

First-year higher education ICT studies and dropout rates – the Estonian case

Küllli Kori^{a1}, Kadri Mardo^b

^a *Institute of Education, University of Tartu*

^b *Tartu Catholic Education Centre*

Summary

Introduction

The importance of information and communication technology (ICT) has undergone a significant growth in the past decades. The labour market therefore needs more workers with ICT knowledge and skills, especially in the fields of science and technology (Gareis et al., 2014). According to forecasts, by the year 2020 the unmet demand for ICT practitioners in the European Union could rise from 481,000 to 1,685,000 (Hüsing et al., 2013). In Estonia, a need for 6661–8456 additional ICT workers is predicted by 2020 (Hüsing et al., 2013). However, if the current numbers of students enrolling in higher education ICT curricula are sustained, the demand of the Estonian labour market will be met. But, we are facing another problem in higher education, which may still lead to an insufficient number of ICT workers – high dropout rates.

Dropout is a global problem, and ICT is not the only field affected. Nevertheless, STEM fields (36%–39%), which also include ICT, exhibit the highest dropout rates (Heublein, 2014). The average European higher education dropout rate is 19% in the ICT field (Hüsing et al., 2013), but in Estonia about two thirds of undergraduate IT students fail to finish their studies (authors' calculations based on the Estonian Education Information System (EHIS), 2015). This far exceeds the average European dropout rate in IT and surpasses other fields of study in Estonia.

One of the most often used dropout models is the one developed by Vincent Tinto. Tinto's (1993) complex model of students' departure shows the following aspects to be an important influence on their decision to drop out: pre-entry attributes (family background, skills and abilities, prior schooling), goals and commitments, as well as academic and social interaction. However, only a few studies have been conducted regarding the

¹ Institute of Education, University of Tartu, Salme 1a, 50103 Tartu, Estonia; kulli.kori@ut.ee

problem of dropout in the ICT field. Tinto's (1993) model is applied to this study.

The current study, based on the Estonian case, investigated first-year student ICT studies and their reasons for dropping out, and, in particular, the differences between students who drop out and those who do not. We also collected ideas from both dropouts and those who continued studying, as to what could be done to prevent dropout. The following research questions were formulated:

- 1) What characterises first year ICT students and dropouts?
- 2) How do first year ICT students and dropouts differ from each other?
- 3) What can be done to reduce dropout rates in the ICT field?

Methodology

Qualitative research methods were used in the current study. The sample consisted of 16 ICT students who started their studies in 2014 at two higher education institutions in Estonia. Of the 16 students, 8 dropped out during the first year and 8 continued their studies in the second year. The students were studying in different study forms: full-time studies, evening studies and distance learning.

Data was collected through semi-structured interviews. The questions in the questionnaires and interviews were formed on the basis of Tinto's (1993) model. Thus, the questions were about students' pre-entry attributes (especially about prior experiences), goals for studying ICT, commitments to ICT studies, and academic and social integration.

Grounded theory was used to analyse the qualitative data. Two raters categorised the interviews and Cohen's kappa was calculated. The Cohen's kappa coefficient was 0.8, showing good inter-rater reliability (Landis & Koch, 1977).

Results and conclusions

The current research was based on Tinto's (1993) model of dropout which concluded the following student characteristics: pre-entry attributes, goals for studying ICT, commitments to ICT studies, and academic and social integration. Whereas the study focused on Estonia, the results could also be of interest to other countries, as the problem of dropout exists globally (e.g., Divjak et al., 2010; Heublein, 2014).

Concerning the first research question, the students were shown to have different prior experiences before entering university. Prior programming experience has been found to be useful for ICT students (Hagan & Markham, 2000; Kori et al., 2016), but the students who had learned ICT at a general education level did not find the knowledge to be useful at university. Students also had different goals for studying ICT at university, but only a few had sufficient information about the curriculum. It has been found that as curriculum introductions on universities' websites are quite short and not very informative, students may have unrealistic expectations for their studies (Espenberg et al., 2014). In addition, many of the ICT students were working during their studies to earn money and acquire some work experience that gives them an important advantage in the labour market. Working, however, is also one of the reasons why students are unable to sufficiently commit to their studies – and this, in turn, may lead to dropout (Järve et al., 2015; Polidano & Zakirova, 2011).

Some problems with academic integration were detected – certain courses and lecturers caused difficulties for the ICT students. A lecture is normally one of the main methods of teaching in the first study year (Espenberg et al., 2014), but students did not find this method effective. Mass lectures also fail to facilitate social integration. However, social integration is an important feature to avoid student dropout (Chen, 2012; Duque, 2014).

In the second research question, fewer differences than expected were detected in the answers from dropouts and of those students who continued their studies. As to academic integration, dropouts were found to have problems with programming courses – a finding that is also supported by the literature (Watson & Li, 2014). The students who continued their studies encountered some problems with logic, algorithms and mathematics related courses, but still conceded that such courses gave them a valuable understanding and knowledge that is required to pass the following courses. Otherwise, the answers of the two groups (dropouts and students who continued studying) were quite similar.

More substantial differences appeared in different study forms. Students in full-time studies had prior experience in ICT from school, whereas those in evening studies and distance learning had gained ICT experience in their workplace, which had motivated them to enrol in ICT studies. Also, social integration was weaker in students of evening studies and distance learning, as they did not meet the lecturers and other students as often as those who were studying full-time. Other studies have also pointed out the negative side of this type of study form – lack of social integration may cause a drop in students' study motivation (Galusha, 1998).

The third research question resulted in some recommendations by the participants of this study, which, in fact, have also been suggested in other studies. For example, the students pointed out that they should be more realistically informed about the curriculum before starting their undergraduate ICT studies. A similar recommendation has been made by Järve et al. (2015) who also proposed that universities should offer counselling to students in order for them to make a good career choice. The ICT students also felt that informatics classes in different general schools should be more harmonised so that university students have more homogenous prior knowledge. Similarly, another study has highlighted the need for general informatics learning materials and teacher training (Mis saab Eesti ..., 2015). Another suggestion by the ICT students was more distance learning opportunities. Distance learning in ICT is currently offered by only one higher education institution in Estonia; however, working students need more flexible study forms (Järve et al., 2015).

In conclusion, students need support at the general education level to make the right career choice and to enrol in the most suitable curriculum. During higher education studies, support and more flexible study conditions are necessary for students to cope with difficult courses and working. Although the ICT students made some theoretical recommendations in the current study, more research is needed to determine the help required to reduce dropout rates in practice.

Keywords: ICT, higher education, dropout