	65,8%
Yes	Count	47	72	119
	% within Country	24,6%	45,9%	34,2%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

creative		Country		Total
		Turkey	Germany	
No	Count	102	106	208
	% within Country	53,4%	67,5%	59,8%
Yes	Count	89	51	140
	% within Country	46,6%	32,5%	40,2%
Total	Count	191	157	348
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

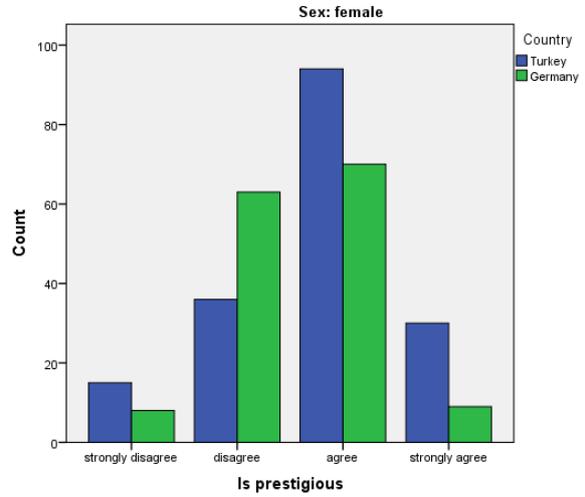
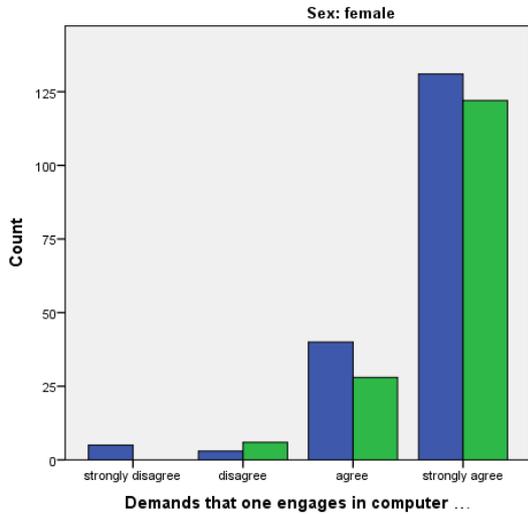
A. Appendix

What do you think? Which aspects are involved in the IT profession?



Turkish female students vs. German female students

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Is creative		Country		Total
		Turkey	Germany	
strongly disagree	Count	8	11	19
	% within Country	4,3%	7,1%	5,6%
disagree	Count	25	39	64
	% within Country	13,6%	25,2%	18,9%
agree	Count	102	90	192
	% within Country	55,4%	58,1%	56,6%
strongly agree	Count	49	15	64
	% within Country	26,6%	9,7%	18,9%
Total	Count	184	155	339
	% within Country	100,0%	100,0%	100,0%

Is competitive		Country		Total
		Turkey	Germany	
strongly disagree	Count	18	2	20
	% within Country	9,8%	1,3%	6,0%
disagree	Count	74	40	114
	% within Country	40,4%	26,3%	34,0%
agree	Count	74	85	159
	% within Country	40,4%	55,9%	47,5%
strongly agree	Count	17	25	42
	% within Country	9,3%	16,4%	12,5%
Total	Count	183	152	335
	% within Country	100,0%	100,0%	100,0%

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Is interesting		Country		Total
		Turkey	Germany	
strongly disagree	Count	15	23	38
	% within Country	8,2%	14,8%	11,2%
disagree	Count	45	64	109
	% within Country	24,6%	41,3%	32,2%
agree	Count	81	60	141
	% within Country	44,3%	38,7%	41,7%
strongly agree	Count	42	8	50
	% within Country	23,0%	5,2%	14,8%
Total	Count	183	155	338
	% within Country	100,0%	100,0%	100,0%

Is difficult		Country		Total
		Turkey	Germany	
strongly disagree	Count	12	4	16
	% within Country	6,7%	2,6%	4,8%
disagree	Count	61	20	81
	% within Country	33,9%	13,2%	24,4%
agree	Count	76	62	138
	% within Country	42,2%	40,8%	41,6%
strongly agree	Count	31	66	97
	% within Country	17,2%	43,4%	29,2%
Total	Count	180	152	332
	% within Country	100,0%	100,0%	100,0%

Is well-paid		Country		Total
		Turkey	Germany	
strongly disagree	Count	14	1	15
	% within Country	7,9%	0,7%	4,6%
disagree	Count	35	18	53
	% within Country	19,7%	12,0%	16,2%
agree	Count	95	101	196
	% within Country	53,4%	67,3%	59,8%
strongly agree	Count	34	30	64
	% within Country	19,1%	20,0%	19,5%
Total	Count	178	150	328
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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Is prestigious		Country		Total
		Turkey	Germany	
strongly disagree	Count	15	8	23
	% within Country	8,6%	5,3%	7,1%
disagree	Count	36	63	99
	% within Country	20,6%	42,0%	30,5%
agree	Count	94	70	164
	% within Country	53,7%	46,7%	50,5%
strongly agree	Count	30	9	39
	% within Country	17,1%	6,0%	12,0%
Total	Count	175	150	325
	% within Country	100,0%	100,0%	100,0%

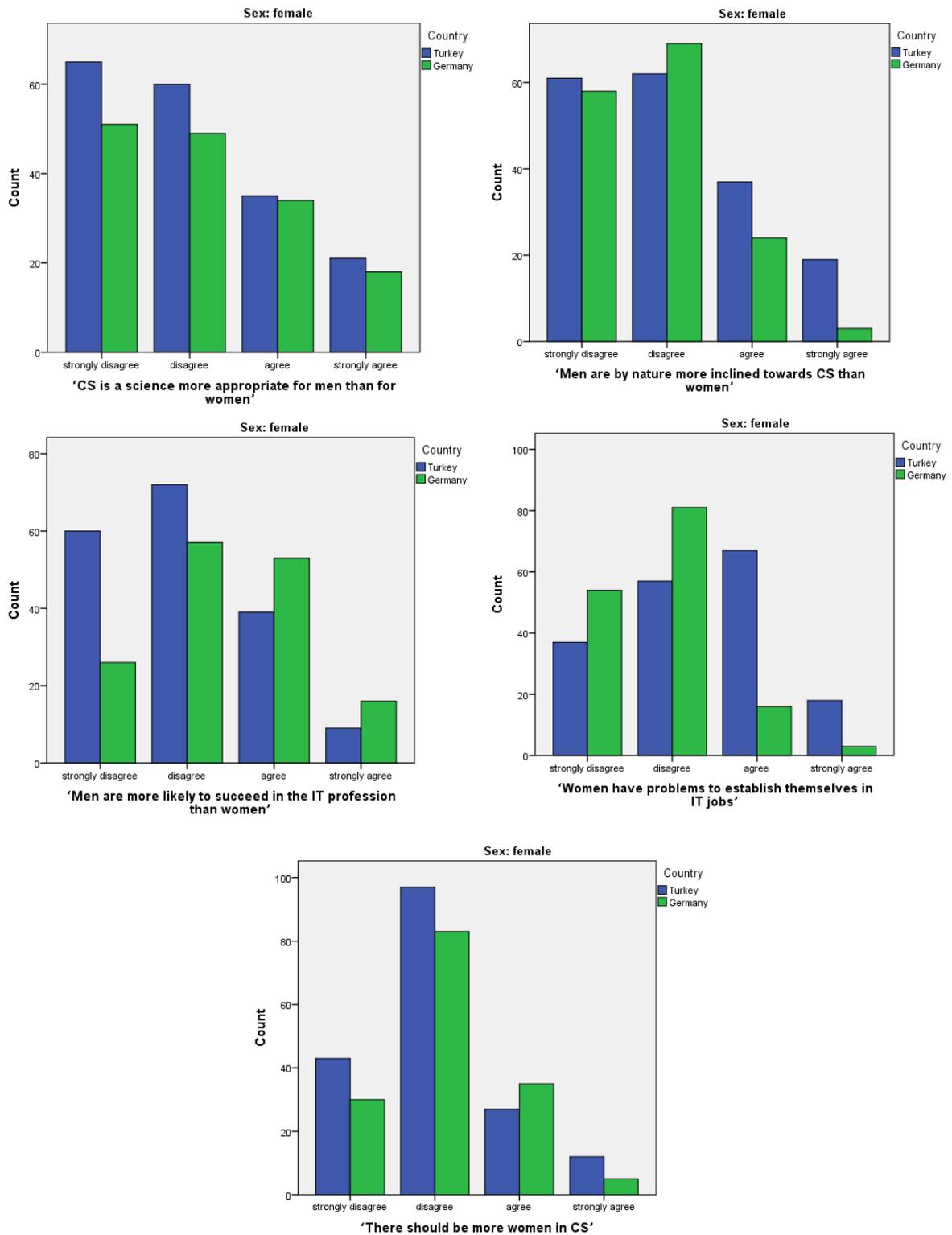
Offers one the opportunity to engage in a variety of fields		Country		Total
		Turkey	Germany	
strongly disagree	Count	10	5	15
	% within Country	5,6%	3,3%	4,5%
disagree	Count	38	29	67
	% within Country	21,2%	19,2%	20,3%
agree	Count	95	80	175
	% within Country	53,1%	53,0%	53,0%
strongly agree	Count	36	37	73
	% within Country	20,1%	24,5%	22,1%
Total	Count	179	151	330
	% within Country	100,0%	100,0%	100,0%

Demands that one engages in computer programming		Country		Total
		Turkey	Germany	
strongly disagree	Count	5	0	5
	% within Country	2,8%	0,0%	1,5%
disagree	Count	3	6	9
	% within Country	1,7%	3,8%	2,7%
agree	Count	40	28	68
	% within Country	22,3%	17,9%	20,3%
strongly agree	Count	131	122	253
	% within Country	73,2%	78,2%	75,5%
Total	Count	179	156	335
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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Do you agree?



Turkish female students vs. German female students

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'CS is a science more appropriate for men than for women'		Country		Total
		Turkey	Germany	
strongly disagree	Count	65	51	116
	% within Country	35,9%	33,6%	34,8%
disagree	Count	60	49	109
	% within Country	33,1%	32,2%	32,7%
agree	Count	35	34	69
	% within Country	19,3%	22,4%	20,7%
strongly agree	Count	21	18	39
	% within Country	11,6%	11,8%	11,7%
Total	Count	181	152	333
	% within Country	100,0%	100,0%	100,0%

'There should be more women in CS'		Country		Total
		Turkey	Germany	
strongly disagree	Count	43	30	73
	% within Country	24,0%	19,6%	22,0%
disagree	Count	97	83	180
	% within Country	54,2%	54,2%	54,2%
agree	Count	27	35	62
	% within Country	15,1%	22,9%	18,7%
strongly agree	Count	12	5	17
	% within Country	6,7%	3,3%	5,1%
Total	Count	179	153	332
	% within Country	100,0%	100,0%	100,0%

'Men are more likely to succeed in the IT profession than women'		Country		Total
		Turkey	Germany	
strongly disagree	Count	60	26	86
	% within Country	33,3%	17,1%	25,9%
disagree	Count	72	57	129
	% within Country	40,0%	37,5%	38,9%
agree	Count	39	53	92
	% within Country	21,7%	34,9%	27,7%
strongly agree	Count	9	16	25
	% within Country	5,0%	10,5%	7,5%
Total	Count	180	152	332
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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‘Women have problems to establish themselves in IT jobs’			Country		Total
			Turkey	Germany	
strongly disagree	Count	37	54	91	
	% within Country	20,7%	35,1%	27,3%	
disagree	Count	57	81	138	
	% within Country	31,8%	52,6%	41,4%	
agree	Count	67	16	83	
	% within Country	37,4%	10,4%	24,9%	
strongly agree	Count	18	3	21	
	% within Country	10,1%	1,9%	6,3%	
Total	Count	179	154	333	
	% within Country	100,0%	100,0%	100,0%	

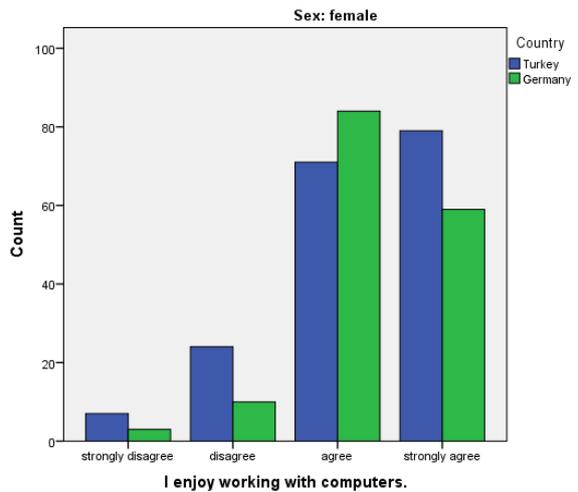
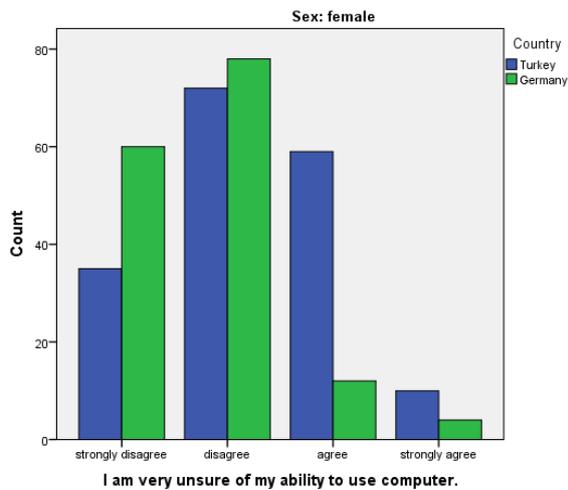
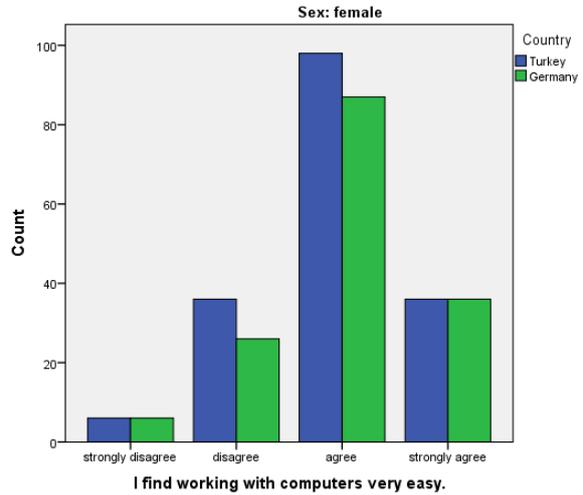
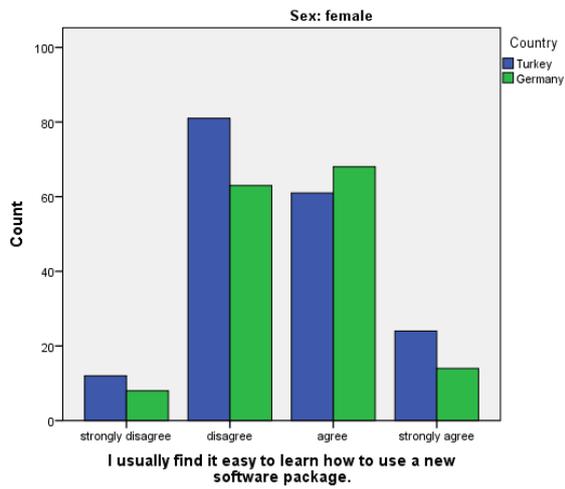
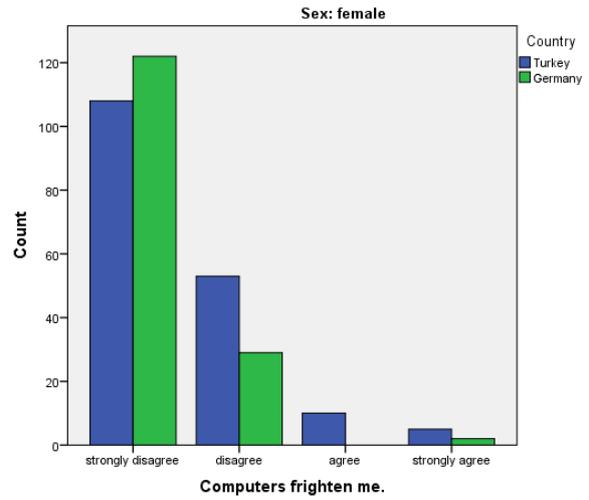
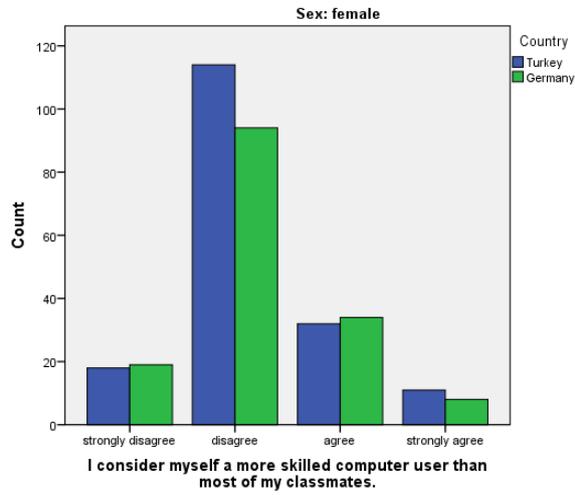
‘Men are by nature more inclined towards CS than women’			Country		Total
			Turkey	Germany	
strongly disagree	Count	61	58	119	
	% within Country	34,1%	37,7%	35,7%	
disagree	Count	62	69	131	
	% within Country	34,6%	44,8%	39,3%	
agree	Count	37	24	61	
	% within Country	20,7%	15,6%	18,3%	
strongly agree	Count	19	3	22	
	% within Country	10,6%	1,9%	6,6%	
Total	Count	179	154	333	
	% within Country	100,0%	100,0%	100,0%	

Turkish female students vs. German female students

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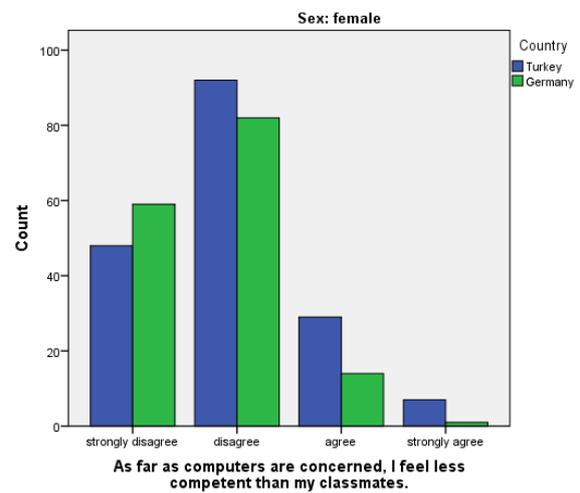
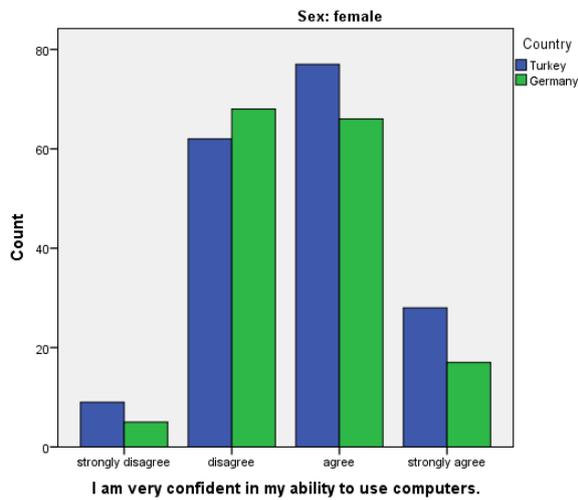
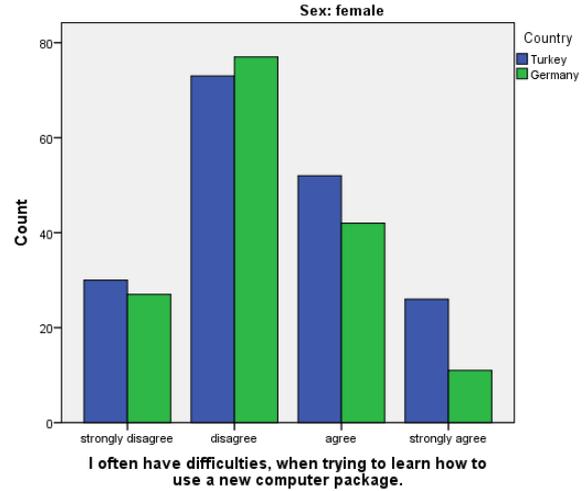
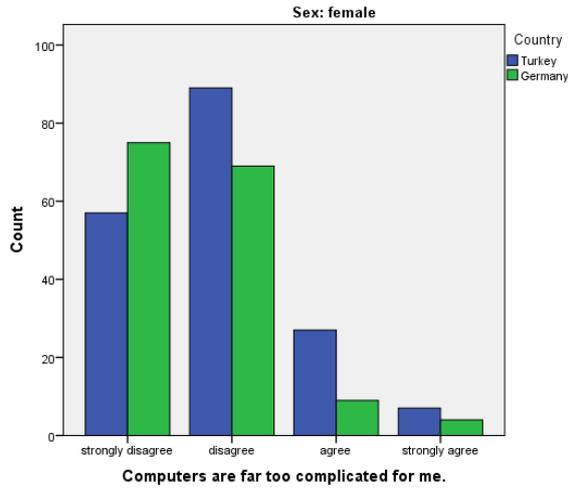
6. Students' computer self-efficacy

Do you agree?



Turkish female students vs. German female students

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I enjoy working with computers.		Country		Total
		Turkey	Germany	
strongly disagree	Count	7	3	10
	% within Country	3,9%	1,9%	3,0%
disagree	Count	24	10	34
	% within Country	13,3%	6,4%	10,1%
agree	Count	71	84	155
	% within Country	39,2%	53,8%	46,0%
strongly agree	Count	79	59	138
	% within Country	43,6%	37,8%	40,9%
Total	Count	181	156	337
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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I often have difficulties, when trying to learn how to use a new computer package.		Country		Total
		Turkey	Germany	
strongly disagree	Count	30	27	57
	% within Country	16,6%	17,2%	16,9%
disagree	Count	73	77	150
	% within Country	40,3%	49,0%	44,4%
agree	Count	52	42	94
	% within Country	28,7%	26,8%	27,8%
strongly agree	Count	26	11	37
	% within Country	14,4%	7,0%	10,9%
Total	Count	181	157	338
	% within Country	100,0%	100,0%	100,0%

I am very confident in my ability to use computers.		Country		Total
		Turkey	Germany	
strongly disagree	Count	9	5	14
	% within Country	5,1%	3,2%	4,2%
disagree	Count	62	68	130
	% within Country	35,2%	43,6%	39,2%
agree	Count	77	66	143
	% within Country	43,8%	42,3%	43,1%
strongly agree	Count	28	17	45
	% within Country	15,9%	10,9%	13,6%
Total	Count	176	156	332
	% within Country	100,0%	100,0%	100,0%

Computers are far too complicated for me.		Country		Total
		Turkey	Germany	
strongly disagree	Count	57	75	132
	% within Country	31,7%	47,8%	39,2%
disagree	Count	89	69	158
	% within Country	49,4%	43,9%	46,9%
agree	Count	27	9	36
	% within Country	15,0%	5,7%	10,7%
strongly agree	Count	7	4	11
	% within Country	3,9%	2,5%	3,3%
Total	Count	180	157	337
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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I find working with computers very easy.		Country		Total
		Turkey	Germany	
strongly disagree	Count	6	6	12
	% within Country	3,4%	3,9%	3,6%
disagree	Count	36	26	62
	% within Country	20,5%	16,8%	18,7%
agree	Count	98	87	185
	% within Country	55,7%	56,1%	55,9%
strongly agree	Count	36	36	72
	% within Country	20,5%	23,2%	21,8%
Total	Count	176	155	331
	% within Country	100,0%	100,0%	100,0%

As far as computers are concerned, I feel less competent than my classmates.		Country		Total
		Turkey	Germany	
strongly disagree	Count	48	59	107
	% within Country	27,3%	37,8%	32,2%
disagree	Count	92	82	174
	% within Country	52,3%	52,6%	52,4%
agree	Count	29	14	43
	% within Country	16,5%	9,0%	13,0%
strongly agree	Count	7	1	8
	% within Country	4,0%	0,6%	2,4%
Total	Count	176	156	332
	% within Country	100,0%	100,0%	100,0%

I usually find it easy to learn how to use a new software package.		Country		Total
		Turkey	Germany	
strongly disagree	Count	12	8	20
	% within Country	6,7%	5,2%	6,0%
disagree	Count	81	63	144
	% within Country	45,5%	41,2%	43,5%
agree	Count	61	68	129
	% within Country	34,3%	44,4%	39,0%
strongly agree	Count	24	14	38
	% within Country	13,5%	9,2%	11,5%
Total	Count	178	153	331
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

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Computers frighten me.		Country		Total
		Turkey	Germany	
strongly disagree	Count	108	122	230
	% within Country	61,4%	79,7%	69,9%
disagree	Count	53	29	82
	% within Country	30,1%	19,0%	24,9%
agree	Count	10	0	10
	% within Country	5,7%	0,0%	3,0%
strongly agree	Count	5	2	7
	% within Country	2,8%	1,3%	2,1%
Total	Count	176	153	329
	% within Country	100,0%	100,0%	100,0%

I consider myself a more skilled computer user than most of my classmates.		Country		Total
		Turkey	Germany	
strongly disagree	Count	18	19	37
	% within Country	10,3%	12,3%	11,2%
disagree	Count	114	94	208
	% within Country	65,1%	60,6%	63,0%
agree	Count	32	34	66
	% within Country	18,3%	21,9%	20,0%
strongly agree	Count	11	8	19
	% within Country	6,3%	5,2%	5,8%
Total	Count	175	155	330
	% within Country	100,0%	100,0%	100,0%

I am very unsure of my ability to use computer.		Country		Total
		Turkey	Germany	
strongly disagree	Count	35	60	95
	% within Country	19,9%	39,0%	28,8%
disagree	Count	72	78	150
	% within Country	40,9%	50,6%	45,5%
agree	Count	59	12	71
	% within Country	33,5%	7,8%	21,5%
strongly agree	Count	10	4	14
	% within Country	5,7%	2,6%	4,2%
Total	Count	176	154	330
	% within Country	100,0%	100,0%	100,0%

Turkish female students vs. German female students

A. Appendix

Results

Turkish students vs. German students

1. Biographical data

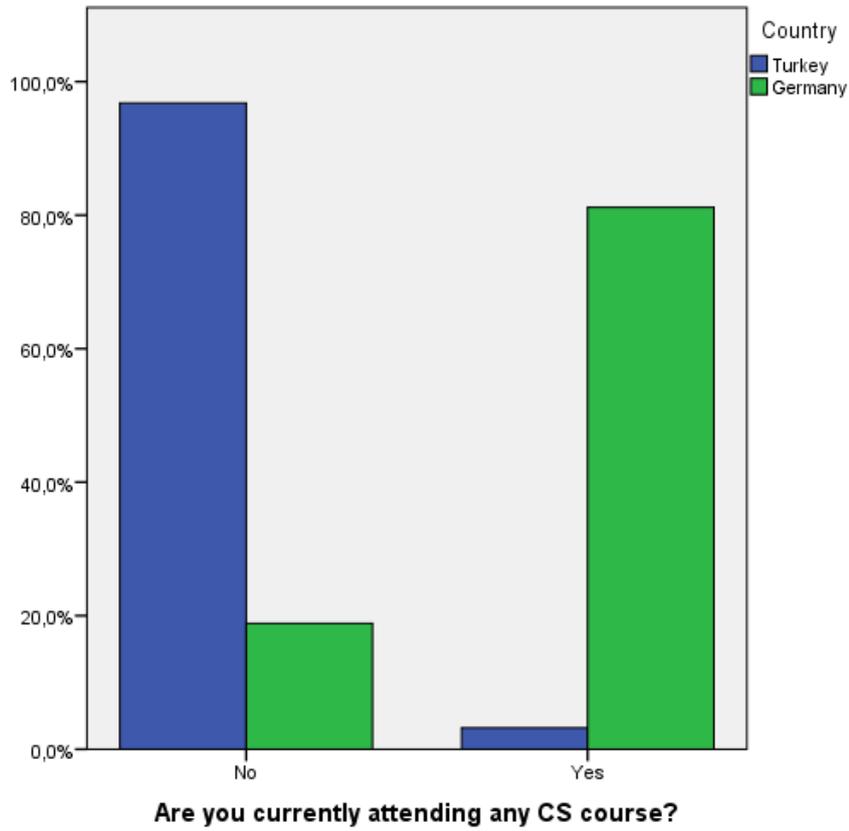
Sex		Country		Total
		Turkey	Germany	
male	Count	166	156	322
	% within Country	46,4%	49,8%	48,0%
female	Count	192	157	349
	% within Country	53,6%	50,2%	52,0%
Total	Count	358	313	671
	% within Country	100,0%	100,0%	100,0%

Age		Country		Total
		Turkey	Germany	
13	Count	1	0	1
	% within Country	0,3%	0,0%	0,1%
14	Count	95	1	96
	% within Country	26,8%	0,3%	14,3%
15	Count	127	46	173
	% within Country	35,8%	14,6%	25,9%
16	Count	80	98	178
	% within Country	22,5%	31,2%	26,6%
17	Count	43	68	111
	% within Country	12,1%	21,7%	16,6%
18	Count	9	68	77
	% within Country	2,5%	21,7%	11,5%
19	Count	0	33	33
	% within Country	0,0%	10,5%	4,9%
Total	Count	355	314	669
	% within Country	100,0%	100,0%	100,0%

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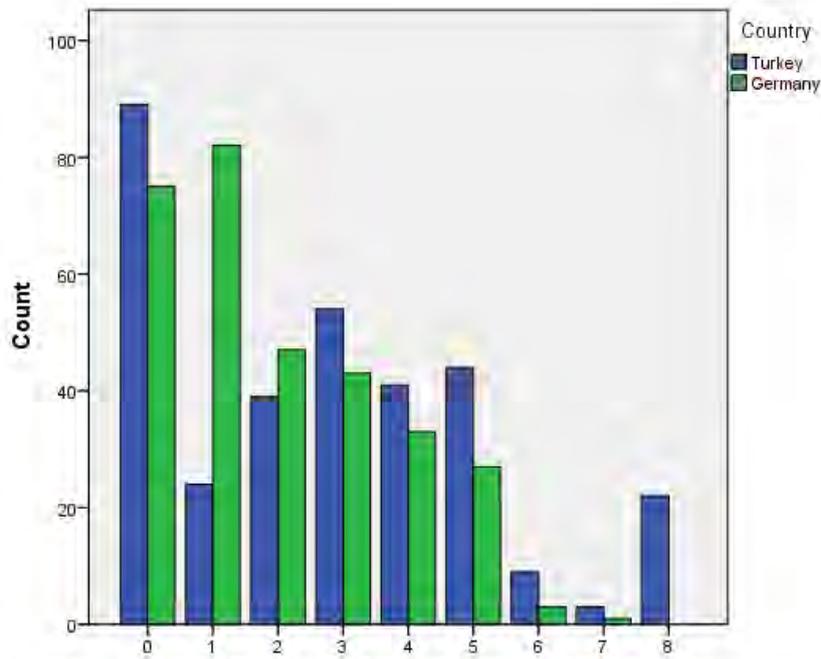
2. Students' attendance at CS courses at school



Are you currently attending any CS course?			Country		Total
			Turkey	Germany	
No	Count	333	59	392	
	% within Country	96,8%	18,8%	59,7%	
Yes	Count	11	254	265	
	% within Country	3,2%	81,2%	40,3%	
Total	Count	344	313	657	
	% within Country	100,0%	100,0%	100,0%	

Turkish students vs. German students

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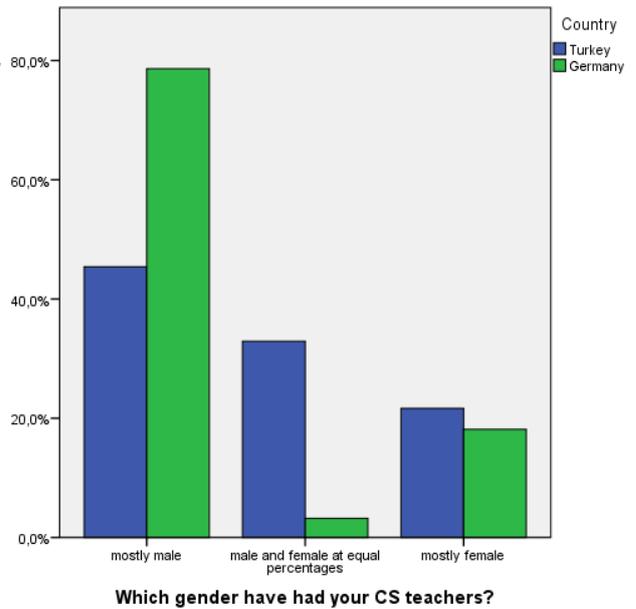
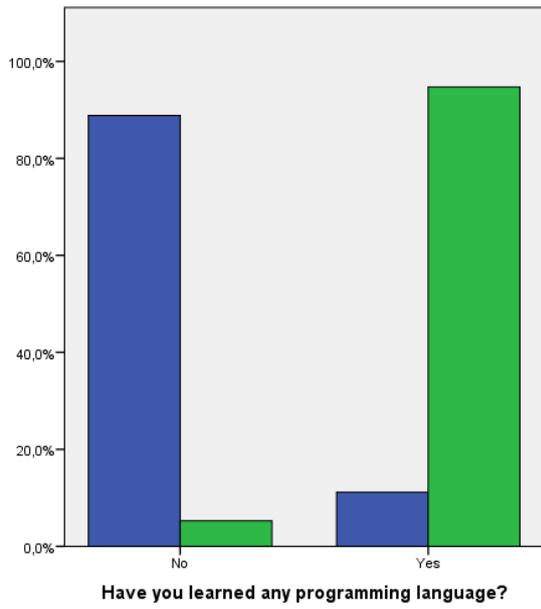


b. How many years have you been taught CS at school totally?

How many years have you been taught CS at school totally?		Country		Total
		Turkey	Germany	
0	Count	89	75	164
	% within Country	27,4%	24,1%	25,8%
1	Count	24	82	106
	% within Country	7,4%	26,4%	16,7%
2	Count	39	47	86
	% within Country	12,0%	15,1%	13,5%
3	Count	54	43	97
	% within Country	16,6%	13,8%	15,3%
4	Count	41	33	74
	% within Country	12,6%	10,6%	11,6%
5	Count	44	27	71
	% within Country	13,5%	8,7%	11,2%
6	Count	9	3	12
	% within Country	2,8%	1,0%	1,9%
7	Count	3	1	4
	% within Country	0,9%	0,3%	0,6%
8	Count	22	0	22
	% within Country	6,8%	0,0%	3,5%
Total	Count	325	311	636
	% within Country	100,0%	100,0%	100,0%

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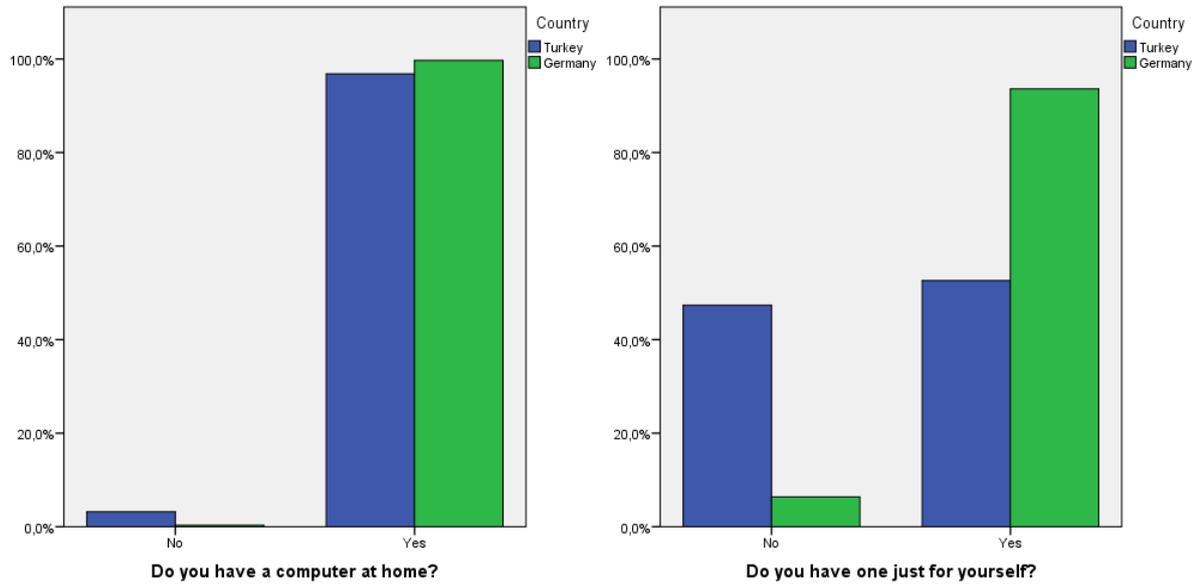
Have you learned any programming language?			Country		Total
			Turkey	Germany	
No	Count	199	10	209	
	% within Country	88,8%	5,3%	50,5%	
Yes	Count	25	180	205	
	% within Country	11,2%	94,7%	49,5%	
Total	Count	224	190	414	
	% within Country	100,0%	100,0%	100,0%	

Which gender have had your CS teachers?			Country		Total
			Turkey	Germany	
mostly male	Count	109	195	304	
	% within Country	45,4%	78,6%	62,3%	
male and female at equal percentages	Count	79	8	87	
	% within Country	32,9%	3,2%	17,8%	
mostly female	Count	52	45	97	
	% within Country	21,7%	18,1%	19,9%	
Total	Count	240	248	488	
	% within Country	100,0%	100,0%	100,0%	

Turkish students vs. German students

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3. Students' frequency of computer use at home

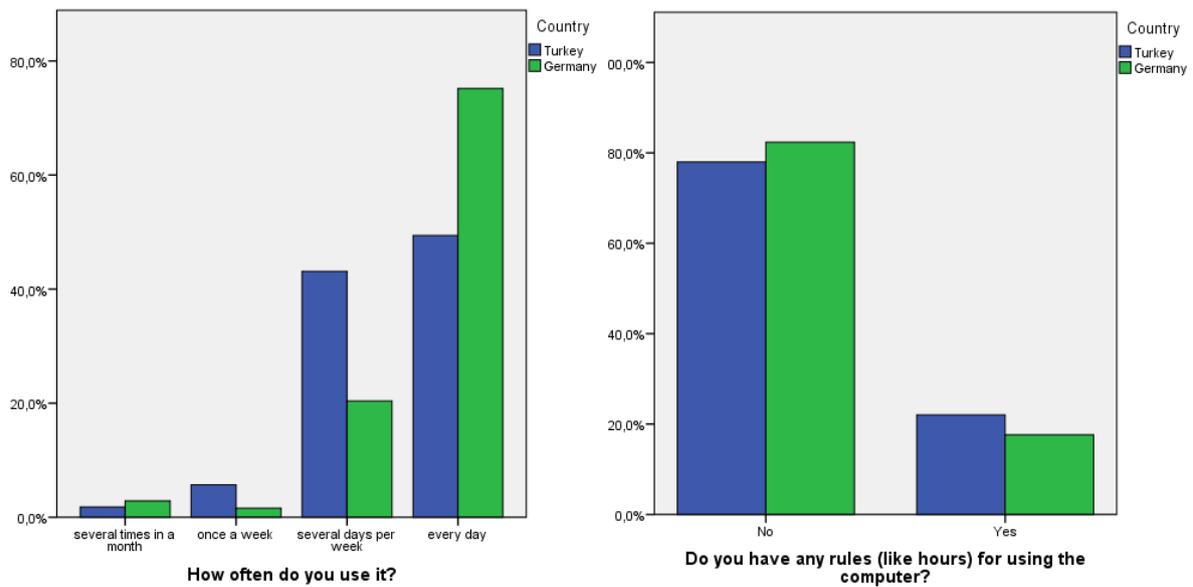


Do you have a computer at home?		Country		Total
		Turkey	Germany	
No	Count	11	1	12
	% within Country	3,2%	0,3%	1,8%
Yes	Count	334	311	645
	% within Country	96,8%	99,7%	98,2%
Total	Count	345	312	657
	% within Country	100,0%	100,0%	100,0%

Do you have one just for yourself?		Country		Total
		Turkey	Germany	
No	Count	163	20	183
	% within Country	47,4%	6,4%	27,9%
Yes	Count	181	293	474
	% within Country	52,6%	93,6%	72,1%
Total	Count	344	313	657
	% within Country	100,0%	100,0%	100,0%

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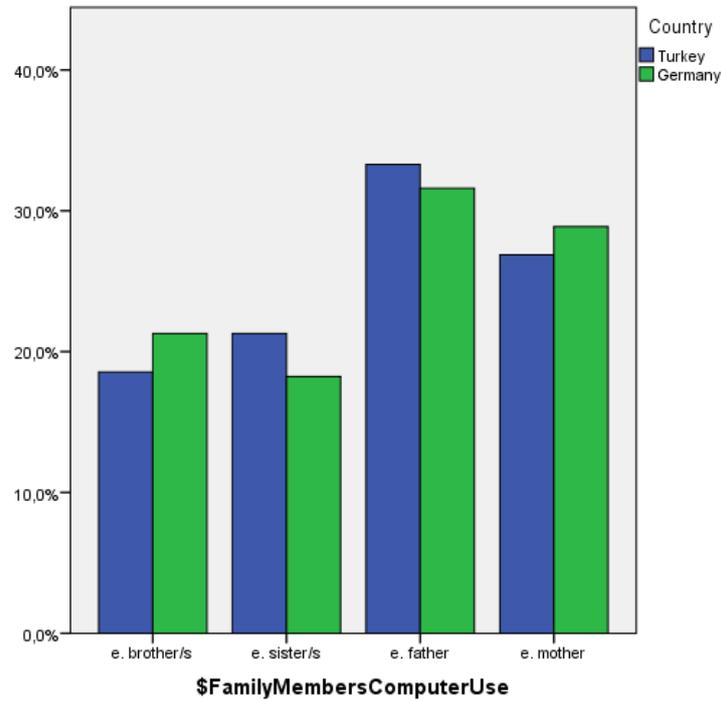


How often do you use it?		Country		Total
		Turkey	Germany	
several times in a month	Count	6	9	15
	% within Country	1,8%	2,9%	2,3%
once a week	Count	19	5	24
	% within Country	5,7%	1,6%	3,7%
several days per week	Count	144	64	208
	% within Country	43,1%	20,4%	32,1%
every day	Count	165	236	401
	% within Country	49,4%	75,2%	61,9%
Total	Count	334	314	648
	% within Country	100,0%	100,0%	100,0%

Do you have any rules (like hours) for using the computer?		Country		Total
		Turkey	Germany	
No	Count	262	257	519
	% within Country	78,0%	82,4%	80,1%
Yes	Count	74	55	129
	% within Country	22,0%	17,6%	19,9%
Total	Count	336	312	648
	% within Country	100,0%	100,0%	100,0%

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brother/s		Country		Total
		Turkey	Germany	
No	Count	205	129	334
	% within Country	56,8%	40,7%	49,3%
Yes	Count	156	188	344
	% within Country	43,2%	59,3%	50,7%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%

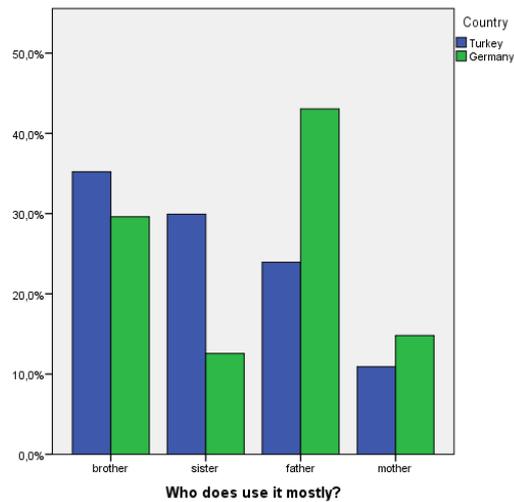
sister/s		Country		Total
		Turkey	Germany	
No	Count	182	156	338
	% within Country	50,4%	49,2%	49,9%
Yes	Count	179	161	340
	% within Country	49,6%	50,8%	50,1%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%

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mother		Country		Total
		Turkey	Germany	
No	Count	135	62	197
	% within Country	37,4%	19,6%	29,1%
Yes	Count	226	255	481
	% within Country	62,6%	80,4%	70,9%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%

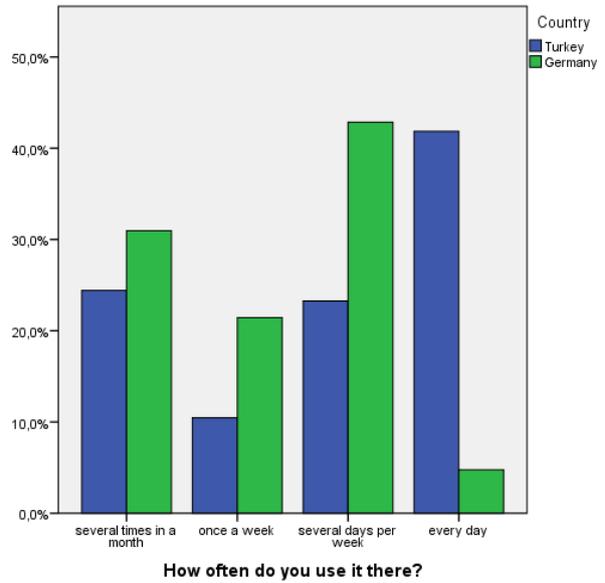
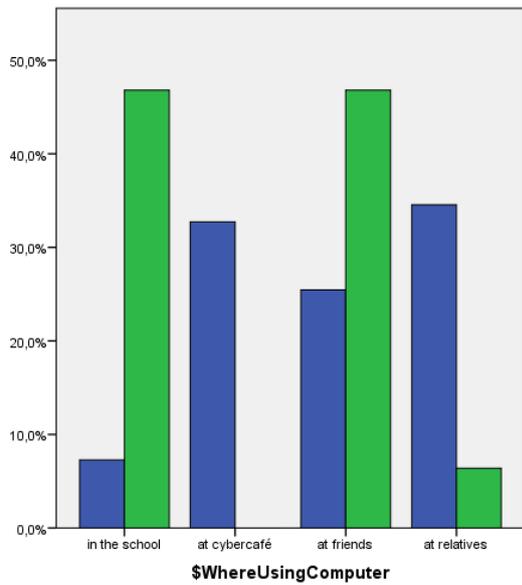
father		Country		Total
		Turkey	Germany	
No	Count	81	38	119
	% within Country	22,4%	12,0%	17,6%
Yes	Count	280	279	559
	% within Country	77,6%	88,0%	82,4%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%



Who does use it mostly?		Country		Total
		Turkey	Germany	
brother	Count	100	66	166
	% within Country	35,2%	29,6%	32,7%
sister	Count	85	28	113
	% within Country	29,9%	12,6%	22,3%
father	Count	68	96	164
	% within Country	23,9%	43,0%	32,3%
mother	Count	31	33	64
	% within Country	10,9%	14,8%	12,6%
Total	Count	284	223	507
	% within Country	100,0%	100,0%	100,0%

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in the school		Country		Total
		Turkey	Germany	
No	Count	357	295	652
	% within Country	98,9%	93,1%	96,2%
Yes	Count	4	22	26
	% within Country	1,1%	6,9%	3,8%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%

at cybercafé		Country	Total
		Turkey	
No	Count	343	343
	% within Country	95,0%	95,0%
Yes	Count	18	18
	% within Country	5,0%	5,0%
Total	Count	361	361
	% within Country	100,0%	100,0%

Turkish students vs. German students

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at friends		Country		Total
		Turkey	Germany	
No	Count	347	295	642
	% within Country	96,1%	93,1%	94,7%
Yes	Count	14	22	36
	% within Country	3,9%	6,9%	5,3%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%

at relatives		Country		Total
		Turkey	Germany	
No	Count	342	314	656
	% within Country	94,7%	99,1%	96,8%
Yes	Count	19	3	22
	% within Country	5,3%	0,9%	3,2%
Total	Count	361	317	678
	% within Country	100,0%	100,0%	100,0%

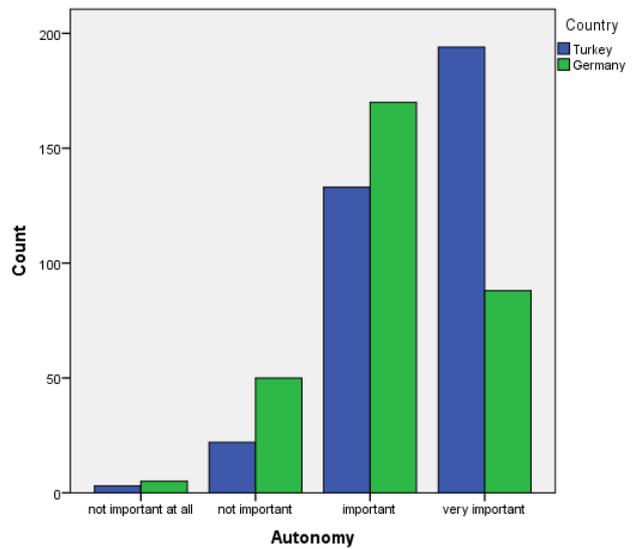
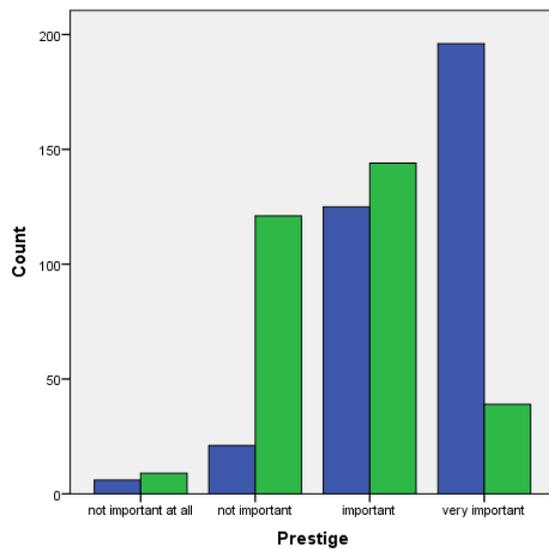
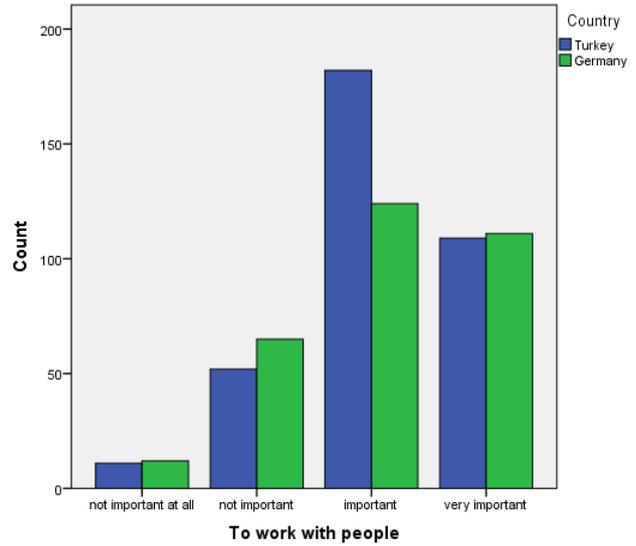
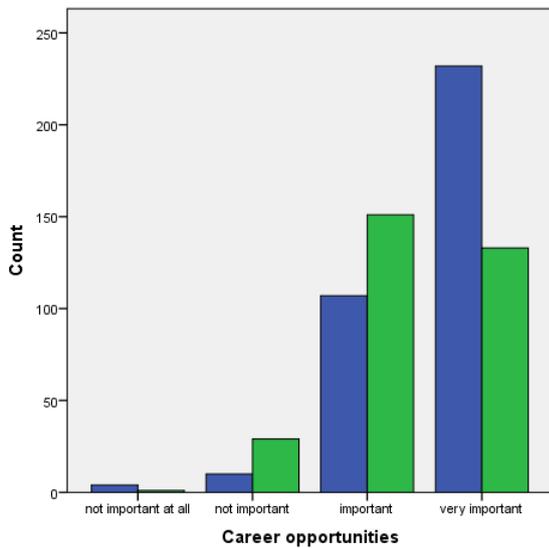
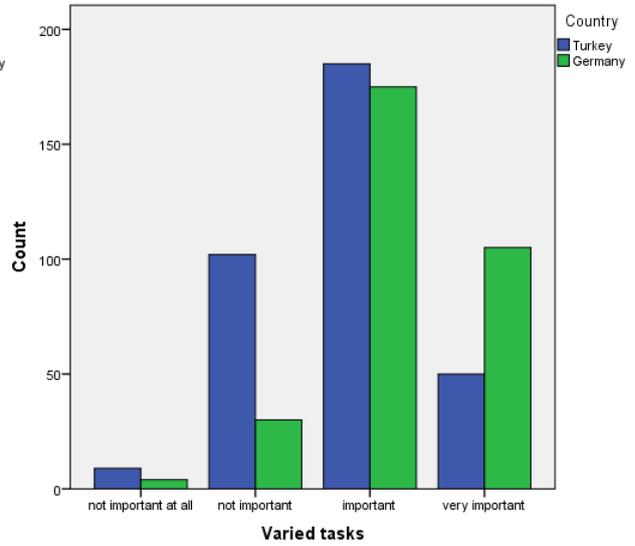
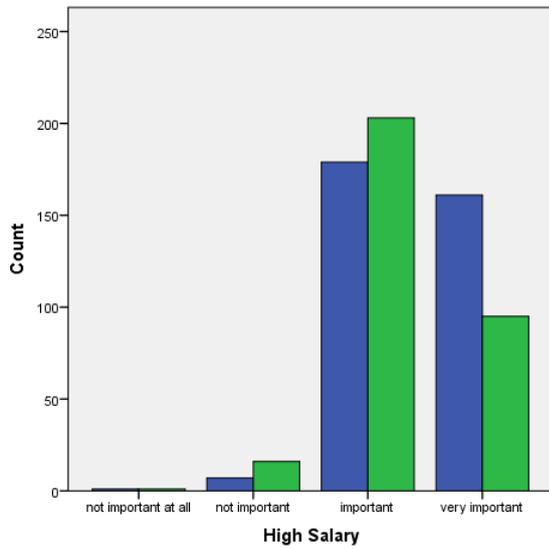
How often do you use it there?		Country		Total
		Turkey	Germany	
several times in a month	Count	34	21	55
	% within Country	26,6%	24,4%	31,0%
once a week	Count	18	9	27
	% within Country	14,1%	10,5%	21,4%
several days per week	Count	38	20	58
	% within Country	29,7%	23,3%	42,9%
every day	Count	38	36	74
	% within Country	29,7%	41,9%	4,8%
Total	Count	128	86	214
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

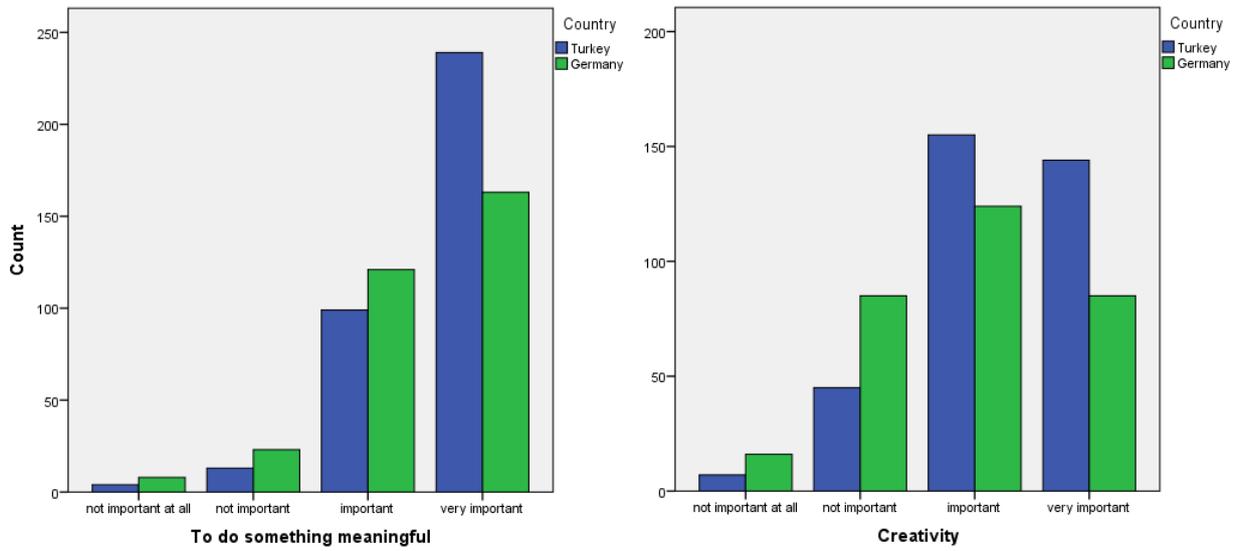
A. Appendix

4. Students' intention to study (CS) at HE level

a. When you think about your future job, what is very important for you?



A. Appendix



High Salary		Country		Total
		Turkey	Germany	
not important at all	Count	1	1	2
	% within Country	0,3%	0,3%	0,3%
not important	Count	7	16	23
	% within Country	2,0%	5,1%	3,5%
important	Count	179	203	382
	% within Country	51,4%	64,4%	57,6%
very important	Count	161	95	256
	% within Country	46,3%	30,2%	38,6%
Total	Count	348	315	663
	% within Country	100,0%	100,0%	100,0%

Career opportunities		Country		Total
		Turkey	Germany	
not important at all	Count	4	1	5
	% within Country	1,1%	0,3%	0,7%
not important	Count	10	29	39
	% within Country	2,8%	9,2%	5,8%
important	Count	107	151	258
	% within Country	30,3%	48,1%	38,7%
very important	Count	232	133	365
	% within Country	65,7%	42,4%	54,7%
Total	Count	353	314	667
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

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Prestige		Country		Total
		Turkey	Germany	
not important at all	Count	6	9	15
	% within Country	1,7%	2,9%	2,3%
not important	Count	21	121	142
	% within Country	6,0%	38,7%	21,5%
important	Count	125	144	269
	% within Country	35,9%	46,0%	40,7%
very important	Count	196	39	235
	% within Country	56,3%	12,5%	35,6%
Total	Count	348	313	661
	% within Country	100,0%	100,0%	100,0%

To work with people		Country		Total
		Turkey	Germany	
not important at all	Count	11	12	23
	% within Country	3,1%	3,8%	3,5%
not important	Count	52	65	117
	% within Country	14,7%	20,8%	17,6%
important	Count	182	124	306
	% within Country	51,4%	39,7%	45,9%
very important	Count	109	111	220
	% within Country	30,8%	35,6%	33,0%
Total	Count	354	312	666
	% within Country	100,0%	100,0%	100,0%

Varied tasks		Country		Total
		Turkey	Germany	
not important at all	Count	9	4	13
	% within Country	2,6%	1,3%	2,0%
not important	Count	102	30	132
	% within Country	29,5%	9,6%	20,0%
important	Count	185	175	360
	% within Country	53,5%	55,7%	54,5%
very important	Count	50	105	155
	% within Country	14,5%	33,4%	23,5%
Total	Count	346	314	660
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

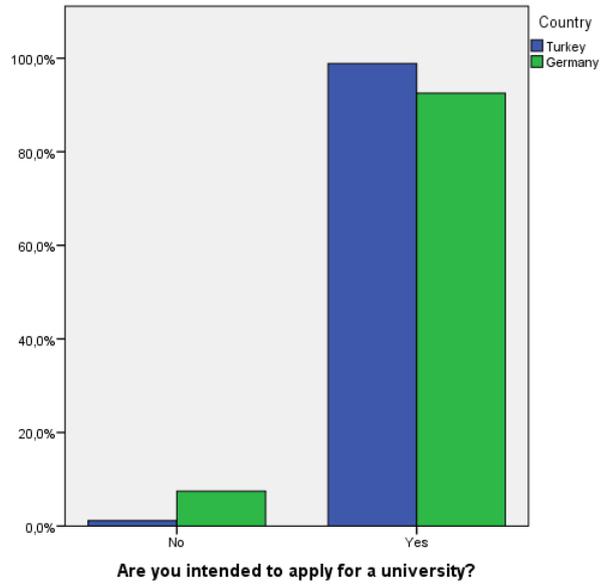
To do something meaningful		Country		Total
		Turkey	Germany	
not important at all	Count	4	8	12
	% within Country	1,1%	2,5%	1,8%
not important	Count	13	23	36
	% within Country	3,7%	7,3%	5,4%
important	Count	99	121	220
	% within Country	27,9%	38,4%	32,8%
very important	Count	239	163	402
	% within Country	67,3%	51,7%	60,0%
Total	Count	355	315	670
	% within Country	100,0%	100,0%	100,0%

Creativity		Country		Total
		Turkey	Germany	
not important at all	Count	7	16	23
	% within Country	2,0%	5,2%	3,5%
not important	Count	45	85	130
	% within Country	12,8%	27,4%	19,7%
important	Count	155	124	279
	% within Country	44,2%	40,0%	42,2%
very important	Count	144	85	229
	% within Country	41,0%	27,4%	34,6%
Total	Count	351	310	661
	% within Country	100,0%	100,0%	100,0%

Autonomy		Country		Total
		Turkey	Germany	
not important at all	Count	3	5	8
	% within Country	0,9%	1,6%	1,2%
not important	Count	22	50	72
	% within Country	6,2%	16,0%	10,8%
important	Count	133	170	303
	% within Country	37,8%	54,3%	45,6%
very important	Count	194	88	282
	% within Country	55,1%	28,1%	42,4%
Total	Count	352	313	665
	% within Country	100,0%	100,0%	100,0%

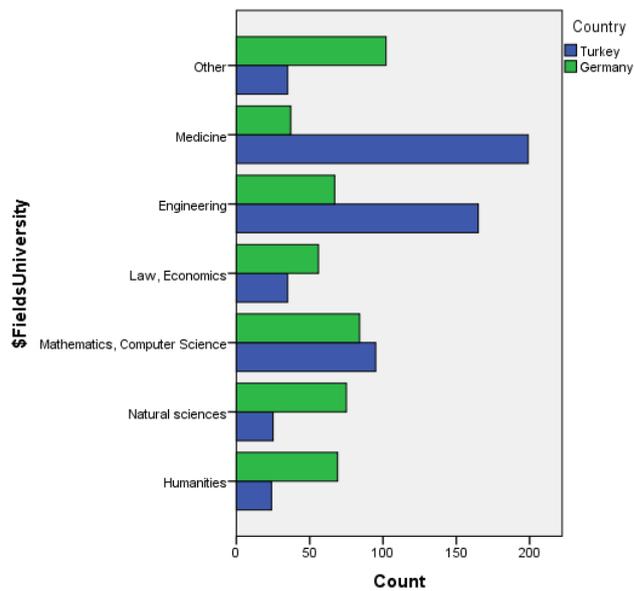
Turkish students vs. German students

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Are you intended to apply for a university?		Country		Total
		Turkey	Germany	
No	Count	4	23	27
	% within Country	1,1%	7,5%	4,1%
Yes	Count	345	285	630
	% within Country	98,9%	92,5%	95,9%
Total	Count	349	308	657
	% within Country	100,0%	100,0%	100,0%

If yes, which fields are the most interesting for you?



Turkish students vs. German students

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Humanities		Country		Total
		Turkey	Germany	
No	Count	339	248	587
	% within Country	93,4%	78,2%	86,3%
Yes	Count	24	69	93
	% within Country	6,6%	21,8%	13,7%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Natural sciences		Country		Total
		Turkey	Germany	
No	Count	338	242	580
	% within Country	93,1%	76,3%	85,3%
Yes	Count	25	75	100
	% within Country	6,9%	23,7%	14,7%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Mathematics, Computer Science		Country		Total
		Turkey	Germany	
No	Count	268	233	501
	% within Country	73,8%	73,5%	73,7%
Yes	Count	95	84	179
	% within Country	26,2%	26,5%	26,3%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Law, Economics		Country		Total
		Turkey	Germany	
No	Count	328	261	589
	% within Country	90,4%	82,3%	86,6%
Yes	Count	35	56	91
	% within Country	9,6%	17,7%	13,4%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

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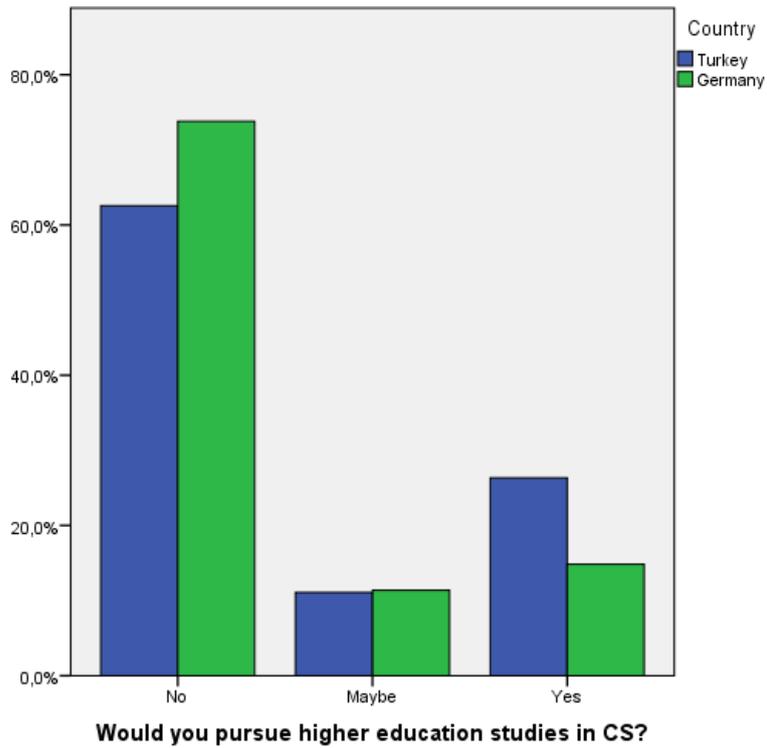
Engineering		Country		Total
		Turkey	Germany	
No	Count	198	250	448
	% within Country	54,5%	78,9%	65,9%
Yes	Count	165	67	232
	% within Country	45,5%	21,1%	34,1%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Medicine		Country		Total
		Turkey	Germany	
No	Count	164	280	444
	% within Country	45,2%	88,3%	65,3%
Yes	Count	199	37	236
	% within Country	54,8%	11,7%	34,7%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Other		Country		Total
		Turkey	Germany	
No	Count	328	215	543
	% within Country	90,4%	67,8%	79,9%
Yes	Count	35	102	137
	% within Country	9,6%	32,2%	20,1%
Total	Count	363	317	680
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

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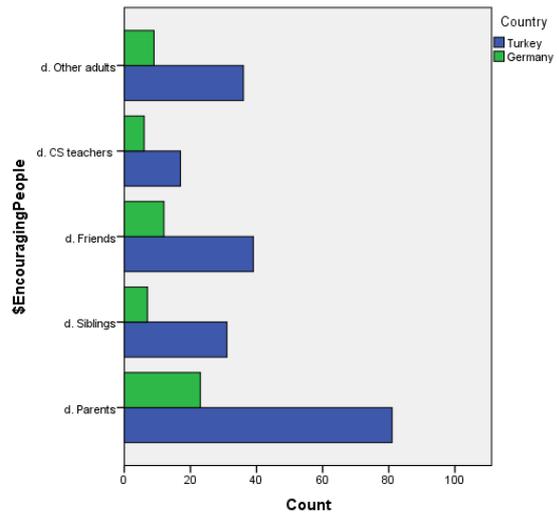
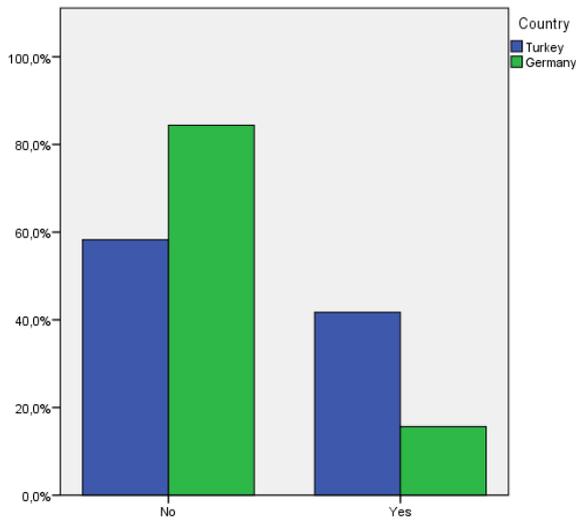


Would you pursue higher education studies in CS?		Country		Total
		Turkey	Germany	
No	Count	209	214	423
	% within Country	62,6%	73,8%	67,8%
Maybe	Count	37	33	70
	% within Country	11,1%	11,4%	11,2%
Yes	Count	88	43	131
	% within Country	26,3%	14,8%	21,0%
Total	Count	334	290	624
	% within Country	100,0%	100,0%	100,0%

Have you been encouraged by a person or several persons?		Country		Total
		Turkey	Germany	
No	Count	134	232	366
	% within Country	58,3%	84,4%	72,5%
Yes	Count	96	43	139
	% within Country	41,7%	15,6%	27,5%
Total	Count	230	275	505
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix



d. Have you been encouraged by a person or several persons?

Parents		Country		Total
		Turkey	Germany	
No	Count	276	293	569
	% within Country	76,7%	92,4%	84,0%
Yes	Count	84	24	108
	% within Country	23,3%	7,6%	16,0%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Siblings		Country		Total
		Turkey	Germany	
No	Count	327	309	636
	% within Country	90,8%	97,5%	93,9%
Yes	Count	33	8	41
	% within Country	9,2%	2,5%	6,1%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

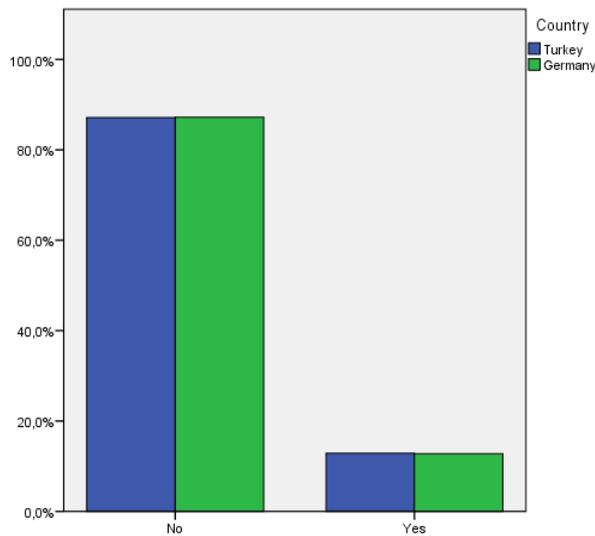
Friends		Country		Total
		Turkey	Germany	
No	Count	318	304	622
	% within Country	88,3%	95,9%	91,9%
Yes	Count	42	13	55
	% within Country	11,7%	4,1%	8,1%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

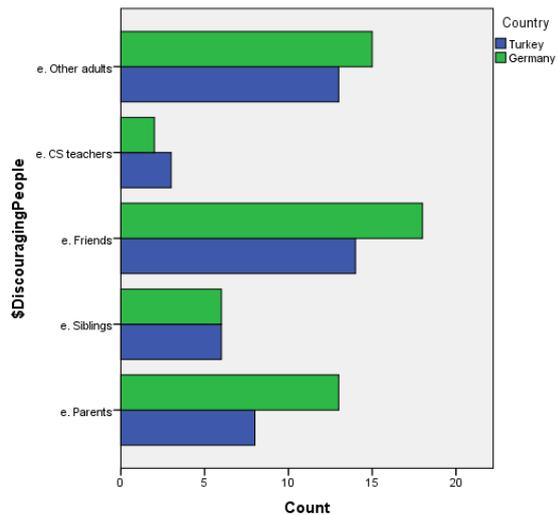
A. Appendix

CS teachers		Country		Total
		Turkey	Germany	
No	Count	342	310	652
	% within Country	95,0%	97,8%	96,3%
Yes	Count	18	7	25
	% within Country	5,0%	2,2%	3,7%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Other adults		Country		Total
		Turkey	Germany	
No	Count	320	307	627
	% within Country	88,9%	96,8%	92,6%
Yes	Count	40	10	50
	% within Country	11,1%	3,2%	7,4%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%



e. Have you been discouraged by a person or several persons?



Turkish students vs. German students

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Have you been discouraged by a person or several persons?		Country		Total
		Turkey	Germany	
No	Count	176	232	408
	% within Country	87,1%	87,2%	87,2%
Yes	Count	26	34	60
	% within Country	12,9%	12,8%	12,8%
Total	Count	202	266	468
	% within Country	100,0%	100,0%	100,0%

Parents		Country		Total
		Turkey	Germany	
No	Count	352	304	656
	% within Country	97,8%	95,9%	96,9%
Yes	Count	8	13	21
	% within Country	2,2%	4,1%	3,1%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Siblings		Country		Total
		Turkey	Germany	
No	Count	354	311	665
	% within Country	98,3%	98,1%	98,2%
Yes	Count	6	6	12
	% within Country	1,7%	1,9%	1,8%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Friends		Country		Total
		Turkey	Germany	
No	Count	346	299	645
	% within Country	96,1%	94,3%	95,3%
Yes	Count	14	18	32
	% within Country	3,9%	5,7%	4,7%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

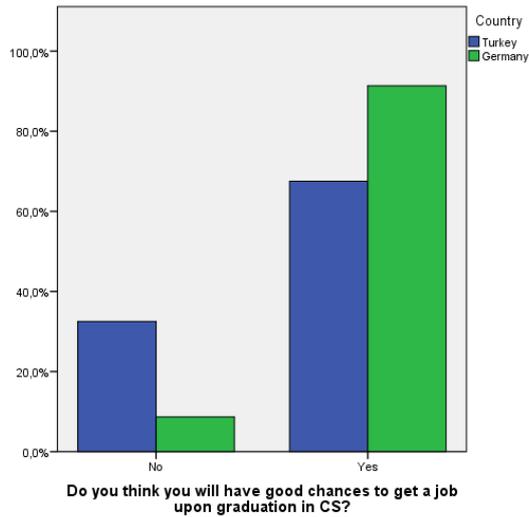
Turkish students vs. German students

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CS teachers		Country		Total
		Turkey	Germany	
No	Count	357	315	672
	% within Country	99,2%	99,4%	99,3%
Yes	Count	3	2	5
	% within Country	0,8%	0,6%	0,7%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Other adults		Country		Total
		Turkey	Germany	
No	Count	347	302	649
	% within Country	96,4%	95,3%	95,9%
Yes	Count	13	15	28
	% within Country	3,6%	4,7%	4,1%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

5. Students' perceptions of CS and the IT profession

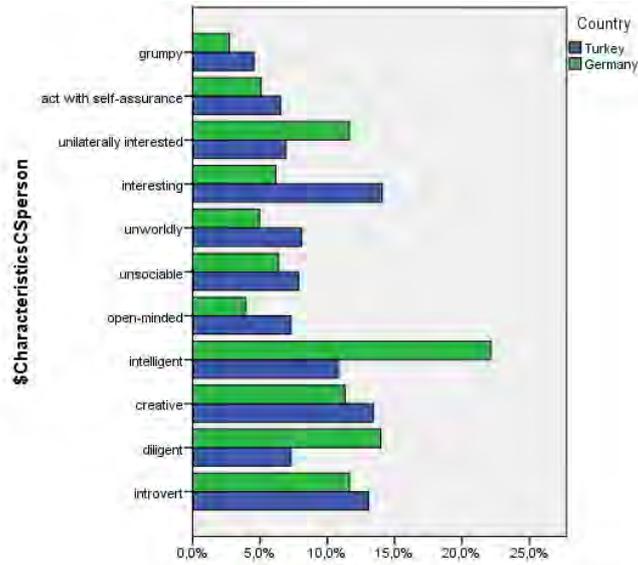


Do you think you will have good chances to get a job upon graduation in CS		Country		Total
		Turkey	Germany	
No	Count	78	25	103
	% within Country	32,5%	8,7%	19,5%
Yes	Count	162	264	426
	% within Country	67,5%	91,3%	80,5%
Total	Count	240	289	529
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

Which characteristics have somebody, who works very often with a computer?



introvert		Country		Total
		Turkey	Germany	
No	Count	194	202	396
	% within Country	53,9%	63,7%	58,5%
Yes	Count	166	115	281
	% within Country	46,1%	36,3%	41,5%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

intelligent		Country		Total
		Turkey	Germany	
No	Count	222	98	320
	% within Country	61,7%	30,9%	47,3%
Yes	Count	138	219	357
	% within Country	38,3%	69,1%	52,7%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

open-minded		Country		Total
		Turkey	Germany	
No	Count	267	278	545
	% within Country	74,2%	87,7%	80,5%
Yes	Count	93	39	132
	% within Country	25,8%	12,3%	19,5%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

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unsociable		Country		Total
		Turkey	Germany	
No	Count	260	254	514
	% within Country	72,2%	80,1%	75,9%
Yes	Count	100	63	163
	% within Country	27,8%	19,9%	24,1%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

unworldly		Country		Total
		Turkey	Germany	
No	Count	257	268	525
	% within Country	71,4%	84,5%	77,5%
Yes	Count	103	49	152
	% within Country	28,6%	15,5%	22,5%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

interesting		Country		Total
		Turkey	Germany	
No	Count	181	256	437
	% within Country	50,3%	80,8%	64,5%
Yes	Count	179	61	240
	% within Country	49,7%	19,2%	35,5%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

unilaterally interested		Country		Total
		Turkey	Germany	
No	Count	272	202	474
	% within Country	75,6%	63,7%	70,0%
Yes	Count	88	115	203
	% within Country	24,4%	36,3%	30,0%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

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act with self-assurance		Country		Total
		Turkey	Germany	
No	Count	277	267	544
	% within Country	76,9%	84,2%	80,4%
Yes	Count	83	50	133
	% within Country	23,1%	15,8%	19,6%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

grumpy		Country		Total
		Turkey	Germany	
No	Count	302	290	592
	% within Country	83,9%	91,5%	87,4%
Yes	Count	58	27	85
	% within Country	16,1%	8,5%	12,6%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

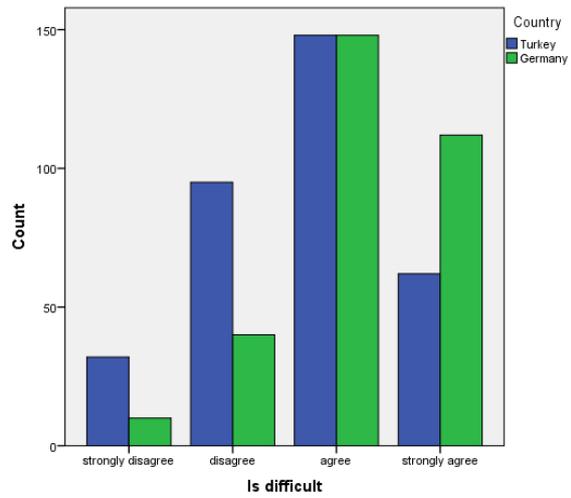
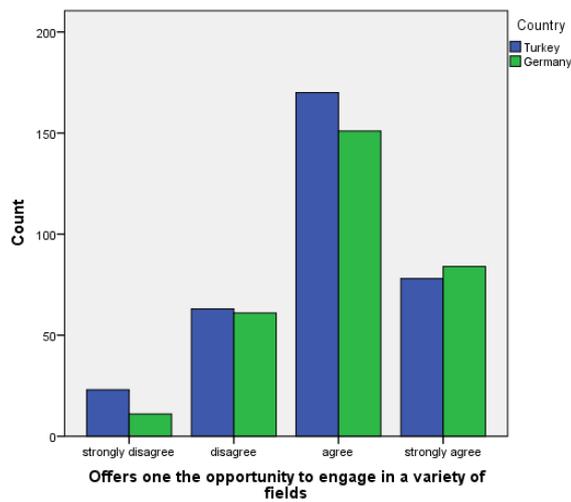
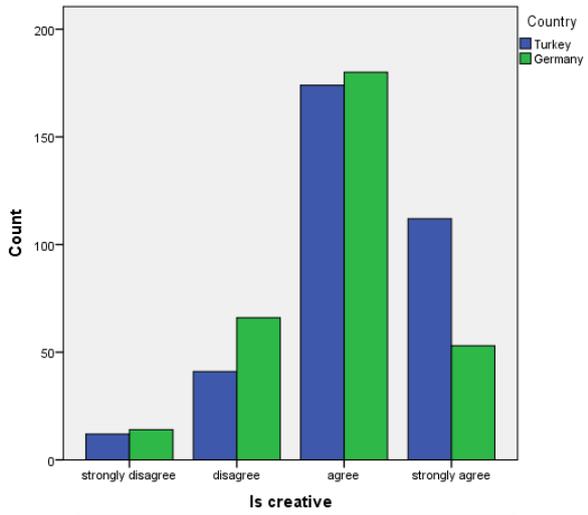
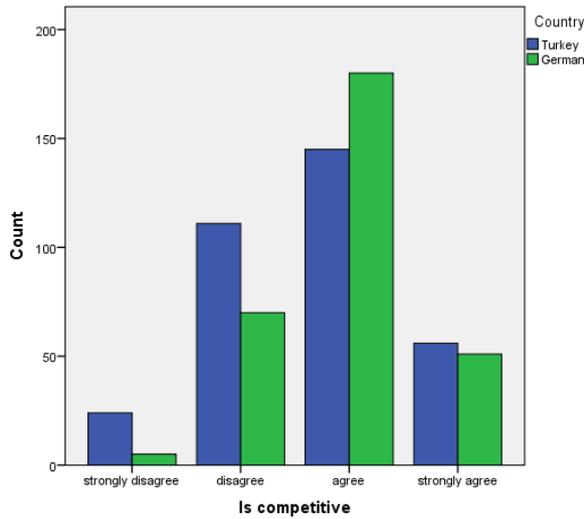
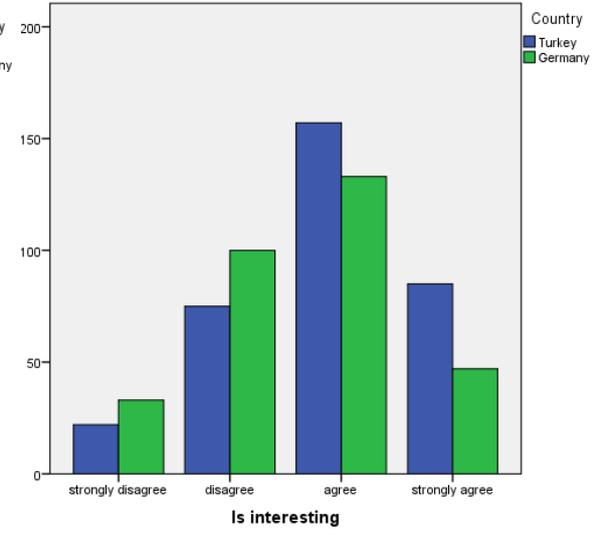
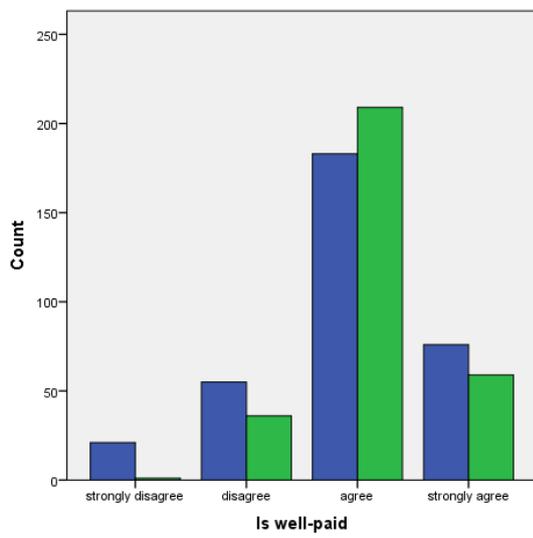
diligent		Country		Total
		Turkey	Germany	
No	Count	267	179	446
	% within Country	74,2%	56,5%	65,9%
Yes	Count	93	138	231
	% within Country	25,8%	43,5%	34,1%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

creative		Country		Total
		Turkey	Germany	
No	Count	189	205	394
	% within Country	52,5%	64,7%	58,2%
Yes	Count	171	112	283
	% within Country	47,5%	35,3%	41,8%
Total	Count	360	317	677
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

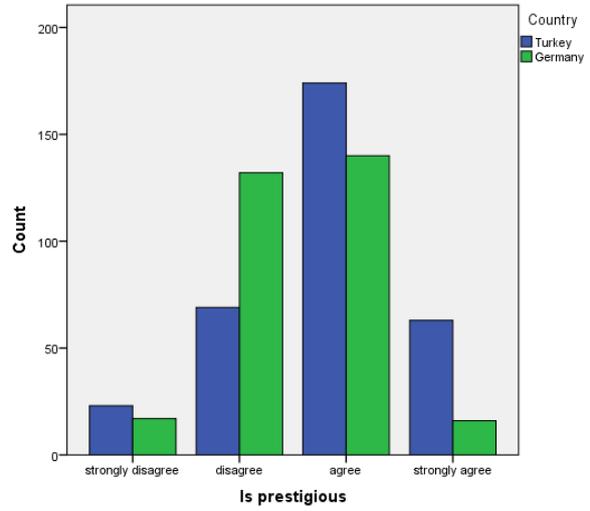
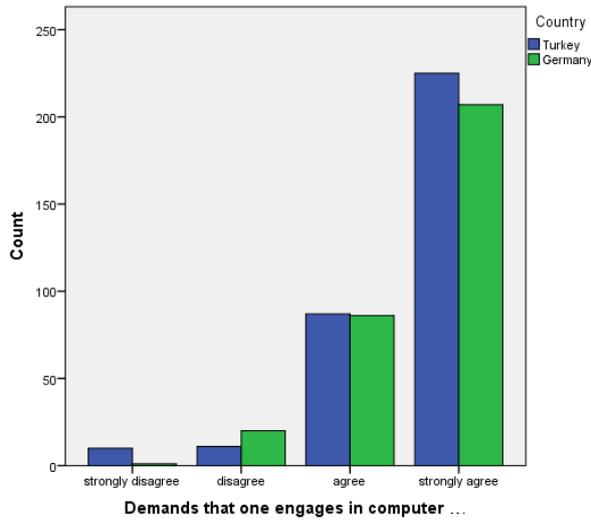
A. Appendix

What do you think? Which aspects are involved in the IT profession?



Turkish students vs. German students

A. Appendix



Is creative		Country		Total
		Turkey	Germany	
strongly disagree	Count	12	14	26
	% within Country	3,5%	4,5%	4,0%
disagree	Count	41	66	107
	% within Country	12,1%	21,1%	16,4%
agree	Count	174	180	354
	% within Country	51,3%	57,5%	54,3%
strongly agree	Count	112	53	165
	% within Country	33,0%	16,9%	25,3%
Total	Count	339	313	652
	% within Country	100,0%	100,0%	100,0%

Is competitive		Country		Total
		Turkey	Germany	
strongly disagree	Count	24	5	29
	% within Country	7,1%	1,6%	4,5%
disagree	Count	111	70	181
	% within Country	33,0%	22,9%	28,2%
agree	Count	145	180	325
	% within Country	43,2%	58,8%	50,6%
strongly agree	Count	56	51	107
	% within Country	16,7%	16,7%	16,7%
Total	Count	336	306	642
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

Is interesting		Country		Total
		Turkey	Germany	
strongly disagree	Count	22	33	55
	% within Country	6,5%	10,5%	8,4%
disagree	Count	75	100	175
	% within Country	22,1%	31,9%	26,8%
agree	Count	157	133	290
	% within Country	46,3%	42,5%	44,5%
strongly agree	Count	85	47	132
	% within Country	25,1%	15,0%	20,2%
Total	Count	339	313	652
	% within Country	100,0%	100,0%	100,0%

Is difficult		Country		Total
		Turkey	Germany	
strongly disagree	Count	32	10	42
	% within Country	9,5%	3,2%	6,5%
disagree	Count	95	40	135
	% within Country	28,2%	12,9%	20,9%
agree	Count	148	148	296
	% within Country	43,9%	47,7%	45,7%
strongly agree	Count	62	112	174
	% within Country	18,4%	36,1%	26,9%
Total	Count	337	310	647
	% within Country	100,0%	100,0%	100,0%

Is well-paid		Country		Total
		Turkey	Germany	
strongly disagree	Count	21	1	22
	% within Country	6,3%	0,3%	3,4%
disagree	Count	55	36	91
	% within Country	16,4%	11,8%	14,2%
agree	Count	183	209	392
	% within Country	54,6%	68,5%	61,3%
strongly agree	Count	76	59	135
	% within Country	22,7%	19,3%	21,1%
Total	Count	335	305	640
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

Is prestigious		Country		Total
		Turkey	Germany	
strongly disagree	Count	23	17	40
	% within Country	7,0%	5,6%	6,3%
disagree	Count	69	132	201
	% within Country	21,0%	43,3%	31,7%
agree	Count	174	140	314
	% within Country	52,9%	45,9%	49,5%
strongly agree	Count	63	16	79
	% within Country	19,1%	5,2%	12,5%
Total	Count	329	305	634
	% within Country	100,0%	100,0%	100,0%

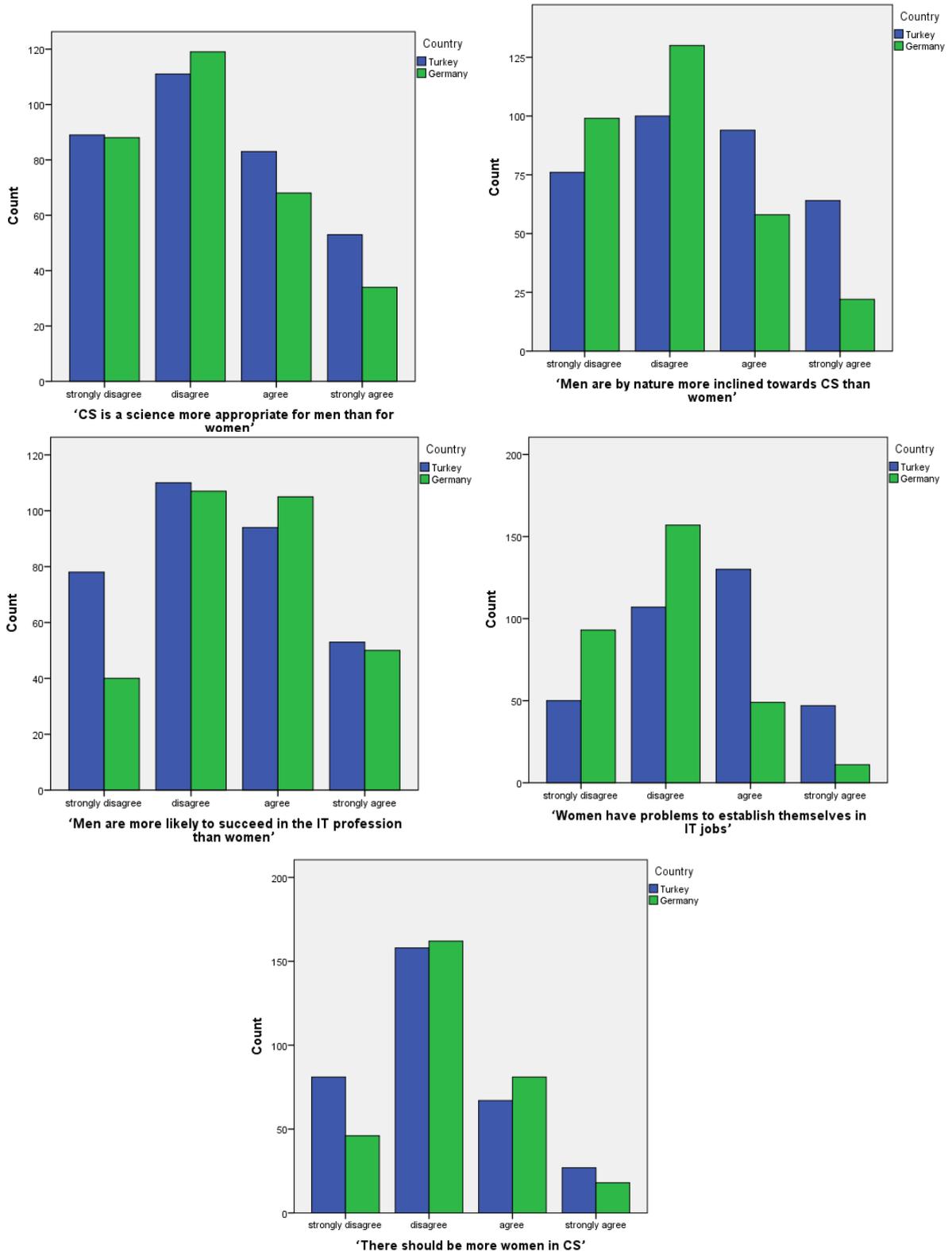
Offers one the opportunity to engage in a variety of fields		Country		Total
		Turkey	Germany	
strongly disagree	Count	23	11	34
	% within Country	6,9%	3,6%	5,3%
disagree	Count	63	61	124
	% within Country	18,9%	19,9%	19,3%
agree	Count	170	151	321
	% within Country	50,9%	49,2%	50,1%
strongly agree	Count	78	84	162
	% within Country	23,4%	27,4%	25,3%
Total	Count	334	307	641
	% within Country	100,0%	100,0%	100,0%

Demands that one engages in computer programming		Country		Total
		Turkey	Germany	
strongly disagree	Count	10	1	11
	% within Country	3,0%	0,3%	1,7%
disagree	Count	11	20	31
	% within Country	3,3%	6,4%	4,8%
agree	Count	87	86	173
	% within Country	26,1%	27,4%	26,7%
strongly agree	Count	225	207	432
	% within Country	67,6%	65,9%	66,8%
Total	Count	333	314	647
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

Do you agree?



Turkish students vs. German students

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'CS is a science more appropriate for men than for women'			Country		Total
			Turkey	Germany	
strongly disagree	Count	89	88	177	
	% within Country	26,5%	28,5%	27,4%	
disagree	Count	111	119	230	
	% within Country	33,0%	38,5%	35,7%	
agree	Count	83	68	151	
	% within Country	24,7%	22,0%	23,4%	
strongly agree	Count	53	34	87	
	% within Country	15,8%	11,0%	13,5%	
Total	Count	336	309	645	
	% within Country	100,0%	100,0%	100,0%	

'There should be more women in CS'			Country		Total
			Turkey	Germany	
strongly disagree	Count	81	46	127	
	% within Country	24,3%	15,0%	19,8%	
disagree	Count	158	162	320	
	% within Country	47,4%	52,8%	50,0%	
agree	Count	67	81	148	
	% within Country	20,1%	26,4%	23,1%	
strongly agree	Count	27	18	45	
	% within Country	8,1%	5,9%	7,0%	
Total	Count	333	307	640	
	% within Country	100,0%	100,0%	100,0%	

'Men are more likely to succeed in the IT profession than women'			Country		Total
			Turkey	Germany	
strongly disagree	Count	78	40	118	
	% within Country	23,3%	13,2%	18,5%	
disagree	Count	110	107	217	
	% within Country	32,8%	35,4%	34,1%	
agree	Count	94	105	199	
	% within Country	28,1%	34,8%	31,2%	
strongly agree	Count	53	50	103	
	% within Country	15,8%	16,6%	16,2%	
Total	Count	335	302	637	
	% within Country	100,0%	100,0%	100,0%	

Turkish students vs. German students

A. Appendix

‘Women have problems to establish themselves in IT jobs’			Country		Total
			Turkey	Germany	
strongly disagree	Count	50	93	143	
	% within Country	15,0%	30,0%	22,2%	
disagree	Count	107	157	264	
	% within Country	32,0%	50,6%	41,0%	
agree	Count	130	49	179	
	% within Country	38,9%	15,8%	27,8%	
strongly agree	Count	47	11	58	
	% within Country	14,1%	3,5%	9,0%	
Total	Count	334	310	644	
	% within Country	100,0%	100,0%	100,0%	

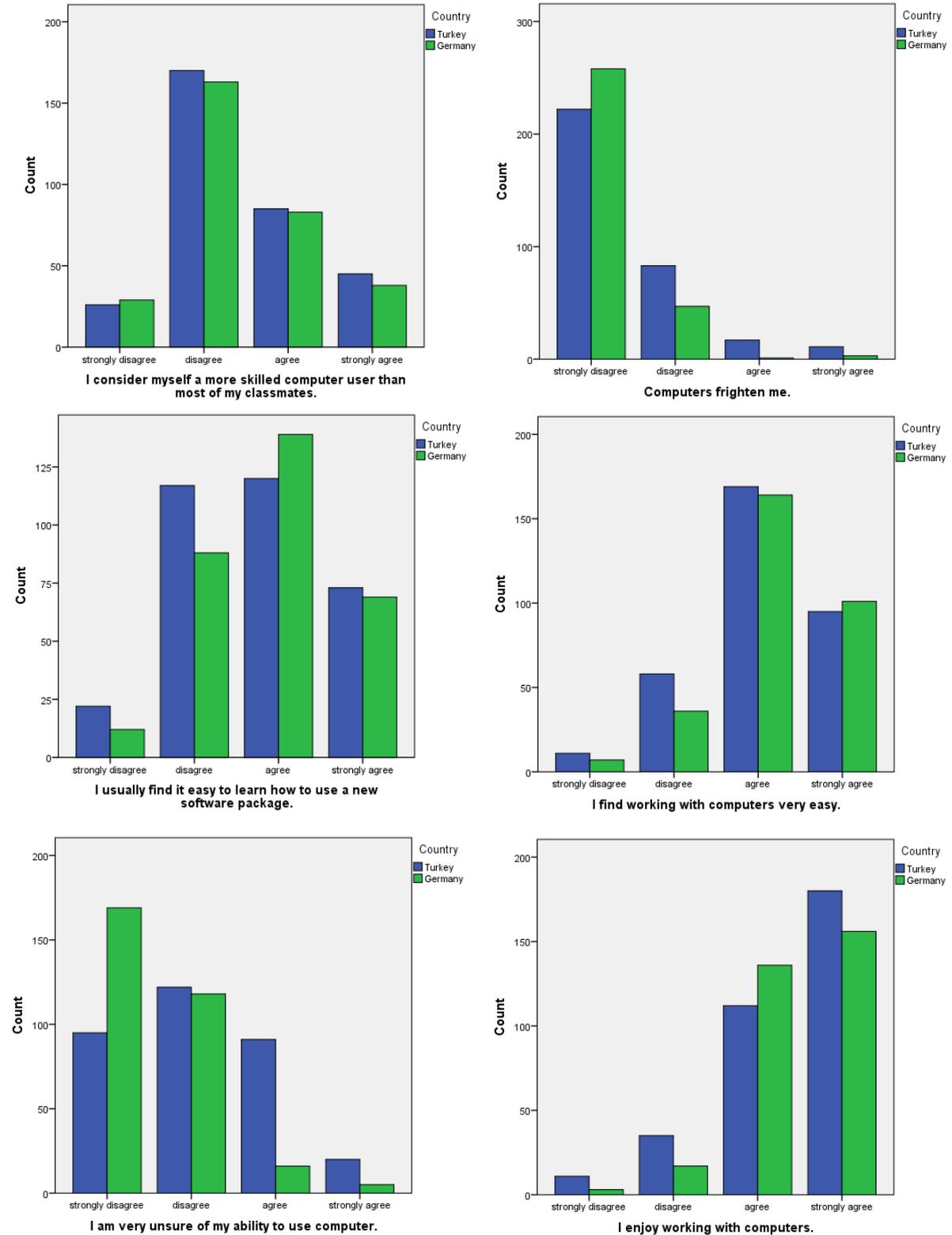
‘Men are by nature more inclined towards CS than women’			Country		Total
			Turkey	Germany	
strongly disagree	Count	76	99	175	
	% within Country	22,8%	32,0%	27,2%	
disagree	Count	100	130	230	
	% within Country	29,9%	42,1%	35,8%	
agree	Count	94	58	152	
	% within Country	28,1%	18,8%	23,6%	
strongly agree	Count	64	22	86	
	% within Country	19,2%	7,1%	13,4%	
Total	Count	334	309	643	
	% within Country	100,0%	100,0%	100,0%	

Turkish students vs. German students

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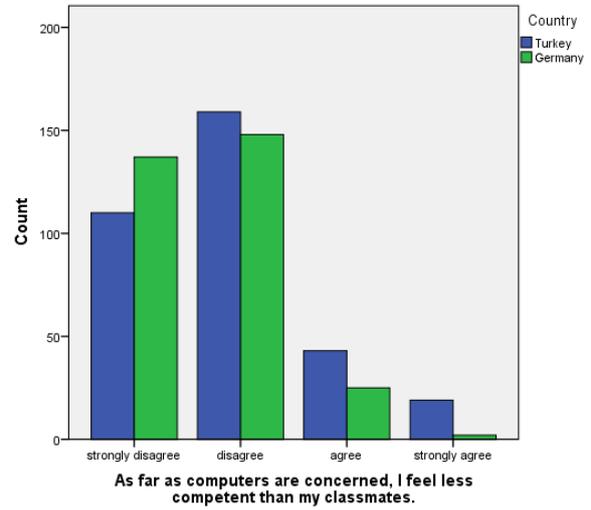
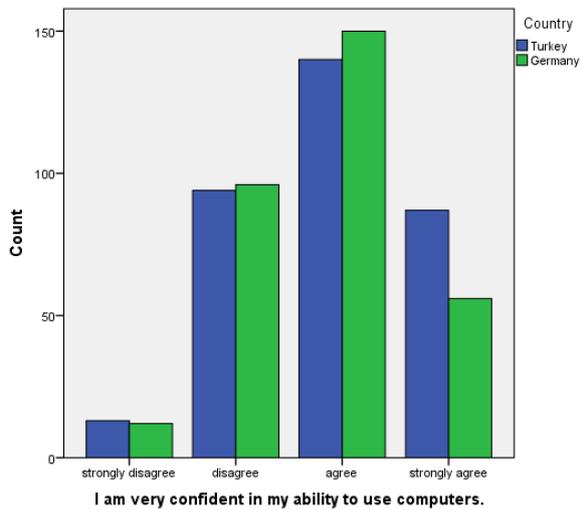
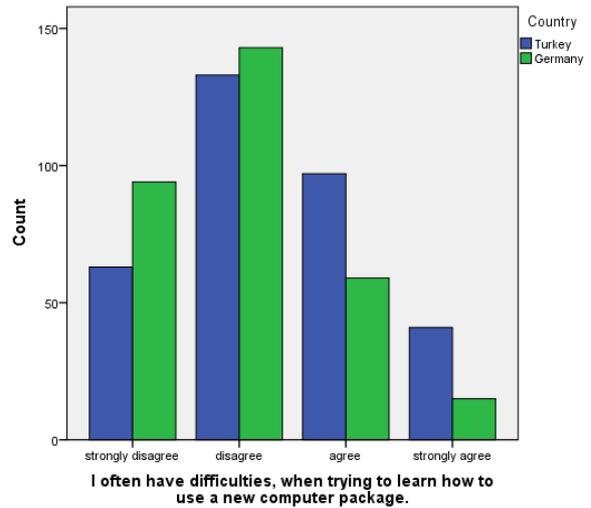
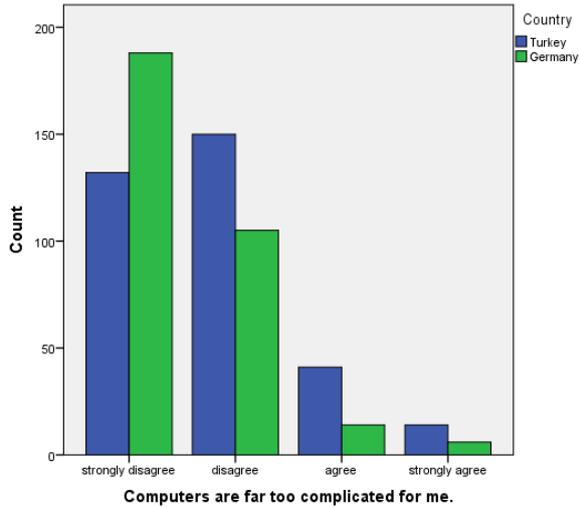
6. Students' computer self-efficacy

Do you agree?



Turkish students vs. German students

A. Appendix



I enjoy working with computers.		Country		Total
		Turkey	Germany	
strongly disagree	Count	11	3	14
	% within Country	3,3%	1,0%	2,2%
disagree	Count	35	17	52
	% within Country	10,4%	5,4%	8,0%
agree	Count	112	136	248
	% within Country	33,1%	43,6%	38,2%
strongly agree	Count	180	156	336
	% within Country	53,3%	50,0%	51,7%
Total	Count	338	312	650
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

I often have difficulties, when trying to learn how to use a new computer package.		Country		Total
		Turkey	Germany	
strongly disagree	Count	63	94	157
	% within Country	18,9%	30,2%	24,3%
disagree	Count	133	143	276
	% within Country	39,8%	46,0%	42,8%
agree	Count	97	59	156
	% within Country	29,0%	19,0%	24,2%
strongly agree	Count	41	15	56
	% within Country	12,3%	4,8%	8,7%
Total	Count	334	311	645
	% within Country	100,0%	100,0%	100,0%

I am very confident in my ability to use computers.		Country		Total
		Turkey	Germany	
strongly disagree	Count	13	12	25
	% within Country	3,9%	3,8%	3,9%
disagree	Count	94	96	190
	% within Country	28,1%	30,6%	29,3%
agree	Count	140	150	290
	% within Country	41,9%	47,8%	44,8%
strongly agree	Count	87	56	143
	% within Country	26,0%	17,8%	22,1%
Total	Count	334	314	648
	% within Country	100,0%	100,0%	100,0%

Computers are far too complicated for me.		Country		Total
		Turkey	Germany	
strongly disagree	Count	132	188	320
	% within Country	39,2%	60,1%	49,2%
disagree	Count	150	105	255
	% within Country	44,5%	33,5%	39,2%
agree	Count	41	14	55
	% within Country	12,2%	4,5%	8,5%
strongly agree	Count	14	6	20
	% within Country	4,2%	1,9%	3,1%
Total	Count	337	313	650
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

I find working with computers very easy.		Country		Total
		Turkey	Germany	
strongly disagree	Count	11	7	18
	% within Country	3,3%	2,3%	2,8%
disagree	Count	58	36	94
	% within Country	17,4%	11,7%	14,7%
agree	Count	169	164	333
	% within Country	50,8%	53,2%	52,0%
strongly agree	Count	95	101	196
	% within Country	28,5%	32,8%	30,6%
Total	Count	333	308	641
	% within Country	100,0%	100,0%	100,0%

As far as computers are concerned, I feel less competent than my classmates.		Country		Total
		Turkey	Germany	
strongly disagree	Count	110	137	247
	% within Country	33,2%	43,9%	38,4%
disagree	Count	159	148	307
	% within Country	48,0%	47,4%	47,7%
agree	Count	43	25	68
	% within Country	13,0%	8,0%	10,6%
strongly agree	Count	19	2	21
	% within Country	5,7%	0,6%	3,3%
Total	Count	331	312	643
	% within Country	100,0%	100,0%	100,0%

I usually find it easy to learn how to use a new software package.		Country		Total
		Turkey	Germany	
strongly disagree	Count	22	12	34
	% within Country	6,6%	3,9%	5,3%
disagree	Count	117	88	205
	% within Country	35,2%	28,6%	32,0%
agree	Count	120	139	259
	% within Country	36,1%	45,1%	40,5%
strongly agree	Count	73	69	142
	% within Country	22,0%	22,4%	22,2%
Total	Count	332	308	640
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A. Appendix

Computers frighten me.		Country		Total
		Turkey	Germany	
strongly disagree	Count	222	258	480
	% within Country	66,7%	83,5%	74,8%
disagree	Count	83	47	130
	% within Country	24,9%	15,2%	20,2%
agree	Count	17	1	18
	% within Country	5,1%	0,3%	2,8%
strongly agree	Count	11	3	14
	% within Country	3,3%	1,0%	2,2%
Total	Count	333	309	642
	% within Country	100,0%	100,0%	100,0%

I consider myself a more skilled computer user than most of my classmates.		Country		Total
		Turkey	Germany	
strongly disagree	Count	26	29	55
	% within Country	8,0%	9,3%	8,6%
disagree	Count	170	163	333
	% within Country	52,1%	52,1%	52,1%
agree	Count	85	83	168
	% within Country	26,1%	26,5%	26,3%
strongly agree	Count	45	38	83
	% within Country	13,8%	12,1%	13,0%
Total	Count	326	313	639
	% within Country	100,0%	100,0%	100,0%

I am very unsure of my ability to use computer.		Country		Total
		Turkey	Germany	
strongly disagree	Count	95	169	264
	% within Country	29,0%	54,9%	41,5%
disagree	Count	122	118	240
	% within Country	37,2%	38,3%	37,7%
agree	Count	91	16	107
	% within Country	27,7%	5,2%	16,8%
strongly agree	Count	20	5	25
	% within Country	6,1%	1,6%	3,9%
Total	Count	328	308	636
	% within Country	100,0%	100,0%	100,0%

Turkish students vs. German students

A.4. Interview guideline in English

'Computer science is no more about computers than astronomy is about telescopes.' (Edsger W. Dijkstra)

1. Have you ever chosen any CS courses?
 - Did u like it? Would u choose it again?
 - Why have u dropped it? or What have you missed?
2. What comes in your mind when you think about technical jobs?
 - Would you say that there are typical jobs for boys and girls?
3. Do you have people in your family or do you know any people who graduated in CS?
 - Do you think he or she has had an influence on your decision?
4. Do you have an idea what a CS exactly does in his/her job?
5. Do you think that CS is a respectful profession?
 - Do you know the term "nerd"?
6. When you think about your personal future life, what comes in your mind?
 - Do you want much time for yourself? Career and family are not so important
 - Do you want have children? A job is not so important
 - Can you imagine arranging your job with your family responsibilities? (like part-time jobs)
 - Do you definitely want to have a fulltime job? (That has to be possible with children)
 - Do you want to be successful in your job? Is that more important than a family for you?
7. What are the most important reasons for choosing a profession? (U. Kelter)
 - Is it important for you that your job makes sense especially for other people?
 - How much do you let your feelings in your decision?
 - Is the money an important reason for you?
 - Would you choose a university which has not the best prestige?

A.5. Interview guideline in Turkish (*Görüşme*)

'Bilişim biliminin bilgisayarla ilgisi, astronominin teleskopla ilgisi kadardır.'

(Edsger W. Dijkstra)

1. Okulda hiç Bilgisayar dersi/ kursu seçtin mi?
 - Hoşuna gitti mi? Bir daha seçer miydin?
 - Neden bıraktın? Hangi eksikleri gördün?
2. Teknik meslek denildiğinde, aklına ne geliyor?
 - Sence tipik erkek ya da kadın meslekleri var mı?
3. Ailen ve ya tanıdıkların arasında Bilgisayar Mühendisliği okumuş kişi ya da kişiler var mı? Sence o kişinin senin meslek seçiminde bir etkisi oldu mu?
4. Bir Bilgisayar mühendisinin tam olarak ne iş yaptığı hakkında bir fikrin var mı?
5. Sence bilgisayar mühendisliği saygın bir meslek mi?
 - Şimdiye kadar hiç "nerd" kelimesini duydunmu?
6. Gelecekteki hayatını düşündüğünde, aklına neler geliyor?
 - Kendin için çok mu zaman ayırmak istiyorsun? Kariyer, aile kurmaktan daha mı önemli?
 - Çocuk sahibi olmak istiyor musun? İş senin için ikinci planda mı?
 - İşini ve ailevi sorumluluklarını bir arada yürütebileceğin bir meslek hayatı hayal edebiliyor musun? Mesela part time çalışmak gibi?
 - Kesin olarak tam gün bir işte mi çalışmak istiyorsun? Ve o şartlarda yine de çocuk sahibi olmayı istiyor musun?
 - Mesleğinde başarılı olmak istiyor musun? Bu senin için aileden daha mı önemli?
7. Bir meslek seçerken en önemli (etkili) sebepler nelerdir?
 - Sahip olduğun mesleğin başkaları tarafından itibar görmesi senin için önemli mi?
 - Seçim yaparken ne derece duygusal davranırsın?
 - Para senin için önemli bir sebep mi?
 - Pek prestiji olmayan bir üniversiteyi seçer miydin?

A.6. Transcript of the interview in Turkey

Recording location and date: Istanbul, December 2nd, 2011

Recording duration: 12m27s

S = Student

I = Interviewer

- 1 I: Sana şimdi bir cümle [cf. Interview guideline] göstericem, bunu okuduğun zaman
2 ne düşünüyorsun?
3 S: Tamam, sesli mi okuyum?
4 I: Yok.
5 S: Sadece bir araçtır, ama daha bilincek bir sürü şey vardır, demek istiyor, öylemi?
6 I: Herkes değişik anlayabilir tabi.
7 S: Hani astronomi bilincek bir sürü şey vardır ama teleskopla bakmak öğrenmeye
8 yarar, aslında bir işin bilimi bilgisayarı öğrenmek değil yani astronomi de teleskopu
9 kullanmaya öğrenmek değil ama sadece bilişim bilimini görmek için bir araç bilgisa-
10 yar.
11 I: Evet. Yani BM veya BT duyduğun zaman, aklına neler geliyor?
12 S: Ne mi geliyor? İşte program yazılımı geliyor, ne bileyim çok fazla veri geliyor
13 bir sürü sayılar. Filmlerde gördüğümüz gibi karışık seyler. Çok ilgimi çekmiyor
14 ama yinede olması gereken ve çok farklı bir zeka gerektiğini düşünüyorum çünkü
15 bazılarının özellikle erkeklerin ankette belirtim özellikle erkelerin onlara özel bir zekası
16 oluyor sanki, hani o şeyi anlamaya.. program yazılımlarını, şifreleri anlamayı ama
17 ben mesela anlamam.
18 I: Yani daha fazla erkeklere sey yapıyorsun.
19 S: Evet.
20 I: Sayılar dedin, matematikle çok ilgisi olduğunu düşünüyormusun?
21 S: Tabiki, direk matematik üzerine kurulu.
22 I: Mühendislik olsun teknik meslekler olsun onlarıda daha fazla erkekler için mi
23 düşünüyorsun, yoksa kızlarda aynı şekilde yapabilir mi?
24 S: Diğer mühendislikler için mi konuşuyoruz?
25 I: Genel olarak.
26 S: Aslında böyle bir ayırım yapmıyorum ama genel olarak öyle olduğu için konuşuy-
27 orum yoksa bir insan ne bilim çok farklı bir şeydede... Futbolcu kadınlarda var hani,
28 futbol erkekler üzerine kurulduğu bir spor ama kadınlarda var o yüzden eğer il-
29 gisi varsa tabiki kadınlarda olabilir. Yeteneği varsa zekası öyle çalışıyorsa ama genel
30 olarak baktığımızda erkekler daha fazla yönelmiş ve daha o şekilde zekası var. Çünkü
31 mesela erkeklerin fizik ve matematik zekası daha iyidir kızların sosyal zekası daha

32 iyidir genel olarak. Öyle ama kişiye göre değişir.

33 I: Arkadaş çevrende hiç BM varmı?

34 S: Kızlardan yok, erkeklerden varda kızlardan hiç yok.

35 I: Ailende hiç okuyan oldumu? Erkek, kadın.

36 S: Yok.

37 I: Sence BM saygın bir meslektir?

38 S: Öyle, yani sonuçta zeka gerektir. Bu meslek çok fazla çalışma değil ama özel
39 bir yetenek gerektiren bir meslek olduğu için bence saygı duyulacak bir meslektir.
40 Çünkü ben hep özel bir yetenek gerektiren şeylere saygı duyulması gerektiğine inan-
41 mışım. Ama şöyle bir şeyde var, burdamı belirtmeliyim bilmiyorum ama çok fazla
42 artık BM olduğu için, yani tamam çağımızın gereği çok fazla artık her şey bilgis-
43 arlarla halediliyor, gerekli ama yinede bir an çok patladı. Ondan sonra şu an çok fazla
44 BM var ortada ve kendini geliştirmese üstüne bir şeyler katmazsa çokta öyle aşırıda
45 saygı duyulacak bir şey değil. Yani bir doktor gibi değil.

46 I: Ve sence bizim Türkiyede toplumda bilgisayar mühendisliği veya bilgisayarlar çok
47 haşır neşir olan insanlar negatif olarak görünüyormu?

48 S: Negatif değil ama asosyal görünüyor olabilir.

49 I: Mesela Almanyada veya Amerikada freak, nerd diye kelimeler kullanılıyor böyle
50 kişilere. Sen hiç böyle kelimeler duydunmu? Burda kullanılıyormu böyle bir şey?

51 S: Özellikle bilgisayar bölümü için değil ama hani böyle ne bileyim kelime olarak
52 söyleyemem ama benim aklımda canlanan böyle hiç kimseyle konuşmayan, sadece
53 bilgisayar oyunu oynayan, bilgisayarla uğraşan, bilgisayarı bir arkadaş olarak gören
54 ama başka arkadaşı olmayan çocuklar var ama hani bu bir dönem, belki ergenlikte
55 çok fazla oluşan bir dönem ama yinede benim gördüğüm bilgisayarla çok uğraşan in-
56 sanlar yada yazırmcılar çok fazla sosyal insanlar değil, çok fazla insanlarla konuşan
57 insanlar değil, genelde vakitlerini bilgisayar karşısında geçiren insanlar bunlar. Bu
58 yüzdende mesela BM bana çok uygun değil, ben daha fazla insanlarla konuşayım
59 felan taraftarı bir insanım. Mesela bir şey anlatacam, bizim bir orta okulda fen
60 öğretmenimiz vardı onun oğlu çok başarılıydı felan. Hiç meslek düşünmemiş ondan
61 sonra ÖSS zamanında tercih listesi gelmiş, çocuk çok fazla konuşan bir çocuk değil.
62 İnek. Ve asosyal bir çocuk, düşünmüşler ne olabilir sonra bilgisayar mühendisi olur
63 demiş ve BM oldu çocuk.

64 I: Yani o yüzdenmi onu okumaya başladı çocuk?

65 S: Evet.

66 I: Böyle çok oluyordur dimi?

67 S: Evet.

68 I: Senin anlatmana göre BM sadece böyle program yazan kişi gibi görüyorsun ak-
69 lında.

70 S: Aslında yani bilmiyorum ama oyunları felanda yapan BM?

71 I: Evet ama BM aslında daha açık çapada daha sosyal mesela firmalarda olabiliyor.

72 Proje müdürü olduğun zaman mesela değişik şeylerde olabiliyor ama çoğu kişinin
73 aklında o zaten.

74 S: Aslında bir sürü meslek hani asosyal nitelendirilen bir sürü meslekte sosyal kişiye
75 göre değişir aynı çok sosyal bir pozisyona da gelebilirsin.

76 I: Bölüme göre, firmaya göre. Şimdi genel olarak gelecek hayatımı nasıl düşünüyor-
77 sun? İş senin için önemlimi veya sosyal hayatımı nasıl düşünüyorsun?

78 S: İş benim için önemli ama işimi daha karar veremedim, büyük ihtimal mimar
79 olacam ama. Genel olarak şöyle düşünüyorum iş olarak görmeyeyim zevk olarak ya-
80 payım yani sanki o benim için hobi olsun ama para kazanayım. Tarz bir düşüncem
81 var çünkü eğer sevmezsem, tabi küçüğüm 16 yaşındayım okula zorlan gidiyorum, işi-
82 minde böyle olmasına "ay işe gidecem, sabah kalkacam" felan tarzı bir hayat yaşamak
83 istemediyim için "ole işe gidecem çok eğlenecem" mantığıyla hareket etmek istiyor-
84 rum. Tam olarak bir şeye karar veremedim meslek olarak dediğim gibi ama genel
85 olarak çize bileceyim, yönete bileceyim bir şeyler olsun. Modacıda olmayı düşünüy-
86 orum mesela.

87 I: İnşallah istediğin şey olur. Çocuk sahibi olmak istiyormusun?

88 S: İstiyorum, 3 kız.

89 I: Çocuğun olduğu zaman mesela iş ozaman ikinci plana düşebilir mi? Evde kalır-
90 mısın ev hanımı olarak?

91 S: Ev hanımı olarak kalmam. Asla kalmam çünkü benim annem mesela yeni çalış-
92 maya başladı. Bütün çocukluğum boyunca annem evdeydi ve benle çok ilgilendi.
93 İyimi oldu kötümü oldu bilmiyorum ama biraz çocuğu yalnız başına bırakmak ,ayak-
94 ları üzerinde tutabilmek, benim kişiliyimden dolayı yapıyorum biraz uzak kalıyorum
95 ama yinede görüyorum işte ev hanımı olan hanımların çocuklarını. Çok anne bağımlı
96 oluyorlar ve hayata erken atılamıyorlar bu yüzden hem önemli olan kendime göre
97 çocuklar şuan tabiki annelik duygusunu bilmiyorum ama önemli olacak biliyorum
98 ama yinede önemli olan kendim, o yüzden ev hanımı olmam ama yinede çocuk-
99 larımla vakit geçire bildiğim kadar geçiririm yani. Ki dahada değerli zaten, bütün
100 gün evde oturuyorlar ama önemli olan kaliteli zaman geçirmek. Çocuğumlan iki saat
101 geçiririm oyun oynarım ona bir şeyler öğretirim bu daha değerli olur onunla 10 saat
102 geçirmekten diye düşünüyorum.

103 I: Anladım. Ozaman diyelim çocuğun oldu ve mesleyinde kariyer şeyin yükselmeye
104 başladı ve işine daha çok zaman ayırmak zorundasın. Yaparmısın yoksa alt kademede
105 kalmayımı tercih edersin

106 S: Yaparım, çünkü yapmazsam hayatım boyunca bir pişmanlık olur kendi açımdan
107 ama dediyim gibi kendi çocuğumlan hani ilgilenmeye çalışırım. Günde bir iki saate
108 yeterli aslında o bağı kurulmasına. Kaliteli zaman geçirirsen demin dediyim gibi.
109 Yaparım, önemli olan kendim, şuan öyle düşünüyorum ama bilemiyorum ilerde nasıl
110 olur.

111 I: Meslek şimdi seçmiş gibisin ama yani senin için ne önemli, demin dediyin gibi

112 yaratıcı olmak istiyorsun anladığım kadarıyla, başka önemli olan? Para mesela önem-
113 limi?

114 S: Önemli çünkü şu yüzden önemli, parayı düşünmemek için önemli ben paraya önem
115 veren bir insan değilim bu yüzden parayı düşünmek istemiyorum. Yani nasıl de-
116 sem "Ay çok param olsun" demiyorum ama bir şey istediğimde parayı düşünmeden
117 ala bileyim. Parayı hayatımdan çıkarmak için çok param olması gerekiyor bu yüz-
118 dende para önemli. Bu yüzden çok para kazanayım ama yinede çok zengin olayım
119 çok param olsun diye bir hırslım yok. Mutluysam 1 milyar, 2 milyarla da mutluysam
120 yanımda güzel insanlar varsa çokta para kazanmama gerek yok .

121 I: Güzel bir düşünce. Şimdi mesela ÖSS ye girdin ve ismi olmayan bir üniversite
122 çıktı. Gidermisin yoksa bir sene daha beklermisin?

123 S: Çok zor bir soru. Benim çok istediğim bir bölüm yok, yani ben tıp istese-
124 dim eğer evet işte Cerrahpaşa olmadı İstanbul tutturamadım mesela şehir dışına
125 giderdim. Ama benim istediğim bölümlerde önemli olan üniversite adı olduğu için
126 çünkü doktorsan eğer atanıyorsun veya öğretmensen atanıyorsun ama ben iş başvu-
127 rusu yapacam ve benim cv me bakacaklar ve üniversiteler doğal olarak çok önemli
128 olacak ve iyi üniversitede iyi insanlar kaliteli insanlar ne bilim güzel kulüpler olurki
129 benim üniversite hayatımda değer verdiğim şeylerde bunlar bu yüzden herhalde bir
130 sene beklerim çünkü bir sene bana çok şey kazandırır diye düşünüyorum, yoksa Ko-
131 caelinde mühendislik okusam bana hiç bir getirişi olmayacak. Evde zaten bir yıl iş
132 bulmayı bekleyecem onun için onun yerine iyi bir üniversiteye gitmeye çalışırım.

133 I: Türkiyede önemli diyorsun?

134 S: Türkiyede bazı bölümler için çok önemli, hani mühendislik, mimarlık ve işletme
135 gibi bölümlerde böyel bir şey var Boğaz içi ne okursan oku çok iyi bir üniversite
136 çünkü çok yüksek maaşlarla başlanıyor direk ama aynı bölümü Kocaelide veya İs-
137 tanbul dışında okursan eğer 1 milyar maaş oluyor. Şimdi Mango ya kaser olarak
138 girsem o 1 milyar maaşı alabilirim zaten üniversite okumama gerek yok.

139 I: Doğru. Anladım. Bilgisayar dersi hiç almadın mı?

140 S: Hiç almadık. Orta okuldayken almıştık ama o da word felan öğretiyorlardı. Yani
141 program yazmayı site yapmayı biraz öğretmişlerdi. Basit bir hesap makinesi felan
142 yapmıştık okadar.

143 I: Program yazmayı biraz görmüştünüz yani?

144 S: Programlamayıda, bir programı bir program aracılıyla yapmıştık. Başka bir şeyde
145 yapmadık.

146 I: Öğretmenin erkekmiydi kadınmi?

147 S: Erkekti. Ama bizim okulda kadın bilgisayar öğretmeni. Ama biz görmedik bize
148 denk gelmedi.

149 I: Zorumlu değil zaten. Kaldırılmış.

150 S: Zorumlu, ama bazı dönemlerde. Bizim üst dönem aldı mesela bizim dönem almadı
151 onlar Milli Eğitimle ilgili seçti.

A.7. Internet interview with ICT teachers in Turkey

Guidline

1. Kısaca BT dersi hakkındaki MEB nin kararını açıklarmısınız?
2. BT dersinin zorunlu olmaktan çıkarılması, sizce okul sisteminin değişmesiyle bir ilgisi olabilir mi?
3. Acaba öğrenci sayısı BT dersinde az olduğu için mi bu karar alındı?
4. BT öğretmenliği kaç üniversitede okunulabiliyor?
5. BT dersi için müfredat ları nerde bulabilirim?
6. BT dersini seçen öğrenciler hakkında istatistikler varmı? Nerde bulabilirim?
7. BT dersi hangi sınıftan itibaren var ve ya vardı?
8. Sizce BT dersi öğrencilere BT ve ya Bilgisayar Mühendisliğini okumaya yardımcı mı büyük mü?
9. **Katılıyor musunuz? Kısaca bu konu hakkında ki düşüncelerinizi yazarmısınız?**
 - (a) 'BT erkekler için daha uygun bir bilimdir'
 - (b) 'Erkekler BT mesleğinde kadınlara oranla başarılı olmaya daha yatkındırlar'
 - (c) 'Erkekler doğaları gereği BT kadınlardan daha eğilimlidirler'
 - (d) 'Kadınlar BT alanında kendilerini kanıtlamıyorlar'
 - (e) 'BT dalında daha fazla kadın olması gerekiyor'

1 **Teacher 1** (October 10, 2011 at 7:08pm):

2 sana bir böteci olarak dersimizin zorunlu derslerden çıkarılması meb politikasının
3 artık dini eğitime ağırlık vermesinden dolayıdır. bilgisayar dersimizin yerine arapça
4 dersi konmaktadır. bt müfredatlarını meb ten bulabilirsin. bayan mı bay mı deersen
5 atansak hepimize uygun bir meslek bence. öğrenci istatistiklerini ösym den bula-
6 bilirsin tc de başka yerde bulunmaz üniversiteler hakkında ösymden bulabilir yada
7 google yazsan çıkar. kolay gelsin derdimiz birilerine tez konusu oluyor ya o da garip.
8 bilgisayar öğretmenlerinin donanımlı şeklinde yetiştirilmesi gerekli ama sorun biz
9 yetişen bt ciler değil üniversitede olabak sıkıntısından kaynaklanıyor. öğrencilerin
10 teknolojiyi doğru olarak kullanmaları gerekli ama 2 haftalık öğretmenlik deneyimde
11 öğrendiğim kadar meslek lisesinde bile öğrenciler teknolojiyi kullanmak istemiyorlar.
12 girmeleri engellenen facebook sayfasını açmak için program indiriyorlar))

13 **Teacher 2** (October 10, 2011 at 5:34pm):

14 Bt derslerinde böyle bir politika izlemesinin nedeni sistemin en başında bir sorun
15 olmasından kaynaklanıyor. eğer BT öğretmenleri meslek lisesinde üniversitede çok
16 iyi donanımlı bir şekilde yetiştirilse, müfredatta kalıcı değişiklikler yapılırsa öğren-
17 ciler liseden mezun olduğunda bilgisayar hakkında çok şey öğrenmiş, teknolojiyi
18 doğru kullanabilen öğrenciler haline gelebilir. Tabi bunun için öncelikle bizi ata-
19 maları gerekir...

20 **Teacher 3** (October 15, 2011 at 12:38pm):

21 SORU 1) İlköğretim okulları haftalık ders çizelgesi Talım ve Terbiye Kurulunun
22 20.07.2010 tarih ve 75 sayılı Kararı ile kabul edilerek 2010-2011 Öğretim Yılı-
23 dan itibaren uygulamaya konulmuştur. Yapılan düzenleme ile 1-5. Sınıflarda seçmeli
24 ders uygulaması kaldırılarak (sadece bilişim teknolojileri dersi değil) 1-3. Sınıflarda
25 beşer; 4 ve 5. Sınıflarda dörder saat Serbest Etkinliklere yer verilmiştir. SORU
26 2) Bence okul sistemi aynı, her değişen meb bakanıyla ülkenin milli eğitim poli-
27 tikasının değişmesinden kaynaklanıyor. yani bizde bir 10 20 yıllık genel milli eğitim
28 yok. hüseyin çelik döneminde bilişim sınıfları dendi, nimet denen kadın zamanında
29 tamamen bitti ve okulöncesine ağırlık verildi. yeni bakanda bilişime yönelme var ama
30 icraat yok SORU 3) BT öğrencisi az olucağımı sanmıyorum, çocuklar genelde bilg.
31 derslerini seçmeye isteklidir. SORU 4) Neredeyse her üni.de var gibi ama sayıyı
32 bilmiyorum. SORU 5) Bu adres belki yardımcı olur [http://ttkb.meb.gov.tr/
33 program.aspx](http://ttkb.meb.gov.tr/program.aspx). Soru 6) Keine Ahnung. Soru 7) 3 olması lazım ama ben hiç öğretmen-
34 lik yapmadığım için yapan arkadaşlar daha doğru bilgi verebilirler. Soru 8) Benim
35 tanıdığım bir sürü arkadaşım var itü, odtü gibi üniversitelerde bilg müh. kazanıp
36 7-8 senede zor bitiren. en azından öğrencinin ilgi duyduğ duymadığını belirler ve evet
37 gerçekten blg. öğretilirse motivasyon sağlıycamı düşünüyorum. Soru 9) e