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## Why Do Students Choose To Study Information And Communications Technology?

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### Abstract

It is a worldwide problem that although many students are highly interested in Information and Communications Technology (ICT), they do not study it at the higher education level, or if they do then many of them eventually dropout. We studied the reasons student candidates choose to study ICT, in order to gather data that can be used for improving future ICT recruitment and retention. During the admissions procedure to three higher education institutions in Estonia, 1,464 student candidates were asked what reasons influenced them to apply to Informatics or Information Technology. On average, 2.6 candidates competed per available position at the institutions. Qualitative content analysis was used to code the candidates' open-ended answers and resulted inductively in 14 distinguishable categories. The most frequent reasons for studying ICT were general interest in ICT, previous experience in the field, need for personal professional development, and importance of the field in the future. Interestingly, only a few candidates expressed as a reason the importance of high salaries. Chi-square analysis showed that candidates were accepted with higher probability if they found ICT to be suitable for them, or expressed good opportunities in the labour market. These results are useful for planning effective admission procedures to recruit ICT students.

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## 1. Introduction

Recent reports warn of decreasing interest among young people to study science, technology, engineering, and mathematics (STEM) in many countries (European Commission, 2007; OECD, 2008), even though these disciplines are regarded as vital for future economic growth. Therefore, it is urgent to collect scientific evidence to find interventions and approaches that can initiate youth interest in studying STEM, including Information and Communication Technology (ICT). Today, European universities produce fewer than 150,000 computer science graduates every year (Hüsing & Korte, 2010). However, the ICT industry desperately needs highly skilled ICT practitioners, and Europe needs more young people to pursue ICT studies to supply future increases in demand (Hüsing & Korte, 2010). In Estonia, employment in the ICT sector is 1.5 times lower than the average of OECD countries, and there is a lack of 1,000 to 2,000 specialists in the ICT sector (Pärna et al., 2011). Moreover, ICT specialists are needed in Estonia to initiate economic productivity in diverse areas of work and to prepare enterprises for international investment (Pärna et al., 2011). A recent report on the Estonian ICT labour market forecasts a demand of up to 5,600 higher education ICT graduates, but notes that the current supply stands at 4,550 graduates (Jürgenson et al., 2013a). In order to increase students' interest in ICT, interventions at the educational level should be developed. In Estonia, a majority of schools offer lessons in ICT, but there is a high variation in the quality and content. The effect of ICT lessons in schools may be one possible reason for students' interest in ICT, and thus it is important to ask student candidates what influenced their choice to study ICT. As a result of this situation, several initiatives in informal settings have been introduced, and some of these have found their way into formal education, either integrated with other subjects or as separate courses; e.g., elective courses such as robotics or computer programming. However, it is not confirmed scientifically if applied initiatives in ICT have influenced learners' behaviours and how these should be combined for designing new interventions and approaches based on a scientific evidence-based conception. One general goal is to increase society's inclusion in the ICT sector by providing education that develops abilities to apply and develop ICT solutions but that also motivates people to continue their ICT-related studies at the higher educational level. Higher education is needed in the ICT sector; a study carried out in the USA (2000–2005) shows that the importance of bachelor's or higher-level degrees in most IT occupations has grown (Sum, Khatiwada, & Palma, 2007). Also, employees with higher education earn more within the same occupation (Sum, Khatiwada, & Palma, 2007). However, at the level of higher education, we are faced with another problem – a high dropout rate among bachelor's- and master's-level students. There is a competition for ICT-related curricula, but about one third of accepted students drop out during the first study year. Therefore, admission procedures for recruiting ICT students should be made more effective, so that accepted students are more likely to finish their studies and start working in the ICT field. The first step to begin this study requires gathering vital information from candidates applying to study ICT-related curricula. In the longer term, our ongoing goal is to observe the students who participate in this study to identify which of them finish their studies and which do not. That kind of information will help predict dropout in future years and make admission procedures more effective. This is why we need to describe candidate groups during admission.

Two research questions were formulated for this study:

- (1) What reasons for studying ICT are expressed by student candidates?
- (2) Which reasons are more frequently associated with the candidates who are accepted to ICT studies versus those candidates who are not accepted?

## 2. Methods

To collect data about the reasons for studying ICT, a question was formulated for applicants and asked during the admissions procedure using the Estonian Admission Information System (SAIS). SAIS ([www.sais.ee](http://www.sais.ee)) is a service for submitting electronic applications securely over the Internet when applying for study at Estonian universities, colleges, and vocational schools. The question asked was: *What are the main reasons that influenced you to apply to Informatics- or Information Technology-related curriculum?* In addition, other information about candidates' background was collected by SAIS, e.g., gender, university, and curriculum. The data were collected during the July 2013 admissions process from three universities and from among seven different curricula: *Computer Science* and *Computer Engineering* curricula at the University of Tartu (UT); *Computer and Systems Engineering* and *Business Information Technology* at the Tallinn University of Technology (TUT); and *IT Systems Administration, IT Systems*

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