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Information and communication technologies in the life of university freshmen: An analysis of change

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ABSTRACT

The passage from secondary school to university puts students in an environment with different expectations. Not only the expectations towards learning might change, but also towards ICT competences and computer use. The purpose of this article is to find out whether freshmen, after 6 months at the university, changed their self-perception of ICT competences and computer use in comparison with their behaviour at secondary school, and what factors can explain the self-perception of ICT competences and computer use in secondary school, in the university and their possible change. Based on a panel research among 714 freshmen of a large university, this article answers the following questions: (1) What is the self-perception of ICT competences among freshmen and is there a change in this self-perception 6 months after entering the university? (2) How often and for what purpose do freshmen use a computer and is there a change in the frequency of the use of a computer? (3) What factors might influence this attitude, behaviour, and possible change? In function of the basic components of Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003) hypotheses was developed and tested to answer these questions. Students who consider the computer to be a useful instrument, have control over the computer, possess a certain level of Internet competence, and are at ease with computers are more likely to have the skills needed to maintain a computer, to develop a web site, and to use basic ICT skills. The predictors have little influence on Internet usage. The same predictors contribute modestly to the explanation of the different frequencies of computer use, and a few of the predictors explain parts of change in ICT skills and frequency of computer use.

1. Introduction

Ever since the 1980s, personal computers have increasingly become a part of daily life, so it is often taken for granted that all first-year students in university (freshmen) are very familiar with them. Not all universities offer introductory courses in using a PC, and only some faculties offer special courses in the ICT programmes they use in research. Because of time constraints, it is understandable that universities focus on their specialized fields of study and on training students in them. Nevertheless, more than one research report has shown that there is a large range of ICT capacities among university students (Lee, 2003; Palaigeorgiou, Siozos, Konstantakis, & Tsoukalas, 2005; van Braak, 2004). This does not diminish the expectation of teachers that all students are able to use ICT as they have become important instruments for university education. All of the students are presumed to know how to work with a PC and to surf on the Internet. This means that the learning environment as well as the instruments needed for studying is changing. Indeed, university education is not the same as secondary-school education. When students enter university, they are confronted with some important changes, such as having to take more responsibility for their own study behaviour, having to adapt to a more rapid pace of learning, having to accept receiving less response to their efforts, and having to live more independently than they had been accustomed to in secondary school.

Another important change in students' lives is the use of a PC for studying. Secondary schools in some countries may well have integrated the use of a PC in everyday teaching, but this is not the case in all secondary schools in Belgium, where the current study was undertaken. Most secondary schools have computers available and use them regularly, but they have not become a routine part of class life.

The growing presence of PCs in universities has created a new awareness of the necessity to act differently in this new environment (Kaminski, Switzer, & Gloeckner, 2009). This is a challenge not only for the teaching staff but also for the students who have to adapt

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to this new learning environment (Jamieson, Fisher, Gilding, Taylor, & Chris Trevitt, 2000). Moreover, research has shown that the perception of the learning environment by students might well strongly influence achievement. For instance, Lizzio, Wilson, and Simons (2002) conclude that "Students' perceptions of their current learning environment were a stronger predictor of learning outcomes at university than prior achievement at school."

Since the computer has become so important for university education, we set out to investigate whether there was a change in ICT competence and in the frequency of computer use of students after 6 months at university and what factors might contribute to explaining this change. In answering these questions, we first provide a theoretical framework that might help to understand why freshman use ICT and why this use might change. Second, we will describe the research design and the main indicators we used. Third, we will present figures on the access freshmen have to computers and the Internet in their changing learning environment. Fourth, we will consider the factors that might account for the level of the ICT skills and the frequency of computer use by students at the time of registering and 6 months later. Fifth, we will determine whether ICT skills and frequency of computer use change between registration and 6 months later, and we also will look for the reasons of those changes. Finally, sixth, we will present Sections 8 and 9.

2. Theoretical background

For an explanation of confidence in ICT skills and use of ICT by freshmen, we will rely on a social psychological theory about acceptance and use of information technology. This theory focuses on the explanation of access to and use of, ICT and finds its inspiration in the perceived usefulness of a new technique and the relative comfort of learning it. Using a variety of social psychological theories, Venkatesh, Morris, Davis, and Davis (2003) constructed a unified theory of acceptance and use of technology (UTAUT). An important source of inspiration was the work by Davis (1989) and Davis, Bagozzi, and Warshaw (1992), who tried to predict the acceptance of computers. For this purpose, Davis constructed two indexes, one to measure the perceived usefulness of technology, which refers to "the degree to which a person believes that using a particular system would enhance his or her job performance", and another to measure the perceived ease of use, that is, "the degree to which a person believes that using a particular system would be free of effort". Davis found a strong relationship between the usefulness of a system and the usage of a system, and this relationship was much stronger than the relationship between the ease of use of a system and its use. This approach was later called the Technology Acceptance Model (TAM), which strongly influenced the development of UTAUT.

Two other variables were added to the design of UTAUT: social influence and facilitating conditions. Social influence has been defined as "the degree to which an individual perceives that important others believe that he or she should choose the new system" (Venkatesh et al., 2003, p. 451). Facilitating conditions may be described as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453).

According to Venkatesh et al. the intention to use new information technologies will be directly influenced by the four variables above. In addition to these four variables, three other variables – self-efficacy, anxiety, and attitude – were included in the model, not as direct determinants of the behavioural intention to use new information technology, but as indirect determinants mediated by perceived ease of use. Self-efficacy may be defined as the degree to which a person believes that he or she can do a job with or without the help of a third person. Anxiety shows the degree to which a person is afraid to use or apply new information technology. The third variable, the attitude towards using technology, refers to "an individual's overall affective reaction to using a system" (Venkatesh et al., 2003, p. 455). The seven variables together will be the basis of the explanation of the usage of new technology (see also Carlsson, Carlsson, Hyvönen, Puhaikanen, & Walden, 2006; Fusilier, Durlabhji, & Cucchi, 2008; Marchewka, Liu, & Kostiwa, 2007; van Raaij & Schepers, 2008; Wills, El-Gayar, & Bennett, 2008; Wu, Tao, & Yang, 2007). Although these variables play a very important role in the explanation of the acceptance and use of technology, Venkatesh and his colleagues were aware that some situational variables, such as gender, age, and experience, could play an important role too in the explanation of the acceptance of ICT (Janssen Reinen & Plomp, 1997; Sutton, 1991; Volman & van Eck, 2001; Colley & Comber, 2003; Losh, 2004).

Although quite a lot of researchers followed the UTAUT line, there are also some who reduced this approach to the more simple TAM model, sometimes supported by some other variables (Chatzoglou, Sarigiannidis, Vraimaki, & Diamantidis, 2009; Lau & Woods, 2009; Lee, 2008; Liu, Chen, Sun, Wible, & Kuo, 2010; Padilla-Meléndez, Garrido-Moreno, & Del Aguila-Obra, 2008; Sanchez-Franco, 2010; Selim, 2003; Teo, Lee, Chai, & Wong, 2009), and others who kept the nucleus of TAM and constructed around this nucleus a more complex model based on other theories (Lee, 2010; Liu, Liao, & Pratt, 2009; Schepers, de Jong, Wetzels, & de Ruyter, 2008; Sørebø, Halvari, Gulli, & Kristiansen, 2009; Tao, Cheng, & Sun, 2009; Wang & Wang, 2009). Most of these researchers are interested in the acceptance of new technology (for instance, new teaching technology, web-based learning, etc.), and only a few look at the acceptance of more widely spread ICT techniques as using the computer or using the Internet (e.g. Padilla-Meléndez et al., 2008; Teo et al., 2009). Most are interested in the explanation of the intention to use ICT technologies (Chatzoglou et al., 2009; Cho, Cheng, & Lai, 2009; Lau & Woods, 2009; Lee, 2008, 2010; Lee, Yoon, & Lee, 2009; Liu et al., 2010; Sanchez-Franco, 2010; Sanchez-Franco, Martinez-Lopez, & Martin-Velicia, 2009; Sørebø et al., 2009; Teo et al., 2009). Others do not only study the intention to use new technologies, but also the application of these technologies (Liu et al., 2009; Padilla-Meléndez et al., 2008; Selim, 2003; Tao et al., 2009; Van Raaij & Schepers, 2008; Wang & Wang, 2009). Although most researchers rely on facilitating conditions, this concept may cover different phenomena. Lee (2008), for instance, mentions intra- and extra-organisational factors, Lee et al. (2009) instructor characteristics, and teaching materials, Chatzoglou et al. (2009) management support, Fusilier et al. (2008) perceived behavioural control and organisational support, and Schepers et al. (2008) refer to perceived tutor and peer support.

Besides UTAUT, several other explanatory models were developed relying upon the robustness of the two central variables of TAM, perceived usefulness and perceived ease of use of new technologies. We only refer to three of them. Tao et al. (2009) apply TAM, agency theory, expectation confirmation theory, and includes learning and emotion factors. Having made TAM the kernel of his theory, Lee (2010) applies the expectation confirmation model, the theory of planned behaviour (TPB), and the flow theory (an extreme form of involvement in an activity) (see also Lee, 2010; Liu et al., 2009; Sanchez-Franco, 2010; Sanchez-Franco et al., 2009). Schepers et al. (2008) draw a line between social support and self-consciousness to psychological safety, and these factors, together with communication with a tutor or peers, might determine TAM.