Educational Technology and Library and Information Science Students' Attitudes towards ICT Use

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Abstract

This research focuses on two kinds of populations: Educational Technology (ET) students and Library and Information Science (LIS) students. This study seeks to explore to what extent do certain elements of Diffusion of Innovations Theory, personality characteristics, attitudes to ICT and motivation explain students' ICT use. Five topics were covered in five questionnaires: personal details, ICT use, attitudes to ICT, personality, and motivation. Over all analysis showed that the more students use ICT, the more they believe it can enhance their ability and improve their efficiency. The more students perceive ICT use as complex, difficult, or complicated, the less they use it. The importance of personality differences that may affect students' ICT use was highlighted. Findings also stressed the importance of motivation in ICT use, suggesting that if instructors in both academic disciplines would like to expand their students' ICT use, they should motivate students to use ICT, presenting its benefits, usefulness, and advantages. Another intriguing finding shows that the higher the year of education, the higher students' ICT use, suggesting that there is an effect of the program on the intensity of their ICT use.

Keywords: ICT (Information and Communication Technology), Educational Technology (ET), Library and Information Science (LIS), Diffusion of Innovations Theory (DOI), The Big Five, motivation.

Introduction

Modern economies depend on ICT (Information and Communication Technology) use and development (Hine, 2011). According to the International Telecommunications Union (2014), by the end of 2014, there will be almost 3 billion Internet users, two thirds of them from the developing world. It seems that technologies are widely used in everyday life, as well as in workplace and academic settings. Therefore, it is very important that students be familiar with and master ICT in order to succeed in their learning environments, as well as their professional lives. The current research focuses on two kinds of populations: Educational Technology (ET) students and Library and Information Science (LIS) students. These two populations were specifically chosen, as ICT plays a major part in both their training and future work environments.

This study seeks to explore what factors influence students' ICT use and web technology competence. The research may contribute to an understanding of the variables that influence their ICT use, and may lead to further inquiry in this field. The current study uses Rogers' (2003) Diffusion of Innovations Theory, as well as the Big Five model (Costa & McCra, 1992), and motivation theory (Deci & Ryan, 1987), as theoretical bases from which we can predict factors that may influence students' ICT use.

The objectives of this study are: (a) To what extent do certain elements of Rogers' (2003) Diffusion of Innovations Theory explain students' ICT use, (b) To what extent do personality

characteristics derived from the Big Five approach explain students' ICT use, and (c) To what extent does motivation explain students' ICT use.

Literature Review

Diffusion of Innovations Theory

Rogers' (2003) Diffusion of Innovations Theory (DOI) is a widely used theoretical framework in the area of technology diffusion and adoption. The theory suggests that within a population group, innovations are not adopted at the same time by all individuals, as some people are more willing to try new ideas and technologies than others. Rogers proposes that innovation, communication channels, time, and social system are the main components of DOI theory. The process is built of five stages: knowledge, persuasion, decision, implementation, and confirmation. In the knowledge stage the person learns about the innovation and seeks information about it. In the second stage (persuasion), the individual forms an attitude after s/he knows about the innovation. According to Rogers (2003), the knowledge stage is more cognitive oriented, while the persuasion stage is more affective oriented. In the third stage, the decision, the person decides whether to adopt or reject the innovation. In the fourth stage, implementation, the innovation is put into practice and in the last stage, the individual looks for support for his or her decision.

Rogers (2003) suggests that the following attributes help decrease uncertainty about the innovation: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. Relative advantage is the extent to which people believe that the innovation is better than the traditional method. Compatibility refers to the extent to which people believe that the innovation is compatible with the traditional idea. Complexity addresses the extent to which people find the innovation difficult to use and understand. Trialability is the extent to which people believe that there are chances for the innovation to be experienced before deciding whether to adopt it or not, and observability addresses the extent to which results of the innovation are visible to others. The current study will focus on two–of these five attributes: relative advantage and complexity.

The Big Five

The "Big Five" model of personality is one of the most famous measures of personality structure in recent years (Golbeck, Robles, & Turner, 2011), and is considered a comprehensive model that includes five major factors representing personality traits: neuroticism, extraversion, agreeableness, openness to experience, and conscientiousness (Costa & McCrae, 1992). According to Wang et al. (2012), neuroticism is in contrast to emotional stability and is characterized by anxiety, sadness, irritability, moodiness, hostility, and nervous tension. Extraversion is associated with activity, energy, assertiveness, sociability, talkativeness, expressiveness, and positive emotions. Agreeableness consists of altruism, warmth, trust, modesty, cooperativeness, and tender-mindedness. Openness to experience addresses the complexity and depth of the person's mental and experiential life, and consists of curiosity, creativity, and preference for novelty. Conscientiousness refers to impulse control that contributes to task- and goal-directed behavior, and is associated with discipline, reliability, responsibility, and organization. The current study will focus on three characteristics: extroversion, openness to experience and neuroticism.

Motivation

Another variable that may influence students' attitudes towards ICT is their motivation. Motivation is considered a key determinant of general behavior (Deci & Ryan, 1987), ICT acceptance behavior (Davis, Bagozzi, & Warshaw, 1992), and work-related behavior (Lu, 1999). Deci and Ryan (1985) have introduced Self-Determination Theory (SDT) and suggested that when individuals' needs are satisfied, they will present optimal motivation and well-being. Contrariwise, when these needs are hindered, people will have low motivation and well-being.

In light of the above, the research hypotheses will be:

H(1): Intensity of ICT use will be positively associated with students' relative advantage.

H(2): Intensity of ICT use will be negatively associated with students' complexity.

H(3): Extroversion and openness to experience will be positively associated with ICT use.

H(4): Neuroticism will be negatively associated with ICT use.

H(5): The higher the motivation students have, the greater their ICT use.

Methodology

Data Collection

The research was conducted in Israel during the second semester of the academic year 2013-14, and included two groups of participants: a group of Educational Technology students (ET) and a group of Library and Information Science students (LIS). The researchers got permission to enter different graduate courses in two Israeli institutions. They entered two classes from the ET program at an Israeli college of education and two LIS classes at an Israeli university in the department of Library and Information Science. The researchers handed out 120 questionnaires to the students and explained the study's purpose. A hundred and ten responses were received back from these groups (91.6%), 50 responses were from college students and 60 from university students.

The sample was made up of 28 (26%) men and 80 (73%) women. The average age was 38; the youngest was 23 and the oldest was 60. In terms of education, 57 (52%) were in their first year, 38 (36%) in their second year, and 12 (11%) in the third year of their graduate program.

Measures

The survey covered five topics that were covered in five questionnaires: personal details, ICT use, attitudes to ICT, personality, and motivation.

Findings

The aim of this study was to examine students' ICT use in the fields of Educational Technology and Library and Information Science in higher education institutions. Descriptive statistics indicate that these populations' use of ICT environments are at the level of $M = 3.31$ and $SD = 0.68$.

In order to examine whether there are differences between the ET students and LIS students, a one-way MANOVA was performed. The MANOVA revealed a significant difference between the two groups, $F (1.106.) = 18.39$, $p < .0.01$ $\eta^2 = .15$. Findings reveal that ET students use ICT more often: $M = 3.61$, $SD = .59$, than LIS students: $M = 3.08$, $SD = .68$. A similar analysis was performed to compare men with women, but no significant difference was found. In order to examine the relationship between attitudes, personality characteristics, motivation, and the dependent variable (ICT use), researchers performed Pearson correlations, which are presented in Table1.

Table 1. Pearson Correlations between ICT Use and Research Variables ($n = 110$)

Measures	ICT Use	Extraversion	Neuroticism	Openness	Advanced	Complexity	Motivation
ICT Use							
Extraversion	.29**						
Neuroticism	−.15	−.38***					
Openness	.25*	.42***	−.17				
Advanced	.35***	.34***	−.32***	.30**			
Complexity	−.40***	−.36***	.22	−.45***	−.58***		
Motivation	.25**	.15	−.21*	.26**	.32***	−.32***	

* $p < 0.5$. ** $p < .01$. *** $p < .001$

Table 1 presents significant correlations between almost all research variables except neuroticism and the dependent variable (ICT use). Most of the correlations are positive; hence, the higher the level of extroversion, openness, motivation, and advanced, the greater the ICT use. Further, significant negative correlation was found between complexity and ICT use. In other words, the less students perceive ICT use as complex, the higher their ICT use will be.

Regarding correlations between research variables, significant, positive correlations were found between extraversion and openness to experience, and advanced. Therefore, the more extroverted students are, the higher their openness to experience and their attitudes towards ICT use. Significant, negative correlations were found between extraversion and neuroticism and complexity. Therefore, the less extroverted students are, the higher their level of neuroticism and their complexity attitudes. Significant, negative correlations were found between neuroticism and advanced and motivation. The more neurotic students are, the less their advanced attitude towards ICT, and motivation to use ICT. Significant, positive correlations were found between openness and advanced and motivation. In other words, the more open to experience students are, the higher their attitude and motivation towards ICT use. A significant, negative correlation was found between openness and complexity, meaning that the less students are open to experience, the higher their level of complexity towards ICT use. A significant, positive correlation was found between advanced and motivation; hence, the higher students' attitudes towards ICT use, the greater their motivation to use ICT. In addition, a significant, negative correlation was found between complexity and motivation, meaning that the more students perceive ICT use as complex, the lower their motivation to use it.

Pearson correlations were conducted between demographic variables (age and year of study) and ICT use. A significant positive correlation was found only between year of study and ICT use, $r = .23$, $p < .05$. In other words, the higher students' year of study, the greater their ICT use.

As this study is in progress, it should be noted that researchers intend to perform a hierarchical regression analysis, in which the dependent variable will be ICT use. Results will be presented in the conference.

Discussion

Referring to Rogers' theory (2003), it was surprising to find out that ET and LIS students are not innovators or early adopters, as was supposed, but rather can be classified as early majority to whom the innovation decision takes more time than it takes for the innovators or the early adopters, or as late majority who will wait till most of their acquaintances adopt the innovation (Rogers, 2003). However, findings confirmed his theory about the importance of relative advantage and complexity as attributes that impact students' ICT use. Addressing research hypotheses, H (1), H(2), half of H(3), and H(5) were accepted, while H(4) and half of H(3) were rejected. H(1) showed that the more students use ICT, the more they believe it can enhance their ability and improve their efficiency. Findings addressing H(2) show that the more students perceive ICT use as complex, difficult, or complicated, the less they use it. H(3) and H(4) highlight the importance of personality differences that may affect students' ICT use. Academic instructors should be aware of these differences, understanding that not all students may adapt smoothly and naturally to technological innovations. In other words, they should make an effort to reach these populations, and try to convince them to use ICT more constantly. In addition, H(5) stresses the importance of motivation in ICT use, suggesting that if instructors in both academic disciplines would like to expand their students' ICT use and would like them to be innovators or early adopters, they should motivate students to use ICT, presenting the benefits, usefulness, and advantages. Further, another intriguing finding shows that the higher the year of education, the higher students' ICT use. We see that these students, who have already started their studies in technology-oriented programs, use more ICT as they progress in their program. We may infer that there is an effect of the program on the intensity of their ICT use.

Limitations and Future Research

Despite its findings and implications, this study contains some limitations. First, the research was conducted on two technological programs. We may assume that results might be different with students from other departments and from other institutions. Second, the research was carried out only in Israel; therefore, it would be interesting to perform the same research in other countries. Third, in a future study, we would like to have a larger sample. Fourth, in order to have a comprehensive, in-depth understanding of ICT use, a future study should use also qualitative methods.

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