

# The ‘Digital Natives’ Debate: An Investigation of the Digital Propensities of University Students

Muhammet Demirbilek  
University of Florida, USA

Received 19 March 2013; accepted 27 December 2013

The purpose of this research is to determine the digital propensities of post-secondary students (N=409) in various faculties/colleges at a large state university located in southwestern Turkey. It was also examined whether gender, the program attended, socioeconomic status, education type (first and second shift education), the number of family members and the number of computers per household are contributing factors to Information and Communication Technologies use. According to the data analyzed, male students use Information and Communication Technologies more than female students. Results also suggest that faculty attended, education type, family income, the number of computers and children per household are some of the important factors in having high digital propensity index.

*Keywords:* digital propensity, digital natives, gender, ICT practices, post-secondary education, socioeconomic status

## INTRODUCTION

“Information and Computer Technologies” refers to any digital technological tools employed for communication or information gathering (e.g., tablet PC mobile devices, smart phones, personal computers, laptops, or the Internet (Ono & Zavodny, 2007). Information and Communication Technologies (ICT) are drastically changing almost every aspect of our daily lives. Furthermore, the ways we communicate and consume information have altered dramatically too. Students as ICT consumers are increasingly introduced to new technological products. Most post-secondary students are younger than personal computers. They are more comfortable using a keyboard than writing on a stationary notebook, and feel more comfortable reading from a computer screen than from a traditional

textbook. The continuous connectivity with friends and family members at any time and from any place is very important for them.

Since the digital world is changing day by day in a mind striking way, new life styles are being formed by a new generation. Prensky (2001a) created the term “Digital Native” to describe the generation of people who born after computers were invented and who spend most of their time with computers, digital games, smart phones, and other smart mobile devices. The digital native generation is also called the “Net Generation” (Tapscott, 1998), and “Millennial Generation” (Howe & Strauss, 2000), “Digital natives” (DN) (Prensky, 2001a), “Net generation” (Tapscott, 1998) and “Generation M” (Roberts, Foehr, & Rideout, 2005), metaphors that have been used to make a distinction between individuals born between 1980 and 1994 with technology skills and those without any tech-savvy skills. Digital Natives interact with each other on different levels of the digital world. Since they were born in a digital world, they feel at home in an environment consisting of internet, social networks, online media and games (Lorenzo & Dziuban, 2006; Palfrey & Gasser, 2008).

Correspondence to: Muhammet Demirbilek,  
Digital Worlds Institute, University of Florida  
Norman Gym Bldg, 624 SW 12th Street  
Gainesville, Florida 32611, USA  
Email: mdbilek@ufl.edu  
doi: 10.12973/eurasia.2014.1021a

### **State of the literature**

- Research suggests that university students' use of information and communication technology (ICT) is radically different from those of past generations.
- The debate over digital natives is based on students' digital propensities driven by factors such as age, socioeconomic status, education and culture.
- Although debate on digital natives has intensified over the last decade, little empirical evidence has been available to examine in order to understand the digital propensities of students in higher institutions.

### **Contribution of this paper to the literature**

- Understanding the digital propensities of university students is crucial for higher institutions to adopt their teaching paradigms and instructional technology infrastructures for future digital native generations.
- Investigating the digital propensities of post-secondary students may shed light on higher education institution administrators and policy-makers for understanding the digital native generations ICT propensity and its role in their education.
- Results of the current study are valuable in understanding post-secondary students' digital behaviors and their propensities while employing ICT in their daily life.

Researchers argue that previous generations who were born in the analog age or printed text/paper era are called "Digital Immigrants" (DI) or "Analog Generation" (AG). Teachers who belong to AG strive to instruct DNs who were born in an immersive digital world (Norman, 2008; Jones, Harmon, & O'Grady-Jones, 2005). They further claim that the understanding of the DN generation and their learning and use of ICT habits is not clear enough (Nasah, DaCosta, Kinsell, & Seok, 2010; Bennett, Maton, & Kervin, 2008). Furthermore, there is an ongoing debate on DN generations' preferences of using ICT in educational settings and social networking settings (McWilliam, 2002; Keen, 2007; Lohnes & Kinzer, 2007; Selwyn, 2009). While some argue that there is some evidence that students are not willing to accept more ICT integration in the classroom (McWilliam, 2002), others dispute that students are more eager to use ICT for social networking purposes (Keen, 2007). Authorities stress that teaching the DN generation still prevails as a major concern of both policy makers and educators (Bennett et al., 2008).

The present body of research suggests that today's post-secondary students as the DN whose learning preferences and ICT use behaviors differ from those of the previous DI generations, especially with respect to technology rich learning (Prensky, 2001a; Bennett et al. 2008; Kennedy, Krause, Judd, Churchward & Gray, 2008; Selwyn, 2009). The experiences of university students have received relatively less attention. Therefore, there is a need for examining the ICT use and preferences of the members of the DN generation at college level. The current study was designed to examine and identify the ICT preferences and perceptions of undergraduate students through the use of the Digital Propensity Index (DPI) questionnaire (Norman, 2008). The DPI mainly investigates the frequency in use of information and communication technologies (ICT) and the level of importance digital natives place on these technologies. In particular, the DPI questionnaire is designed to measure: (a) ICT use preferences, (b) internet use preferences, (c) games, (d) online media activities, (e) digital communications, (f) ICT facilitated learning activities and (g) ICT facilitated social/economic activities. The previous body of research suggests that age, gender and socioeconomic status may play an important role in defining why the DN generation use ICT to different degrees (Kennedy et al, 2008; Kvavik, Caruso, & Morgan, 2004; Livingstone & Bober 2004; Selwyn 2009). Factors affecting the ICT use, such as age, gender, and socioeconomic status were also examined. The findings of the current study may help policy-makers, educators and higher education administrator's better understand the DN generations' ICT preferences and the role of ICT in their education.

### **Background literature**

Nasah and colleagues (Nasah et al., 2010) investigated the ICT preferences of post-secondary students (N=580) through the Digital Propensity Index (DPI), based on their communication methods, internet practices and their ability to create online content. They suggested that the students' use of ICT might be affected by age, gender and socioeconomic status, which should be considered while developing an ICT policy for schools (Nasah et al., 2010). They also reported that ICT use among males and females might enable a closure of the gender gap. They reported that there is no positive correlation between one's socioeconomic status and interest in using ICT, which may have some impact on the socioeconomic gap.

Margaryan and Littlejohn (2008) examined the extent and use of digital technologies among undergraduate students and teachers. They stated that the use of technology by students and teachers to support learning showed some varying results. In addition to this, digital

natives have little patience for passive and linear forms of learning. Digital natives are not demanding an educational revolution yet; on the contrary, they expected to be "taught" in traditional ways. The skills that digital natives possess are increasingly defined as the basic competences expected from every educated person and are those that a modern professional should already have (Margaryan & Littlejohn 2008). Bennett and colleagues (2008) noted that students' relationships with technology are much more sophisticated than the digital native characterization suggests. Further, Bennett et al. (2008) reported that the DN generation possesses very complex knowledge of and skills with ICT. Furthermore, their experiences and interactions with technology have led to particular learning preferences and styles that differ from DI generations. In addition, Jones, Ramanau, Cross, and Healing (2010) explored new generation learners and their relationship to technology, collecting the data from university students in the UK. They reported that rather than showing homogeneity, the net Generation consisted of collections of minorities. They also found that often the use of new technology occupied in ways that did not fully correspond with the expectations that arise from the Net generation. Hargittai (2010) studied the skill levels of US net generation university students and found a wide spectrum of differences in online abilities and activities. Kennedy, Judd, Dalgarno and Waycott (2010) reported a somewhat similar results. They defined four different types of technology users: basic users, ordinary users, irregular users, and power users. They suggested that the approach to curriculum and teaching should be changed based on assumptions about technology experience of the DN generations. Furthermore, there are studies about the factors that influence students' use of ICT (Downes 2002; Kennedy et al., 2008; Kvavik et al. 2004; Livingstone & Bober 2004). For instance, the frequency and nature of students' ICT use changed based on socioeconomic status and age (Livingstone & Bober, 2004). Similarly, Kvavik et al. (2004) reported that differences in ICT use related to ethnic, cultural, or socioeconomic status, background, gender and discipline specialization. In addition, Downes (2002) found that the nature of students' home computer use is influenced by local prosperity and family dynamics. The DN generation's learning habits and daily-life ICT usage is dramatically changing.

Understanding the digital propensities of university students is crucial for higher institutions to adopt their teaching paradigms and instructional technology infrastructures for future DN generations. Therefore, the purpose of the study is to determine the digital propensities of post-secondary students in various faculties/colleges at a large state university located in southwestern Turkey. It was also examined whether

gender, the program attended, socioeconomic status, education type (1<sup>st</sup> education and 2<sup>nd</sup> education), the number of family members and the number of computers per household are contributing factors to ICT use. It is hoped that the results of this research may shed light on higher education institution administrators and policy-makers for understanding the DN generations' ICT propensities and the role those propensities play in their education.

## METHODOLOGY

### Participants

Undergraduate students participated at a large university in the southwestern portion of Turkey. These students were drawn from nine participating colleges. The DPI questionnaire was distributed to a random selection of 1260 undergraduate students. A total of 409 undergraduate students responded to the questionnaire. The research design for this study was a descriptive research with a questionnaire. A descriptive scanning model is used for the determination of digital propensities of university students. According to this method, the existing situation and properties have been described (Dooley, 2001; Cohen, Manion, & Morrison, 2007).

### Instrument

The Digital Propensity Index (DPI) (Nasah et al., 2010) questionnaire was conducted to measure post-secondary students' use of various forms of ICT in their daily life. The DPI questionnaire was designed to measure ICT use preferences, Internet use preferences, gaming, online media activities, digital communications, ICT-facilitated learning activities and ICT-facilitated social/economic activities of targeted participants. A printed questionnaire was used for students to maximize the response rate and reduce sample bias, as opposed to online methods, such as web-based surveys, which tend to involve low response rates and are biased towards technologically literate and enthusiastic respondents. The questionnaire was translated into Turkish. Then, the questionnaire was translated by a different person who did not participate in the first translation process. Working with translators, the errors and nuances were corrected and revised by the researcher. During the pilot study, the Cronbach Coefficient Alpha test was conducted to assure internal consistency for the questionnaire. The Cronbach alpha was .858. Although keeping at least .70 or higher is accepted in most behavioral science research, a cut-off value of .80 or higher is widely acknowledged evidence of good reliability (Becker, 2000).

## Data collection and analysis

The questionnaire prepared for data collection consisted of two parts. The first part contained personal questions about the participants while the second part contained questions aimed to determine the digital propensity of students. Students responded to the hand-delivered questionnaire during class time. The questionnaires were collected after completion. The first part of the questionnaire contains demographics, such as the gender, age, department, type of education, total income of their family, the number of members and the numbers of computers in the family. The second part of the survey which is called the main part consists of 41 items for the evaluation of the digital propensity of university students.

Participants were asked to rate their agreement with 41 DPI questionnaire items on a Likert-type five-point scale labelled none, barely, partially, a great extent, completely. The scales were scored so that 1=non to 5=completely. In the DPI questionnaire, the following demographic information about each participant was collected: socioeconomic status (measured as family annual income), age, gender and the number of computers found in the home. Furthermore, the DPI questionnaire consist the following categories: (a) ICT use preferences, (b) Internet use preferences, (c) gaming, (d) online media activities, (e) digital communications, (f) ICT facilitated learning activities and (g) ICT facilitated social/economic activities. All analyses were conducted with SPSS statistical software (version 15.0), using a statistical significance level of .05 or less for all tests.

## RESULTS

To examine the relationship among the digital propensity index score and gender, faculty attended, type of education (1<sup>st</sup> and 2<sup>nd</sup>), socioeconomic status of family, the number of computer per-household, the number of family members per-household, the data were analyzed using frequency, mean, percentage, t-test, Analysis of Variance (ANOVA) and post-hoc Scheffe's test.

While 219 respondents of the questionnaire, representing 53.5% of study population, were male, 190 participants of the questionnaire, representing 46.5% of the study population were female.

The mean age of participants appeared to be relatively young as age ranged between 17 and 26 (mean age = 21.4 years). The majority of participants were from, respectively, Faculty of Arts and Sciences, Faculty of Technical Education, and Faculty of Engineering-Architecture. Appendix A illustrates the results about demographic features of the participants.

Findings on "gender" variable: To determine the digital propensity of students according to gender variable, a T-test statistic was conducted to examine whether there was a significant difference between males and females in relation to their digital propensity score. The results of this test indicated that there was a significant difference in DPI score observed between males and females,  $t(359) = 6.92, p < .00$ . Male students ( $\bar{x} = 3.08, SD = .60$ ) reported significantly higher levels of DPI score than did female students ( $\bar{x} = 2.61$ ). This result suggests that male students' individual use of ICT in their daily life and the level of importance they place on these technologies are higher than female students. According to this result, it seems that there is a significant correlation between gender and the digital propensity index.

Descriptive statistics between faculties / colleges' DPI scores yield the relationship between the faculties attended and the DPI score of the participants. Students ( $N=30$ ) in Faculty of Agriculture had a mean score of 2.89 ( $SD=.78$ ), Participants ( $N=52$ ) from Faculty of Technology had a mean score of 3.04 ( $SD=.56$ ). Faculty of Engineering-Architecture students ( $N=62$ ) had a mean score of 3.03 ( $SD=.76$ ). Students ( $N=80$ ) from Faculty of Arts and Sciences had a mean score of 2.56 ( $SD=.69$ ). Participants ( $N=24$ ) from Faculty of Law had a mean score of 2.64 ( $SD=.64$ ). Student ( $N=71$ ) who participated in the study from the Faculty of Technical Education had a mean score of 3.09 ( $SD=.47$ ). Faculty of Economics and Administrative Sciences participants ( $N=21$ ) had a mean score of 2.62 ( $SD=.68$ ) and finally Faculty of Forestry participants ( $N=21$ ) had a mean score of 2.84 ( $SD=.59$ ).

A one-way ANOVA was conducted to examine whether there were statistically significant differences among the faculties/colleges attended by students and the DPI score. The results revealed statistically significant differences among the faculties/colleges attended. The digital propensities of students differed significantly across the faculties/colleges. The faculty / college attendend is closely related with the DPI score of students  $F(7.353) = 5.75, p < .01$ . In other words, the means of students' digital propensities show variations depending on their faculty. Following the ANOVA test (equal variances assumed,  $p > .05$ ), the Scheffe post-hoc test was conducted in order to determine which groups have significant differences. A Scheffe post-hoc test showed that students in Faculty of Technology ( $\bar{x}=3.04$ ), Faculty of Engineering-Architecture ( $\bar{x}=3.03$ ),  $\bar{x} = 3.03$ ), Faculty of Technical Education ( $\bar{x}=3.09$ ) reported significantly higher DPI score means compared with the students in Faculty of Arts and Sciences ( $\bar{x} = 2.56$ )=2.56).

Furthermore, a t-test statistic was conducted to examine whether there was a significant difference

between the education type (1<sup>st</sup> education: between 8am and 5pm / 2<sup>nd</sup> education: between 5pm and 11pm) in relation to their digital propensity index scores. The t-test results showed a statistically significant difference between 1<sup>st</sup> education and 2<sup>nd</sup> education  $t(359) = -2.83$ ,  $p < .01$ . The students attending 2<sup>nd</sup> education showed a higher digital propensity ( $\bar{x} = 3.03$ ) compared to the students attending 1<sup>st</sup> education ( $\bar{x} = 2.80$ ). T-test results revealed a strong relationship between the education type (1<sup>st</sup> education/2<sup>nd</sup> education) and the digital propensity index score of the students.

According to the family household income per month students reported, the descriptive statistics results are 0-1000TL ( $N=93$ ,  $\bar{x}=2.69$ ,  $S_s=.72$ ), 1000-2000TL ( $N=149$ ,  $\bar{x}=2.87$ ,  $S_s=.65$ ), 2000-5000TL ( $N=98$ ,  $\bar{x}=2.93$ ,  $S_s=.64$ ), 5000-10000TL ( $N=31$ ,  $\bar{x}=3.30$ ,  $S_s=.662$ ) respectively.

Furthermore, a one-way ANOVA was conducted to correlate the different levels of household income per month and their DPI scores. The dependent variable of family household income per month included five levels: 1) 0-1000 TL, 2) 1000-2000 TL, 3) 2000-5000 TL, 4) 5000-10 000 TL, and 5) Above 10 000 TL and above. The dependent variable was DPI score.

The ANOVA results revealed statistically significant correlation between the total household income per month and digital propensity index scores of students  $F(3.357)=5.61$ ,  $p < .001$ . In other words, as the family household income per-month increases, the DPI score of students increases. The Scheffe post-hoc test for multiple comparisons was applied for identification of the specific differences in the variables in which ANOVA presented significant interaction.

According to the results of Scheffe test, there was a significant difference between students whose families

have a total income of up to 1000 TL per-month ( $\bar{x} = 2.69$ ) and a total income between 5000 and 10000 TL per-month ( $\bar{x} = 3.30$ ). Furthermore, the result also revealed that there was a significant difference between students whose families have a total income between 1000 and 2000 TL per-month ( $\bar{x} = 2.87$ ) and between 5000 and 10 000 TL per-month ( $\bar{x} = 3.30$ ) (see Table 1).

Household computer ownership data descriptive statistics results are "none" ( $N=27$ ,  $\bar{x}=2.18$ ,  $S_s=.64$ ), "1" ( $N=128$ ,  $\bar{x}=2.82$ ,  $S_s=.61$ ), "2" ( $N=123$ ,  $\bar{x}=2.92$ ,  $S_s=.67$ ), "3" ( $N=60$ ,  $\bar{x}=3.07$ ,  $S_s=.66$ ), "4 and above" ( $N=23$ ,  $\bar{x}=3.12$ ,  $S_s=.65$ ) respectively.

A one-way ANOVA was conducted to examine whether there were statistically significant differences among the number of computers owned per-household in relation to DPI scores of participants. The result revealed statistically significant differences among the number of computers owned per-household, have 1 ( $\bar{x} = 2.82$ ), 2 ( $\bar{x} = 2.92$ ), 3 ( $\bar{x} = 3.07$ ), 4 and above ( $\bar{x} = 3.12$ .) The mean DPI score increased as the the number of computers owned per-household increased. Furthermore, Scheffe post-hoc comparisons were conducted to determine the differences among the means. Post-hoc Scheffe tests revealed statistically significant differences among the number of computers owned per-household, 1 ( $\bar{x} = 2.82$ ), 2 ( $\bar{x} = 2.92$ ), 3 ( $\bar{x} = 3.07$ ), 4 and above ( $\bar{x} = 3.12$ ). Students who have one or more computer in their homes have higher digital propensity mean score than students who have no computers in their home (see table 2).

A one-way ANOVA was used to test for the DPI scores of students among the number of family members per-household. The DPI scores differed significantly across the number of the family members

**Table 1.** ANOVA summary on DPI score in the different levels of household income per-month

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.431	3	2.477	5.605	.001
Within Groups	157.769	357	.442		
Total	165.201	360			

**Table 2.** One-way ANOVA summary on DPI score in the different levels of the number of computers owned per-household.

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.472	4	4.368	10.526	.001
Within Groups	147.728	356	.415		
Total	165.201	360			

**Table 3.** One-way ANOVA summary on DPI score in the different levels of the number of family members per-household.

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.936	2	1.968	4.369	.001
Within Groups	161.365	358	0.450		
Total	165.201	360			

$F(2,358) = 4.369, p < .01$ .

A post-hoc Scheffe test was used to find the differences between groups. The post-hoc Scheffe test showed statistically significant differences between students who have 3 family members ( $\bar{x} = 3.00$ ) and 4 family members ( $\bar{x} = 2.93$ ) in their families. Students with 3 or more members in their family reported lower DPI scores than students who have 5 or more members in their families (see Table 3).

## DISCUSSIONS AND CONCLUSIONS

The purpose of this study was to examine the digital propensities of post-secondary students by using the Digital Propensity Index, which measures how often individuals use various forms of information and communication technologies in their everyday lives.

The results of the research suggest that gender, faculty attended, education type (1<sup>st</sup> / daytime or 2<sup>nd</sup> /night), monthly income per-household, the number of computers per-household, and the number of family members per-household together make a significant contribution toward one's digital propensity. According to the study results the gender and socio-economic status of the family are important factors in an individual's propensity toward ICT use. These findings seem in line with prior research findings, suggesting that ICT preferences of individuals' gender, economic status, and intellectual status are important factors to individuals' technology habits and preferences (Bingimlas, 2009; Brown & Czerniewicz, 2010; Thinyane, 2010, Ritzhaupt, Liu, Dawson, & Barron, 2013). Most participants in this study were between the age of 20-22 (66,3 %). This is a real representation of post-secondary students' age interval. The age factor was ignored in this study, since the age groups are very close to each other. Furthermore, Salaway, Caruso and Nelson (2008) stated that age is the most important factor in the use of social networks, but not in all areas of ICT use. Nasah et al., (2010) reported that the age factor affects less than 15% of digital propensity index according to the results of multiple linear regression analysis (MLR). In addition, the number of responses to the questionnaire by participants was distributed almost evenly among the faculties participants attended. Therefore, it reflects the equal representativeness of each faculty population in the research data. Results of the data make clear that gender is one of the major factors in an individual's propensity toward ICT. The t-test results showed that there is a significant difference between gender and digital propensity. Male students had better scores of individual propensity towards ICT use than did female students. There are several possible explanations for this result. First, the propensity index gap between genders reflects the cultural and economic context of the society. Second, it is also related to

household access to ICTs, household income of per month, female participation in the labour market, and gender choices in engineering, social sciences and art subjects at university. Lastly, the gender gap in the digital propensity index reflects gender inequalities throughout societies and economies, and a range of socio-economic and political factors affect gender divides. Nasah et al., (2010) reported that the gender variable has accounted for approximately 15% of the digital propensity points, and they also stated that the difference is getting closer in favor of females, compared to previous studies.

According to the study results, the family household income per-month is also a predictor for students' digital propensity index for ITC use. Therefore, income is one of the key drivers of ICT use in Turkey. It can be speculated that the level of household income starting at 5000 TL is the threshold for affordable ICT tools. Furthermore there is also a relationship between the number of computers per-household and the digital propensity index. As expected, students who have more than three computers per-household have a higher level DPI score. In addition, students reporting not having a computer at home are less likely to have higher DPI score and ICT use in their daily life. This finding suggests that students who have ICT opportunities at home also have a lot of opportunities to use ICT tools elsewhere. It may also indicate that students who have high levels of ICT resources at home may have more parental involvement/support in their learning at higher education institutions.

While students from social science and art programs have lower ICT use proportion, students from engineering and technology related programs have high ICT use proportion. This is likely to reflect the fact that students from social sciences and arts may have less interest in technology and spend more of their time with reading and creating art and this may not require high needs for technology usage. On the other hand, students from engineering and technology related programs have higher DPI scores. The results suggest that these programs may require a higher level of ICT use.

The results of this study also indicate that the education type (1<sup>st</sup> and 2<sup>nd</sup>) is a prominent factor in the use of ICT. Whereas students from 2<sup>nd</sup> education use ICT in a higher proportion, in contrast students from the 1<sup>st</sup> education have a lower score of ICT use. This pattern can be understood in terms of the life style and socio-economic status of 2<sup>nd</sup> education students. These students' courses start at 05:00 pm and last until 11:00 pm. They also pay higher (double) tuition fee compared to 1st education.

As a result of our study, socio-economic status plays an important role in ICT. Mobile devices and internet use vary among student according to their economic

conditions. Students with a lower income prefer computers and free internet at school, while others prefer a mobile phone with limitless internet use. Hence, students who have higher socio-economic status are immersed in rich technology environments and their preferences are usually high-end technologies based on their own personal needs. This is also consistent with Canole, Laats, Dillon and Darby (2008) who found that students prefer appropriate technologies to suit their own needs and socio-economic status.

The results of this study are valuable in understanding the students' attitudes to the rapidly changing digital world. Understanding students' attitudes on learning and digital behaviors will make a contribution to education. This study presents some results which need to be considered by the decision makers and education authorities.

Further analysis of depth interviews, focus groups, or combination of both are likely to provide more information about the impact of ICT use on students' lives, and their learning behaviors. However, higher education institutions need to consider not only the affordances offered by ICT, or the diversity of technological skills that students have, but the stated goals of the institution to prepare next-generation workforce. Furthermore, little is known about students' use of ICT between the digital propensity and academic achievement. To probe deeper into relations existing between technology and the digital generation of future higher education, joining like-minded researchers (e.g., Jones & Healing, 2010), more investigation needs to be done. The current findings may have deep insights and implications for both the technical infrastructure higher institutions provide for students and the ways in which the educators support their learning through use of technologies. It is important, therefore, that educators, curriculum developers and educational policy-makers consider the results this study revealed when planning ICT use for today's DN generations.

## REFERENCES

- Becker, G. (2000). Creating comparability coefficient: The case of Cronbach alpha and Cohen kappa. *Psychological Reports*, 87, 1171-1182.
- Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775-786.
- Bingimlas, K.A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education*, 5 (3), 235-245.
- Brown, C., & Czerniewicz, L. (2010). Debunking the 'digital native': beyond digital apartheid, towards digital democracy. *Journal of Computer Assisted Learning*, 26(5), 357-369.
- Conole, G., De Laat, M., Dillon, T., & Darby, J. (2008). 'Disruptive Technologies', 'Pedagogical Innovation': What's new? Findings from an in-depth study of students' use and perception of technology. *Computers & Education*, 50(2), 511-524.
- Downes, T. (2002). Blending play, practice and performance: Children's use of the computer at home. *Journal of Educational Enquiry*, 3(2), 21-34.
- Hargittai, E. (2010). Digital Na(t)ives? Variation in Internet Skills and Uses among Members of the "Net Generation". *Sociological Inquiry*, 80(1), 92-113.
- Howe, N., & Strauss, W. (2000). *Millennials rising: The next great generation*. New York: Vintage Books.
- Jones, C., & Healing, G. (2010). Net generation students: agency and choice and the new technologies. *Journal of Computer Assisted Learning*, 26(5), 344-356.
- Jones, M. G., Harmon, S. W., & O'Grady-Jones, M. (2005). Developing the digital mind: Challenges and solutions in teaching and learning. *Teacher Education Journal of South Carolina*, 2004-2005, 17-24.
- Jones, C.; Ramanau, R.; Cross, S. & Healing, G. (2010). Net generation or Digital Natives: Is there a distinct new generation entering university? *Computers & Education*, 54(3), pp. 722-732.
- Dooley, D. (2001). *Social research methods* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* 6th edition. London: Routledge
- Keen, A. (2007). *The cult of the amateur: How today's Internet is killing our culture*. London: Broadway Business.
- Kennedy, G., Krause, K.-L., Judd, T., Churchward, A. & Gray, K. (2008). First year students' experiences with technology: Are they really digital natives? *Australasian Journal of Educational Technology*, 24(1), 108-122.
- Kennedy, G., Judd, T., Dalgarno, B. & Waycott, J. (2010). Beyond natives and immigrants: Exploring types of net generation students. *Journal of Computer Assisted Learning*, 26, 332-343.
- Kvavik, R. B., Caruso, J. B. & Morgan, G. (2004). ECAR study of students and information technology, 2004: Convenience, connection, and control (Research Study, Vol. 5). Boulder, CO. EDUCAUSE Center for Applied Research. Retrieved August 29, 2013 from <https://net.educause.edu/ir/library/pdf/ers0405/rs/ers0405w.pdf>
- Livingstone, S. & Bober, M. (2004). Taking up online opportunities? Children's use of the Internet for education, communication and participation. *E-Learning*, 1(3), 395-419.
- Lohnes, S., & Kinzer, C. (2007). Questioning assumptions about students' expectations for technology in college classrooms. *Innovate: Journal of Online Education*, 3(5). Retrieved September 29, 2013 from <http://innovateonline.info/index.php?view=article&id=431&action=article>
- Lorenzo, G., & Dziuban, C. (2006). Ensuring the net generation is net savvy. *EDUCAUSE Learning Initiative Paper 2*. Boulder, CO. EDUCAUSE. Retrieved August 29, 2013, from <http://www.educause.edu/library/resources/ensuring-net-generation-net-savvy>

- McWilliam, E. L. (2002). Against professional development. *Educational Philosophy and Theory*, 34(3), 289–300.
- Margaryan, A., & Littlejohn, A. (2008). Repositories and communities at cross-purposes: Issues in sharing and reuse of digital learning resources. *Journal of Computer Assisted Learning (JCAL)*, 24(4), 333-347.
- Nasah, A., DaCosta, B., Kinsell, C., & Seok, S., (2010). The digital literacy debate: an investigation of digital propensity and information and communication technology, *Educational Technology Research and Development*, 58 (5), 531-555.
- Norman, D. K. (2008). *Predicting the performance of interpreting instruction based on digital propensity index score in text and graphic formats*. Unpublished doctoral dissertation, University of Central Florida
- Ono, H., & Zavodny, M. (2007). Digital inequality: A Five Country Comparison Using Microdata. *Social Science Research* 36 (3), 1135 -1155.
- Palfrey, J., & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. New York: Basic Books.
- Prensky, M., (2001a). Digital natives, digital immigrants. *On the Horizon*, 9, 1–6. Retrieved August 29, 2013 from <http://www.marcprensky.com/writing/default.asp>
- Prensky, M. (2001b). Digital natives, digital immigrants, part II: Do they really think differently? *On the Horizon*, 9, 1–6. Retrieved August 25, 2013 from <http://www.marcprensky.com/writing/default.asp>.
- Ritzhaupt, A. D., Liu, F., Dawson, K., & Barron, A. E. (2013). Differences in student information and communication technology literacy based on socio-economic status, ethnicity, and gender: Evidence of a digital divide in Florida schools. *Journal of Research on Technology in Education*, 45(4), 291-307.
- Roberts, D. F., Foehr, U. G., & Rideout, V. (2005). Generation M: Media in the lives of 8–18 year-olds, pp. 1–145. Retrieved August 29, 2013 from <http://www.kff.org/entmedia/upload/Generation-M-Media-in-the-Lives-of-8-18-Year-olds-Report.pdf>.
- Selwyn, N. (2009). The digital native - myth and reality. Paper presented at the CILIP (Chartered Institute of Library and Information Professionals) London seminar series. Retrieved August 21, 2013 from <http://www.scribd.com/doc/9775892/Digital-Native>.
- Salaway, G., Caruso, J. B., & Nelson, M. R. (2008). *The ECAR study of undergraduate students and information technology*, (Research Study, Vol. 8). Boulder, CO: EDUCAUSE Center for Applied Research. Retrieved August 12, 2013 from <http://net.educause.edu/ir/library/pdf/ERS0808/RS/ERS0808w.pdf>.
- Tapscott, D. (1998). *Growing up digital: The rise of the net generation*. New York: McGraw Hill Companies.
- Thinnyane, H. (2010). Are digital natives a world-wide phenomenon? An investigation into South African first year students' use and experience with technology. *Computers & Education*, 55(1), 406–414.



**Appendix A.** Demographic features of participants

Feature	Type/ Level	Frequency (f)	Percent (%)
Gender	Male	219	53.5
	Female	190	46.5
	Total	409	100.0
Age	17-19	79	19.3
	20-22	267	66.3
	23 and above	63	14.4
	Total	409	100.0
Faculty/College	Agriculture	34	8.3
	Technology	54	13.2
	Engineering-Architecture	69	16.9
	Arts and Sciences	93	22.7
	Law	25	6.1
	Technical Education	77	18.8
	Fine Arts	1	0.2
	Economics and Administrative Sciences	30	7.3
	Forestry	26	6.4
	Total	409	100
Type of Education	1 <sup>st</sup> Education (8am-5pm)	298	72.9
	2 <sup>nd</sup> Education (5pm-11pm)	111	27.1
	Total	409	100
Total household income per month	0-1000 TL	106	25.9
	1000-2000 TL	168	41.1
	2000-5000 TL	113	27.6
	5000-10000 TL	17	4.2
	Above 10000 TL	5	1.2
	Total	409	100
The number of computers owned per-household	None	32	7.8
	1	144	35.2
	2	142	34.7
	3	66	16.1
	4 and above	25	6.1
	Total	409	100
The number of family members	2	5	1.2
	3	57	13.9
	4	167	40.8
	5 and above	180	44.0
	Total	409	100